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JANUARY 1985

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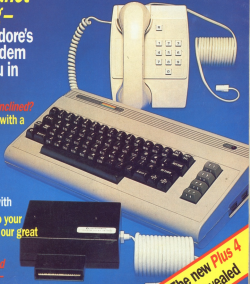
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Our COMMENT

Welcome to this month's issue of Your Commodore. The editor considers CompuNet and offers the compliments of the season.

HOME COMPUTING HAS long been regarded by the uninitiated as a solitary pursuit. We are supposed to sit for days on end, without food or drink, in semi-darkened rooms hunched over the keyboard with only the strange glow of the screen to keep us company. It can happen, of course, though I have yet to go for a period of longer than two hours without some form (usually liquid) sustenance. All the signs point in the opposite direction but have you tried convincing people? Show them the two joystick ports on the 64 and point to the increasing number of games which require the use of both. Tell them about the growing number of computer clubs and their ever increasing membership. Show them that programs are written for useful purposes and not for their own sake; indeed tell them that many programs, and not just commercial ones, are written by teams of people, someone designing the graphics, someone else the music and so on. All to no avail.

The answer could have arrived in the shape of CompuNet. At last Commodore owners can communicate with each other through the medium of their computers. By attaching the modem to your C64 you could be at

the forefront of a whole new form of communication. Of course, newsdata (of which CompuNet is another manifestation) is not new. Postal and its offshoot Micronet 800 have been with us for some years and it is also true that neither have really fulfilled their initial promise. Postal suffers from a debilitating identity crisis: it is aimed at the business or the domestic user; it began as a method of using all the spare telephone capacity during off-peak times but it was soon adopted by diverse sections of the business community, its order to repair the balance

Micronet 800 was started. Directed at the home micro user it offered an innovative and well presented package (and still does) but it leaves one sided — Micronet provides the information in the form of news, information and software and the user downloads it.

CompuNet offers the revolutionary advance of a two-way service. The user can up-load his own software as well as down-loading other people's. You can find out more in the article on the new service in this issue. Let me just finish by saying that CompuNet

offers Commodore owners the chance to dispel forever the myth of the computer hermit.

The Plus/4

The other big recent launch from Commodore is, of course, the new machines. Last month we looked at the VIC's replacement, the C16 and now it's already coming through that it's selling extremely well. At the price and with its specifications this is not at all surprising. The Plus/4 which we look at this month is rather different. The market does not already exist for it, instead it will have to create its own.

The idea behind the Plus/4 certainly looks promising and we shall take a look at the built-in software next month.

For the moment the hardware is considered by our reviewer who is not unimpressed.

All the best

This issue also contains a large number of graphics related articles. The Commodore machines are all renowned for the excellent graphic capabilities but there is also room for improvement. You can choose the solution which most suits you by reading our reviews of lightpens, of logo and the Turbo, of the Koola Pad and of many of the Commodore drawing packages. So whatever your interest there is something in this issue of Your Commodore for you. And strange as it may seem (and it often confuses us although this is the January issue) you should be reading this before Christmas; so from all of us at Your Commodore may we wish you a very merry Christmas and a Commodore filled New Year.





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Following the review of the Commodore 76 last month, Mike Roberts places its big brother, the Plus/4, under the magnifying glass.

PLUS/4: HOW DOES IT ADD UP?

THE COMMODORE PLUS/4 is Commodore's first entry into the top-level home's big small business bracket. Commodore said that it wasn't suitable for running a business but went on to say that it could be used in certain applications by a "professional" person. This is one of the most lauded statements that I have heard regarding a company's opinion on the subject of the business use of a home computer. Clyde Sinclair once said that you could run a power station on a 200 (in RAM, or ROM or keyboard).

Where this business subject comes from is the four built-in software packages — word processing, spreadsheet, database, and graphics — versus Plus/4, but more about this in a later article.

Externally the Plus/4 is a generalist, wedge-shaped box with a keyboard taking up most of the room on the top and ports and interfaces taking up the whole of the back and sides. Now it becomes obvious why Commodore opted for the smaller type of connector instead of keeping it the same as they have for Apple. If the normal "chunky" type edge connectors and D sockets were used there would not be enough room around the edge of the machine.

The magic touch

The keyboard excels even Commodore's beautiful quality although some people express reservations when they first get their dabble with it. However, after a period of some weeks, love it.

The keyboard is very similar to the 5544, and is angled, sculptured and curved. This means typing is in a real dream. The layout consists of 48 keys, 46 of which are normal and 4 for close key



above the top row and four cursor control keys arranged in a cross shape. One odd thing about these keys is the shape—they look like arrows — the way the arrow is pointing indicates the direction that the cursor will go in.

The ports around the back and sides of the box show a departure from the 5544 cable. The VIC and 64 had almost identical I/O.

All change

Most things, however, have been changed. The cartridge/expansion port has been reduced in size to stop people plugging CBM 64 cartridges into it. I do not know whether the highly advanced structure of the CBM 64's slot with its levelling for vertical connectors is duplicated on the Plus/4. But given the nature of the machine, as a small systems/increase device, this is more

than a distinct possibility.

The Plus/4 support advanced ROMs; these were first implemented on the BBC micro some years ago and computers are starting to get these features. Commodore call them "function key packages". The reason for this rather strange name is that when the machine boots up, it checks to see if there are any ROMs attached. If there are then it will assign each ROM to a function key. The internal software uses this system so pressing F1 gets you into it, if the ROMs are removed the function key goes back to its original state. Internal ROMs will go on F2. It is unknown how many ROMs cartridges can be attached to the machine at once, but there is the possibility of four (RAM, the internal ROMs, plus two others).

The two 09 connectors of the CBM 64 have been dispensed with and replaced

with mini DIN connections. This means you can only use Commodore's 19pin1143. Commodore peripherals are not the best things in the world, even their new "hi-tec" style ones.

The Cassette recorder socket is also a mini DIN connector, this is for ease of the CBM cassette deck is different to the old tape decks. The Plus/4 is at its best with disc drives, including the new high speed ones intended for this new range of machines.

Thankfully, Commodore have left the Serial BUS, and the sub-video connector alone. All Commodore's existing peripherals, that use these ports, will work straight off, so there are plenty printers and disc drives available for the machine. However, it may be worth the wait to get hold of their new discs which use the cartridge port and are a lot faster than the old ones.



Inside knowledge

Mooring on to the internal hardware reveals some surprises. Most of the video chips driven via one big chip, depending on the model depending on your inclination. It combines a 6018 processor at 2MHz with a sound generator, timers, input/output, memory banking, and graphics generation. In all it has 19 registers to control things.

Sound quality is as good as the next best although it only has two channels. There can be two sound channels or one sound and one noise (or special effects). Nearly all the advanced sound features of the MD chip have been left out like ADPCM, filtering, and modulation.

Graphics ability is superb. It is natural that this will be compared with the Commodore 64 as there are a lot of similarities in spec. However, the graphics are different and there are currently two schools of thought as to which is better the C64 or the Plus/4.

Simulated sprites

The big difference is sprites. These wonderful things that make games programming easy have been dropped from the Plus/4. In their place is a software simulation of them from BASIC where you can select an area of the screen and store it in a string. You string can then be recalled and put back on the screen at any point. There are also other options to manipulate these strings, but they are not true sprites; a large 128 byte object takes about a quarter of a second to write to the screen. I feel that the world can live without sprites, but at least another computer generation (about 18 months). The Commodore 64 and Plus/4 are not just too far ahead of their time.

The trade-off against the sprites is more colour. The screen of the C64 can have 128 colours (121 excluding black) made up of 16 colours, 8 luminance levels, and flashing. Screen size is 40 x 25 text with four other graphics modes. The other graphics modes are 120 x 400 with the previously mentioned 128 colours being used in a colour map system, and 140 x 200 in a multi-colour form. Both have screens have an option to leave four text lines at the bottom of the screen. There are some other graphics modes and options but these

are only available by FORKING. User defined graphics (UDGs) are obtained by FORKING and manipulation of registers.

The manual gives no hint of these although they are very straightforward to obtain. While playing with UDGs one other feature becomes apparent. A character generator is 28 long, 126 x 8 bits (the C64 one is only 16 long, how come! Well, the long and short of it is that the C64 uses a hardware reverse field attribute, the top bit of the current character displayed indicates whether it is inverted or not. This has some advantages and disadvantages. The advantage is memory consumption. The disadvantages are that you can only have 128 UDGs, and flashing works in a rather strange way. A reverse field space is shown as a black square. When you flash it instead of getting a flashing square nothing happens. This is quite confusing until you realise that a flashing space doesn't change.

Other features

Other modes not documented include Extended Background Colour mode, which gives you different background colours as well as

foreground colours, and multi-colour characters where each character can be made up out of a number of colours. There may be others but I must wait until I get a technical manual to find them out.

This brings me onto another point, the BASIC is ideal for an inexperienced user or an experienced BASIC user, but what about its machine code factor and people who wouldn't use BASIC if they were paid for?

The answer is TROMOSL. This is a full feature assembler, disassembler, monitor, debugger. It is similar to Extronix 7.5 and is very good indeed. This makes writing assembly language very easy as you already have most of the development software built in.

The monitor can also be called by using the reset button. This is a great feature and is in a little recess just by the power supply. Press it in and the machine goes back to its power on state — memory contents are preserved but it is a hard task at that. The benefit of it all is when you keep the STOP key pressed down at the same time as you press in the reset key the computer jumps into the monitor, key in 'K' (for OK) and you are back in BASIC, complete with intact programs.

The manual is excellent

and may just Commodore's usual standard. It is informative and instructional for the first time user, for the experienced person there are memory maps and register details.

In conclusion

The Plus/4 scores over its little brother the C64 by having 64K of memory, and now comes the good bit — the BASIC has built in memory banking so that you can use the extra memory to the full. When using hi-res this only cuts you down to 10K. Compare that to a BBC that leaves you with a fifth of that after hi-res has taken its chunk out. This memory banking of course all memory will mean that there should be a lot of huge adventures and great arcade games on the market to use them.

The BASIC is identical to the C64 and all standard month applies here. This is the computer of now, excellent BASIC, keyboard, software built in, and best of all a vast amount of user memory. The problem is whether it is worth it at the price — £299, this is well below the BBC with which it is comparable, but when the BBC always was over priced. Only time will tell, as the Plus/4 is carving a new area in the market.



ATTENTION! ATTENTION! ALL COMMODORE USERS!

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- Or directly copy the drawing on the screen to the printer! And keep it for ever or send it to a friend as a post card!
- Design your own colourful sprites and characters
- Play the games in the package or use the light pen in your own games/education/programs.

GRAPHKIT is available on disk and tape. Tape version is £15.95 and disk version (recommended) is **£19.95.**



All you 1540/1541 disk users **OMON** is here at last. Omon is the disk monitor you have been waiting for! It will allow you to:

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TORNADO 20/64

Do you use tapes? Are you sick and tired of waiting for your programs to be Loaded/Saved from/on the tape? Then you need a **TORNADO**! Tornado allows you to Save/Load/Verify your Basic/machine code programs faster than a CRM 1541 disk drive does! Due to popular demand! Tornado now comes with new and more powerful commands plus extra instructions to assist you in making fast versions of your existing machine code/BASIC programs. Tornado is available on tape for CRM 84 and 8K - 1/2 20.

BREAKER 20/64

Do your Run/Stop and Restore keys often fail? Do you want to come out of those crashes? Or get into those unbreakable programs! Then what are you waiting for, get yourself a **BREAKER**! Reset switch and let your computer know who is the boss! Breaker can be connected to your machine in seconds, no soldering. Included with the Breaker is a copy of basic recovery software on tape. Now available for any CRM 84 or 1/2 20.

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DATA STATEMENTS

Commodore in the classroom

COMMODORE WILL BE sponsoring the prestigious 1985 British Computer Society Schools' Computer Quiz. It committed itself to increasing the number of computers in schools in 1984 and sees this quiz as a vehicle for its education initiative next year. Commodore has contributed sponsorship of over £30,000 including prizes for schools worth over £12,500.

In conjunction with the quiz, Commodore is running a special schools' loan and sponsorship scheme. Every school taking part in the quiz will be offered the free loan of two complete Commodore 64 computer systems for three months and, if at the end of the loan period the school wishes to keep the loaned systems, Commodore will match every £200 the school raises with £100.

The quiz comprises a quiz master and six to eight teams and individual rounds of questions. Schools in each area will be asked to select a team of three pupils — one under 17 years, one under 16 years and one under 15 years. Local area heats start in November and

the 40 schools that emerging as winners of the branch final will each receive a Commodore communications modem for use with Compuserve, Commodore's own on-line database service. The 40 branch finalists will then go on to compete in eight regional finals to win prizes of Commodore 64 computers and 1041 disc drives, in total worth over £5,500.

The eight regional finalists will then compete in a national final scheduled for July 1985. The winning school will receive £1,800 worth of Commodore computers and peripherals, and the runner-up will receive Commodore equipment worth £750; there will also be more different prizes for individual team members.

Commodore plan to follow each regional final with a 'roadshow' giving parents, teachers, children and local people the chance to try out Commodore's range of computers along with their educational and recreational software and the new modem.

Further details are available from Commodore Education Department on 0345-261251.

VIC 20 word processing

ATLANTIC SOFTWARE HAVE released their TQW range of word processing programs for the VIC 20.

TQW, TEXT 2.0, for the VIC 20 with at least 8K expansion claims to offer full formatting control, text input, editing and insertion in a single mode, with full cursor control, forwards and backwards scrolling and direct screen editing. This package can be used not only with Commodore printers but also with popular linked parallel and RS-232 interface printers. TQW, TEXT 2.0 is menu-driven and incorporates machine code sections to speed loading and printing and may be used to print multiple

copies from memory, or documents of any length from files.

TQW, TEXT 2.0 is provided for the VIC 20 with 64K and contains extra features such as embedded footnotes, soft-faced characters and printing direct from tape or disc files. Direct keyboard input while printing makes this program suitable for mailshots and form letters.

The software is available on tape and disc and prices range from £11.95 to £19.95. TQW software is available from Atlantic Software, 28 Park Farm Road, Kingston, Surrey, KT2 3TQ.



Norbain interface

NORBAIN MICRO LIMITED have launched their Turbo-points/CI, a printer interface for the Commodore 64 and VIC 20, following an exclusive UK distribution agreement with the American manufacturer, Telex Computer Peripheral Products.

This interface enables the Commodore 64 and VIC 20 to be connected to most of the popular makes of printer currently available on the market. It features a DIP switch selector for different printers as well as the printing of enhanced Commodore graphics including reverse

characters, a very fast graphics dump and a special line buffer which doubles the text printing speed on printers without on-board memory.

The Turbo-points/CI interface also includes an optional plug-in 1M printer buffer to overcome the low print speed of the printer when transferring data to the printer at the computer's maximum speed.

The Turbo-points/CI printer interface sells for £65.00. Norbain Micro Ltd. can be contacted at Norbain House, Baulston Road, Reading, Berkshire, RG2 0ET; telephone 0734-751201.



DATA STATEMENTS

Dream makers

WILDEST DREAMS SOFTWARE Rental are working on the premise that if you can rent video films why not computer games? This company, from November 16th, will be offering a package of new Commodore games tapes for rental only.

These tapes will be available for hire only through video dealers.

Wildes Dreams can be contacted at P.O. Box 84, Coventry telephone 0203-62085.

The Ultimate Game

IF YOU'VE EVER SEEN ONE OF Ultimate Play The Game's programs you'll know why American owners rave about them. *Atic Atac* and *Valley Ball* are both now classics. Unfortunately, C64's owners have been deprived — until now. The Staff of Karnath is their first game for the 64 and it should be out in time for Christmas. It is an arcade adventure in the style of their most recent games and going on past form the graphics should be breathtaking.

Ultimate Play The Game, The Green, Ashby de la Zouch, Leicestershire, LE65 3RU.

One for the road

CEL HAS ALSO RECEIVED approval from the AA for its Commodore version of *Highway Code*. The program consists of over a hundred questions, all of which can be found within the book produced by HMSO.

The user chooses either a 25 question test or ten question test from which he/she is given a percentage rating. The program includes a number of graphics which represent road signs and traffic situations. *Highway Code* will cost £3.95.

CEL can be contacted at CEL House, 3 Kings Road, Carpenter's Road, London E3.



Buzby alliance

BRITISH TELECOM'S NEW software house is producing a new range of low-price home computer games under the label Firebird. Mr. Richard Hooper, Chief Executive of British Telecom's Value Added Systems and services, hopes that these games, which retail at £2.50, "...will offer the same

quality as some products costing twice as much." *Bob Combs* and two VIC 20 titles are included in the initial release. These and all games, but Mr. Hooper hopes to eventually offer "...recreational software and other types of programs".

Eastern promise

DONARR HOPE THAT A £25,000 prize will do for *Turkka* what millions poured bingo prizes have done for Fleet Street sales, since they expect it to be a number one hit for Christmas.

Turkka comprises five complete adventure stories in one. With a plot unfolding across five time zones from our history to the present day. The five adventures can be enjoyed independently and each contains vital clues that lead to the £25,000 reward. Each adventure starts with a mission and your success in the adventures is aided by your skill as a warrior.

Turkka was programmed by Hungarian software company, Andromeda. It took the equivalent of five years to create along with the skills of four graphic artists, two musicians and a professor of logic.

The program is accompanied by a booklet of riddles and verse which, together with the game, leads to a mystery telephone number somewhere

in Britain.

Turkka, which has already been translated into French with a Spanish translation underway, is available on the 64

at £14.95 for the tape version and £16.95 for the disc version.

Donarr can be contacted at 128 Munster Road, London SE8.



Ghostbusters

WE WERE SPIRITED OFF TO the Premier Theatre in Greentown for a sneak preview of Columbia Pictures' *'Ghostbusters'*. Already bored silly by Ray Parker Jr.'s song of the same name, I faced the evening with trepidation. But I was in for a surprise. With its 'good clean fun' approach, I can understand how the outstanding piece of family entertainment is achieving such success in America. The film, which tells the story of three New York para-

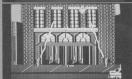
psychologists who set up a ghost-fighting business, has become the all-time box office record for Columbia Pictures. Our evening's first entertainment was at the invitation of Activision who have acquired from Columbia Pictures the exclusive worldwide rights to develop *'Ghostbusters'* home computer software. The game claims to follow the film closely, using the most and characters from *'Ghostbusters'*.

As with the film, the game requires you to fend off a ghost invasion of New York and make sure your *'Ghostbusters'* make it to a local hospital charnel house at the Temple of Zuul, with the cash you are given to build a *'Ghostbuster'* franchise, you choose and equip your own vehicle and watch your debts and credits rising or falling, depending on your skill as a *'Ghostbuster'*. With all sorts of gadgets at your fingertips, such as an Energy Detector, Marshmallow sensor or ghost vacuum, you must search for, catch and store ghosts. New York street maps are provided to guide you on your mission.

Your progress is checked by a Status Report and, if you're successful enough and earn enough money, the *'Ghostbusters'* franchise and secret number you acquire can be used next time you play. Your own secret number may be used on any version of *'Ghostbusters'* anywhere in the world.

The game is now available on the Commodore 64 at £10.99 for the tape version and £15.99 for the disc version.

The game is now available on the Commodore 64 at £10.99 for the tape version and £15.99 for the disc version.



At Angus nobody can hear you scream...

COMPUTER GAMES BASED on *'Exorcist'*, his seems to be all the rage. Angus Press Software will be releasing their game, *'Alien'*, on 19th November to pre-empt the release of the sci-fi horror movie on January 1st. The game will be on sale in over 200 cinemas across the South of England and B.H. Smith will hold a competition in the cinema on the opening night in each town; the prize will be a copy of the game.

'Alien' is the first of *'Angus'* *'Moral Games'* to include *'PC3 (Personality Control System)'* which sets up the personality variables for each game. The behaviour of each character in a particular situation is determined by a set of instructions, the history of the personality, and his/her experience in the game.

The point of the game is to try and beat the *'Alien'* while you are increasingly trapped in your spaceship, the *'Nostromo'*. You are aided in your struggle by trackers and other weapons, but have your characters get the courage to use them?

'Alien' is available on the Commodore 64 at £9.99.

DATA STATEMENTS

Stock market

KUMA COMPUTERS ARE hoping that, rather than splash out vast sums of money on computer games, that some Commodore users might need some assistance in investing their money. With their latest game, 'Stock Market', they have simulated the London Stock Exchange. Players are given news reports on company shares and advice, hints and tips for likely good investment - although not all of these are accurate. Players win or lose money through playing and managing investments.

'Stock Market' can be played by 1 to 4 players and costs £6.95. Kuma Computers Ltd. can be contacted at 12 Ironstone Road, Pangbourne, Berks, RG12 7TW; telephone 0757-4335.



More Melbourne games

FOLLOWING THE SUCCESS of their 'The Commodore 64 Games Book', Melbourne House have released a sequel, 'Commodore 64 Games Book 2'. Melbourne House claim that the book contains 30 'completely new and original games listings' with a C40002M listing supplied at the end of each program so the reader may determine immediately whether a program typed in contains a transcription error, in which case the line number where the mistake has occurred is pinpointed.

In keeping with the times, Melbourne House have also released the 'Commodore 64 Games Book', which includes a variety of games from educational and simulation games to gambling games. Once again, the CHECKSUM utility is supplied.

'Commodore 64 Games Book 2' retails at £6.95 and 'Commodore 64 Games Book' at £4.95. Melbourne House (Publishers) Ltd. can be contacted at Castle Yard House, Castle Road, Richmond TW9 1ST; telephone 01-842-5864.

THE SPANISH TUTOR



THE GERMAN MASTER



THE FRENCH MISTRESS



Continental drift

KORANOS SOFTWARE HAVE released Commodore 64 versions of their educational titles, 'The French Mistress', 'The German Master' and 'The Spanish Tutor'. The programs provide learning aids for thousands of foreign words, verbs and phrases.

Each package consists of a tuition control program and pre-recorded lessons, which can be used in a variety of learning modes and, finally, a translation test mode. Each language is covered by two cassettes (Level A and Level B) covering different areas of grammar and vocabulary.

Each cassette costs £6.95 i.e.

£17.90 per language) although Koranos insist that the cassettes may be bought separately as each contains the necessary control program. Koranos Software Ltd. can be contacted at 1 Pilgrims Close, Haslington, Donstable, Beds LU5 6LX; telephone 05255-9943.



Scrolling Stones

SEA, SUN, SAND AND NOW software. The Isle of Wight has got the lot. Software! Commodore has just launched Spirit of the Stones, an arcade game with 21 locations based on a scrolling map of the island. However, as well as a game you also get the chance to join in a treasure hunt for 40 small talismans, each containing a single diamond and for the Great Wight the all of which have been scattered around the island. Fortunately, (or perhaps unfortunately) you don't have to take the ferry over to the island to claim the treasure.

Included with the game is the book of the Spirit of the Stones, a tale of smuggling and the supernatural which tells the tale of how the talismans came to be scattered. The book, written by island resident John Worries, is also full of visual and verbal clues to the whereabouts of the stones and one of the first steps for all would-be treasure hunters must be the deciphering of the runes or secret writings which feature the pages.

Those clever enough to unlock the key to this parable and find one of the talismans will also be eligible for a share of the Royalty Fund into which 50p will be deposited for every package sold. However, the share-out will not be until 1993 or when the £1 million ceiling is reached.

Spirit of the Stones costs £14.99 and is available from Commodore.



Tymac Talks

TYMAC HAVE RELEASED A series of 'talkies' for the Commodore 64 and VIC 20. These arcade games feature speech without the use of a synthesiser.

The games include Cardiff, where you fire power bolts at ruthless attackers, Pegasus and the Trials of Pegasus where you must fight strong creatures while searching for treasures of the ancients in combat with the Samurai and code name: DEADZONE where, as the heroic heroism, you must battle with the mad leader of a hostile nation which has developed a deadly virus which he plans to unleash on the world. Also available from Tymac, for the VIC 20, is an educational/quiz program called Popo Boyer. Wizard's Graphics, a VIC 20 utility designed to generate high resolution multi-coloured graphics quickly and easily on screen, should be available soon.

Tymac Talks are designed by the American company Game Creek Inc. Tymac UK, Ltd. can be contacted at Rosemead House, Edgbaston Road, Edgbaston, Birmingham, B15 2SL.



Four from Beyond

BEYOND HAVE ANNOUNCED the launch of four Commodore 64 titles — Anah, Aztec, Mc Robot and My Chess II.

Anah is described as a "computer mind game... in which players explore a mystical, maze-like, "Mazeland" world". Explore with your "investigator" to divine to manipulate or destroy objects, hazard warnings. Within each section their lies a task, which must be solved through the mindprobe and creative thinking, a tool or treasure to collect for help in solving future puzzles, or a trap. Beyond reckon you will need assistance with this game and are, thus, providing a special helpfile. They are also offering a prize to the first player to solve a particularly difficult problem within the game.

In Aztec, players control an "Indiana Jones-style hero searching a forbidden temple for a priceless golden idol". Each Aztec adventure is different and, as the game is loaded, the computer creates an eight level adventure starting from a library of 32 different floors.

In Mc Robot, players use the Robot Factory hardware and play their own screen designs on the A-side and guide Mr. Robot around a 32 screen obstacle course, collecting power pills and killing alien bees, on the B-side.

Beyond describe their Chess II, with a new length of play and a debut of 2, as the "Kidd Royale of computer chess programs". You battle against the computer in 3D with a view of the chess pieces from the rear and the side of the board.

All the games will be available on cassette at £8.99 or on disc at £11.95. Beyond can be contacted at Better Code, 153 Farringdon Road, London EC1R 3JQ.



DATA STATEMENTS

What's said Dylan

OH, WHO HAVE ALREADY released the program 'The Magic Roundabout' for the BBC's popular children's programme, will be releasing the Commodore 64 version before the end of the year.

The program is based on the BBC's popular children's programme. The game takes place in and around the confines of the Magic Roundabout where Dougal is trying to build a sugar house. His fellow characters insist on eating the sugar cubes. He needs to complete the construction as the sugar gives them all much needed energy.



Spectrum simulator

WHY COMPUTERS LTD. claim to have produced a Spectrum simulator for the Commodore 64. It sells for £14.95 and should allow you to use all Spectrum BASIC programs and some machine code programs on the 64 without modification.

It should be available just after Christmas on turbo load cassette. We'll believe it when we see it.

Why Computers Ltd. can be contacted at 7 Chubb Hill Road, Witley, West Sussex; telephone 047-609666.



December issue — errors

WE'VE FOUND SOME 1048 errors in the article 'The BASIC Facts Pl.' (December issue, pp 34-36). They are as follows:

Program 3.1 page 35 — line 130 should read:
130 IF A < 20 GOTO 118

Program 3.2 page 35 — line 130 should read:
130 IF A < 20 GOTO 118

Page 36, column 1 — line 128 should read:
100 IF A = 20 GOTO 100

Program 3.5 page 36, column 3 — line 128 should read:
IF I < 17 THEN 100 NT 1

Page 36, column 3, 5 lines from bottom — line 128 should

Commodore face the music

COMMODORE USERS CAN now turn their 64 into a musical instrument with a new music package from Commodore. The package is called 'Music Maker' and comprises software, a book containing 28 popular songs and tutorial material and a 34-key piano style keyboard which fits over the computer keyboard.

'Music Maker' has been specially developed for the Commodore 64 by Music Makers Ltd, the world's leading music publishers.

The software's eight built-in voices simulate instruments such as the guitar, piano and synthesiser. All the parameters of each sound can also be altered to create almost any sound within the capability of the Commodore 64. A tune can

be created around a range of rhythms from waltzes to blues, with pre-programmed bass patterns. You can also use 'Music Maker' to create three note polyphonic music.

'Music Maker' caters for those Commodore users with no musical experience with its single step input mode which allows songs from the book provided to be entered into memory by note or letter. The rhythm is then 'lugged out' on any key and the completed tune played by the computer. Finally, the piano keys are duplicated on the screen and light up when the corresponding note is played.

'Music Maker' will sell for £29.95 and will be available on disc or cassette before Christmas.

Game of the Century?

HERMIE VAN TOUND DAREN and Andrew Glaser are responsible for Century Communications Ltd's new arcade game, *Myline Attack*.

After taking off from London, the aim of the game is to pilot your plane across the world's cities, shooting down and scoring points while watching your fuel gauge. The game, for either one or two players, includes 18 different types of aliens, 10 levels and joystick or keyboard option.

Sterling down under

STERLING PUBLICATIONS Limited have entered the games market through a newly-formed division, Sterling Software, whose first titles include the winner of the best-selling software competition *Ophiurus in the Underworld*.

Ophiurus is an arcade/venture game involving a treasure hunt through 120 screens while avoiding a series of hazards. The program features split screen scrolling and secret passageways through walls.

Ophiurus in the Underworld retail for £6.95 on the Commodore 64.

A novel addition is the game *Isoskel* which provides an alternative to staring at a blank screen while the program loads.

Isoskel Attack is available on the Commodore 64 for £7.95. Century Communications is a division of Century Publishing Company Ltd and can be contacted at Parkland House, 10-11 Creek Street, London W1V 5UL; telephone: 01-434-0341.

Home Computer Line

BRITISH TELECOM (BRADFORD) have set up the country's first computer information service called 'Home Computer Line'. Calls to dialling a Bradford number will hear a three minute tape covering all aspects of computer ownership. The information should initially cover hardware, software, peripherals and computer world news.

For further information contact British Telecom (Bradford), Impulse House, 11 Broadway, Bradford, W. Yorkshire, BS71 8BA; telephone Bradford 393424.

read:
100 IF A = 1 TO 10000

2. We have been bombarded with telephone calls regarding a couple of blurred lines of data statements in the program 'Turbo 64' (pp. 28-29).

Line 285 should read:

301 DATA CC:FF,AA:DD:DD:AA,02:02:AA,01:00,AB:02:20:AA:1A:0A

Line 285 should read:
301 DATA 00:2A:00:2A:00,AA:00:01:00,CA:00:00:00:00:00

We apologise for any inconvenience caused to our readers.

A L I E N



In space no one can hear you scream.



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Michelle - Helen Jones



MISSION SPECIALIST
Steve - Stephen Jackson



MISSION SPECIALIST
Andrew - Andrew Jackson



CAPTAIN
Neil - Stephen Jackson



MISSION SPECIALIST
Paul - Stephen Jackson



MISSION SPECIALIST
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Steve - Stephen Jackson

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Program 2

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7200 7300 7400 7500 7600 7700 7800 7900 8000 8100 8200 8300 8400 8500

8600 8700 8800 8900 9000 9100 9200 9300 9400 9500 9600 9700 9800 9900

10000

A User Defined Graphic (UDG) is a character specially designed by a programmer (author). The CBM 64 has 256 predefined characters and a vast set printing at them. They are stored in ROM. You can change the vector to point elsewhere in RAM and define your own characters. On the 64 you have to redefine all of the characters so the best thing to do is to copy all of the character information out of ROM and then redefine as many as you require.

Dear Sir,

I am strongly thinking of purchasing a disc drive for my Commodore 64. As I have read in different magazines that the Commodore 1041 disc drive is a little bit sluggish. Please could you tell me whether there are any other disc drives which are compatible with the Commodore 64. Yours faithfully,
Gerrine Lee
Miss Susan

We answer:

There are no other disc drives that may be directly fitted on

to the CBM 64. This is due to the particular serial port used by Commodore. The speed of the 1041 is mainly limited by the speed of this cable. There is at least one add on extra that you can buy that will considerably speed up the 1041 but might have other impacts on buffer limitations. Alternatively you can buy an IDE cartridge (which should plug onto the user port) and this will speed up the whole world of IDE devices including the Commodore single and twin disc versions as well as hard discs, jet pen plotters and so on. A cartridge like this may cost around £25.

Dear Sir,

Two weeks ago I bought a Commodore VIC 20 computer from a local shop. The computer was reduced in price from £159.95 to £99.95. Not knowing very much about computers, but interested enough in buying one for my own education as well as my children's, I thought the offer represented a good buy. Unfortunately, having bought the item I now find that software availability is being run down for this particular

machine. Furthermore, I am informed that the supply of 2-MB RAM may prove difficult as shops are running down stocks in order to make way for the new Commodore 26.

At the time, I was not made aware of the forthcoming change in machines and I am anxious to find out if the new Commodore 26 software can be used on the VIC 20, or if an expansion unit can be obtained to bring it online with the '26'. If so, when can I purchase such a unit?

Having read your first issue of the magazine, I am delighted that a series on VIC Games Programming is available in an easy to understand format. However, in view of the difficulties described above, could you let me know where I can get games such as 'Blast from Hell' described on page 35 of your October issue, and also whether my computer can be updated or not.
Yours faithfully,
P.J. Joyce,
Balford

We answer:

Commodore 26 software will not run on the VIC 20. As this machine is being phased out, stocks of games will be depleted steadily although all the current owners will want to buy new games. There are still plenty of shops stocking a large range of excellent games. If you have trouble getting software or RAM expansion boards then there are certain to be adverts in your local papers from people wanting to sell their second hand equipment. The VIC 20 cannot be upgraded to become a Commodore 26.

Sumlock who released Multitron are at Royal London House, 198 Deansgate, Manchester M3 3JG.

Dear Sir,

I have a VIC 20 and a Zero Electronics 64K RAM card. I want to get into, and use, the 'other' 32K store I understand enough to write RAM out of the card. The October issue of Your Commodore said 'There is indeed 64K of RAM... (Mastering Machine Code, p.7) although I have a VIC 20, have I some 'jiggling' around to do with my card?'

'No doesn't we but all helpers I sure to not speak English? Can you assist?
Yours faithfully,
S.J. Riley,
Devon

We answer:

The article was referring to the CBM 64 when it said 'There is indeed 64K of RAM...'. You need

know anything specific about this particular RAM card but there are some guidelines I can give. These must be a manual supplied with it telling you how to use it. If this manual is unhelpful, then try getting in contact with the manufacturer. The principle will probably be one of paging banks of RAM in and out. This means that you get bank one which contains 16K, then you page this out and page bank two in and access the second 16K. To access the first bank, you have to page it back in again. Therefore you can look at either bank but not both at the same time.

Dear Sir,

I have just purchased a Commodore 64. Needless to say I am lost. The book that tells the minimum. Could you advise me on a better book (or books) where at least the graphic symbols are listed.
Yours faithfully,
T. Davis
Barnham

We answer:

The best all round guide giving simple and advanced techniques, information and data charts is the 'Programmer's Reference Guide' which costs about £15 from "all good computer shops".

Dear Sir,

Please can you help me with a simple problem. I am having great difficulties trying to devise a random number generator in a machine code program on my CBM64. Have you got any ideas?

We answer:

There are a number of ways of doing this. Firstly, you can use any of the memory locations in the 64 which are constantly changing. A good example of this is the clock. You can also time any variable length operation in your own code such as how long a key is pressed down.



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Kalah



KALAH

One of the oldest games in the world, Kalah is played by two players using white and black stones. You start with 14 stones in each of the seven pits. The object is to get all your stones into your home pit.

Available on **Amiga** **Atari ST** **MS-DOS** **OS/2**

Escape



ESCAPE

Start on a tropical island and escape to a new one. You'll have to solve puzzles, find hidden items, and avoid traps. You'll also have to find a way to get to the next island.

Available on **Amiga** **Atari ST** **MS-DOS** **OS/2**

Escape

WEST

A classic western game set in a ghost town in the American West. You'll have to solve puzzles, find hidden items, and avoid traps. You'll also have to find a way to get to the next town.

Available on **Amiga** **Atari ST** **MS-DOS** **OS/2**



LASER REFLEX

A fast-paced, action-packed game set in a futuristic world. You'll have to solve puzzles, find hidden items, and avoid traps. You'll also have to find a way to get to the next level.

Available on **Amiga** **Atari ST** **MS-DOS** **OS/2**



PARADRAMA (2)

A suspenseful, action-packed game set in a dark, atmospheric world. You'll have to solve puzzles, find hidden items, and avoid traps. You'll also have to find a way to get to the next level.

Available on **Amiga** **Atari ST** **MS-DOS** **OS/2**

The program is available on a 3.5-inch floppy disk.

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E

Display the time of
day on the screen
while programming
with this handy
machine code routine
from Les Allan.

HAVE YOU EVER WONDERED how much time is spent on the family computer when writing or debugging a program? Well, here's a chance to find out with a simple screen clock that can be used either as a digital clock to keep an eye on things or as a time elapsed indicator.

Stored away inside the computer is the Complex Interface Adapter (CIA) chip which performs as well as many other things the time of Day Clock (TOD). This is a general purpose timer for real time applications. The TOD consists of a 24 hour (AM/PM) clock with $\frac{1}{10}$ sec resolution being organized into 4 separate registers: 10ths of a second, seconds, minutes, and hours. The AM/PM flag is located in



SCREEN CLOCK



the MSB of the hour register.

A specific sequence of events must be followed for the proper setting of the T003-500. It automatically stopped whenever a write is made to the MSB register and will not start again until a write to the MSBs of a second register. This means that the T003 will always start at any desired time since the program time is frozen until the final write to the MSB of seconds is made.

Window display

This program creates a window in the top-right hand-side of the screen to continuously display the time. The interrupt routine is re-routed to a real-time clock program located high in memory (\$4700) so that every time an interrupt occurs the

clock can be updated. The only limitation to this program is that the interrupt pointers must not be shared by any other program.

The program works by taking the MSB value of data, converting it to binary coded decimal, carrying out a check to see if it is within the legal range and PENDING into memory. Hex data has been used because it keeps the data statement tidy, makes it easier to read and is the working code of the machine. Providing that the final check sum is 04, the machine code routine is activated and the display set to enter the correct time of day. Error trapping is again provided to ensure that only the legal range of time can be entered. When the value has been correctly entered, pressing any key will start the clock from that desired time.

Combination changes

The sequence has been arranged to create pleasant colours for the clock, hours, screen and cursor as the prime purpose for this routine is to

the machine code routine it is essential that no mistakes are made as the program will irreversibly crash. It is therefore essential that a user's main hardware (including or changing these values.

Clock colour
Hours colour
Screen colour
Cursor colour

POKE \$31100-15
POKE \$31000-15
POKE \$31000-15
POKE \$31000-15

allow a check to be made at time when programming. However, if a change to these combinations is necessary then a low simple pointer is all that is required.

Warning!!

As these locations are used by

To turn on the screen clock at any time all that is required is to enter SYS 50000. To turn off the screen clock enter SYS \$1200 or Press RUN/STOP and HISTORY keys simultaneously.

Further information on the T003 can be found from the Programmer Reference Guide Appendix A1 on page 401.

Program Listing

MEMORY

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02 REM ***** SET UP AND ROUTINE FOR CLOCK *****
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05 ***** (POKE) *****
06 ***** (GET) *****
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Phil South offers all budding artists a guide to graphic software on the Commodore 64.

GRAPHIC SOLUTIONS SOLUTIONS GRAPHICS

THE COMMODORE 64 IS A VERY sophisticated computer; its sound and graphics capabilities make it one of the best drivers available to the home user. But why, oh why was the machine not furnished with a state-of-the-art BASIC? This, it seems was an oversight. In an effort on the part of Commodore to get a 64 computer "out the door" earlier, in case they were beaten to the punch by Japanese Casio's or English's 8-bit. Specification is everything these days, though, so we are stuck with superb facilities that cannot be easily arranged. So can they? For graphics, we can purchase software solutions to our hardware problems in the form of graphics software.

Graphics Software

Let me demonstrate how a problem to a novice can be easily overcome with software. To draw a line on a computer you first do (a) PLOT an invisible point and (b) DRAW from that point to another point, and for both of those points you need precise coordinates like so:

```
10 PLOT 100,100  
20 DRAW 50,2
```

This means you've instructed the computer to go from the location left of the screen (0,0) to 100 pixels across to the right and 100 pixels up from (0,0,0) without making any marks on the screen (PLOT). Then from 100,100 drawing a line 50 pixels up, producing a diagonal line from 100,100 to 100,150. I don't know about you, but this kind of thing gives me a headache after the 400th line of my drawing.

The same problem on the same 64 becomes simple when you boot up your graphics program, like PAINTPIC from Korea. You can select the "line" option, move the cursor with your joystick or keys to the start position, mark it and move to the finish position. The second method is more accurate and less work, especially in complex drawings where you don't want to take up work on the usual co-ordinates of single pixels.

There are essentially three types of graphics software available to the 64 user: Draw or painting programs, languages, and Games Designers or Sprite Editors.

Draw programs

With Draw programs, or "painting" programs as they are sometimes known, the process of producing graphics screens or titles for your programs is reduced to merely "drawing" your design directly onto the screen, a bit like the old Tekn-artists gadgets. They are however a bit more sophisticated than that, as you have

the facility to copy individual pixels or lines, or even whole blocks of the screen if you wish.

There are quite a few draw packages available now: DODDLE by Quikbait, for instance. This is a nice basic drawing system, and as such, is quite pleasant if a little bit slow. You can perform a great many useful acts with a drawing, many including acts with a drawing, copying a section to "memory" all over the screen, or use as a hotspot, "wax", "line" and "circle" modes, and something called ZOOM, which enlarges an area of the screen, to allow you to draw with greater precision.

Another two similar packages are the cassette based systems, PAINTPIC by Korea and PAINTBAMA by Japan. Of the two I find PAINTPIC the better. Despite of the fact it's less user friendly than PAINTBAMA. In part because PAINTBAMA has some really annoying sounds in it. Why do you need sound in a drawing program? I find myself asking the same question. The cursor enters across the screen to a kind of synthetic bell sound, which on auto-repeat causes like an angry machine gun. In the end I had to turn the sound off to concentrate. Not only that, but if you make any mistake like entering an option which is not available, you get the most horrendous noise. I don't know what it's meant to represent, but to me it sounds like a mosquito squeal being cut in half by a circular saw in an echo chamber! (Circumstances are not mentioned.)



PAINTPIC is a far quieter piece of kit. It is fast, accurate and colourful, making full use of the Commodore's capacity for multi-coloured drawings. It's a shame the manual is so difficult to understand.

The last piece I looked at was something called SOUP HARRIS' PICTURE BUILDER. This is a kind of computer aided nursery block program from the originators of the machine itself. You can use the character blocks on the machine's keyboard to build up pictures of letters or character graphics. Simple stuff, you may say, but computer education must begin somewhere, so why not with toddlers?



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Computer Graphics language

The second type of program is by far the most far reaching and useful of the three, as it is the computer graphics language. ULTRABASIC 64 is the first example of this type of program. The disc-based ULTRABASIC 64 is an extended BASIC, boosting the root to just two lines a page on its predecessor BASIC supplied with your machine. This means you can reap the benefits of both in TURBO functions, and generally enhanced control of colors, line and sound capability. An excellent piece of software with an interactive tutorial on the disc, and well written documentation.

Games Designer and Sprite Editors

The final, and most popular area of interest in graphics at the present is Games Designers and Sprite Editors. Games Designers do just that, allow you to create your own games, which you can play or lend to your friends. Such tools for the 64 are the excellent GAMES CREATOR and GO SPRITE from Mirrosoft. Let me start by congratulating Mirrosoft on the quality of all their products. They are sleek, sensibly packaged, well documented and user



GRAPHIC SOLUTIONS SOLUTIONS GRAPHIC



friendly. **GAMES CREATOR** allows the user to define his own sprites, backgrounds, lighting and sound effects, even music, with no difficulty. And they're not just simple effects either! You've got jumping and gravity effects, scrolling backgrounds, animated games, full length musical pieces and explosive, not to say good 'n' noisy sound effects. This is a very detailed and satisfying games constructor, the only drawback being the need to drive all your new games using the master program, **CGI**, so you can't sell your game and become rich, but you can re-design your own favourite game. As this type of program goes, **GRAPHIC SOLUTIONS** is very good.

GO SPRITE is a large and fancy sprite creation and animation package, with lots of steps and arrows pointing to applicable parts of the screen. It displays the

different "frames" of your sprite like frames of film, and animates them while you watch. You alter the sprite either with keyboard commands or a joystick, moving the cursor to the facility you want to use and pressing the fire button. Of this type of program, **Go Sprite** is the best I've seen.

Two other packages are not so good. **GRAPHICS MASTER** is **CGI** but nothing new and a bit oddily laid out, it does however have more colour combinations than many other sprite editors I've seen.

GRAPHICS DESIGNER is possibly the most versatile piece of software I've ever seen. It is "user-expert", in that it assumes the user knows what it is that they're trying to do! The films, manuals, guides and the on screen prompts, excuse me, for instance, what would you make of the phrase "TV", I know what I'd do!

Drawing to an end

The applications of these pieces is up to you. It is possible to use them for games, business graphics, animated cartoons or even art for its own sake. I suggest that before you buy any package that you match its facilities with your skill and/or requirements.

One last point, I've fed up with people buying share programs and doing "abstract computer art" or "computer-type" pictures. Using an art program like a computer instead of using a computer like an artistic tool, for goodness sake, where you buy a draw program, **DRAW** be creative. Don't just doodle. There aren't nearly enough people in the world who know about computers and the art, so there's plenty of room for you in the computer art world of the future.



FIRST AID



for your 64

Computers, like people, are fallible. They need the right combination of code and care to perform effectively in the business or the home. And that requires first hand knowledge from you to create a healthy operating environment for your Commodore 64.

Knowledge about machine language, about the lesser known qualities of the 64, about the disc drives, graphics, and about the tricks and tips to keep your 64 on line. That's why First Publishing has now launched in the UK a series of high quality books and software packages to provide a complete health care kit for your 64. Commodore 64 users throughout Europe have already found it a tonic. We think you will, too.

For a brochure on all the Commodore 64 books and software packages available from First Publishing, please fill in the coupon and send to: Amanda Vint, First Publishing, Unit 208, Watlington Road, Watlington, Oxford, England, OX9 2JH.

Name
Address

Or ring Amanda Vint on 07537 533 or Colin Robinson on 01 464 026

1st
FIRST PUBLISHING LTD

Simon Rockman talk up

Commodore's new number,

CompuNet, an on-line

database service for the

Commodore 64.

COMPU.NET IS THE BIGGEST THING that has happened to the Commodore 64 since the machine was launched two years ago. When you buy the Commodore communications modem you get a one's free subscription to the new database service. Anyone who is used to dial-up databases will find CompuNet a close relative. PRISTIN, and Bulletin Board, PRISTIN, is a personal system whose only specially authorized people (Information Providers, IP's) are allowed to put up pages; however, CompuNet has had a section called "The Jungle".

Here anyone can put up a page of text or a program and charge for it. When another user wants to read that page or to load that program they can buy it. The money is automatically debited from their account with half of it going to the person who provided the information and the other half to CompuNet. The maximum price for a page is \$999.99.

When dealing with large sums like this the system needs to be secure against the intruders and hackers who could put up a page under their own name and then use a stolen ID and password to read it. CompuNet is one of the most secure on-line systems invented. Every CompuNet modem has its own fingerprint, a code number built into it which is specific to your ID. To use a different account you need a different modem. This level of security should open the door to major transactions such as booking holidays and horse banking. The system sounds great so let's look at what happens when you go to use it.

CompuNet in use

After the small black box arrives from Commodore you rush to the computer and un-wrap the package. The manual is a single flimsy sheet of paper, the rest of it is on the system. It has a cover embedded with a plastic film like using paper directories when they could use the computer they are talking to do the work of looking things up for them. The manual contains an IR ROM. This holds your secret serial number and some of the routines necessary for a conversion with the CompuNet mainframe. The rest of the routines need to be loaded, from tape, disc or from the mainframe itself, it is in this last form that the program is first sent to you.

To call up the mainframe you simply press shifted C return; this is the connect command and prompts you with the question "Dial Number?". Depending on where you are in the UK you dial a telephone number given in the leaflet which comes with the modem. The modem then dials the number out like a

CALLING compuNet



normal telephone. When the modem finishes dialing it prompts you with the message "Connecting" and then the border changes to that of a computer. CompuNet does not have a maintenance fee (although this is supposed to change); it shares time on a DDC 70 mainframe owned by ADP computer services, whose telephone line is also used. While the two computers seem to be doing nothing during logging in they are in fact chatting away, logging you into the control area of the DDC and establishing who you are (from the code number in your modem).

When these formalities are completed, CompuNet asks you for your ID and password. The ID is an eight letter code which is used to identify you as the source of any information which you upload. At the moment the password can only be changed by CompuNet, however the facility for the user to change the password will become available and will add an extra level of security.

Once logged in, CompuNet shows the files in a column arranged in your '44. It finds out what software you have loaded before you logged in. If you have the latest version of the entry software the system lets you straight through. If you have not got anything soft loaded (loaded from tape or disc) then CompuNet sends you the software you need. This is called linking and takes a little while. The process is a little slower than using a 1541 disc drive and so, although disc users may decide to save on the cost of the telephone call, tape users may decide to link every time they log in (after their usual for cassette tape to load). If the extra software has been updated since you last used it the system will send you an update.

Because the mainframe always knows what system you are using in Commodore 64, it can send you routines and expert via to be able to run them. It would be possible for you to have a program which shares the work between the mainframe and the users. This would speed up any

games which involved player to player interaction. The main aim could just send a note and the software in the micro would transfer it into a sequence of movements. This is looking to the future; there is a fair bit on CompuNet as it is.

The jungle is fine for posting announcements, but you may want to send a private message to a few friends. For this there is the Courier service. This allows you to send the same information to up to five people. When one of them logs in a small letter box appears on the title page to tell them that there is mail waiting. The first page of the letter shows the recipient who else has had the same letter, this change has yet been announced but this is likely to be an impressive service.

Fun and games

Besides all the banking, letting, home banking and estate agent services which make the database profitable for the owners, there is CompuNet, a database of rumour and gossip which is run by a computer freak who seems to know some very important people.

CompuNet is not to be confused with Comp-U-Card, a discount ordering scheme which allows you to buy over the modem with a reasonable discount. Because Comp-U-Card requires a scrolling screen the system has to send you some special software, called a link, which supplements the CompuNet software.

A similar link is used for the systems adventure game. This is MUD; standing for Multi-User Dungeon, it is the best



Jane Pirbank, Editor of CompuNet

adventure game written. The vocabulary is much better than that of the Hobbit and the logical analysis allows for commands like "Get it" and "Kill Him". There are three types of objects: items like the crown and sword which can be carried, mobiles — computer generated avatars which can be fought and may be carrying treasure which can be added to your haul and, finally, real people. Other players enter the same fantasy land; you can follow, talk to, fight with or even kiss the other players. MUD is huge; some people get really addicted to it, living as an enchanter or Necromancer is much more fun than being a computer programmer. There are so many facets to MUD that it is impossible to cover them in any one article; the best way to find out about it is to play in local links.

Then the Wizard has just disappeared in a puff of smoke...☛



Nick Green, CompuNet's boss man



**If you need some help
in creating your own
games, follow this
new series from David
Rees.**

GAMESMANSHIP

IN THE FOLLOWING SERIES, I hope to be able to give you an insight into creating your own fast, impressive and well packaged action games. The series contains four parts, the first three of which will contain ideas, examples and sub-routines.

Part one deals with the foreground, probably the most important part of any action game. This encompasses the objects which are to move, writing out (I) instructions from you (the good guy); (2) your indirect instructions (eg. you lose life, or (3) the computer's logic (the bad guys).

The last thing to consider concerning the foreground is tactics and, more especially, their limitations. It is very easy to make a game where you

wipe out the enemy in one fell swoop, but this would not be challenging enough. Thus, a game has to be difficult to make it more fun. There are two ways to make a game more challenging: you can make the enemy more intelligent or vicious, or you can limit your own moves to a 1/5th opportunity.

The second choice is better in this case as it speeds up the game, intelligently, or, more imaginatively, takes up plenty of processing time and would turn a BASIC game into a slow job. Once this foreground format is decided, you can start on the background (which part two will cover).

Now the format is decided, you have to implement it. It is up to you how you do this, but to help speed things up, I have

included some machine code sub-routines. An explanation of each one follows. Note that the first listing gives a general way to POKE the machine code to memory. You can put as many routines as you want into memory, in any order, and at any variable location with the following limitations: each routine is no more than 256 bytes long so it is easier if all the

routines are spaced this distance apart; the code is used by SPS 'start of the code sub-routine'; bytes used at locations 3200-3247 must be ready before using the routines. Routine one: on using the routine via SPS routine starts every sprite that you want to move will be moved by a predetermined amount in X and/or Y directions. The routine is very quick, as you can POKE in values before the main part of the game starts, as well as during it. POKE registers as below:

POKE 3200+(sprite no.)	x2, X increment
POKE 3201+(sprite no.)	x2, X add/d or subtract (Y)
POKE 3202+(sprite no.)	x2, Y increment
POKE 3203+(sprite no.)	x2, Y add/d or subtract (X)

routines are spaced this distance apart; the code is used by SPS 'start of the code sub-routine'; bytes used at locations 3200-3247 must be

ready before using the routines. Routine two: this routine watches a collision has occurred between up to eight pairs of sprites that have been defined beforehand. Sprite

Program Listing 1

```

1  REM*****
2  REM%GAME MACHINE CODE%
3  REM%SUBROUTINES PART 1%
4  REM BY
5  REM DAVID REES
6  REM*****
10  R(1)=13129:R(2)=27778
200  FORM(1)6:TO6
210  FORM=GT0255:FORMA IFO8THM030
220  POKE40020+R(2)5+H:6:TO4+NDOT
230  PRINT"TOTAL FOR ROUTINE"R(1)6:"T
240  PRINT"IT SHOULD BE"R(2)
250  IFH=2THM6
260  NEXT
290  REM ROUTINE 1 +
295  REM%SPRITE MOVE%
1000  DTR029.1.133.251.169.-173.16.200
1010  DTR037.251.249.2.169.1.133.252
1020  DTR105.-288.198.1.287.24.0
1030  DTR049.12.24.121.-287.144.3.24
1040  DTR238.252.24.144.9.56.249.-287
1050  DTR176.2.199.252.24.153.-288
1060  DTR165.252.41.1.249.8.165.251
1070  DTR13.16.200.24.144.7.165.251
1080  DTR73.255.49.16.200.141.16.200
1090  DTR185.1.200.198.17.287.224.0
1100  DTR244.7.24.121.16.287.24.144.4
1110  DTR5.249.16.287.24.133.1.200
1120  DTR6.251.288.288.132.16.288.174
1130  DTR96.-1
1140  REM
1150  REM%ROUTINE 2 +
1155  REM%SPRITE/SPRITE COLLISION%
1200  DTR173.32.287.41.7.141.32.287
1210  DTR160.-133.2.185.33.287.281.6
1220  DTR240.111.24.18.24.168.24.74.24
1230  DTR179.169.1.224.-249.6.24.18.24
1240  DTR202.288.288.45.16.288
1250  DTR244.2.169.128.133.251.185.-288
1260  DTR24.74.24.181.251.24
1270  DTR241.288.287.185.1.288.24.74.24
1280  DTR41.251.287
1290  DTR54.2.185.41.287
1300  DTR24.18.24.168.24.74.24
1310  DTR178.169.1.224.-249.6.24.18.24
1320  DTR288.288.288.45.16.288
1330  DTR240.2.169.128.133.251.185.-288
1340  DTR24.74.24.181.251.24
1350  DTR141.252.287.185.1.288.24.74.24
1360  DTR41.253.287
1370  DTR24.144.6.24.144.136.24.144.77
1380  DTR73.259.287.56.237.252.287
1390  DTR78.2.73.255.24.172.32.287
1400  DTR192.249.3.74.24.136.288.251
1410  DTR287.-249.5.169.24.144.2
1420  DTR169.1.133.253.173.251.287
1430  DTR56.237.285.287.176.2.73.288
1440  DTR24.144.2.169.1.37.253
1450  DTR24.236.288.251.281.-248.5.169.
1460  DTR24.144.2.169.1.37.253
1470  DTR43.49.287.288.192.8.288.161
1480  DTR069.169.24.121.45.287.24.288
1490  DTR132.8.288.246.96.-2
READY.

```



one of the colliding pair has its number POKEd to 10005*pair no.; sprite two's value is POKEd to 10000*pair no. The result (2-collision) is POKEd from 20041*pair no., and in addition, by POKing 788 directly using this routine, the number of collisions detected will be given. This is a very quick way of telling if a collision has occurred during that go. The last register that you need to know about is 10014, which controls the proximity of the collision (how close the object's centers have to be for a collision). When POKing a value here, zero gives a range of two pixels, one gives four pixels, two gives eight pixels, etc.

If I have not explained this clearly enough, I give examples of how to use each routine.

Next month: Scrolling, sprite/background collisions and guns.



Program Listing 2

```

1 REM*****
2 REM#EXAMPLES OF USE#
3 REM# OF#
4 REM#GAME MACHINE CODE#
5 REM#SUBROUTINES PRT 1#
6 REM# BY#
7 REM# BYVLD REES#
8 REM*****
9 REM# CODE START BYTES#
10 R1=49152/R2=49152+256
11 REM#SET UP ROUTINE 1 REGISTERS
12 REM# R0#
13 FOR N=0 TO 7
14 POKES2992+##2,RND(1)*4
15 NEXT
16 REM# ADD/SUBTRACT
17 FOR N=0 TO 7
18 POKES2993+##2,INT(RND(1)*2)
19 NEXT
20 REM# R0#
21 FOR N=0 TO 7
22 POKES3000+##2,RND(1)*4
23 NEXT
24 REM# ADD/SUBTRACT
25 FOR N=0 TO 7
26 POKES3009+##2,INT(RND(1)*2)
27 NEXT
28 REM#SHOW SPRITES
29 V=53248-POKEV+21.255
30 FOR N=0 TO 15
31 POKEVH,RND(1)*255
32 NEXT
33 POKEV+32,0
34 FOR N=0 TO 7
35 POKEV+39+H,N*8
36 NEXT
37 REM#SET UP ROUTINE 2 REGISTERS
38 REM#PRECISION +/-16 PIXELS
39 POKES3004.3
40 REM#SPRITE NUMBERS#
41 FOR N=0 TO 7
42 POKES3005+H,0
43 NEXT
44 POKES3005,0
45 POKES3003,1
46 POKES3005+1,1
47 POKES3003+1,2
48 REM#OCLR HOME#
49 PRINT"IT"
50 POKE788,0
51 SVR1:SVR2:T=T+1:IFT>999THEO?O
52 IFPEEK(788)=0THEM#0#
53 FOR N=0 TO 1
54 %PEEK(53041+H):IF(O)THEM#66
55 NEXT
56 GOTO780
57 %VH+39
58 POKEX,(PEEK(X)+1)AND15
59 POKEX+1,(PEEK(X)+1)AND15
60 PRINT"BIT ON REGISTER"
61 GOTO560
62 END

```


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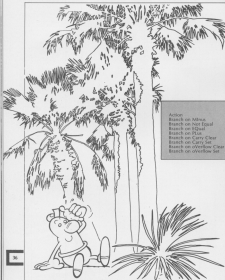
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Branching and the status register are the subjects of this month's installment of our machine code series from A.P. and D.J. Stephenson.

MASTERING MACHINE CODE



WHEN PROGRAMMING IN BASIC, the IF/THEN statement provides an easy way of introducing a decision. The conditions can be quite complex, such as:

```

GOIF A < C: TAB(10) DE C: B
THEN PRINT "BASIC"
GOTO 100
  
```

Also, it is not so easy in machine code. In the first place, the decision options are known as **branch** instructions and there are only eight to choose from as can be seen from Table 4.1. At least, so it used to indicate the operand is one byte long and can be specified by two hex digits.

TABLE 4.1

Action	Assembler	Hex code
Branch on Always	BAL ax	50 xx
Branch on Not Equal	BNE ax	D0 xx
Branch on Equal	BEQ ax	F0 xx
Branch on Plus	BPL ax	10 xx
Branch on Carry Clear	BCC ax	90 xx
Branch on Carry Set	BCS ax	B0 xx
Branch on Overflow Clear	BOC ax	58 xx
Branch on Overflow Set	BOS ax	F8 xx

What does it mean when, for example, we write BNE? We can see from the table above that it means branch if not equal! But it immediately poses the question — branch if WHAT is not equal? The answer to this is — if the Z bit in the processor status register is 0. It would help you at this point if you turn back to Part 2 of this series where you will find details of the flags in this register and the conditions under which they are set to be cleared to 0. You will see that an appropriate flag is updated automatically after most of the instructions. So, still referring to BNE as an example, the branch will take place only if the last instruction caused a non-zero result. Then in turn the microprocessor will examine its processor register to see if the Z bit was a 0. The opposite instructions, BEQ can





be used to test if the last result was zero — the branch will now take place if the Z bit is 1.

Another pair of branch instructions is BPL and BML. A branch takes place with BML only if the N bit is 1. You will remember from Part 1 of the series that single byte negative numbers in two's complement notation always have a 1 in the most position but positive numbers always have a zero. So, if you are working in two's complement (that you won't always be), you can use either BPL or BML as appropriate, to test the sign of the last result. It is worth mentioning here that these two instructions may not be used as frequently as the other branch instructions.

BCS and BCC are another pair of opposites. These are used to test if the last operation caused a result which was 'too big' to be handled by a single byte, so having a 'carry out'. This carry bit is captured in the C bit position of the status register. With BCS, a branch takes place only if the C bit is 1, with BCC, a branch takes place only if the C bit is 0.

The final pair of opposites are BVC and BVS. A branch takes place with BVS only if the V bit is 1. In other words, you can test if the last result caused two's complement overflow because, if it did, the V bit is set to 1. However, two's complement overflow must not be confused with the carry-out condition mentioned earlier. Indeed, it is possible for the overflow condition to exist without a carry out occurring and vice versa. In case this seems strange to you, consider

what happens if we add 1 to +127 in two's complement binary:

```

-127      0111 1111
add 1
-----
          1000 0000
  
```

If we treat the result (100 in decimal) as a pure binary absolute number, it is quite sensible. If, on the other hand, we interpret the result in two's complement, it is clearly absurd because 1000 0000 is -128. Although there has been no carry out, an overflow condition is established which would set the V bit to 1. The largest positive two's complement number which can be held in a single byte is 127 so, if we try to add 1, we must expect the result to be invalid — overflow in fact. This is a tricky business, so it is worth one more example:

```

-1      1111 1111
add +1      0000 0001
-----
          1000 0000 result
  
```

If we add plus 1 to -1, the result should be zero, as indeed the above shows. There is therefore no overflow condition and yet there is a carry out — which is ignored! So, the V bit would show a 0 and the C bit would show a 1 after this example. This should illustrate the point we are trying to make: it is the way we interpret the arithmetic that determines whether we ignore the C bit or the V bit. It must be firmly established in your mind that 'overflow' is a condition which only makes sense if you are conducting arithmetic in

two's complement form, if you are working with absolute numbers (only all positive) the concept of overflow, as signalled by the V bit, has no meaning. Later in the series, when we deal with peripheral controls, we shall learn that the V bit is employed in another role, quite unrelated to overflow.

Calculating branch operands

We have, in the preceding passage, frequently seen a branch formed from 'the branch takes place if — etc etc'. The next topic of discussion is how we work out the branch destination. In BASIC, of course, we just say GOTO followed by a line number. We can't do this in machine code because the concept of line numbers does not exist. Even if we had an assembler listed, we still couldn't use a line number as a branch destination. The operand in a branch instruction is a number which, if the condition is true, informs the microprocessor how many bytes forward (or backward) the next instruction is to be found. This is called **relative addressing** because it indicates a destination address relative to the present address. Only the eight branch instructions use relative addressing.

To understand this mode of addressing, we should be clear in our minds as to the role of the most important register in the microprocessor, the **Program Counter (PC)**. This is a 16-bit register which always

contains the absolute address of the NEXT instruction byte to be executed. As you already know, a machine code program is simply a set of bytes, stored in memory in sequential addresses. Suppose these program bytes are stored in a block from address 4C000 (49152 decimal) onwards. To execute the program, we can simply enter 49152 (49152 and press RETURN). This will cause the first equivalent of 49152 to be loaded into the program counter. The sequence of events is then entirely automatic: the instruction byte at address 49152 is brought into the microprocessor and processed, after which the program counter goes up (and the next sequential byte is processed) and so on. However, if a branch instruction is encountered and conditions are met, the operand byte of the instruction is added to the present contents of the program counter. The smooth sequential action is now replaced by a sudden jump to a new instruction byte address. Once the new address has been reached, the program counter proceeds in orderly sequential fashion from that new address. An example will help.

1. Assume the program contains a set of bytes located from address 4C000 onwards.
2. Now assume the program has reached the second byte of the instruction 0401 5017 located at address 4C071. The program counter will then contain 4C072 — the next instruction byte address.
3. If the branch conditions



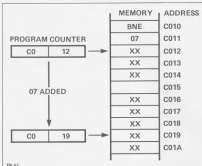


Fig 4.1

are true and the branch is taken, the operand (07) will then be added to the program counter which will then contain C019. The next instruction byte to be executed will then be taken from this address — seven bytes forward. If the branch conditions were not true, the program counter would not be altered and the next instruction byte at C012 would be executed.

Figure 4.1 illustrates our example and should be carefully studied.

Calculating backward branches

As you are aware when programming in BASIC, GOTOs can be to higher or lower line numbers. How do we calculate the operand number if we wish to branch backwards? The answer is that we resort to two's complement arithmetic. Relative addressing can be used with negative numbers in the operand to indicate a branch back to an earlier address, for example, if we wish to branch 7 bytes backwards, we must have an operand of -7. This is where our previous knowledge of two's complement arithmetic is brought into use. If you understand that 1 of the series,

you will be able to work out that -7 can be calculated as follows:

$$\begin{array}{r} -7 \quad 8000\ 0011 \\ -7 \quad 1111\ 1001 = 9F \end{array}$$

Thus if we write, say, BNE 9F, and the condition is true, it will

cause 7 to be subtracted from the program counter. Figure 4.2 illustrates this example.

It should be realised, from previous discussions on two's complement, that the maximum number of forward bytes which can be used with any branch is 127 and the

maximum backward bytes, 126. This is because the operand of a branch instruction can only be one byte long.

Fortunately, it is very unusual in practical programming to require branches greater than these allowed limits. However, as we shall see later, there is a way of overcoming this problem, should it ever arise.

Mistakes in machine code programs can often be traced to incorrect branch operands because it is so easy to be out out in the byte count. Another pitfall is the status register flags. When a branch instruction is encountered, the current state of the flags determine whether or not the branch takes place. Normally, but not always, it is the effect of the last instruction which is being tested. However, some instructions do not affect the status flags, in which case, the test is dependent on earlier conditions.

The following instructions have no effect on the status flags: STA, STR, PMA, PMP, DAs and all the branch instructions. The fact that branch instructions have no effect on status flags means that branch instructions can follow one another in order to test for two different conditions.

The status flags affected depend on the instruction so it is important to be familiar with Table 4.2, showing which of the status flags are affected.

At this stage, of course,

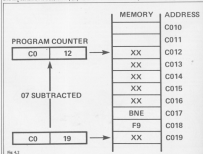


Fig 4.2



Table 6.2 Flags affected

Updates NZ and C flags: AND, OR, XOR, CP, CPY, BCL, BDR, SBC

Updates N and Z flags: ADC, DCD, DCDY, DOR, JNC, JNS, INT, LDA, LDD, LDY, DRA, PLA, TAA, TAY, TZA, TZA, TZA

Updates NZC and Y flags: ADC, SBC

Updates NZC and always clears N to 0

many of the above instructions have not yet been discussed but the table will be helpful to refer back to. It shows, for example, that there is little point in using BCC after DEX to check if it had reset the carry to zero because only the N and Z flags are affected by DEX. If the carry was 0, it would have been due to the effects of an earlier instruction.

Branching when an assembler is fitted

Calculating the number of bytes in the operand of a branch instruction is fraught with danger. It is so easy to get it wrong, particularly with backward branches. If the code is not too long, it is highly possible the program will crash because the branch destination could be the operand instead of the op-code of an instruction. If, to illustrate, the operand happens to be a legitimate op-code, the microprocessor will treat it as such and execute it if, on the other hand, it doesn't recognise it, the program would crash.

One of the most useful aspects of an assembler is the way it allows us to write branch instructions. Instead of counting the bytes, we can use a list of our choice. Using the MIBSD assembler, but using 0 to represent example bytes, a branch would look something like:

```

BNE VOLTS
  00 00
  00 00 00
  00 00
VOLTS 00 00
      00 00 00
  00 00
  
```

The operand table in the branch has been chosen as VOLTS. The assembler will search down the program until it finds a line beginning with VOLTS. Note that the assembler demands that the destination label ends with a space. As an instruction, safely yourself that, without an

assembler, the above branch instruction in hex machine code would be: 08 07. The op-code for BNE is 08 and the branch is 7 bytes forward — not 8.

Table 6.3 Status register instructions

Action	Assembler	Hex code
Clear Carry	CLC	18
Set Carry	STC	38
Clear Decimal	CLD	08
Set Decimal	STD	28
Clear overflow	CLV	08
Clear interrupt mask	CLI	38
Set interrupt mask	SEI	35

As a simple illustration, study the following line first written in assembly language and, for comparison purposes, in hex machine code.

Assembly	Hex coding
LDA 00	A7 00
BNE 01	08 04
STA 0400	05 00 C4
00	00
00 STA 0400	05 00 C4
00	00

It is a trivial program and it is not expected that you try and run it. It starts by loading 00 into the accumulator, using immediate addressing. This will make the Z latch 0 then because the Z latch is then labelled 00, forward 04, of course, since the accumulator is currently set zero. The accumulator contents are then stored in the absolute address 0400. The computer then reaches 00, which means BNE and it is roughly equivalent to (A00 in BASIC). If the first line of the program was changed so that the assembler was initially loaded with 00, the branch would not be taken and the accumulator contents would then be stored in 0400 before reaching 0000. So, depending on the state of the accumulator, the program will either stop in the middle or at the end. Examine the hex code section carefully, particularly the branch operand — safely yourself that this is correct. Note also that the op-code for BNE is 08. You will no doubt agree that the assembler means to make and more informative.

Programming the status register

When we discussed the status register bits in connection with branch instructions, it was established that the relevant bits are automatically updated by the microprocessor after each instruction. However, there are certain situations where it is necessary for the programmer to intervene and manually alter the bits. The seven instructions available for this purpose are shown in Table 6.3.

Action	Assembler	Hex code
Clear Carry	CLC	18
Set Carry	STC	38
Clear Decimal	CLD	08
Set Decimal	STD	28
Clear overflow	CLV	08
Clear interrupt mask	CLI	38
Set interrupt mask	SEI	35

Note we can set or clear the C bit, or clear the V bit. We shall not attempt, at this stage, to discuss the conditions under which these instructions should be used. Neither would it be profitable to discuss interrupt masks or D bits. For the moment, treat Table 6.3 as reference material to be consulted later.

Comparison instructions

There are times when a simple branch test is not quite what we want. For example, BEQ and BNE can only test for zero or non-zero. What if we want to find out if a register contains some particular number? Perhaps! One way which comes to mind is to subtract 7 from the number in the register and then use BNE or BEQ to see if the result is zero. Obviously, if 0-7 then 0 must contain 7. Unfortunately, the subtraction operation destroys

the number originally in the register and we may not want this — it would be destructive testing. We could, of course, save the register contents somewhere before the test and reload again afterwards, but this, to say the least, would be cumbersome. Fortunately, there are three beautiful comparison instructions available which perform the subtraction for you but without altering the register you are testing. It is called 'unadjusted' subtraction. We shall describe the action of CMP first and, because it is the easiest to understand, we then describe immediate addressing mode for example purposes.

Suppose we write CMP 00. This will compare the hex number 00 with the number in the accumulator (A) and update the Z, N and C bits according to the following rules:

1. If operand number (00 in this case) = number in register, Z and C become 1.
2. If operand number is less than number in register, C becomes 1 and Z becomes 0.
3. If operand number is greater than number in register, C becomes 0 and Z becomes 1.
4. If operand number is less than or equal to number in register, C becomes 1. It should be clearly understood that a compare instruction only affects the status flags, it does nothing else. Therefore, the only possible instruction after CMP is a suitable branch test. Unless you use a branch immediately afterwards, there is no point in using CMP in the first place.

Although we have used immediate addressing in our example, a wide range of addressing modes are possible. Thus, we can compare the contents of a particular memory address. The full range of comparison instructions are shown in Table 4.4.

Table 4.4 The comparison instructions

	Assembler	Hex code
Compare A	CMP #hex	C3 00
	CMP #n	C3 00
	CMP #hex, X	C3 00 00
	CMP #hex, Y	D3 00 00
	CMP #hex, Z	D3 00 00
	CMP #hex, I	D3 00 00
Compare X	CPX #hex	E0 00
	CPX #n	E0 00
	CPX #hex, X	EC 00 00
Compare Y	CPY #hex	C0 00
	CPY #n	C0 00
	CPY #hex, X	CC 00 00

**Try and stop poor
Pinky from being
driven completely up
the wall in this game
from F.G. Tout.**

'THE WALL' RUNS IN BASIC with several machine code routines to move all 8 sprites, change sprites and rotate the colours at the End Of Game sequence.

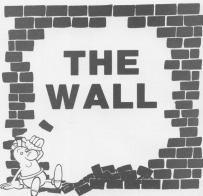
For those who know about Pinky, this will be quite familiar, for those who don't, Pinky is a young man striking slowly into a state of total insanity...and so top things, everybody's after him - the wife, the school teacher, the mother, the lawyer and the hammer.

Can you save Pinky by guiding him through 4 waves of walls and ladders?

The screen is a rectangular screen so you can jump from one side and appear on the other, but you can still collide off screen, so be careful.

When you get Pinky to the gates at the top of the screen you will proceed to the next wave.

Save in parts 1, 2 and 3 separately, and save before raining. Then, when all is well, plug your joystick into port 2 and you can start to play...THE WALL.



Program Information	
Part 1	
This is quite straight forward: it's all sprite data.	
Part 2	
1	900
4004	9008
6004	40025
6080	60812
6160	61650
Part 3	
1	
2	128
2080	2010
8880	8860
4880	5250
6810	6865
6008	6010
7000	7068
8008	8075
9008	9099
9040	9099
7080	7299
5080	5099
7880	7899
6080	6099
6180	
Download characters Machine code move rot... Machine code move and change colour sprites Machine code rotate colour instructions...	
Sound variables/clear sound Variables and sprite positions Time limit Main routine Check collision with wall Move the wall jump Alter enemy sprite positions. Vile enemies I Game over Screen 1 Screen 2 Screen 3 Screen 4 Screen 5 Update score Title page	

Variable	Value
A0	RAM Machine code address
X1, X2, X3	Sound
V	Sprite variable
L1	Level
L2	Level
SC	Score... 99 high score
BT	Decrement time limit
C-3	Colours pos.
Q	Change rot



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Runecaster returns with guidance on how to keep your cool when lost in a maze.

SENSE OF ADVENTURE

LAST MONTH WE LOOKED AT MOVING into adventure games, with how to map adventure gaming — and how you know of those people with sidetrack (photographic) memory.

To recap, look at figure 1. This is the sort of map you would expect to find after exploring the first few locations of a new game. Each box represents a discrete location and the lines between them show how they are linked together. Arrows signify the direction you may take to reach the location. Only one arrow would mean movement in only one direction and the cross-bars indicate that no exit (at the moment) exists in that direction. The loop to the east of the "steep river bank" shows that if you continue going east from this location — you end up at the same position! This technique is often used in the 'edge' of an adventure's known world. Each box is labelled so that you will be able to relate it's position to the description seen on the screen. Items found — and if not obvious how found — are also recorded.

All this is fairly straightforward, providing you have a large enough piece of paper and keep your head — sometimes literally! Now look at figure 2. Gosh, what a mess. One slip of the pencil and you could land yourself in real trouble! What's worse, nearly all the paths are one way only. AND, what if all four locations had the same description? I have labelled them ABCD just for the purpose of this article!

Just amazing

As you've surely guessed, you are in a form of maze. Directions no longer necessarily follow the logic used elsewhere in the game. Going west, having just moved east, is not likely to get back to where you started! Figure 2 shows a four location maze but rarely will you find one with so few 'exits'. You can often find your way out by just testing the directions keys at random, but this is seldom the whole story and is unlikely to help you solve the adventure. Either you have visited a number of valuable items during which your food or lamp is running out — and of course the program is structured so that it is then impossible to reach more food/lamp etc. Or hidden somewhere in the heart of the maze, is something vital to your wellbeing or vital to a successful conclusion in the future!

You have got to face up to the problem of mapping the maze. Mazes seem to be an accepted part of most adventure games.

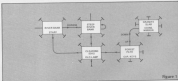


Figure 1

up to whenever you have reached it that time. Adventure games are very rarely written with the intention of a player sitting down and solving them in one sitting! They are meant to provide you with days or weeks of playing time before you reach a solution.

To use the SAVE facility fairly often — do not overwrite a previous SAVE all the time, otherwise you may find that the objects you now hold are the objects you need — one of those previous SAVES may save you a lot of time! Using this form of recursive approach is not cheating, it is part of the system by which you learn your way around.

Right... you may find yourself in a maze — so QUIT! Quit DAD your last SAVE and approach the maze carefully! Make sure you are carrying as many objects as the game permits — now when you enter the maze, drop something at location 'A'

Some people would say that they are unnecessary as they tend to be similar puzzles. But at the turning of the program's next guess, so too does the type of maze they produce and we the players have got to look for clues to pinpoint what version we are being called to solve!

The 'original' type of maze is not so difficult to overcome and the basic procedure used to solve it, may well form the core of how you approach its many variants. Firstly, you must use a different form of 'mapping', something like figure 2 would produce a very messy and unreliable map of the area altogether.

Obviously you will not always know in advance that you are about to enter a maze! So this immediately hampers, hence the need to make frequent SAVES of your progress. Nearly all of the better adventure games include the facility to SAVE your character's position



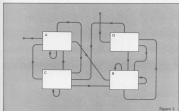


Figure 1

we'll just use Fig. 2 as our maze; say "a staff" lying around? Instead of following our previous mapping technique, we'll draw a separate, and unconnected, line for each location.

Although the descriptions are the same, location "W" will also have "a staff" lying around! Move in any direction — if you moved south you will return to location "A" — and will see the staff, but if you go east you will come to another seemingly identical place — but without the staff! Go along something else . . . a cup. Last time, and you are back in the cup, west, and get another location . . . drop some keys. North . . . to and behold, back to where you dropped the staff.

something extra, then it is still unique — mind you, this is a pretty dirty trick and certainly gets the adventure pumping, and you realize what is happening!

Once you have mapped your maze, you can either retrace your steps and pick everything up or QUIT, reLOAD and travel through carrying your precious (you hope) artifacts with you — just don't forget where you are!

Although this kind of maze is disappearing in favor of more complex mazes — it still points the way to how to solve most if not all mazes. You have got to find a way to **uniquely** define each location.

Perhaps your maze is a mixture of the two above types — could! Just keep your cool and hope that there is a logical solution. "You see on a path in a forest", "You see on a path in a forest", "You see on a path in a forest" — how about **EXAMINE TRIES to EXAMINE PATH** — you may well find a clue at one or all locations!

Another obvious one is for your location to also something you are already carrying — perhaps your sword tumbles or that magic mirror you have been holding onto, revealing what use it is — is showing different reflections as you move around the maze!

The plots and puzzles within mazes have by no means been using dry and a well thought, logical adventure maze can still give tremendous satisfaction when solved!

Thorny subject

Much has been written about tape copy programs. We all know that one of their primary uses is to check the software houses out of their rightful dues. All of them warn about this usage — but still, thousands of people "just make a copy for a friend".

It is of course nearly impossible to stop software houses can tackle the problem in three ways: (1) *obscure* to make their programs "uncopyable" (2) the *latter* or (3) increase the price to make up for losses.

If you want a good product it is almost certain that it was costly to produce. Often, teams of programmers have worked on different aspects — music, graphics, etc. — for months.

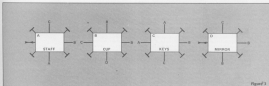


Figure 2

To be sure you have mapped the maze you must try every possible direction from each location. Having done this you will end up with a map like that in figure 1. You must try every direction; programmers are quite devious enough to make the only acceptable "NW" move in the whole game, like way out of the maze to somewhere vital!

To solve a maze such as this you must be able to carry enough objects to drop in the various locations! If you think about it, you will realize that it is possible to solve a maze with **one** line object than there are locations, if only one place does not have

Take care

Sometimes the solution to a maze is staring you in the face — literally. Read the descriptions of all locations, **very** carefully. "You are on a raft in a storm" except one there are sharks all around you" looks very similar to "You are on a raft in a storm" except one, there are sharks all around you". It is easy enough to spot the difference on this printed page but when those two descriptions follow one another on your screen — will you always notice the extra comma? Or a space, or a full stop at the end of one of them?

Having said my piece, let us look at the other side of the coin: (1) it is useful to have **your own** back-up, in case of catastrophe and (2) although many adventure games are now on "Turbo Load" (and it's many variants), some take a long time to LOAD . . .

I recently got a copy of HYPERMATH for my CMM (as — one fixed by DOSGIT) of Blackgold. The entry requires a Hyperpanel copy of a standard LOAD system to be made. Not all tapes will be accepted but I would certainly recommend having one to hand, as the old chance! Inquiries — that's me!

**Need some help in
compiling your
Christmas list? Let our
reviewers guide you
through another
jungle of Commodore
software.**

House of Usher

★ ★ ★
Astral
66.95
CBM 64 + joystick

QUESTION: COULD YOU BE responsible for the fall of the House of Usher? Answers require simple, yes. But it will take some doing. It's not that there's anything desperately rare to get used to or, indeed, anything desperately difficult about it. No, it's just that there is a lot to get through. The concept of the game, however, is relatively novel although perhaps a little disappointing in terms of excitement value. But on with the game. The escaped and twisted minds of generations of mad Ushers have devised a variety of terrifying challenges. On entering the ancestral house you are given a choice of nine rooms to enter in each of which there is a game to play. As stand alone games go it's fair to say that they are not up to much. Better to say, although they are all different, there is a touch of the 'darker things' about them all. However, taken as a whole they are quite challenging because you have to essentially negotiate them all before you are allowed to enter a further two rooms to complete the game. Whether you live long enough to maintain the fall of the House of Usher is another matter though.

E.M.

Terrorist

★ ★ ★ ★
Wings Games
12.95
CBM 64 + joystick

THE CITY HAS GOT A NERVE CASE as the terrorist attack on Red London, the head of the anti-terrorist squad has been given the task of putting a stop to all the mayhem. First choose your talk: private, sergeant, captain or colonel and then study the map you have been given. Don't take too long because the longer you take the more points you lose. There is a list to

SOFTWARE



SPOTLIGHT

Car Journey
★ ★ ★
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THIS IS A SCORNET/CASSETTE educational package which deals with sundry aspects of road transport.

The booklet starts with a brief history of roads starting with the Ridgeway, a possible stone-age road, through Roman roads and Macclesfield modern motorways. The rest part of the booklet deals succinctly with the workings of a car. Further sections deal with petrol consumption and the layout of roads in Britain. An interesting diversion from technicalities is a short extract from the 'Mind in the Willow'

(read where enjoys motoring... if you didn't know), a footnote suggesting that the child reads the rest of the book. Finally there are several games to play on the theme of Car Journey. The booklet is very well thought out and presented.

The program supplied in the package endeavours to put into practice what has been learnt in the booklet. You play the role of a delivery man and must make money from your service by using your car, petrol and the routes available efficiently. Calculations have to be made throughout the game. The graphics are simple but effective and can be used in further exercises suggested in the booklet as well as the main routine.

Overall the program appeared to be the winner



section of the package, but used as a whole would serve as a good addition to any classroom.

M.L.V.

the trouble spot. To transport you around the attack zone at speed, a helicopter has been placed at your disposal. You also have a police car and a boat to use in uncovering the route and the river in the area. You transfer from one to another simply by pressing the allocated function keys. You can use the helicopter to transport both the car and the boat to other parts of the attack zone. Points are scored for uncovering the route, hitting the attack locations and points are lost for going in the wrong direction as not moving at all, but watch your fuel levels closely. Fuel can be transferred to

the boat and the car from the helicopter when it runs out but the helicopter must take on more fuel from the fuel dump before it crashes. The helicopter has three 'lives'. All locations under attack are revealed by a shell burst and you must rush to them immediately. When you get there the screen changes to show the area in more detail. Silhouettes of the terrorists will appear but you must get in the line shot. At the end of the battle the casualties are counted and the location declared either safe or in the enemy's hands. So do your good deed for the day. A great game.

E.M.



Borjak

★ ★ ★
 Channel 5
 £4.95
 CBM 64



ISN'T IT NICE TO KNOW THAT at the end of a long and tedious day you can relax and rest assured that Borjak, the amazing huggery leader from Borjogus, has been banished from whence he came? Apart from the fact that the joystick option was unresponsive, an irritating misfeature, to be sure, about the best part of this game was the 'game over' screen which finally put Borjak out of his misery. The object of the game is to get Borjak back to his "smoking intergalactic seat" avoiding a variety of obstacles emerging from the right of the screen as it scrolls from right to left. You'll be glad to know that there is a pause facility although I managed to avoid temptation. *trough* **B.45**

Chess

★ ★ ★
 Microsoft
 £6.95
 CBM 64 + joytick (optional)

THEY SAY THAT OLD GHOSTS are hard, well something like that! It's true, I am having real difficulty with this one. Chess by Microsoft is a boring game. The concept of the game is to retrieve the Power Jewels from a rather nasty mission. With this delectable albedo you will find poison tipped spits, moving floors, spiders and the Ghoul.

Your man, who resembles a distant relative of a Pacman with legs, has to traverse four floors of this mission to get to the Power Jewels. The only catch you have are the occasionally spiky to step on and the evil Power Jewels to eat. Upon

absorbing this apparition the Ghoul, who is slowly descending on you, disappears for a few seconds allowing you to continue your task unhindered.

If you do die, and I can assure you it's very likely, the Ghoul will grin with pleasure. But you soon return to try and complete the level and return to harder screens. When your little Pacman completes the fourth and final screen the Ghoul disintegrates before your eyes and Pacman jumps up and down.

The game also contains a facility to turn sound off, which includes all the sound effects. It's a very last game as you have a time limit to complete each screen in. There is a high-score table and a pause feature as well as the last loading screen.

Bristles

★ ★ ★
 Microsoft
 £5.95
 CBM 64 + joytick

AT LAST A SOCIABLE computer game and a good one into the bargain. Bristles has a fast plot option and gives each player the chance of playing two positions. And that's the object of the game...simply to paint all the rooms in a variety of houses as quickly as possible. There are six skill levels to progress through and eight houses in each skill level, so it's not exactly an easy task. It's not just a high score you're after either. On each skill level there is a hidden message which will appear in part after every house you complete the painting (usually an "interesting" challenge) or to discover all the messages (what, no challenge? Well not quite. In fact there are quite a few. Each player starts the game with one paintbrush and gets an extra two for each house painted but also loses one for each mistake made. There are lifts to help you get from floor to floor but unless you time it right they will splutter you into the basement. There are also three ladders located in the



basement but again unless you are quick, the lifts will splutter you. But the major obstacles are the flying half pints of paint which you have to jump over or duck under and the dumb hackers. The hacker checker is highly intelligent and will chase you down rooms to rooms. And there's more. Bristles the first is based on real-life hand-painted walls and the only way to stop her is by giving her a message. There are also the many pipes to watch out for which just happen to occasionally protrude through the Boxes of some rooms. Oh, I almost forgot: sometimes you are painting with clear varnish and at other times you are painting in the dark. Come off painting and decorating a bit! Well I'm not surprised but definitely give it a go before you give up completely. **B.46**

Ant Attack

★ ★ ★
 Quicksilver
 £5.95
 CBM 64 + joytick

THIS GAME HAVING BEEN A great success on the Spectrum has now been converted for the 64. As the first of it's original screens, there was great acclaim for the unusual use of the 3D effects. To my mind the effects on the 64 are also very good albeit not quite as impressive as the Spectrum version.

Notwithstanding the absurd spot on the cassette label, the plot is tolerably simple. You control a small figure and attempt to locate unknowns scattered about the deserted city of Antioch. The buildings of the city are represented as blocks and you get a nice perspective view of part of the city. As you move about, the scene scrolls diagonally showing more of the area. By pressing any of the hardware buttons, you can choose any one of four views of the area. The main problem is that the city is occupied with large quantities of giant ants which have this irritating habit of killing our hero. To evade

death, you can either try to eat our friend, climb up a building or throw one of your limited supply of grenades.

When you encounter one of the lost souls, they make a suitably nasal comment and, if you don't run too fast, follow you to safety. You must be careful, however, to protect both yourself and the rescued victim.

The graphics are superbly simple consisting of grey lines with different shades of grey to give perspective. The movement of the little man is accurate in as much that you can climb over, through and around the buildings. The animation of all figures is superb. The use of sound, on the other hand, was weak.

Overall, whilst the visual effect is flawless, I found the play rather boring. After the first half hour, I found myself dearly wishing that something new would happen.

A.E.W.

SOFTWARE SPOTLIGHT



High Noon
 ■ ■ ■
 Ocean Software
 \$7.99
 CBM 64 + joystick

SO YOU FANCY BOURN(E) AS A bit of a cowboy do you? Care to live out your wild west fantasies? Already, here's your chance. High Noon brings beauty on this much-loved world to joystick a real little game plot. Needless to say you are the good guy in the scenario and, armed with your pistol, it is your responsibility to keep the peace in a non-to quiet frontier town. You are up against a desperate gang of bandits intent on stealing the gold from the bank and the girl from the saloon. They'll come on horseback and on foot and armed with dynamite or just their six guns but, whatever it is it is bound to lead to a show-out on main street. To prevent the loss of your beloved points you have to keep the girl and the loot safe so shoot first and ask questions later and remember, they won't shoot when there is a chance of shooting each other...the

cowards. Of course there are a number of screens to progress through each of which is increasingly difficult. Eventually, if you're good enough you will track them down to their hide-out in the hole in the wall where you will be faced with the final showdown. That's always assuming you escape the clutches of the overworked undertaker, Rippe Monte.

E.M.



Cyberton Mission
 ■ ■ ■
 Microposers
 \$8.95
 CBM 64 + joystick (optional)

48

THIS IS YET ANOTHER COPY OF yet another successful game for the Atan. This is a copy of a game called Shamus in which you have to run through rooms searching for treasure while eliminating clones, drones or as they are called in this

game, spinners, Clones, Cyberoids and a ghost of a player just. The difference between this one and other copies is the task you have to perform.

In this game the player is told what treasure has to be retrieved and put in the safe. On the first level it is one treasure, on the next it is two and so on. I must point out that just before you enter a level there is this superb sound effect. It only lasts for a second or so but it's great. Anyway, there are 16 rooms on each level to explore while looking for the treasure, an indicator in the top right-hand corner

Secret Agent
 ■ ■ ■
 Fitzmaurice Software & 908
 Macintosh Inc.
 \$8.95
 CBM 64

THIS IS AN EDUCATIONAL game with a difference. It comes in a package of cassette and booklet. The booklet deals with real-life spies and those from fiction. After reading about spies, the reader is given activities to try, either writing a spy story or doing further research. To be a successful spy you will need to understand about codes and spy language. Similarly, a good grasp of Europe and it's sites is necessary. The booklet gives information about all these aspects and suggests extra activities. Having done the background work from the booklet, the game puts theory into practice.

Your aim in the game is to capture an enemy agent who is travelling about Europe killing off your resident agents. You have secondary aims in that you try to operate as fast as possible and to keep costs down. Fail to keep to your

budget and to operate quickly and you will end up pre-empting behind a desk. A high score may end for a secret agent!

During the game your agents will send intelligence reports going clear as to the whereabouts of the enemy. Some of these reports have the added difficulty of being in code. You can get help from headquarters to de-code the message but it costs extra money. As do messages from informants. When you think you know where the enemy is, you can dial up a time table of flights and buses out of town and to other cities. You can then travel to a city where you think he is and, with luck, capture him.

This is a very good pack up in that it brings together all aspects of education. These include geography, history, the need to perform simple decoding and even the ability to use the 24 hour clock.

In all, this is an excellent package which can be used as a fun way to spend time at home, or can be used as a project for use at school.

M.L.M.

indicates which room and what level you are in.

I mentioned earlier the existence of a ghost. He cannot be killed but he can be hunted. Obviously as you travel through each level the spirit, when viewed, isn't stationary for a long period. The game has reasonable graphics with good sound accompaniment. It has a save facility and a high score table. I would have preferred the treasures and the safe in a different colour as they are occasionally hard to find.

S.L.P.



Falcon Patrol 2

★ ★ ★ ★
Single Games
£7.95
CB&M 64 + joystick

YOU HAVE CAPTED THE upper hand in the war with your deadly energy and it seems to be your VTOL that has done the trick. But now the enemy is about to launch a last ditch attack to win the war and it is up to you to prevent them

from succeeding. For the fourth year VTOL has been armed with both air-to-air and air-to-ground missiles. Although your VTOL is nippy and highly manoeuvrable, it requires careful handling. You can't just turn around and chase the enemy, you have to slow down first. And the enemy is no pushover either. Although they have no VTOLs,

they have three types of helicopters: transports which drop flat batteries and radar jammers, gunships which can shoot you down, and sales designed to lure you into making mistakes. A radar display at the bottom of the screen will indicate the enemy's position unless radar jammers have been dropped. Fully fuelled and fully armed

the VTOL carries 100 missiles but you are bound to need to take on more weapons and fuel during the course of the battle. You do this by landing on the strategically located launch pads which contain serviceable until 75% are destroyed. But there are dangers in this. You are vulnerable and the enemy knows it. So beware otherwise your 75% never make it through the 6-levels.

R.M.



Magic Micro Mission

★ ★
QuikBalls
£7.95
CB&M 64 + joystick

THIS GAME OFFERS TWO GAMES OF different but unexceptional styles. The first game involves pseudo 3D movement effects to simulate the slow forward from the cockpit of a spaceship. The idea of the game is to shoot approaching nasties before they reach you. You have a cross-hair sight to aim your aim. The graphics and use of colour were very nice but the actual action was appallingly unexciting.

The second game is a maze type and, much to my surprise, was worse than part one. You wanted a robot and must move onto a maze endeavouring to catch various BCAs (Bread Only Molecules). Your movement is impeded by patrolling monsters and BAW chips. If you get into trouble you can double the opposition for you loose 5000 points. Since scoring was low, I didn't have this option available very often. Crucially this segment was only just average.

Overall, I found this package weak and really not any better than average.

A.E.W.



Ballooning

★ ★ ★
The Way Software & Bill MacGibbon
£9.95
CB&M 64

USING THE WORDS OF THE accompanying booklet, "Ballooning is an accurate simulation of a hot air balloon". In fact it was so accurate that the second book so long that it was very easy to fall asleep, the missing the whole point of the game (you should be observing the dial giving your altitude and fuel etc.). You start off at flying school learning how to fly and land your balloon. Following this, when you think you are ready, you take your flying apt and hopefully gain your wings. Should you wish to do a little extra work, you can keep a record of your altitude during your flights and try to make a duplicate flight. The booklet accompanying the cassette supports alternative games which you can play using the package.

The booklet covers many aspects of balloons and ballooning starting with their history through to the scientific principles of their flight. Suggestions for further research are provided so that the topic can be stretched as far as you want. An important aspect of flying is the ability to read maps and estimate the effects of wind. Again this aspect is discussed in the booklet.

The display gives a side view of your balloon moving across the terrain. Along the bottom of the screen are instrument dials showing altitude, rate of climb, fuel and temperature. Overall a reasonable package although the program seemed a little slow and tedious.

M.L.M.



Phase 4

★ ★ ★
Channel 4
£9.95
CB&M + joystick

NO CONCESSIONS TO THE mainstream with this rapping game. It's straight in on the deep end with the kind of difficult levels that killed video gaming as a past sport. No sooner had you just your 10p in the slot when the game was over. There are ten or so different types of alien craft to zap more of which are firing at you at the same time and all of which have a different value in terms of points. Take the first screen for example. It looks like you're defending the planet and not only do the aliens fly across the screen steadily dropping turrets but there's one that homes in on you as well. And, with such a highly coloured background it's hard to tell where anything is, let alone avoid it. Turn straight forward this, without taking a shot yourself, pushes you into the next screen where you have a quick change into a more horizontal aspect before moving back to screen one's targets on an even more technicolour background. What else can I say? Still having played the game and written about it, I can't quite make up my mind whether it's good or bad. One thing is for sure. It's extremely irritating to play and lose so quickly.

R.M.

See-Saw
★★★★
QuickSilva
\$7.95
CBM 64 + joystick

IT IS A GREAT TREAT to review a game in which you do not chase anyone, are not chased by weird and wonderful characters or fire at space ships or monsters. This game is none of these but is so simple to learn both addictive and challenging.

You are the Great Master in the guise of a little blue blob. Your fellow brothers have been captured by the wicked lord and his henchmen and your task is to rescue them from his castle. The evil lord stands on the parapet of his castle and hurls bricks trying to dislodge you from your vantage. However, you can see these bricks in your advantage by using a falling brick to propel a stationary one from your spot-on in the same manner as some animals at the

circus (principle of momentum and all that). You can also throw propelled rocks and, with luck, dislodge the lord's henchmen from the walls. Kill the henchmen of sufficient henchmen and you can get yourself propelled over the castle walls without being

grabbed. The lord and his henchmen are cowardly and once you are in the castle they flee enabling you to rescue your breack.

On the next level, some of the bricks are heavier than others thereby making your task more difficult. None I am yet to progress beyond level 2.7 raised questions on how things proceed from there.

Obviously this game is simple but brilliantly effective giving a cartoon like quality. The sound effects are certainly different, the moaning henchmen sounding like someone eating a rubber band for lunch if you see what I mean. If not, try it, I should add that this program is written by the Andromeda software people, and their pedigree speaks for itself.

This is a game of dexterity and strategy, which, if you are seeking that unusual experience, is the one to try.

M.L.W.

SOFTWARE SPOTLIGHT



Boulder Dash
★★★★
Starsoft
\$6.95
CBM 64 + joystick

SHAPE ROCKFORD CRACKS INTO action, ready and waiting to be opened through the caves in search of jewels. He has to collect the indicated amount of jewels before the mysterious door to the next cave is revealed on the screen. Of course you might not see it at once because the game has a fairly large scrolling screen. The main danger for Rockford in each cave are the boulders which drop into the tunnels that he navigates in search of the jewels. Although they drop predictably enough, they still make a pretty scary jump out of Rockford. Apart from the boulders there are the growing amonias to block, rivers to avoid, enchanted walls to activate, bunter flies to turn into jewels, in name but a few delights of this excellent arcade game. There are sixteen caves altogether to work your way through and five difficulty levels for each cave. And there is a bonus life too. Forty five hundred points you score adds to the twenty three original lives Rockford starts the game with. What's more, he needs them.

M.L.

Strontium Dog and the Death Gaudier
★★★★
QuickSilva
\$7.95
CBM 64 + joystick

IF IT NEVER ACHIEVES ANYTHING ELSE, this game must have one of the longest titles in the market, from the instructions the Strontium Dog is really a mutant called Johnny Alpha (don't the author read Jerry Harrison?). Our hero is on the trail of a couple of renegade mutants called the Six Brothers. The action takes place on the Planet of the Brevogales where we find Johnny shot down in no man's land. Hence, our man, of the mutant must cross the planet shooting, avoiding a wide range of nasties.

From the nature of the task, you won't be surprised to hear that the game is of the scrolling type. You are shown the side view of the planet. This steadily scrolls from right to left giving the appearance of normal movement to the right. Scattered along the way are animated nasties, plants and the occasional rock. Collision with these has a nasty effect on our hero's strength. Excessive depletion of his power results in his demise. Occasionally rather useful objects (shel valuable pods). You run very fast speed across the planet, but this rapidly depletes your strength. If trouble looms you can use electro-blasts

to dangle the opposition or fire bombs to move back from trouble.

Graphically the game is very nicely done with plentiful use of raster interrupts. Similarly the use of sound is effective and suits the scenario perfectly. Along the bottom of the screen is an overall view of the planet showing your progress.

OK, how does it play? Well, at low levels it doesn't present a significant challenge and soon becomes rather boring. This is aggravated by the fact that completing each level simply puts you back at the start of the next level. In fact, after completing the last screen, it put the cassette to bed... permanently.

A.L.W.



Time Zone

★★★★
 Channel 5
 £6.75
 CBM 64

TIME ZONE IS ONE OF THOSE straightforward, honest, no-gimmicks capping games with a



playing zone which scrolls from right to left. You are the pilot of combat craft Alpha-4 flying the evil Terion out of the galaxy. The problem is remembering them when you see them because they are a race of shape changers. Their shape depends on the time zone in which they choose to travel. In the 20th century they attack as helicopters, U.S.A. tanks, cruise missiles and tanks, in the medieval era as castles, armies and winged horses. Typically they are temples and pyramids and in the prehistoric era prehistorically, snakes and volcanoes. Presently they are dragons and assorted space junk. The sole object of the game is to destroy them once and for all, but every time you clear all five zones the difficulty level of the game will automatically increase. Can you win you must well wish them if you don't by who knows.

8/14

Chiller

★★★★
 Mastertronic
 £1.99
 CBM 64 + joystick (optional)

YOU'VE SEEN THE VIDEO. You've seen the making of the video, and you've heard the single. Now play the game! Yes, you too can be a werewolf with Mastertronic's Chiller. I was, when I saw the package, very sceptical of this game, but now I've played it, it could go on to my top twenty favourites of all time.

I think the best way to describe it is as a high-resolution graphic real-time arcade adventure of that's possible. The basic idea is to rescue your girl friend from a house of the dead and get her back to the car. The problem is that you have to get through five areas of Zombies, collecting the magic crosses.

Once you get to her you then have to get back (with her) to the car. Both you and the girl have to collect the crosses. The blue for you and the red for her.

Both characters are played with the same joystick by pressing the fire button and this automatically switches to the other character. The graphics are superb and the sound is very good.

11/15



Punctuation Pete/Wardfinder

★★★★
 Research Software & HIS
 MacOffice
 £100
 CBM 64

DID YOU KNOW THAT 'London' is a Celtic name meaning 'the place of loadens' or that 'Punctuation' is Greek meaning stone term or that 'Chester' comes from Cestre meaning Roman fort? All these snippets come from the booklet accompanying 'Punctuation Pete'. This is one of a series of educational packages comprising a cassette and booklet. The booklet contains a poster, binary, mazes and lots of follow-up activities, all relating to words and English.

The first part of the booklet covers story writing. Cartoons are used to illustrate the start of a story followed by a cartoon plus text for the next section. You are then invited to complete the story and pictures. There are other sections covering dialogue writing and a series of word games, crosswords, anagrams

and code breaking.

The cassette contains two programs. The first, Punctuation Pete, comes with three difficulty levels and gives a passage for the child to correct. The keyboard is used to correct this as he walks the lines of paper, stopping to allow the child to choose what to do. When the passage is finished, Pete will mark the work and if it is correct he will reward the child by jumping and waving. The second used is a large primary school type font, which was both attractive and easy to read. The use of animation was smooth and skilled.

On the reverse of the tape was a Thesaurus which carried a dictionary of about 1800 words through which the child could discover the relationship between words and the concept of the simile. These words were used in hangman and anagram games.

Overall this is a good package which makes the English language fun (not an easy thing to do) and is suitable for use in both the classroom or at home.

11/15

Punctuation Pete



Felix In The Factory

★★★★
 Mastertronic
 £6.75
 CBM 64 + joystick (optional)

THIS IS ANOTHER YALANT attempt at emulating the game of Apple Panic. It's a variation on a theme with an interesting new twist, but it's still basically a ladder game. The idea of this game is to keep the generator, at the bottom of the screen, running. This is accomplished by running up the ladders and jarring the oil cans. When you have returned to the generator and filled it up, the can disappears and you

have to start again.

While you are innocently maintaining this machinery, the Gremlins are trying to knock you off the platform which you have to traverse to get the oil can. This is done by using the picklock, which is on one of the platforms, you try to knock them off the floor. Also, after a short time, a rat occasionally makes a dash across the platform. If you are lucky enough to have the bag of poison with you and you drop it in front of the rat, you gain extra points for killing it.

Meanwhile, at the bottom of the screen the generator is getting low on oil and, sure you can only carry one thing at a time, it's a race to the can again. One thing to be careful of is the conveyor belt at the bottom on which you have to run because, also moving on the belt are numerous packages which you have to jump over. If you get knocked off or knocked over, you really lose a life. The sound isn't much to write home about but the graphics are possible.

11/15

Gutbert Enters the Tombs of Doom

Quicksilver
\$2.95
CBM 64 • joystick

AFTER PRODUCING A HUGE volume of Dragon software,

Merendel are now into the CBM 64 market. This program continues the theme set in the Dragon by featuring Gutbert, an over-weight schoolboy with a taste for adventure. As clearly suggested by the title, this game is a graphical adventure set in a maze of interlinked rooms. (I believe that there are in excess of 200 of these!) During his travels, Gutbert

must collect a number of things. First, keys are necessary to open doors barring his route. There are lanterns, rings, golden apples and gems which yield points. All of these items are found in niches in the walls.

Your travels are impeded in a number of ways. There are deadly monsters which appear in the rooms and will kill you given a chance. You are, of course, armed with a laser with which the enemy can be shot. The air between doors is limited and gradually decreases with time; you must therefore remember to unlock doors regularly before air runs out. There is one other method of protection. To aid your movement through some rooms, there are magic transporters. You have three coloured lamps which can be used in rooms of the corresponding colour. If the

lamp is full, you can freeze the enemy group. You must then refill the lamp by scoring points. Filling a lamp also lights up letters in the word CATACOMB written at the top of the screen. When all of the letters are lit up, you get another life.

Overall this is a well designed game with lively graphics and a jolly rather than a scary sound track. Certain of the rooms are designed so that ruzzing and tactics must be adopted to collect treasure or open doors. As with many games, the actual system for solution is hard and can be resolved given time. You can, however, vary many of the game parameters to increase the difficulty of the game. My first is room 171 and that leaves me feeling exhausted. In all, a nice one.

A.L.W.



Summer Games

Quicksilver
\$2.95 (also) \$4.95 (joystick)
CBM 64 • joystick

I HAVE JUST SPENT A VERY enjoyable afternoon teaching, diving, pole vaulting, gymnastics, running and shot throwing and all without leaving the comfort of my computer corner. Quicksilver's new game jumps on the Olympic bandwagon and does it very well. The program starts with the opening ceremony. The flame is lit and doves are set loose to fly across the screen. You are then invited to enter your name and choose the country you represent. An approximation to your national anthem will be played if you wish. Up to 16 players can participate. You can then elect to either be a single event or partake in all. If you wish you can even practise any events you choose.

In the diving you have four dives and you can vary the dive (and turn) by deft manipulation of the joystick. Next is the pole-vault which needs a lot of dexterity and timing to clear the bar. The next events are the 400-metre relay and the



800 metre dash. Both races are against the clock as are the two swimming races.

The gymnastics are great fun especially as everything is tied a vault the gymnast either landed on her face or rear end! The most difficult of all was the shot-put, probably because it was the most realistic. You have to shoot either single or double darts from several positions. The simulation was most accurate and even included the effects of shot sizes.

The graphics in this game are of a very high standard with detailed, high resolution backgrounds and excellently animated sprites. Overall this is an excellent program and is probably the best 'Olympic' program available.

A.L.W.



Swoop

Micro-Power
\$2.95
CBM 64 • joystick (Optional)

CAN THIS BE TRUER? I'M SURE it isn't—I think it is. Yes folks, it's Galaxian time again. Swoop is yet another iteration of that old game which people just won't let go. The difference between this one and others is that it's Galaxian, sorry, Space Culture gets past you it lays an explosive egg in your path. Which means if you touch it you blow up and if you don't you blow up anyway! and get blown up anyway!

As you progress through the levels the Galaxians, yes, space cultures get more vicious and it does require a lot of agility on the higher levels. Yet again, the move on this Micro-Power offering is outstanding and a nice graphics touch has been added. The stars in the background move at different rates, giving an impression of depth and when your craft explodes the debris is scattered in a wide arc.

The game has different skill levels and a high score facility. There is also a pause button. So in all fairness it's not a bad copy of Swoop, sorry, Galaxian.

A.L.W.



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Exploit the graphics capabilities of the Commodore 64 with the right tools. Simon Palmer and David Crisp review two graphic aids currently available.

DRAWN TOGETHER

KOALA PAD TOUCH TABLET
Koala Technologies Corporation
\$79.95

Commodore 64
I KNOW KOALAS COME from Australia, but this one is definitely American, being an art package of a high caliber. It comes from the Koala Technologies Corporation, the software is written by Audio Light UK and distribution is in the care of Aculogistic.

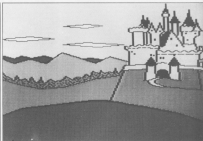
"Koala Pad" Touch Tablet.

Attractively packaged in a bright red box, Koala's touch tablet comes complete with operating instructions for the software and touch tablet, plus a stylus for drawing on the touch-tablet.

Readers might find useful the following brief explanation of how a basic touch-tablet works. Imagine two sets of wires running north to south and east to west. When the stylus is pressed onto the board it pushes down on to the wires and contact between the horizontal and vertical wires induces a x and y coordinate in one form or another. These are then translated into signals which can be understood by the computer.

The software which is supplied is available on tape or disc and, as usual, it took a long time to load from tape. In this interval I took the opportunity to flick through the manual and immediately observed that it was written for the disc-based system, with just an insert for tape-users. However, since the Koala tablet is so rare to see, the manual is gloriously short and readable.

The Koala pad itself is made of a very strong plastic, and is plus into Joytask Part 1. A long cable facilitates armchair operation and therefore greater comfort. It uses two



regions to gain the x/y/z location information from the pad. For example, here is a simple line routine which changes the colour of the screen as the stylus is moved around the touch-pad:

```
10 A=PIE(51287)@-PIE:
   (5428)
20 PCH(51280),A PCH
   (5381)
30 GOTO10
```

It's crude but efficient! A number application could be the creation of a new musical instrument by using two-different notes registers on the MIDI chip. However, I am digressing from the main thrust of this article — it is so easy to indulge in these fascinating topics!

Koala Painter

In conjunction with the Koala Pad, the Koala Painter opens up a new world for the user who wants to create high-level graphics with relative ease.

With quick pen strokes you can switch from facility to facility, from point brush to paint brush. This assembly is by no means a direct competitor to the Photo Graphics machine, but for around £80, it is good value for money.

Once loaded, the machine displays the painter menu. It is divided into three sections: commands which flash when activated; brushes, under which relevant items a small black appears; colour palette on which 16 different colours are displayed, together with a further 16 painted colours below them.

There are 17 different commands, of which 14 apply to graphics. The remaining 3 are facilities for erasing the total picture, saving or loading a picture, and leaving the last penstroke made.

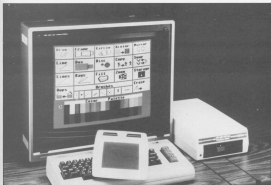
When you enter the message mode you can select either type of disc for your medium. This facility also enables you to install a new disc without

exiting the program. The "Copy" command is very useful indeed, because it is almost certain that at some time when you are using the painter, a mistake will be made. This command will remove the last penstroke or "fill" made on the picture, enabling you to start it again. The first command simply removes the picture on the first screen, leaving it ready for another classic masterpiece.

The 14 graphics commands enable you to simply draw or construct a picture from the box or circle commands as well. A selection of the commands which I must mention are: "SCROLL" (American spelling, not reset) which will change a particular colour in the picture to another by incorporating the new colour desired and then placing the cursor pointer over the target colour.

The next command is called "Balance". This simply splits the screen into quarters and copies





whatever is drawn in one section into the others, line for line. However, if after completing a complete picture, you want to transfer a particular object which you have created to another space in the picture, the "Arrow" command will not suffice, as the object in question is already on the screen; this is where the "Copy" command comes into its own.

Koala's "Copy" command reproduces the desired graphics and, since it is square around the particular shape you're after, it also reproduces the graphics on the entirety of the command's action. Perhaps the user could benefit from the useful effect I picked up when playing around with this section; this involves the use of another command called "Swap". Basically what this command does is to transfer the user from one screen to a second screen. I found that, by transferring the graphics to copy to the second screen, and then by using the "Draw" command in the same window as the background, I could eliminate the peripheral graphics not required, and then transfer it

back to the original screen.

Finally, in the command section I decided to see how accurate the "Fill" command would be. The manual says that it can spill into other areas of the picture if the graphics are not completely enclosed. This is logical but attention is drawn to the fact that you can only use 3 colours and a background colour in a given space.

With this information in mind, I started to play with the "Fill". It is most efficient but colour-collision does occur when more than the stipulated number of colours are used. I feel that this is not so much due to the limitations of the software, but possibly the computer itself restricts the most ambitious inclinations of the exploring user! (Yes, even the IBM 64 cannot do everything!)

Brushing up

This package contains more brushes than Bob Harris's paint box! Seriously though, if brushes are supplied in the Koala Painter from a single line to five lines, or even a very thick brush. So, in conjunction

with some of the commands such as "Frame" you get some very pleasant designs to play with. Instead of getting a single line on the screen you get five or, if you wish, by using the "Draw" command, you can literally sign your signature on the screen. Mind you, it does not run fast enough to facilitate a normal writing speed but, at medium pace, it will give a fair representation. This is a good way of discovering how fast a package runs, and how accurate it can draw.

We now move on to an important part of the software — the "Colour Palette". It is most interesting to see how this section has been designed. There are 16 solid colours and 16 patterned colours from which to choose. For example, you wished to have a patterned colour comprised of red and blue, you would move the pointer over the red solid square and press the button on the pad. The border of the screen turns red, and the patterned colours all now contain red as one of the two colours. You then simply move the pointer over the desired patterned colour which appears under the blue colour.

You can now paint in the patterned colour, or more frequently it would be used to fill in a section of the screen. There is an arrow marker at the side of the Colour Palette which indicates the type of colour being used — either solid or patterned. Thus you do not mistakenly use the wrong type and have to resort to the "Copy" command in theory, since you have available 16 solid and 16 patterned colours, 256 combinations are achievable.

Pictures outside the program

It is most likely that, if you create a good picture, you will, like all artists want an exhibition for family and friends to admire your skill. You will also want to show it without all the hassle of loading the art program. Well, Koala have had the foresight to put a program in the manual which will enable you to load the picture from disc without using the Koala Painter. You may have already spotted that I used "fill" and not "tap" as well. I would have thought that since

most computer owners at present have only cassette and not disc, it would be more advantageous to include a tape version of the program. As I said earlier, the manual is written for disc users and not the cassette-tape populace. But even so, this does mean that if you are an adventure fanatic, you could design the graphics for your latest adventure, and by using the program in the manual, display them via the disc.

Now, throughout this article, I have not mentioned anything about example graphic screens. The manual and all the other bits of paper coming with the Koolha Pac do not mention any extra screens so, obviously, there aren't any. Missing — there is a picture contained in the tape directly after the program itself. This depicts a simple screen and is quite good. So why did they not say something about it in the manual? I don't know — people are funny!

To conclude

Although this is not the only package available for graphics, considering all factors, games and entertainers, at £60 or thereabouts it is jolly good value for money with a formidable array of commands and facilities summarized as follows:

DRAW, FRAME, CIRCLE, SCROLL, MIRROR, LINE, ROT, DMC, COPY, SWAP, UNDO, RAYS, HIL, ZOOM, STORAGE, COPY, ERASE, B Buttons
 16 Locations + 16 Patterns (256 Combinations)
 S.L.P.P.

DESIGNER 64 Studio Software (E.L.P.)

Commander 64
QUOTE THE MANUAL,
 Designer 64 is a design and layout application program which incorporates a screen character layout editor and a program generator.

As all Commander 64 owners know, this computer is capable of tremendous graphics with the right software. A lot of potential for good but simple graphics are built in via the keyboard but, if you know how, then greater things are possible.

I expected to be able to tap some of the 64's true potential from this piece of software, especially as it carries the much desired Commodore Appearance Apparent logo. It is possible that the product I received was prototype as it came to me in a plastic bag with a label indicating that it was. The manual is substantial (A4 size, of considerable thickness and very clear and easy to read.

Aims and ambitions

With this program it was my intention to bring out some rather nice introduction pages to some of the programs I write. Also, I was going to lay out some day-to-day diary pages. I had success on the second job but not the first. Read on and I shall explain why.

My copy came with a second disc which had a few demonstration pictures, created with the software. The most interesting part of the package was that, if its design had been created, the program could translate what you had

into a BASIC program, and that the BASIC listing could then be used in your own programs. To help achieve this, a menu routine could be used outside the program but, I must point out that it would have nothing to do with goods and groceries as its use is limited. However, used within the context of Designer 64 it is perfectly adequate.

Using these facilities, I designed my diary page and saved it to disc. I then wrote a little bit of BASIC around the program asking the date and the day of the week and, also, for how many days I wanted a printout. After inputting this information, it would print out pages of a diary which I often use. It is cheaper than a diary and, of course, I can have as many dates as I choose. A useful application but hardly one to attach a program to its belt.

Underused

The idea is to choose a shape. When you have chosen the shape you want, which must be a letter, number or graphics key, you then manipulate the shape. You can magnify, rotate and move it around the screen, fill the page with it and so on. The most important thing to note is that you are limited to the pre-defined Commodore key shapes. To my mind this was hardly adequate. It was not possible to draw true straight lines except by plotting a line of the relevant character, an absence of commands such as *circle*, *arc*, *move* that it was difficult to make anything look better than 'fuzzy', for want of

a better word. I can achieve almost the same results by clearing the screen, placing the characters I want to make the desired picture on the screen, putting a line number, operation mark and a quote mark at the extreme left edge of the screen and pressing return. Repeat this down the screen and you then have your design as program lines. Most important of all it costs nothing!

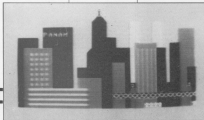
Admittedly a degree of animation is possible with Designer 64 but nothing that could not be done fairly simply through BASIC anyway. All the software does is take the graphic capabilities of the 64 to its lowest level, here you see just what you can have. There are no screens, change colours and turn it into a limited calculator. Deeper reading of the manual reveals that almost half of it is not concerned with actually using the graphics side of the machine but with disc use aspects and glossaries.

Without practice this was not an easy program to use and there was much to be remembered. Use of the keyboard and function keys was good though, and on screen prompts were logical. It was possible to get good screen dumps using a Commodore printer but there was absolutely no help given in the manual for the many people who use non-Commodore machines. If you want screen dumps from any of the more popular day-matrix printers you would have to work out your own way of doing it.

More potential

Designer 64 is not an expensive program compared to some but it is certainly not in the pocket money market. So far, however, I don't think I would buy it unless I had a very specific use for its facilities. I must stress that it is very definitely a low-replication drawing aid and therefore lacks a lot of potential. I get the feeling that it is a wasted opportunity and that for just a few pounds more it would be possible to get far more sophisticated design packages. Look closely at it before you buy as I feel that you may not be getting quite what you expect. To be fair though it does what it does very well and, if its design potential is adequate for what you want, then it is an excellent product and should make things a lot easier.

D.C.



One of the most common queries received by 'Your Commodore' concerns the symbols found in the program listings. We hope the following information might help you.

64 SYMBOLS

THE 64 ALLOWS YOU TO specify control keys, etc. in your statements so that these functions can be executed within a program. For example, it is possible to position the cursor on clear the screen using the relative symbol with the position marks. The following list shows the symbols and the keys that generate them. (Don't forget the quotes.)



CLR



HOME



BLK



BHT



F00



CYS



CLR



CWN



BLU



YEL



REV ON



REV OFF



F1



F2



F3



F4



F5



F6



F7



F8

CURSOR
DOWNCURSOR
UPCURSOR
RIGHTCURSOR
LEFT

INSERT



DELETE



CWM & BLK



CWM & BHT



CWM & REV



CWM & CYS



CWM & F00



CWM & CWM



CWM & BLU



CWM & YEL



F.G. Tout invites you to recover the four crowns of Adelim and thus succeed where lesser mortals have failed.

THE FOUR CROWNS



In **THE PRE-COMMODORE** days of old, Adelim ruled over the four kingdoms of Adelarhia. He held the four crowns and was a wise and powerful king. But he had an enemy — his name was Darius. He planned and schemed and one day he drew Adelim and stole the four crowns. He took them back to his dark castle and hid them. Darius has prevailed since that time, and all efforts to regain the crowns have failed.

One warrior alone, with courage and determination, might succeed where armies have failed. Can you that warrior?

Instructions

In screen 1, I have used all characters as the main is easy to learn; the collision detection box, of course, the character remaining tends to flash. However, from screen 2 onwards, it's split all the way — all 8 sprites, in machine code, plus last, seventh screen scrolling on screen 4.

Screen 1

Swim around underwater, collecting all the treasure chests but don't hit anything else. When you have got all the

chest, a key will appear. Pick up this key and the underwater gate will open, and allow you onto screen 2.

Insert joystick in port 2, move up/down, etc.

Screen 2

Jump the creatures and levels to get the crown.

Left = walk left; Right = walk right

Forward and fire button = jump

Screen 3

Click the castle walls, avoiding the falling rotating blades.

Left = left; Right = right

Screen 4

Run the gauntlet, avoid the enemy soldiers and regain the crown.

Forward = up; Back = down

Screen 5

Step on and off floating platforms.

Left = left; Right = right

VCL	
30 = 499	Download U.D.C.s
400 = 948	ten pointer
1000 = 25000	Sprite data
30000 = 40000	Music options (cc. 1)
40000 = —	Randomness (cc. 1)
41000 = 45000	Print water (cc. 1)

VCL	
90 = 100	Variables
1000 = 1000	Sc. 1
3000 = 5125	Mouse character (cc. 1)
4000 = 4500	Score
8000 = 8000	Sc. 2
9000 = 9000	Sc. 3
1000 = 1000	Sc. 4
1100 = 1100	Sc. 5
90000 = 90000	Clear map
90001 = 90000	Baseline for sc. 2
90000 = 90000	Jump (cc. 2)
91000 = 91000	Print water
91000 = 91000	Day, lives
91000 = 91000	Title page
91000 = 91000	Intro
91000 = 91000	Music (got crown)

Variables		
V = 51200 (sp. variable)	Z	Character (cc. 1)
V1 = y pos sp. 1	SC	score
X2 = x pos sp. 2	LI	lives
L	CC	pos sp. 2-8
L&I	SP	pointer (sp. 1)
CD	S	sound reg
M		





In the fourth part of
this series, **Graham**
Davies shows you how
to write your business
programs to disc.

DOING IT YOURSELF

IF YOU HAVE BEEN FOLLOWING this series, then by now you should have nicely finished programs to enter data and present it in a neat fashion. To store this data we will use a disc drive. Of course, you may wish to use a cassette recorder to store data on, but this is not to be recommended for several reasons: firstly, and most importantly, Commodore's cassettes are slow, secondly you can practically only store data in a sequential format and so to read even one particular record, you will always have to start at the first record and scan through the file, thirdly you cannot update one record without re-writing the complete file and so the only practical way to use a cassette is to read the complete file into the computer at the start of the program and to write it all back at the end of the program, doing this will severely limit the amount of data you can store.

Sequential disc files

Sequential files on disc have the same qualities as sequential files on tape but are faster. There are good reasons for using them though — for instance you may require a transaction list of some sort and would never need to look at a single record so a sequential file would be suitable. To make this clearer, say you were writing a program to take care of your record collection, you would have a file of record names together with details about these records and you would want to access an individual record to a sequential file would not be suitable. However, if you wanted to know where all your records are (what you have lent them to and so on) then every time you tell your program you have lent a record out, it would make an entry on the transaction file. Every record returned would also have an



entry on this file and each new entry would be added to the end of the file. When you come to list this file you will simply read it from the start and print out every entry. Reading a sequential file from start to end is faster than doing the same with relative files (see below) and sequential files are easier to maintain.

None of you reading this article will be using a TFD disc drive and if you are then you must be aware that it has a fault which can easily be (and must be) avoided. When overwriting a directory entry using the "U" feature, the file may become corrupt. This applies to program files and sequential files. To avoid this, always use the scratch, rename and save facilities:

```
scratch filename + "bak"
rename filename to filename + "bak"
save filename
```

You will notice that these are our BASIC commands but just general guidelines to the saving of files. Another advantage of doing it this way is

that you end up with a backup version of the file being saved.

Relative files

Relative files can look difficult and clumsy to use at first but are in fact a very good way to store data allowing plenty of flexibility. If you are using a machine with BASIC 4.0 instructions then the following conventions will be of no interest although they will still work for the rest of us with BASIC 3.0 as on the VIC 20 or the CBM 64 all we need to do is take the asterisk comments once and create them as subroutines. Having done this they will become simple to use. The end result of using a relative file is that every time you update a record, it always immediately writes back to the disc which means that during the program and ending the program does not involve lengthy waits while data is being read in or written back. This also means that we can store unlimited amounts of data (you just have to buy another or a bigger disc drive if you run out of space).

To explain the principle of a relative file, take a plain sheet of paper and draw the left hand side from top to bottom and write down the integers 1 to 20. Each of these integers represents a record, the blank space to the right of the record represents the data that is stored in that record. If we select a record, say number 3, then we can immediately go to record number 3 and start writing data in it until we reach the far edge of the paper when we run out of room. The amount of data we have now written, represents the record length. We could write in every record of the sheet (the file) until we reached the bottom and then we would take another sheet of paper and so on. If we wanted to write so much data against one record that it would not fit on that line, then we would have to throw that piece of paper away and start with a new and wider piece. In practice of course you would probably not expense an entire word or line if that when using disc drives you obviously cannot.

A relative file takes the same format as your piece of paper; at the start you decide how wide it is to be (the record length) and what name to call it. These two things cannot be changed later and so it is important that you get them right first time. If you try to write past the end of the file (off the bottom of the paper) then a relative file will automatically make itself bigger — this is called expanding. When we create a relative file, we will pre-expand it. The reason for this is that expanding takes extra time which you will not want when your program is running. Another point is that if you try to write past the end of the file the disc drive will first of all return an error (no record present) which is really just a warning message. When you



print to the file it will expand full and the next time you access that record the error message will not be returned. This means that your error checking code will have to allow for this and this makes it easier.

Accessing a record

When accessing a record we use the equivalent of the RECORD command which is in the form RECORD file number, record number, byte position. The byte position is the position along the record to start from. If this is not set, or is zero or one, otherwise will look at the record starting from the first character. If it is five then we will start character number five in that record. Of course, BASIC 3.0 does not have a RECORD command so there is a subroutine to replace it but if you think of it in the same terms as above, it will be easier to use.

Expanding a file

The following listing incorporates a subroutine to expand a file with the filename given in %1 (less than 17 characters long), the record length in %2 (up to and including 254 characters) and the number of records to pre-expand the file to in %3. Remember that you can always make it longer later on. To expand the file we will RECORD to position 0% and print a CHR\$(1) there. The reason for this is that when a relative file is expanded, all of the empty records automatically get created with CHR\$(255) and you can use this fact to look for empty records within a file.

Note that the listing is split into three subroutines — to create a file, call line 2000, the routine at 2100 is a RECORD routine and there is a disc status checker at 2600. I suggest you make this a separate program which prompts you for the file name and to go. If you want to use the character position facility then I suggest you put the subroutines in another variable called %p% and change line 2140 to end with chr(%p%) instead of chr(1). Note this is for use in your main line code only and is NOT suitable for creating a file. If you alter line 2100 to read gosub 2600, return then you can include the subroutines at 2100 and 2600 in your application program.

At this point I will just point out a few other things to be aware of with relative files: firstly you can only have one

```

2138 rem
2139 rem
2140 open#1,8,10:rem open command channel
2141 print"creating new file" %3
2142 open#1,8,2,%2,"l":chr$(1)%3:gosub 2900
2143 dr=#%3:gosub 2100:rem record command
2144 print chr$(1,%3):gosub 2900
2145 close#1:close#1:return
2158 rem
2159 rem
2160 rem record command
2161 a=int((dr+1)/256)*256+b=dr+1-a
2162 print"%1%,"p"chr$(2)chr$(a)chr$(a):chr$(1)
2163 rem send position = p, secondary address = 2
2170 rem hl and lo byte of record, character position 1
2180 return
2198 rem
2199 rem
2200 rem check disc error channel
2201 input"%1%a,%3,c,d:ifa=0then 2940
2202 print a,%3,c,d:stop
2203 return
ready.
```

Listing 1

open to a file at any one time because it takes three buffers and this disc only has five buffers, secondly always remember to close all your files when the program has ended even if it looks as if it has no error because the drive has a buffer which will only get written back when you force it to use the CLOSE command.

Three subroutines

We now need three more subroutines to have a set of working utilities. The first will open an existing relative file whose name is given in %1, the second will read from record position 0% (no %2) and the third will write a record in %2 to record position 0%.

```

2000 rem open an existing relative file
2010 open %1,%2:rem open command channel
2040 open#1,2,%3:gosub 2600:rem open relative file
2080 return
```

```

2100 rem read in from file 1 secondary add = 2
2120 gosub 2900:rem position to correct record
2140 input"%1%r%:gosub 2900
2160 rem input and check disc status
2180 return
```

```

2600 rem write to file 1 secondary add = 2
2620 gosub 2700:rem position to correct record
2640 print,%1,%2,%3,%4,%5:gosub 2900
2660:rem print to disc
2680 return
```

Note that line 2144 inputs two strings from disc. When using the INPUT command from disc, you will find that it behaves just the same as INPUT from the screen — as you can only input up to 80 characters (inclusive) and input will truncate an colon and carriage returns.

At this point you should practice using these routines. Note that when you use the PRINT command, the computer will always output a carriage return at the end of the statement unless there is a semi-colon ";" in line 2144. The reason for suppressing this extra carriage return is that if you have a record length of 80 characters and you send a record that is 80 characters long, when you print this to the disc, the extra carriage return

will have nowhere to be printed. The same thing occurs when you try to write a record to the disc that is longer than the record length of the file. This will cause an error 61, overflow in record and the extra data will be lost (and will not overwrite the next record).

Record keeping system

We can now put these routines to good use by creating a fast access record keeping system. The method to be used is called hashing and you will find that it is well suited to relative files. The principal is straight forward. When you want to call up an item from disc, you have to tell the computer something you know about that item and this information is called the key. A key can take any form you like — a part number, a name, letters and numbers mixed and so on. The only restricting factor is that to call up an item you must type its key exactly, in just one difference in the key will cause the program to look at the wrong part of the file. From this key, we will form a "random" number and we will use this number to calculate where to look in the file. The best thing to use is the Commodore's random number generator for this purpose but you must remember that this "random" number has to be calculated to the same small every time you wish to call up that record.

The next routine creates a random number from a key passed to it in %1. If you call this

routine with the same key it should always return the same number. You could of course write your own algorithm to have and for some applications this will be very important. This particular one works along the key and takes the ASCII of every character and multiplies it by if it's position in the key and then adds it into a variable 'a'. The reason that we must multiply by the position is so that a key "ABC" does not give the same result as "CBA," and so on. Having done this we send the random number generator with the negative value and then take the random of that number and convert that into an integer between one and the file size which is in 'f'. The result is returned in 'a'.

```
2500 read hash routine - given key in 'k'
2510 read value of hash position into 'd'
2520 read random number
2530 read random number
2540 read random number
2550 random number
2560 random number
2570 random number
2580 random number
```

We now need one more subroutine to make use of this hashing. It will return a variable 'm' as to whether we find a record or not. Another variable returned is 'dc' and we will use this for deleting and creating purposes. I will explain this later on. Remember that when we create a relative file, all of the records have got chr\$(255) in them and so to find a record we pass this routine the key and it creates the hash number and then scans the file until it finds the key at a chr\$(255).

```
2600 read find key
2610 read chr$(255) disposition
2620 read chr$(255) disposition
2630 read chr$(255) disposition
2640 read chr$(255) disposition
2650 read chr$(255) disposition
2660 read chr$(255) disposition
2670 read chr$(255) disposition
2680 read chr$(255) disposition
2690 read chr$(255) disposition
2700 read chr$(255) disposition
2710 read chr$(255) disposition
2720 read chr$(255) disposition
2730 read chr$(255) disposition
2740 read chr$(255) disposition
2750 read chr$(255) disposition
2760 read chr$(255) disposition
2770 read chr$(255) disposition
2780 read chr$(255) disposition
2790 read chr$(255) disposition
2800 read chr$(255) disposition
2810 read chr$(255) disposition
2820 read chr$(255) disposition
2830 read chr$(255) disposition
2840 read chr$(255) disposition
2850 read chr$(255) disposition
2860 read chr$(255) disposition
2870 read chr$(255) disposition
2880 read chr$(255) disposition
2890 read chr$(255) disposition
2900 read chr$(255) disposition
2910 read chr$(255) disposition
2920 read chr$(255) disposition
2930 read chr$(255) disposition
2940 read chr$(255) disposition
2950 read chr$(255) disposition
2960 read chr$(255) disposition
2970 read chr$(255) disposition
2980 read chr$(255) disposition
2990 read chr$(255) disposition
```

Line 2740 needs a little explaining. For our purposes we will have a file with one hundred records. If a key happens to record one hundred and that is already occupied, then the next position to look at is record number zero. From this you can see to show it so that you can look at the file which is why it is called a circular file.

Using the routines

The following program gives an

example of how to use these routines. Type them in and try them and I will then explain how they work and the importance of the delete flags.

Run the program, type 'c' for create and type in the key as "abc" and any data that you want to be the record. Note that the program requests a date relative file called "rel" to be set up with a minimum of one hundred records and a record length of about fifty bytes. When this key "abc" is created, it is created at position 42. This will not be true if you type the key in upper case or if you mixed lower and upper case. If you want to avoid problems with upper and lower case then change line 2540 to this:

```
2540 read random number
2550 read random number
```

You should be able to type 'd' for amend followed by a key of "abd" and amend this record. You cannot of course amend the key as it will never see the file. Now create a key of "aaa" and you will find that it is created at 93. In fact as good by now to test the problem of hashing to an occupied position. Create a key of "d" - This key hashes to 42 which is

```
2600 read find key
2610 read chr$(255) disposition
2620 read chr$(255) disposition
2630 read chr$(255) disposition
2640 read chr$(255) disposition
2650 read chr$(255) disposition
2660 read chr$(255) disposition
2670 read chr$(255) disposition
2680 read chr$(255) disposition
2690 read chr$(255) disposition
2700 read chr$(255) disposition
2710 read chr$(255) disposition
2720 read chr$(255) disposition
2730 read chr$(255) disposition
2740 read chr$(255) disposition
2750 read chr$(255) disposition
2760 read chr$(255) disposition
2770 read chr$(255) disposition
2780 read chr$(255) disposition
2790 read chr$(255) disposition
2800 read chr$(255) disposition
2810 read chr$(255) disposition
2820 read chr$(255) disposition
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2900 read chr$(255) disposition
2910 read chr$(255) disposition
2920 read chr$(255) disposition
2930 read chr$(255) disposition
2940 read chr$(255) disposition
2950 read chr$(255) disposition
2960 read chr$(255) disposition
2970 read chr$(255) disposition
2980 read chr$(255) disposition
2990 read chr$(255) disposition
```

occupied by "abd" and so it is created at position 43.

Deleting records

We now have a method of creating and amending records using keys. Unfortunately, deleting is slightly more complicated. The obvious thing to do when deleting is to place a chr\$(255) in the deleted record position. If we did this and deleted the key "abd", we

```
2600 read find key
2610 read chr$(255) disposition
2620 read chr$(255) disposition
2630 read chr$(255) disposition
2640 read chr$(255) disposition
2650 read chr$(255) disposition
2660 read chr$(255) disposition
2670 read chr$(255) disposition
2680 read chr$(255) disposition
2690 read chr$(255) disposition
2700 read chr$(255) disposition
2710 read chr$(255) disposition
2720 read chr$(255) disposition
2730 read chr$(255) disposition
2740 read chr$(255) disposition
2750 read chr$(255) disposition
2760 read chr$(255) disposition
2770 read chr$(255) disposition
2780 read chr$(255) disposition
2790 read chr$(255) disposition
2800 read chr$(255) disposition
2810 read chr$(255) disposition
2820 read chr$(255) disposition
2830 read chr$(255) disposition
2840 read chr$(255) disposition
2850 read chr$(255) disposition
2860 read chr$(255) disposition
2870 read chr$(255) disposition
2880 read chr$(255) disposition
2890 read chr$(255) disposition
2900 read chr$(255) disposition
2910 read chr$(255) disposition
2920 read chr$(255) disposition
2930 read chr$(255) disposition
2940 read chr$(255) disposition
2950 read chr$(255) disposition
2960 read chr$(255) disposition
2970 read chr$(255) disposition
2980 read chr$(255) disposition
2990 read chr$(255) disposition
```

Listing 2

would not be able to call up key "abd" because this key would hash to 42 which is now a chr\$(255) and the routine would say that that is an empty record and stop searching. If you don't believe this, then change line 2600 to read:

```
2600 read find key
2610 read chr$(255) disposition
```

Now delete "abd" and try to amend "dcr". Having done this change line 2600 back to what it should be. In circumstances like this we have a special flag on the disc. I have chosen to use chr\$(254) as you are very unlikely to have this as your key - if you did use it as a valid key, you would cause havoc with your data! Using the above example, deleting "abd" will cause a chr\$(254) to be written to the disc at position 42. The routine for scanning for a key at 2600 will treat this as any other key and not assume end of file. The only special handling

in there is the variable 'dc'. This is set to zero on entry and if the scan finds a chr\$(254) it is set to the disc position. Note that on one scan, it only sees 'dc' to the first chr\$(254) found as there may be others. This flag is then used by the create part in line 2600. The create routine logically says check the key does not already exist; if not then create the data; now create the record at dc which is the position of the chr\$(254) found by the scan routine a few lines while we were scanning we found a chr\$(254) - if it then create it there at this position (dc).

Using the above methods you should have a manageable fast access system. As more items are put on, the access time will slow but should remain acceptable until the file becomes about 90% per cent full. This will depend on how good your hashing algorithm is and a routine program is used to whether the keys used create a good spread across the file.



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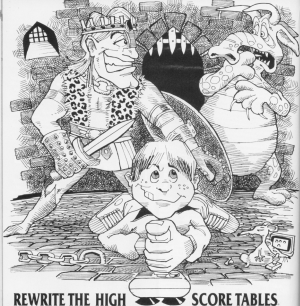
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Simon Palmer comes

out of his shell to

look at the Valiant

Turtle and the

language it speaks,

LOGO.

ONE OF THE BIGGEST STEPS so far in educational computing has to be LOGO. It is a language which is very powerful yet simple to use. LOGO is a language which children find easy to grasp, as so many of the fundamental words which make it up are similar to the same as the recognised English definitions, they are designed to achieve. For example, if a child while using LOGO graphics system required the TURTLE on the screen to move forward a set number of steps, he would not have to worry about formulating the BASIC program but simply type 'FORWARD' and then a number of steps. Ease of use is a distinct advantage when teaching a language.

Now, in the past few years a valuable extension to LOGO has been developed. In previous years anyone who coded a TURTLE was either rich or had built it. However, they have become much more freely available, and at a price that can be afforded by the everyday user. The TURTLE is a robot which can be controlled by the computer using LOGO. It is mainly used in conjunction with LOGO's 'Turtle Graphics'.

When these 'kits' were first introduced they were attached to the computer by an umbilical cord which transmitted the data to the robot. This was a disadvantage as it limited the range of movement. The robot was also bulky and expensive which meant that most schools could not afford to own one.

Valiant manufacturing has since led to a decrease in prices. Technology has improved ten fold and the size of the components has halved.

TURN TURTLE

This has led to some exciting developments, such as Valiant Design's TURTLE.

Welcome to the World of LOGO.

LOGO is and has for quite a while, been given little or no acknowledgement of its existence in the U.K. by the general public. A few pockets of activity in schools or computer clubs and the odd article have reminded people of its existence. Perhaps because it doesn't have the software games or otherwise, it has been unfairly overlooked. But the time has come for people to recognise that it is not just another language but that it is more powerful than BASIC.

LOGO is a procedural language. This means that when a program is generated, it is structured out of procedures. These procedures are either the primitives of the language or have been created to perform a certain function. When a set of procedures are used together, they may call on each other so determine a result as well as performing their own independent tasks.

Speak the same language

In LOGO, the language has been specifically designed to bring both the English Language and the Computer Language closer together to enable use by a greater spectrum of ages. The words

used in LOGO are very similar to the words that would describe the function in English. So in theory a child or adult could start using LOGO almost immediately. LOGO enables the user to define a function and then allow him to use a word to define the task in question. He can then use the word every time the program requires this task to be performed.



The best way to describe LOGO is as if it were a pyramid. You have the primitives (LOGO itself) at the bottom and on those you build your structure and you have a single word at the top which will perform the whole program, called a SUPER-PROCEDURE.

Commodore Logo

In this plain, small, no-frills box, Commodore supply you with the Language (on disk), the manual which totals well over 300 pages, a utility disk and a damaged disk replace-

ment card. When I thumbed through the manual I found it easy to read and understand, but if I had been a seven- or eight-year old working alone with LOGO then I would have had difficulties. I would, therefore, suggest that if you are a parent thinking of buying LOGO for your son or daughter, make sure that you can get hold of workbooks for beginners and then use the manual as a reference instead of a tutorial.

After saying that, I must confess that I am a little bit adding that there is a Utility Disk with some fine examples of LOGO graphics and other items contained with the Language disk which might help.

Logo Graphics

This is the most powerful section in LOGO. It is worth remembering that a child will find working with a language more stimulating if he or she can make pretty patterns or draw a house or just be very creative. In it is logical to think

```
Example 1
TO SQUARE
FD 30
RT 90
FD 30
RT 90
FD 30
RT 90
FD 30
END
or
Example 2
TO SQUARE
REPEAT 4 [FD 30 RT 90]
END
```

Both of the above perform the same task. One is simply an abbreviation of the other.

In Example 1, I gave the procedure the name SQUARE. I then gave the command FD (forward) 30 and RT (right) 90 four times. This made the TURTLE move 30 units forward and turned 90 degrees to the right four times. Example 2 does the same, except I have used a primitive and a different way of getting the angle by dividing the total number of degrees in a circle by the four sides.

So, after playing with the standard graphics via LOGO I decided to move on to higher things. I flicked through my manual and I came to the Sprites chapter. Within this I found that the Utilities disk not only contained examples of how the Sprites could be used but also a Sprite Editor to enable the design of Sprites, always a tricky problem.

For example, if you wanted to move a sprite across the whole of the screen you would have to set the X&Y (short for X-coordinate & Y-coordinate) which is Location 2204. This would, in BASIC, enable a sprite to move on its X-coordinate across to the right-hand edge of the screen where the register would normally be greater than 155. Well, on LOGO this is already taken care of.

What about sprite to background and sprite to sprite collision? The detection of a sprite hitting another sprite is again a complex affair! But on LOGO there are two procedures found on the Utilities disk which enable the computer to gain the necessary

data to decide if a collision has occurred. They are "TB" which checks for background collision and "TS" which checks for Sprite collision. A not so complex problem is getting an enlarged sprite to appear. With BASIC you have two locations \$1271 and \$1277 which control expansion. Whereas on LOGO, \$G1, \$G2, \$G3, \$G4, \$G5, \$G6, \$G7, \$G8, \$G9, \$G10, will suffice to complete the job.

It was surprising, however, that the manual does not make any reference to Multicolour Sprites. In the 21 pages on Sprites it deals with everything from defining to using, but nothing at all on Multicolour mode. It is also worth pointing out that most of the control of Sprites, i.e. the commands, can only be found on the Utilities disk so it is worth making a back-up copy just in case something happens.

Sound

When I loaded the first file for music on the Utilities disc called Music, I watched it define the various procedures required to gain Sound. I was expecting more commands to be defined but unfortunately only items such as Attack, Decay, sustain and Release are there. In all fairness, even though the procedures defined for music are very few, they are the important ones required for complex music making and obviously, if there isn't enough there, you can create a new procedure by using the various LOGO machine code primitives.

Machine code

It is worth mentioning this subject as we are in LOGO and LOGO is supposed to make the execution of jobs easier. Well, again some former knowledge of programming is required if you are going to benefit from the various commands supplied.

Briefly, they have supplied on the Utilities disc a copy of an assembler to enable the structuring of code. The manual then goes on to explain how to run the LOGO



that when this language was designed with education in mind, that it would be heavily orientated towards graphics. For example, if I wanted to draw a square in LOGO I would not have to think of the various details of BASIC. I could simply type the following:-



assembler and also gives an example of how to change colours via machine code.

Words, words, words

Words and lists is the largest section in the LOGO language book even though it covers a relatively small area (17 primitive verbs). Whereas the graphics section would in most cases be of a direct input and result nature, Words and Lists requires indirect operations.

This set of primitives allow you to generate data bases all the way to 'Intelligence' software. Now I am not going to get into the argument of whether computers can or cannot be intelligent, but with the aid of the primitives the computer can learn and react after a specific action has happened.



Commodore has supplied a game on the Utilities disc to illustrate this very point.

Finally

Much more on this fascinating subject can be found out by using the package and the TURTLE together or just LOGO on its own. It is worth bearing in mind that even though it is a teaching language, the subtlety of a high-level language has been incorporated. Items which appear within LOGO but do not appear within BASIC can also be found in the more powerful languages available on the open market. So when the user has learned to work with computers they can, without changing languages, continue on to higher things.

The Valiant designs Turtle

The Valiant TURTLE, designed for use with LOGO, is prepared for battle and ready to run as soon as you remove it from the box. It comes complete with an infra-red controller, a power supply/transformer, the various manuals and paperwork, and obviously the software.



On your marks

Before starting to connect the TURTLE I read through the manual. The points which are worth noting here are that the manual can be read by anyone. If they are being taught, it's an aid and if you are teaching it's a guide to enable smooth operations. The manual does contain a large selection of cartoons illustrating the various stages in which the TURTLE can be involved and these highlight very well any problems that might arise when setting the machine up or fitting operation. They also had the foresight to include a large version of a troubleshooting and the various remedies to be administered to any ailing TURTLES.

The one criticism I must make is that even though there is a high-quality magazine called PIN-UP included, I would like to have seen a few example programs contained either with the software or the manual.

Get set

After perusing the paperwork, I started to set up the hardware. First, the TURTLE itself. Constructed out of very robust

plastic, the green see-through shell provides a perfect view of the internal workings which have been anchored safely to a cream base. At the front of the TURTLE two light-emitting diodes give an indication of whether the TURTLE is up to strength by maintaining a constant light or by flashing to indicate that recharging isn't far off. On the main board of the TURTLE are two extra LEDs. These tell you whether



the signals are being received by the TURTLE or whether it is recharging safely.

The infra-red transmitter plugs into the User Port on the CBM 64. The transmitter is powered by a transformer which also recharges the TURTLE. Once the various items are plugged in and you have loaded the LOGO package into the computer, the TURTLE software can be loaded.

Go!

The Valiant TURTLE software, when loaded, redefines some of LOGO's primitives. This custom writing software, which will work with the TURTLE, a little bit difficult as they do not describe what has been changed. Now everything has been set up, you can check the accuracy of your TURTLE.

Valiant supply with the TURTLE one marker pen and also one screwdriver. When the TURTLE is ready to work you can adjust the wheels to enable a greater degree of accuracy whilst drawing.

The most efficient way is to get the TURTLE to draw a square.

Example
TO SQUARE

REPEAT 4 PD 30 RT 90:4
The above procedure in LOGO should be enough to enable accurate adjustment. The adjustment is made by turning the screws which move the wheels either nearer the TURTLE body or further away.

Turtle on the run

The TURTLE when working moves at a steady pace. One problem I did come across is that the space between the wheels and the floor is very small, this will lead to the TURTLE catching itself and being left high and dry. So make sure it is level on a level surface.

The final item to be connected to the TURTLE was the marker pen. This is inserted into a holder which is serviced by a small servo-motor. The two LOGO commands to raise and lower the pen are PENUP and PINDOWN (PU and PD for short). Make sure that when you write a procedure to incorporate some TURTLE graphics with movement of the robot you use these commands otherwise, like I did at first, you will get more lines than you bargained for.

From start to finish

I found the TURTLE a pleasure to use; it is very easy to set up and even easier to operate. Commands such as TURTLE which will direct the input from the computer to the TURTLE or, if the command is repeated, will stop the signals are very useful. The operation of the TURTLE can be speeded up imaginably by hiding the computer's screen version of the TURTLE. This means there is less for the computer to operate.

So, taking all into account the TURTLE is a valuable extension to the computer system.

LOGO is available from Commodore and costs £34.95. TURTLE is available from Instant Design Ltd, 1st Floor, Pine House, 140 Battersea Park Road, London SW8T 4AB, it costs £79 + VAT.



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Dave Crisp throws some light upon a couple of the more popular lightpens on the market.

LIGHT FANTASTIC

A COUPLE OF YEARS AGO IT WAS ONLY possible to see lightpens being used on the most expensive computers. Between now and then the lightpen has been made to seem old hat. Special monitors now give the user the ability to simply touch the screen with their finger to make a decision relevant to the program, but it is going to be a long time before this system is available at a reasonable enough price to implement in the home.

Until then one thing that can take the place of the keyboard in some respects is a lightpen. It is called a lightpen because of its shape and the fact that it responds to light emitted from the TV or monitor screen. A lead connects the pen to a port on the computer and it is linked to the main program by short subroutines which are able to detect the pen's position on the screen. It is able to do this because the monitor screen is scanned at a particular rate. When the lightpen is pointed at the screen and it is passed, the decoding software calculates the position of the pen from the point at which the scan is detected.

In older pens ambient light often made reading the position of the pen a very hit and miss affair but, with improved circuitry, it is possible for the pen to react only to light from the monitor. The main use for lightpens on home micros seems to be for drawing and design programs. Software detects the position of the pen on the screen and as you move the pen a line may be drawn at the position of the pen may be a reference point for the start of a line, circle or triangle etc. It is also possible to indicate the gain of a drawing which is to be filled with colour. All these things could be done with the mouse keys but in most cases the use of a lightpen speeds up positioning and improves accuracy.

Another use for a lightpen is in programs where a lot of decisions are to be made. Since I own the Stark lightpen I have been able to write a couple of educational games where my youngest daughter can complete the whole program without using the keyboard. There is no need for her to be able to recognise letters or keys as the options can be displayed on the screen in a graphic form and the decisions can be made from this.

It is usually fairly easy to adapt home written software to work with a lightpen but it is always in my mind overworked with the pen. If the user continually has to go from the lightpen to the keyboard and back again it becomes as much a trial as a benefit. I have not seen much software available to use with lightpens in a useful way and, as I am a nurse by trade and have a couple of patients who have lost most of the use in their arms, I feel that it should be possible for me to write



software where they are able to use a computer in many ways using only the lightpen, possibly in their mouths to attract, educate and help them.

Datapen lightpen (price: £25.00)

The **Datapen Lightpen** is easy to use and comes with three programs to get you started. It is plugged into one of the joystick ports and the lead is long enough to enable you to reach all the screens. Although that sounds obvious I have seen a lightpen where it was only possible to reach one side of the screen. Instead of using the pen (stage based) can be saved easily to disc, and the first program simply tells a little about the program and enables you to move spiral graphics around the screen. It also shows the way movement of the pen affects the variable values used in the detection of the pen point. The other two programs are both for drawing on screen. The first allows four-colour block graphics in all the colours on the led to be drawn on the screen, the second allows drawing in high-res mode. This mode is, single colour but with precision neat line drawings could be achieved and then use to copy. In order to save the disc it was first necessary to slightly adapt the program. My young children enjoyed the two graphics programs and soon they became quite proficient. The manual that comes

with the pen is of a fairly low quality but it is packed with useful information which makes using the lightpen in your own programs very easy indeed.

Quality of finish

When you get it in your own software to switch on the pen can be programmed in such a way as to make the pen incorporate until the point is at the desired location or to perform a particular operation when it is pressed. This is a feature that was missing on some earlier pens and it made them difficult to use. The quality of finish on the pen was not fantastic compared to the Stark lightpen but it was robust. The hole at the back of the pen from which the LED sprouted seemed to have been cut out with a hammer and chisel and the moulding of the body was rather spoiled by a large amount of flash. Small points there but it could have been finished a little better. The LED is there to indicate that the pen is receiving some sort of signal and gives out a reassuring glow when powered on. When the switch is pressed it glows brighter and serves to indicate as a visual reminder that the position has been calculated. I enjoyed using this pen and I am sure that, given the time, I shall be able to use it to its full potential. It can be made into a useful item as much at home, in business and education, as in games.

Stack Lightpen (Price: £28.00)

Later I received the **Stack Lightpen**. The pen comes in a fairly odd box along with a manual and tape-based software. With my 55-64 the first thing I had to do was to get the software onto disc. Barely clear instructions are given in the manual on using the software to do this with a monitor. However you can run into trouble. Most of the software that comes with the pen can be loaded and saved on the programs set all BASIC, the tennis game, and the Paintbox software are in machine code and fit in several pages. As I said the documentation tells you how to use this to do with the aid of a monitor. I have three monitors and I could not do it with any of them as they conflicted in memory with the software. I eventually managed to save it onto disc.

Playing the games was not exactly mind boggling and had I bought them I would have been disappointed. However they are free and you don't look a gift horse in the mouth!

Clear those Liverpoolians

The accuracy of the light pen amazed me. It was lucky enough to talk to a young lad from Stack a few weeks ago at a trade show and he took a lot of trouble to explain to me why the pen was so accurate and reliable. Some pens simply mark the position at which the pen is contacted and plot that position. The Stack pen however, takes sixteen readings, excludes the four highest and lowest numbers and then calculates the mean average of the remaining eight; very clever and very reliable. The end result of this is that if you try to draw a straight line (horizontal) then you usually manage to fit the real world to the though as it is possible to LOCK the TRACK of the pen either horizontally or vertically and draw dead straight lines with ease. For diagonal straight lines you simply HOLD a point where you wish your line to start, move the pen to the point where you wish your line to end and press the up arrow key. (Along) a straight line. A similar method is used to draw squares and rectangles. Plot one corner (move the pen to a position where you would like the opposing corner to be, press 'Q' and there you have it. Circles were not quite as accurate as the other shapes but a similar method was employed and you end up with a slightly squashed circle.

Unlike a few

Some machines when used with light pens and drawing aids do not like you drawing over the screen edge and often come up with an error report. The Stack pen however allows you to draw over the edge. It causes nothing to draw on the screen border, but the line or shape will at least go up to the edge. I did find, however, that when this occurred there were odd lines when you would get unexpected and the rest of the line would end the screen at the opposite edge — Not a serious problem though.

Finishing touches

The Paintbox program had some fantastic little touches. To my mind the most impressive was that on one screen you could have a set of diagrams and designs, and you could PICK UP the desired design. CARRY it onto your work screen and DROP it where you wanted; excellent for planning etc. You are provided with electrical component designs and frame part designs on tape and that saves you having to draw these. Another nice bit is the ability to ZOOM into a small section of your work sheet. Using this method it is possible to plot pixel by pixel and also UNPLOT. This made it possible to do very precise work and turned the lightpen from a plaything to a fairly serious design tool.



MERGE	merge the two screens together
CIRCLE	draw a slightly squashed circle
RE-ALIGN	draw square/rectangle
GET	pick up a small area of the page
DROP	use to leave above on desired spot
CLEAR	clear screen (whether by accident or design)
FILL	fill an enclosed area with present ink colour
INVERT	invert screen colours
KEYS	lock pen's travel horizontally
KEYS	lock pen's travel vertically
READ	PERFORM a picture from tape disc
WRITE	take a picture to tape disc

this table does not contain a complete list of commands but it includes the main points of interest.

Pictures to hang

With a Commodore printer it was easy to get a screen dump of any masterpiece you had created (if you can handle the wait) and also using the Stack Electronics interface with another printer.

Ready to improve

Talking to Stack, I learned one or two snippets of information. Improvements are underway and one or two little niggles I pointed out appear to have been noted already and acted upon. The most frustrating of these was the ease with which it was possible to lose your picture. One press of the 'C' key and all was gone. I lost work on more than one occasion and turned the air blue. Apparently work is being done on it.

Little number two is the switch on the pen. It comprises two bands of metal — one near the end of the pen and one near the top. Unless you have very large rubber hands it is not easy to get your hand on both contacts at once (to activate the switch). This made use of the pen by children very difficult and I soon noticed that, very often, my five year old daughter was using two hands to do it. Apparently this too has been noticed by Stack and I believe that later they will have the two bands closer together at the end of the pen.

First class

Almost everything about this pen was well above average. The quality of funds, the quality of the materials used, the actual Paintbox software, and so on. Only the quality of the games provided and the little faults mentioned above scratched it's highly polished finish. One thing I must point out is that it is not a multi-colour paintbox. It is possible to globally change the colours of screens, ink, and border but it is not possible to have more than one ink or screen colour displayed at once, although I didn't find this too great a problem.

Before it is a quick bit of its commands so you should be able to see what a well thought out piece of software it is.

For those of you who want a multi-colour paintbox all I am able to say is "WELL! Stack have some cash and go play."

This month Keys

Phillips examines the creation of User Defined Graphics on your VIC 20.

VIC GAMES PROGRAMMING

THIS IS THE FOURTH OF A five part series of BASIC Games Programming for the VIC 20. The series is primarily intended for newcomers to game programming, but there might well be a few useful tips for seasoned programmers.

The VIC 20 has a very well thought out graphics set which can be used to good effect in many games. However, if you want a single character to represent an object such as a dog, an alien or a spaceship it's really stretching the imagination too far to stick to the standard graphics set. To get a professional finish to your game you need to define your own characters. The steps involved in creating User Defined Graphics (UDGs) are outlined below:

- 1) Make room in the memory for the graphic set.
- 2) Calculate the data for the UDGs.
- 3) Put the UDGs into the reserved memory and direct the VIC 20 to use the UDGs.

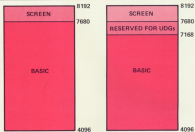
It sounds a lot of work, but in practice it's quite straightforward. A few POKEs and DATA statements, and you're there — but let's start at the beginning.

Making Room for the UDGs

The standard character set supplied with the VIC 20 is stored in ROM, and it can't be altered. If you want your own customised graphic set you have to put it in RAM. The way you do this depends on what expansion you have on board. This month we will be considering the UNEXPANDED VIC 20, and I will go over the procedure for dealing with expansion in the next article. The memory map for the unexpanded VIC 20 is shown in fig. 1a. You can alter the top of BASIC memory pointer to P&B as shown in fig. 1b. Switch on your VIC 20 and enter:

```
POKE$256,POKE$64,28:CLR
```

That's it. You've changed the memory map. Now enter:



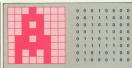
1a and 1b

POINT FREE!

It's gone down to 8000. You've lost some BASIC, but you've gained enough space for your UDGs. In fact you've got more to let — that should be enough for most games.

Designing the UDGs

Each VIC character is made up from an 8x8 matrix of pixels, as illustrated by the rocket in Fig. 2. The rocket is made up of 8 rows, each of which can be represented by a binary number as shown in fig. 2b. The binary number is obtained simply by designating each pixel which is switched on as 1, and each pixel which is switched off as 0. The binary number is then converted into decimal as shown in Fig. 2c.



2a and 2b

The process is simplified by starting off with a blank grid as shown in Fig. 3, shading in the required squares, and adding up the numbers shown at the top of each column to give the decimal value of each row.

We'll almost always now fill that 8 bit in to POKE the character data into the allocated memory location.

Entering the UDG data

Having re-defined the VIC memory, the character set

Figure 3c

POKE	= 16
POKE	= 30
POKE	= 20
POKE	= 30
POKE	= 42
POKE	= 54
POKE	= 34
POKE	= 20

READY.

```
1 REM LIST AND I
2 *
30 POKE$2,28 :POKE$6,28:CLR
40 FOR L=7:32767:439 :READ J:POKE L,J:HD<T
50 DATA 16,30,20,30,42,54,34,20
```

Listing 1



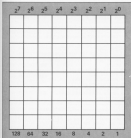


Figure 1

read from 7168 onwards, each character is made up of 8 bytes and, so the first character is stored at 7168-7175, the second at 7176-7183, and so on as shown in Fig 1.

read All the characters have been converted to garbage apart from the "1". Press this key and you'll get the wicket. So far so good - only 63 more characters to go!

Character	Display Code	Memory Location
A	1	7168-7175
B	2	7184-7191

Figure 4

The start and finish address of each character is easily calculated using the Display Code (DC).

Start Address = 7168 + DC*8
 Finish Address = 7168 + DC*8 + 7

Now to enter our UIDG. Let's use character number 13, the "7". The start address is 7411, and the finish address is 7419. The data can be POKE'd in quite simply using Listing 1. Now enter:

POKE 3688,255

This instructs the VIC to get in character information from RAM starting at 7168. What a

It's unlikely that you will want to re-define the entire character set as you'll probably want giving a few of the standard characters in your game. Fortunately the solution is quite simple. All the data you need for these characters is already in ROM, and all you have to do is to copy these into RAM, a painless operation, and then just change the ones you want. Press RUN/STOP and RUN/GO back to normal and enter our RUN/GO listing 2. Line 28 copies out the character set, and line 30 modifies the character. If you want to modify more than one character you just change the start and finish address in line 30 or, if the characters you want to change are not consecutive,

add additional lines as necessary, following the format of line 30.

Making it Easy

So far the whole business seems to be pretty laborious, particularly calculating the right bytes required for each

of the grid, and the byte values for each character. It's continuously updated on the right of the grid. If you have a 7000 printer plotter, lines 980-1010 will give a hard copy reproduction of the character and the values for the data statement. An example of the output obtained from the 1520

```

1 REM LISTING 3
2
3 POKE352,255:POKE354,255:CLR
4 FOR I=7168 TO 7175:POKE I,1:NEXT I:POKE7176,255
5 FOR I=7184 TO 7191:POKE I,2:NEXT I
6 END

```

Listing 1

character. Writing games should be fun, and while working out lots of binary to decimal conversions might improve your mental

is shown in Fig 5. If you don't possess one of these printer plotters, just skip out this part of the program - it's not essential.

```

1 REM LISTING 4
2
3 POKE352,255:POKE354,255:CLR
4 FOR I=7168 TO 7175:POKE I,1:POKE I+256000,1:NEXT I
5 FOR I=7184 TO 7191:POKE I,2:POKE I+256000,2:NEXT I
6
7 REM CHARACTER DATA
8
9 POKE3688,255
10 GOTO36,36,36,36,36,36,36,36
11 POKE3689,48,32,112,124,48,48,48
12
13 REM CHARACTER CODES: 1, 2, 3
14
15 GOTO30,3,3,14,21,6,3,3
16 FOR I=0 TO 255:POKE I+1,1:NEXT I
17 GOTO30,34,35
18 P1=0:G2=0:POKE3694
19 PRINT"2"
20 FOR I=0 TO 255
21 FOR J=0 TO 255
22 POKE I+J+3690,0
23 POKE I+J+3692,32
24 END

```

Listing 4

arithmetic, it tends to knock your imagination for six. Besides that, when you try your character set on the screen for the first time it probably won't be exactly what you want, and you're back to the drawing-board! A far better way of designing your UIDG is to do the job directly on the screen. The utility program on this article, "CHARACTER DISPLAY-MIR", will allow you to do this.

On RUNNING the program you are presented with a blank 8x8 grid, which you can fill in using the cursor control and function keys, as directed in the program. The actual character is shown to the right



Figure 5

Listing 4

```

1 REM LISTING 4
2
3 @SPEED=2
4 POK=255,255:POK=255,255:CLR
5 FOR I=7148707679:POKE I,PEEK(I)+256000:NEXT I
6 FOR J=7432707409:REDEF=POKE I,PEEK(I)+256000:NEXT I
7 @SPEED=255
8 DWT=16,16,16,16,16,16,16,16,16,16,16,16,16,16,16,16
9 DATA 0,0,0,128,255,255,128,0,0
10 DWT=0,0,0,0,0,0,0,0
11 DWT=16,16,16,16,16,16,16,16,16,16,16,16,16,16,16,16
12 DWT=16,16,16,16,224,224,16,16,16,16
13 POK=1702
14 POK=1702
15 @SPEED=100
16 NEXT I,J
17 DWT=16,16,16,16,16,16,16,16,16,16,16,16,16,16,16,16
18 PRINT " "
19 NEXT I
20 P=16:Q=16:R=256000
21 POK=1702
22 POK=PEEK(P)+256000
23 S=1:FFF=32768:1=2
24 POK=1702:CH1=224:CH2=224
25 POK=1702:CH3=224:CH4=224
26 POK=1702:CH5=224:CH6=224
27 POK=1702:CH7=224:CH8=224
28 NEXT I
29 @SPEED=10

```

Imaginative use of LDCs

To finish off this month, it's worth thinking about some of the things we can do with the LDCs, apart from simply

regarding them as little objects which we can move around the screen. There's enormous scope, and if you're not careful you'll end up into the realm of computer art and forget all about that game you want to write!

Listing 5

```

1 REM LISTING 5
2
3 POK=255,255:POK=255,255:CLR
4 FOR I=7148707679:POKE I,PEEK(I)+256000:NEXT I
5 FOR J=7432707409:REDEF=POKE I,PEEK(I)+256000:NEXT I
6 @SPEED=255
7 DWT=16,16,16,16,16,16,16,16,16,16,16,16,16,16,16,16
8 POK=1702
9 POK=1702
10 PRINT " "
11 NEXT I,J
12 POK=1702:CH1=224
13 POK=1702:CH2=224
14 POK=1702:CH3=224
15 @SPEED=100

```

You can design some really good characters by making a block of several LDCs. Even a modest 3x3 block can look quite realistic, if you type in and RUN Listing 5; you'll get a tank.

By using several LDCs to represent an object you can get reasonable animation. You can really make a ball look as though it's bouncing, by squashing it as it hits a wall, or you can make a funny little man run across the screen. Try Listing 4 — you'll see what I mean. By working really hard you can simulate quite complex movement, like and RUN Listing 5, and work out how it's done.

Really, you can use LDCs to give you lots of movement quickly. If you alter the

configuration of a LDC during a program then BASIC representations of that character will change simultaneously. In Listing 5, the alien muggles their legs simultaneously. Now that really could be put to effective use. Couldn't it?

Next Time

If you've followed this series through you should now have all the tools at your disposal to write running and effective games in BASIC on the UNEXPANDED VIC 20.

Next month I'll cover memory expansion, and go through some of the techniques which can be used to give a lot of polish to your programs.

Program Listing

READY.

```

10 REM CHARACTER DESIGNER
20 REM BY AN PHILLIPS 1984
30 POK=255,255,255:PRINT " "
40 PRINT " " CHARACTER DESIGNER
50 PRINT " "
60 PRINT " " THIS PROGRAM WILL ALLOW YOU TO DESIGN YOUR OWN CHARACTERS
70 PRINT " " AND WILL PROVIDE YOU WITH THE CODE FOR THE DATA STATEMENTS.
80 PRINT " " USE THE CURSOR KEYS FOR DESIGNING THE GRID.
90 PRINT " " @PRINT OUT VIA 1520
100 POK=255,255:POK=255,255:CLR
110 FOR I=7148707679:POKE I,PEEK(I)+256000:NEXT I
120 FOR J=7432707409:REDEF=POKE I,PEEK(I)+256000:NEXT I
130 DATA 255,255,255,255,255,255,255,255,255,255,176,65,176,65,176,65,176,65
140 PRINT " "
150 PRINT " " PRESS S TO START "
160 PRINT " "
170 GET #8

```


**Owen Manderfield
 shows you how to
 clearly control
 characters by inserting
 'REM' lines into BASIC
 programs.**

HAVE YOU EVER TRIED typing in listings of BASIC programs for your Commodore (involving long lines or cursor controls and colour commands)? If so, you will probably know that deciphering the graphic symbols representing these controls can be very difficult. This is a real problem for programmers producing programs. For publications in magazines such as this one, as the program will have to be typed in from a printed listing. One way of overcoming this problem is to document your programs with 'REM' statements, explaining the control characters used.

Here is a simple machine code routine which inserts 'REM' lines in any BASIC program held in memory immediately before every line that contains the line:

1000 PRINT"HELLO"?

This a few lines is inserted showing that a 'cursor right' and a 'cursor down' character are to be printed.

**1010 REM CUR-CUR
1020 PRINT"HELLO"?**

The dash between the two commands shows that the control characters are next to each other. If they are separated, then a space is printed, eg:

**1010 REM CUR-CUR-
HERE HELLO**

This means that 'HELLO' is printed on red, 'HERE' in black and 'YOU' in reversed green. Function keys can also be shown:

**1000 REM F1 F2
1000 [F1]+[F2]GOTO***

ALL CLEAR



Program Listing

```

10 READ P1:P1=TT+8:LN=1000:P=0
20 CO=B:LN=LN+18:PRINT"READING"LN"T
30 READ R:R=[P#R]+E#T#H#R#
40 FOR Q=1 TO LN:R#Q STEP 2:R#R#C#K#D#R#R#L:Q=Q+48:IF Q#10 THEN R#Q+7
50 L#R#C#R#D#R#R#L:Q=Q+48:IF L#10 THEN R#L+7
60 H#R#S#L#C#C#H#P#Q#P#H:P#P+1
70 NEXT Q:PRINT"CARTRIDGE PRINT"#### ERROR ON LINE"LN"####P=1
80 TT=TT+8:GOTO 20
90 IF TT#CARTRIDGE PRINT"#### LINE COUNT ERROR ####P=1
100 IF P#2 THEN PRINT"ALL DATA OK. P#Q="P1"TO" P
1000 DATA 49152
1010 DATA 8528068885208961, 876, 1178 DATA 860C88186C81C3, 1188
1020 DATA 866818885820891, 1841, 1188 DATA 88F76881F888882, 1259
1030 DATA 88852888288884C, 718, 1198 DATA 8888888888888888, 875
1040 DATA 8FC1F8888884C48D, 1000, 1208 DATA 888C888888888888, 914
1050 DATA 88C8888888888888, 780, 1218 DATA 834C84C88884C8D, 1862
1060 DATA 88C88188888884C77, 1874, 1228 DATA 88C8888888888888, 912
1070 DATA 81C8828888888814D, 894, 1238 DATA 88C8888888888888, 878
1080 DATA 88C8888888888888, 830, 1248 DATA 4C8C888888888888, 872
1090 DATA 8888C8F88F2877C8, 1200, 1258 DATA 8582888888888888, 848
1100 DATA 888888888888881C, 1800, 1268 DATA 8888888888888888, 778
1110 DATA 8888888888888888, 924, 1278 DATA 8888888888888888, 728
1120 DATA 8888888888888888, 858, 1288 DATA 8888888888888888, 964
1130 DATA 8888888888888888, 868, 1298 DATA 4C8C888888888888, 1100
1140 DATA 88C8888888888888, 1848, 1308 DATA 8888888888888888, 1488
1150 DATA 87C8888888888888, 1807, 1318 DATA 84C84C8888888888, 938
1160 DATA 8888888888888888, 877, 1328 DATA 4888888888888888, 1802

```





David Crisp examines
**Practical, Practifile and
 Inventory 64**, three pieces of
 business software from the
**Computer Software
 Association for your
 Commodore 64.**

BUSINESS

BUSINESS FILE




COMPUTER SOFTWARE ASSOCIATION has been advertising these for quite a while now but this is the first opportunity I have had to try them. My first reaction was to compare each program with a similar product from another company but later I decided to treat them as a complete but non-integrated package. I have been using a spreadsheet a lot recently and so **Practifile** was the one I dealt with first.

The packing leaves a lot to be desired. It is a flimsy box which suffers greatly in the post. This type of packing seems to be the type with all of the programs from C.S.A. Even when stored under normal circumstances at home the box is really crushed and soon becomes more than useless. The manual was quite comprehensive and it's small size is misleading. It is clearly set out and packed with information laid out in a clear way with a good tutorial approach. If you have not used a spreadsheet before then this would soon get you going. Lacking in the manual, as in most manuals that arrive with spreadsheets, is anything that would point out the potential of a spreadsheet.

For the novice it is difficult to imagine it as anything other than an electronic calculator which can do things such as cash flow projections and analysis. When you start to plumb the depths, however, it is possible to suddenly discover how versatile the sheet can be. To date I have found no manual which stimulates the imagination. I have an unusual investing application on my spreadsheet which allows me to easily take interest and payments for several customers. I can see at a glance each account and its present position. Some crafty print routines give the appearance of a standard investing program. This is a function I worked out for myself while trying to justify owning a powerful spreadsheet, through rambling and back to **Practifile**.

Display

Practifile seems to load very quickly and once loaded you are asked how many columns and how many rows you would like. The default values are 40x20. For my own use this is not really big enough but for many small users it would be enough. After choosing the size of your sheet the top left corner of the sheet is

displayed. I cannot recall up the display pointed out as it looked a little bare. The columns were displayed well enough but the rows were not marked out at all, and I had some difficulty placing the cursor on the desired row. At the top of the screen where I have learned to expect information such as cells remaining and memory available there was nothing except the current row/column and the word **PRACTIFILE**.

The information there though was clear on both the 3" colour screen of an S-Mate and a 14" green screen monitor; some programs while looking O.K. on one are often almost invisible on the other.

Standard practice

As would be expected on a sheet full mathematical functions are available for use such as LOG, EXP, ABS, SQRT, etc, plus a few extra ones such as AVG (for finding the mean average for a range of numbers), MAX AND MIN (for finding maximum and minimum values over a range) and CUM (for finding the number of entries in a range). This is only a selection of the possibilities which are available. Once you have been introduced to a few of the functions you are led into a tutorial to show the possible use of the sheet.

Overshoot

I am a great believer in working through a manual and this one was no exception. I started up the information as instructed and soon felt it was 'almost tapping'. The repeat rate on the cursor keys was far too fast and trying to home in on a box was as hard as getting the last alien on an invader game. At this point I stopped for coffee. A series of short tabs at the key were enabled me to get around the sheet. The column numbers on **Practifile** are at the bottom of the screen and on all the other sheets I have used they are to be found at the top. It took some time to get used to this but with practice I soon mastered it. Panning function keys soon enabled me to bring up the options menu. This is unfortunately fairly standard and as with most sheets a single key press enabled me to clear, freeze, delete, columns/rows, format etc. As usual, commands could refer to the individual



cell, row, column, or to the sheet as a whole. It is possible to set the display up to show integers only, text, numerics to two decimal places and so on. To enable you to enter formulae later there is the replicate function. This allows you to repeat a cell's formula across the sheet or down according to the range you specify. It would appear to be a vital function but one which is not present on all spreadsheets.

Pictures

A nice extra with this sheet is the ability to display sets of figures graphically. As spreadsheets tend to contain a large amount of numeric data it is nice to be able to display a whole row or column as a bar chart in order to get an overall picture. To chart a set of numbers with Practicle was very easy indeed and quick. You have the choice of displaying in low or hi-res graphics which means a bar of asterisks in low-res or a bar of solid squares for hi-res: simple but it does the job.

Printout

It is possible to obtain hardcopy from the unit using either a Commodore printer or the built in software interface. The interface is mentioned in the manual but there is no specification. If the specification was there it should be possible to make any printer work using a custom built cable. I could get some of me leads to work and not others, so all I can suggest is to try before you buy.

Practicle conclusion

I can't quite make up my mind on this one. It is definitely not a bad spreadsheet but on the other hand it is not brilliant. If you are a first time user and were learning to use one I think you would take to it quite easily. However, for someone who is used to a spreadsheet I think they may have a few difficulties in getting used to some of the odd quirks, such as column identifiers being at the bottom. I am suffering from a severe bout of interstion. The best thing would be to have a look at it and decide once you have seen it. I would put it somewhere between Basicalc and Richard Stephend's Autocalc.

Inventory 64

From the same company comes INVENTORY 64. My comments about packaging are the same as with Practicle. The manual is considerably smaller but the program is considerably simpler as well. It is an inventory control system in the words of C.S.A. and is straightforward to use even without the manual. It is menu driven and getting used to it only takes a short while. It is when I call a pre-named database and so is inflexible but that is all some users will want.

Capacity

You are able to hold approximately 620 items per disc but there is no reason why

more than one disc could not be used. I will deal with the program in the order in which it is discussed in the manual. After loading, the first thing that is required is that you insert the database. Relative filing has been employed in the program so at the setting up of your first disc will take some time although, once it was, searching for specific records is fast.

The first menu to appear on screen gives you the option to exit, into sales to date, maintain or produce reports. Choosing option one (maintain) gives you the opportunity to manipulate the records. When entering stock for the first time you will come across the first restriction. It is necessary to allocate the stock item a number between 1 and 630; this cannot be prefixed or suffixed with a letter or anything else and so a stock identifier will be a meaningless number. This is a lesson from a programming point of view, it is possible to use a hashing algorithm to produce the record number and also to find it again and the algorithm can be a simple formula. Any program I have written using relative files has been written using a hashing algorithm and so identifiers can be precise or at least meaningful. Another problem caused by the lack of the algorithm is that you are unable to use the numbers from 100 through to 200. This again is indicative of lazy programming, but could be put right in later versions.

Standard options

All the functions you would expect of a simple stock control program are there; you can produce a re-order list, an predetermined levels, a price list of all stock held, a stock list for reference etc. As I said before, it is a simple program and on the whole performs well. A nice touch is being able to enter the unit of measurement so it is possible to indicate whether something is stocked by size, weight, quantity, and so on. On this one it is possible to zero all sales to date, an important feature which has been missed on a couple of other stock control packages I have looked at.

Printer compatibility

This program is written in BASIC. For a program of this type, BASIC is perfectly adequate. The often cited advantage is that because it is a simple language, it is not marked away in corners of your RAM any printer interface you may have will probably work. My interface software sits at C800 (hex) and is marked DR. Printouts were simple and clean with everything clearly marked. Total parts in stock and total stock value was clearly marked and everything relevant was printed.

Inventory 64 conclusion

A simple program which worked well in what it covers, it is lacking in a few things, e.g. the use of stock numbers and it was not possible to perform any batch operations so if the VAT rate changed and your price included VAT it would be necessary to change each record. It is a stand alone system and so you must assume a printer interface routine exists. Had that it lacked a daily sales printout which would have made it useful in applications where a storeman could use it for issuing parts within the factory etc. With the addition of these things I feel it would be a very useful program. If you were to consider buying it then I recommend that you write down the information you would want from an inventory control package and then see if this program provides what you need. All in all it's not bad for the price.

Practicle

From the advertising information Practicle was the package I was most looking forward to using. I am a fan of database management systems and I spent a lot of time writing odd applications on them. They tend to be extremely versatile and can usually be used in a simple BASIC menu driven form or alternatively programmed to perform many operations automatically.

As the manual is fairly thick it represented a couple of hours bedtime reading before actually loading. I would not recommend reading the manual straight through unless you are conversant with this type of program as they can be heavy going and possibly end up quite lost, but as to many database



management programs are similar I tend to read through the manual first in order to see if there are any extra bits that have not been present on other systems.

The packing and the manual, unfortunately, are much the same as with the other two programs. The only difference seems to be the thickness and the number of errors. My copy came with a six page addendum, not to correct mistakes but to clear up parts of the manual and to explain possibilities not explained fully in the manual. Most of the pages are concerned with the organisation of files and data from PractiFile into PractiFile and vice-versa. This indicates that some degree of integration is possible between the two programs and other sequential files. I'll mark it for explaining it so well, but could it not have been concluded in the manual as later pages are so easily lost.

In use

This is only a review and not a full length depth trial I will only point out the main features of this package. If you would like to find out more about what these packages are capable of and how they can be used then it may be worth reading a couple of the many good books which are available on database management systems.

After loading, the first thing I noticed was the constant need to change discs. I am reading the manual I realised there would be a need to change discs but did not fully appreciate just how often the need would arise.

As a simple test I decided to set up a fairly basic file which would enable me to store my ever increasing stock of software. I wanted some degree of mathematical calculation regarding total values etc and the ability to search according to program type. PractiFile does all this as it imported it would but to be honest the way it did it was dismal. The screen displays and prompts were tatty and simply seemed to scroll up as you went further through the format routines. I found myself having to draw what I wanted on paper and then translate this into a form that PractiFile could understand. I seemed to be relying a lot on memory regarding what I had already put in and if I had made a mistake I required going through each field defined and confirming that each one was alright.

Menus were comprehensive but their layout was basic to say the least and throughout using it I constantly had the feeling that I was testing a program to see if it was functioning OK before sending it back to be tidied up and prepared properly. Unfinished is probably the best way of describing my feelings about this program.

Plenty of space

One thing that cannot be criticised is merely the use of floppies. It's capacity seemed endless, with an advertised number of 8000 files per record. Obviously a record has to be of a reasonable size in order for that many



records to be stored but by anyone's standards some impressive crutching has been employed.

You have a choice of filing methods (sequential or relative) and depending on the type of file you desire the sort of operation will change. A nice feature which could be employed on other databases. Relative files are fast but if the records you have are small enough to fit into RAM then obviously searching and sorting etc are much faster. Despite my criticisms, its design features such as this are impressive. That is one of those small things that make a complete read of the manual worthwhile.

It is possible to generate virtually any type of report from your records and this is fairly easy to do.

Printing

There is a section concerned with maintaining PractiFile which reuses certain information back to the program disc; these parameters are used each time you use PRACTIFILE. It covers screen paper and ink colours, whether you are using two single drives or dual drives etc. and the type of printer you are using. As before, I found that some interfaces would work and others would not and so I am afraid I can only once again suggest that you try before you buy.

Another feature of PractiFile is the facility for using a cassette. I could not try

this as I own an SS-44 but, for long term archival storage of sequential data, tape is ideal as it is fairly safe and very, very cheap. Again this is one of those little things that are changing my opinion of PractiFile.

Yet another of those important but often neglected little things is the ability to batch file. If you are entering a lot of data even random filing seems to take a long time and you are soon conscious of the delay between finishing an entry and being able to start another one. Once again, PractiFile saves the day. If batch entry is chosen, the data that you type in is temporarily stored in RAM and, at the end of entry, it is organised and stored into a random file. It is surprising just how much time this can save.

PractiFile conclusion

I am still a little muddled at the number of times I needed to change discs and totally unimpressed by the 'gross' screen display but, before all you PractiFile devotees have me hanged, drawn and quartered, may I add that I think the program is very good. The things I have covered in 'big and bold' make all the difference. Although I will continue to feel that this program could be greatly improved, it is, without any doubt, a workhorse. I grew to like it and will continue to use it for some applications.

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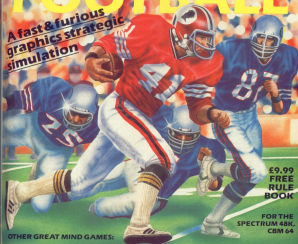
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THE BASIC FACTS PT.4

THE WORD "DATA" IS MUCH overworked. In general, anything which has meaning to the computer could be defined as data. However, as far as the practical programmer is concerned, it is better to consider data as the additional information required by a program. A program, after all, is little more than a set of instructions for manipulating data so it is almost self-evident that, in most cases, it should be supplied from outside. For



example, a program which adds five numbers (10, 200, 300 and 425.45) together and printed out the result may be of slight interest during the first run but subsequent runs would provide no further information. On the other hand, if the numbers were supplied from outside, so that subsequent runs acted on different numbers, the program would, in spite of its simplicity, have some justification for being written. As a further example, it would be a pathetic waste of time to write a program for calculating the number of factors in 48, for neither if the program could find the factors of any number supplied from outside during a run, how we have defined data as information required by a program, it is important to be aware of the different ways in which it can be supplied. We can use the INPUT, INPUT#, GET, CALL or READ/DATA statements.

The INPUT statement

When a program is running, the instructions are executed one after the other at lightning speed — far faster than humans can think or act. If a program requires data during a run, there must be some provision for halting the computer, until such time as the user of the program has finished entering the required data via the keyboard. The relevant BASIC statement which halts the computer until you feed in some data is INPUT. There are actually two forms of this statement, depending on whether a prompt message is to be displayed on the screen or not. The syntax of the simpler form is as follows:

```
INPUT variable
```

INPUT is the BASIC keyword and must be followed by a variable name of your own choice. For example, suppose we write the line:

```
100 INPUT A
```

The computer will halt at line 100 and output the character "?" to the screen accompanied by the blinking cursor. When you have entered suitable data and pressed RETURN, the data will be placed in the variable named A and the computer will resume its high-speed progress. If the data is unsuitable, an appropriate error message is displayed. The commonest case of error is when string data is entered instead of a number, in which case the somewhat cryptic error message "BASIC FROM START" will appear on the screen. If strings are to be entered, the variable must be a string



variable such as INPUT A\$. It is worth remembering here that numbers are accepted into a string variable (hence numbers are included in the definition of strings), numeric variables will accept no other characters but numbers. If the operator happens to press RETURN before entering data, an original value which the variable may have had is still preserved. It is advisable to enter many data items at a time into different variables, providing they are all separated by a comma. For example:

```
100 INPUT A,B
```

You enter the A data first, followed by RETURN, then the



B data, followed by RETURN. Although this facility is offered, you are advised not to use it very often because it could be confusing to the operator. It is far better to use a separate

INPUT line for each data item. In fact, we should mention that the use of the simple input statements described above should be employed sparingly. A halted program, accompanied only by innocent looking "I am unknown" into the heart of an inexperienced operator — remember the person using the program may not be computer minded. What is needed is some message to accompany the INPUT statement which guides the poor user. In other words, he or she must be prompted. Because of this, it should be almost a rule that you use the following expanded format of the INPUT statement:

```
100 INPUT "message", variable
```

The computer will now halt as before but this time, a suitable prompt message is displayed for guiding the operator. For example:

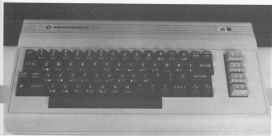
```
100 INPUT "Enter gun velocity " G
```

Note that the message must be enclosed within double quotes and that a semicolon may separate the message from the variable. Notice also that a space has been left between the end of the message and the closing quotes. This is not mandatory, but if you leave it out, the data entered will butt up close to the end of the message and look messy on the screen.

INPUT validation

Sometimes, due to carelessness, malice or thoughtless or sheer ignorance of the





circumstances, operators will respond to an INPUT statement by entering data which, although correct in syntax, is quite odd. For example, if the prompt is "Enter your age" and the operator responds with 456 then the accuracy of the data is, to say the least, suspicious. The computer will accept it at once, because it is naive and quite incapable of mature judgement. It is up to the programmer to include validation checks on all data received from the keyboard.

example of a validation check:

```
800 INPUT ENTER YOUR
AGE = AG
500 IF AG > 120 OR AG < 2
THEN GOTO 900
```

Line 500 would reject ages greater than 120 or less than 2. These limits are naturally up to the programmer to decide but it is hardly likely that a child less than two years old, however precocious, would be operating a keyboard. At the other end of the scale, it is difficult to imagine how someone over the age of 120 could have sufficient strength left to push down the RETURN key. However, it is often desirable for the program to include an escape clause. For example, it may be that the operator may want to see what happens if he was 121 years old — a kind of digital peep into the future. To cater for such anxious individuals, the previous example could be modified as follows:

```
800 INPUT ENTER YOUR
AGE = AG
500 IF AG > 2 AND AG < 120
THEN GOTO 100
520 INPUT ARE YOU SURE?
530 IF = N THEN GOTO 800
540 — end of program...
```

This version incorporates the Are you sure? trick. That is to say, if the data supplied is outside the limits, it is finally



rejected only after the operator has been given the chance to confirm or reject it by entering either Y or N (yes or no). Notice that line 500 uses the AND connective in between the two limits instead of the OR. If you think this is wrong try going OR instead and see what happens. You can get into some strange difficulties with AND and OR. For example, if a number is less than 120 OR greater than 2 then it could be any number within the range —infinity to —infinity. This would be a ridiculous pair of limits, but if we had used AND instead of OR, the number is rightly bound. We shall be dealing with the AND, OR and NOT connectives in great detail later in the series when we discuss logical operations. In the meantime, see if you can re-arrange the program in a better way. Remember though, if you have to use more GOTOs than we have done it should not be considered an improvement.

The INPUT statement

The normal INPUT statement is used for entering data from devices other than the keyboard. Data can also be moved on a data tape or tape disc and read in from the program by means of the INPUT statement. However, we do not think this is the best place to treat the subject because it demands a knowledge of channel numbers and other unpleasantities. INPUT is best treated later in the series under the heading of tape and disc files.

The GET statement

The INPUT statement is used for entering one or more characters from the keyboard. The RETURN key being used to inform the computer that no more are to follow. The GET statement is different. It is used to enter a single character and does not require the RETURN key. As soon as we press a key, the character is entered immediately into the variable. Thus, if we write GET A or GET AB, any key pressed is entered immediately into the variable A or AB. However, some strange things can happen unless you understand the action of the keyboard buffer. This is a small memory, capable of holding only ten characters. Whenever a key is pressed, the character code of the key is entered into the buffer. When we use the



The best place for this is immediately, or at least soon, after the INPUT statement. It will take the age query as an

GET statement, one of the characters is read into the variable, leaving room for another one to be entered into the buffer if more than ten keys have been struck without an intervening GET, the excess key presses are lost. The keyboard buffer action still goes on, irrespective of whether the computer may be



waiting at the moment. For example, if a program is running and we hit the space bar, nothing may appear to happen but the character will have entered the buffer (provided it was not already full). If, later on in the program, a GET statement is reached, the character will be dropped up the buffer without you knowing it. If we wish to use GET in order to pick up a particular character, we must include a small loop which waits the computer until the required key is pressed. For example:

```
100 GET #3, H: @KBCD: ""
  THEN GOTO 200
```

This is an example of a line which does TO itself unless some criteria is satisfied. The only way for the computer to escape from the loop is by pressing the 'H' key. We can widen the criteria to include any key by using:

```
100 GET #3, H: @KBCD: "" THEN
  GOTO 200
```

Note carefully that "", which is called the null string (no key at all), must not have a space between the quote marks. The computer stays in the loop until the keyboard buffer receives a character — it doesn't matter which character. If we wanted the computer to halt until the space bar was pressed, then we would have a space between the quotes.

The GET statement

This is used when we wish to read a single character from a device (other than the keyboard, such as from tape or disc) like INPUT. We shall postpone discussion on GET's until later in this series.

The READ/DATA statements

We have defined data as information required by a program and, so far, we have assumed that such data has been accessed from the keyboard during a program run. The READ/DATA statements represent a grey area because, although they are used to pick up data, the data is part of the program — it occupies program lines. The format of the DATA statement is as follows:

```
DATA list of constants separated by commas.
```

For example:

```
1000 DATA 30,50,8,5
```

Note that the constants allocated variables names. Note also the high line number, which is of course an arbitrary



choice. Although DATA statements can be placed anywhere in the program, it is customary, indeed desirable in the interests of structure, to place DATA statements at the end of a program so they stand out and can easily be changed. To read the data into variables, corresponding READ statements must appear, the format being:

```
READ variables
```

For example, to read in the



three constants used in the previous DATA example, the following line must appear somewhere in the program:

```
200 READ A,B,C
```

This will read the DATA items into the three variables in stated order. That is to say, 30 will go into A, 50 into B and 8,5 into C. There must not be more variables in the READ than there are constants in the DATA. For example, if we had written READ A,B,C,D the computer would get error and spit out the prior message 'OUT OF DATA. Another way of providing an outflow is to assign to READ the same data twice. It is not necessary to read all the data items at one go. We could have written our example in this form:

```
100 READ A
  200 READ B,C
```

Although, we have used numeric constants to illustrate the features of READ/DATA, there are no restrictions as to the kind of constants. They can be simple string variables or even long sentences and can be mixed with numbers. However, there are two provisions. Any strings in DATA statements must be enclosed within double quotes and the corresponding READ variables must be string forms. A possible DATA line could be:

```
1000 DATA "CALDY", "GRABBY", "BURTON ON TRINT" 500
```

This could be read with:

```
200 READ A,B,C,D,E
```

Note the first four are strings and the fifth numeric.

It may be asked why we could not have written the whole thing much more simply by using a set of assignments such as:

```
100 A="CALDY" B="GRABBY" C="BURTON ON TRINT" D=500
```

The answer is that, in this simple case, we could have done. However, situations can arise where the DATA/READ method is advantageous. Up to this point, we have only mentioned one virtue — the fact that the DATA items, when placed at the end of the program, stand out in a listing and can easily be altered at some later date. Some data is, what we might call, semi-permanent in nature. For example, how much tax to pay in the pound is usually semi-permanent because it lasts until the current Chancellor decides it isn't enough or, much more



rarely, we are given a sufficient rise in salary to lift us into the next tax bracket. If the tax percentage appears as a DATA item, it can readily be changed without having to find an obscure variable assignment. However, we must admit that these points alone are not sufficient to justify the READ/DATA method. To appreciate its other uses, we must delve a little deeper into other ways of holding variables.

Variable arrays

Up to now, we have only dealt with simple variables like A or AT because they are relatively easy to understand. The time has come for us to delve into variable arrays. You will find these provide a far more flexible and powerful way of



expressing variables and will work the same without requiring to understand them. To start with, let's see what a simple array variable such as A(4), or A(4) if it is to hold strings, looks like. The general form is:

```
Array name (numeric subscript)
```

For example, we can store something in A(1) and something else in A(2) etc etc. In fact we can store something in A(200) if we wish. The array name is, in this case, 'A' which may be considered as a label

However, it is also to confirm that something has happened if we now use PRINT A(2) in direct mode — it should print out "COPENHAGEN". If there is a long list of DATA items it would be more professional and certainly quicker to use a simple loop to read in the data. For example:

```
500 FOR I = 1 TO 5
510 READ A(I)
520 NEXT
530 DATA 28,11,8,2,7
540 DATA 450,200,50
```

When this is run, the first revolution of the loop places 1 in A(1), the next revolution places 8 in A(2) and so on. To prove it, by PRINT A(8) — you should see 20 displayed on the screen. You should try to get into the habit of using PRINT in direct mode to test what happens after a run because it can become a powerful debugging weapon. If you think that some variable should have a certain value, a quick PRINT of the variable will confirm or reject your beliefs. After all, there can be a difference between what you think should be in, say, A(4) and what actually is. If you want to feel obscurely at the computer, by all means do so but, in the end, you will find it is something you have overlooked.

The DIM statement

In the last example, notice that the loop ran from 1 to 5. The loop was deliberately kept to a modest size to avoid having its dimension the array. It is a peculiarity of any array that the computer must be prior informed of the number of elements in the array it is to exceed eleven, that is to say, the highest allowable subscript is 10 (this allows for the 9

subscript). The computer is, of course, probably somewhere near the top of the program, by the DIM statement, the general format of which is as follows:

```
DIM array name (highest subscript)
```

For example: DIM A\$(100) will reserve 101 locations to hold the variables with subscripts within the range 0 to 100. Once an array has been dimensioned, you must now allow the program to re-dimension or you will get the error message, DIMENTD ARRAY. This is understandable when you think about it. Once the computer has gone to the trouble of allocating its resources for your array, it is going to be very annoyed if you later change your mind within the same program. If you must re-dimension, you must first clear the computer of all variables (quite a bit of tedious work) and run to be taken lightly by using CLR.

consider a matrix of numbers as follows:

```
1 2 3 4
5 6 7 8
9 0 1 1
```

It consists of three rows of four columns and could be described as a 3 x 4 matrix. We could then imagine this stored



in an array A(row,column). Thus, A(1,3) would hold the number 3 because it is in the first column of row 1. The number 8 is in A(3,4) and the number 0 is in A(3,2). We should stress that it is not essential to allocate the first subscript to rows and the second to columns. How you visualize or see the array is your own choice — the computer hasn't got a clue what a column or row is anyway.

The following few lines will read in the 12 data items into a two-dimensional array and prints them to the screen as a matrix of 3 rows and 4 columns:

```
500 DIM A(3,4)
510 FOR I = 1 TO 3
520 FOR C = 1 TO 4
530 READ A(I,C)
540 PRINT A(I,C);
550 NEXT
560 PRINT
570 NEXT
580 DATA 1,2,3,4,1,5,4
590 DATA 9,0,1,1
```

The inner loop, line 520 to 560 begins with 8 fixed at 1 while the first four constants are read in and printed. The next four constants are similarly read and printed but this time with an I value of 2. The last four items are read and printed with an I value of 3. Note the semicolon, which terminates line 540, ensures that each row of four items is printed on the same line. The separate PRINT statement at line 560 is to cancel the semicolon effect in order that the next row starts on a new line.



same for a block of separate data. Each individual item in the array is identified by a number, known as the **subscript**. We must be careful to distinguish between A2 (which is a simple variable) and A(2) which is the 2nd variable in an array called 'A'. It is the position of the brackets around the subscript which informs the computer that it is one element in an array. The subscript can be any number from 0 to 32767 but, unless specifically wanted, it is less confusing if you avoid going to the zero subscript. Most people, except computer fanatics, like to count from 1 to 1 rather than from 0 to n-1. To get used to the feel of variable arrays and to consolidate previous discussions on DATA/READ statements, study the following few lines which will read data items into the string array A\$(n):

```
100 READ A$(1);READ
102 READ A$(2);READ A$(3)
1000 DATA LONDON, BERLIN,
10000COPENHAGEN, MOSCOW
```

Type this in and run it. Nothing appears to happen because all we have done is to place the data items into an array.



Multi-dimensional arrays

The type of array variable we have discussed so far is classified as a one-dimensional array. It is possible to extend this idea to include arrays of two or more dimensions. A two-dimensional array has the general format:

```
Array name (for subscript, 2nd subscript)
```

For example, A(3,4) is one particular variable in the two-dimensional array named 'A'. It is a little difficult to grasp the computer's concept of two dimensions but suppose we

In most small towns, computers usually have to share shop space with an assortment of other electrical goods. David Crisp visited Minehead Radio where this is the case.

COMPUTERS IN BUSINESS

IF YOU LIVE OUTSIDE A LARGE TOWN, the chances are that you do not have a shop close by which specialises solely in home affairs. However, you can probably buy radios, gramophones and software from your nearest dealer who will be either one of the national chainstores or a shop which sells computer related products as an extension to its existing business, normally, an audio/video/ electrical shop.

Trained staff

In many towns and villages, it is unlikely that a 'computer-only' shop would be a viable economic proposition as, by selling computers as a ' sideline', the shop may increase its turnover by attracting new customers. It also enables computer users to purchase equipment without having to travel long distances.

Despite this being a godsend to a lot of people, this system entails obvious disadvantages. The most common problem stems from asking an assistant, who may be as much a computer novice as yourself, for advice on buying or using a computer. In some cases, you may be given incorrect or, at once, hazardous by me case, very dangerous information.

In the early computing days, I wanted to control my domestic lighting system with the computer; fortunately, I had a good idea of what I could and could not do but, when I asked for a little extra help at a shop that professed to be 'expert' in these matters, I was advised to connect the user port direct to the 240v mains. Needless to say, had I followed their advice, I would not be here to tell the story.

Staff training in shops is gradually improving. The large chainstores, as the whole, provide basic but important training in computer sales and use. Come the days when, if you asked about 'motivation' the staff wondered why you were inquiring about their plans for the new year!

Minehead Radio

One of the many small shops which has taken home affairs under its wing is Minehead Radio. It is situated on the borders of Dorset and Devon, the people within a radius of about twenty miles. In the summer, its business is boosted by a nearby holiday camp but, as the computer boom, the locals provide the



Graham Lawrence of Minehead Radio

vast majority of its business.

Minehead Radio received its first computer ten months ago — a Commodore 64. Suppliers were rapidly found and, very soon, the whole back portion of the shop was taken over by computers. It stocks a wide range of machines including the 64 and the VIC 20 and a corresponding amount of software. Obviously, it is unwise for a shop in the outback to stock too many copies of each title as sales per copy are fairly small. However, a wide range of floppy discs and monitors are also stocked by the shop; it is also their policy to stock many items that might be difficult to obtain outside the larger towns. For example, how many shops do you know where Commodore price indications may be thought of as the 'shell' — certainly not many in business?

A large comprehensive stock list while walking distance of the outback. Come 4:00 o'clock, it is difficult to get near the shop as children file through its door in their eagerness to try out the latest game.

Minehead Radio is usually successful in sorting out its customers' problems. Graham Lawrence, the financial director of the company is becoming more conversant with each computer. He says "It is easy to get familiar with our other lines such as radios, S.N.C.s but, as each computer comes out, we as new peripherals for the market, it is very difficult to keep up with what is available and that is without the constant release of new software".

Another problem confronting small retailers is the relatively short shelf life of

many of the games. Graham states: "When we hear that a new release is available, it is very difficult to assess the number of units in stock and it is easy to find you have over ordered and, just a few weeks later, you are left with a box full of 'dead' games. Apart from that it is obvious that a lot of copying goes on and this has an obvious effect on the number of sales per game. Copying is a problem and the people who are copying are only doing themselves out in the long run. It is a simple way of making programs 'topcopied' could be found and our sales increased, we would obviously not like to take on a wider range of software".

From the conversation I overheard when I was in the shop, it is obvious that copying amongst friends is a common practice.

All muck in

Nobody in Minehead Radio deals exclusively with the computer department. Andrew Knight and Kevin Middleton, who are usually found in the van delivering T.V.s, videos and microscopes, often have to turn their hands to loading and demonstrating the latest releases. While they haven't got the time to become experts in this job, Andy and Kevin have had Commodore 64 at home in order to learn the lingo.

Kate Bradwick is responsible for looking after the main computer system in the back room. She too shares a keen interest in home micro but, again, she faces the problems of not having enough time to keep up with the home computer developments.

"Everybody in the shop has to muck in when things get hectic", says Graham later, the director. "It is obviously not the best arrangement but we can usually sort out most problems that arise".

Hard to get

From talking to the two Grahams, it is obvious that difficulties arise in the shops due to the unreliability of supplies. "Late last Christmas", remarks Graham later, "Commodore 64 was available in abundance, unlike other machines, but it was nearly impossible to get a cassette unit. We were stuck with unsuitable computers. It was possible to get the 144 discs but how many parents would afford to buy their children a 64 and a disc drive in one go?"



Pete, who works in the service department makes similar comments about the components: "I could service most of the machines we have here but the supply of I.C.s is so irregular it is very, very difficult to maintain an adequate stock."

The home computer industry is relatively new and still causing small cut loss, what annoys the two Grahams more than anything is the way that manufacturers and distributors seem to "dump" the small retail outlet in favour of the large multiples where things get short or at peak times like Christmas. "There have been times when we have not been able to get any computers at all, it gives the impression that we are not doing our job properly".

Up to the ceiling

At the rear of the shop, where the computers live, it was easy to see that space is a problem. The software was displayed from floor to ceiling and, when the shops gets very busy, it is easy to lose a considerable amount of stock through shoplifting.

"Was any more", Graham Sr. tells me. "We did notice that quite a lot of stock was disappearing but we now have closed circuit T.V. ...It does have a deterrent effect as losses have dropped considerably since it was installed".

Putting the 64 to use

Down at Milehead Radio's video library, a few hundred yards away from the main shop, Ron Rorer is concealed under a pile of video tapes. Ron says: "We have got about 1500 tapes at the moment and that number is increasing all the time. We do need to keep some type of inventory in order to get stock values etc so we are going to use a Commodore 64. I have one at home and use it a lot and I know that it is capable of doing all that I require".

While talking to Ron, it also became apparent that using the 64 and a piece of software such as Superbase, he should be able to keep an eye on which titles and tapes are most popular. With a good member list and a video list, it should also be easier to keep members informed.

Milehead Radio seems to be investing more and more in computers. They are obviously providing a service that is required in the area and seems to be doing it with a high degree of success. It was encouraging to see the 64 being used so much by the shop's staff who have access to a wide range of machines! Ron, for example, as secretary of the local rugby club, is storing the club's records on his own Commodore 64. This only goes to show what a versatile machine the 64 is. Graham is also keen to start stocking the new Commodore models.

For a small shop, Milehead Radio offers a wide range of services. Retaining home movies is obviously a much harder task than would at first appear, it is time consuming and, so far as capital investment goes, expensive. I finally left at 4.00 o'clock to be replaced by the local comprehensive's computing contingent.

This month we show that reading can be all fun and games as Alan Webb assesses some of the Commodore games books on the market.

REFERENCE LIBRARY

THE MAJOR PROBLEM ENCOUNTERED by new-comers to computing when they first get their computer is... "OK, what do I do with it". Quite understandably a ready-written game or other program to type in is what they really need. In response to this requirement, there has been a veritable flood of books providing games listings onto the market. Here is a small selection of such publications.

Book Title: Winning games on the Commodore 64
Authors: T.P. Barrett and S.W. Colwill
Publisher: Ellis Horwood Ltd.
Price: £5.95

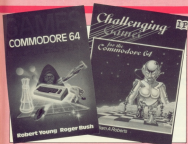
From the title of this book, it isn't very clear whether the book provides "winning games" or whether it intends to help you win games. A quick scan of its contents shows that the book has a title more than the others of its genre. There are in fact two main sections, the second containing 33 reasonable albeit unexceptional games.

The most exciting bit is the first section which gives a good beginner's guide to the 64. The areas covered include BASIC, simple animation, outputting information to screens, Boolean operators, user defined graphics, sprites, joystick routines and sound. The treatment of the subject matter was far giving a good level of information for the beginner. The section on sound was the exception in that it as was short and almost of no value at all. I got the impression that the authors preferred the graphical side of things. The chapter on the use of joysticks was of some value in as much that a machine code routine is provided for the scanning of the joysticks. This routine was in fact used in many of the games in section 2. On the whole the section is probably marginally better than the user's guide supplied with the 64.

The games listings provided were mainly "arcade" type games with the odd educational program. The instructions or guidance notes were minimal and the games were generally mediocre. I noted with some surprise that simulation or adventure games were included.

Overall, a rather disappointing book which falls badly between a games book and a user's guide and isn't really any good for either purpose.





Book Title: 411 Fun projects for your Commodore
Authors: D. DeHaron & H. Kohl
Publisher: Reston Publishing Company
Price: \$6.95

This book is more of a variety of things to do than a book of games to play and seems to be aimed at the younger end of the beginner market. The book is split into six sections covering word games, number games, IQ exercises, strategy puzzles, music programs and utilities. To my view, the strength of many of the routines given is that apart from being used as they stand, they can be used as a rich source of ideas and hints on programming techniques.

The most notable routines are a word search generator, a simple database, a tiny word processor, and several amusing puzzles. All programs had introductory text describing the program and giving some indication on its operation.

If you want to simply play mindless tapping games, this book is not for you. If on the other hand, you need to use the 64 and exercise your mind and programming skills, this book is a good starting point.

Book Title: Games Commodore 64 computers play
Authors: Robert Young & Roger Bush
Publisher: Addison-Wesley
Price: \$6.95

At 179 pages, this book was one of the heaviest in this collection. On opening the book it is pleasant to note that the book is split into discrete sections, each containing games of a particular type. As the title indicates, this is a game only book.

Section one contains the ubiquitous

"Arcade" games. As expected these comprise the usual space, chase and race types. A nice touch is that a number have back keyboard and joystick options. Overall a fair variety which should offer something of interest to most people.

Next come the simulations. Four such programs are given representing the main types. First there is a space adventure which, while being tolerably short, is reasonably challenging. Two of the games are of the "what if" genre where you change a number of parameters and hope that the result is correct. These games enable you to run a farm or control the Roman Empire. Finally, there is a war game simulating the Battle of Britain.

Last come the "mind games" in which you must try to think faster than a 6490. These games include 3D mazes & crosses, Reversi, and Mines. Not an inspiring collection but good honest logic stuff.

Each program has a piece of descriptive text which not only gives instructions on how to play the game but also indicates how sections of the programs function. The introduction has a full listing of the meaning of the COM operational characters and the graphics characters, invaluable if you aren't used to typing in listings.

Generally, a reasonably friendly text which should provide hours of harmless fun at an acceptable price.

Book Title: Challenging games for the Commodore 64
Author: W. A. Roberts
Publisher: Interface Publications
Price: £3.95

This volume presents a varied mix of 16 games. I got the overall impression that the games tended to require brains rather than reflexes. In fact the majority of the games were of the simulation, adventure or strategy type game. The most notable

inclusions were Reversi and Chess on programs.

Rather an exciting book which is hardly better than average.

Book Title: The Commodore 64 Program Book
Author: Vince Apps Publishing Associates
Price: £4.95

This book contains twenty five programs of widely varying size and type including educational programs, games and utilities. Personally, I welcome this side directly since not all of us live for tapping alone. Overall, the programs tend to be more suitable for the older user and this book is not suitable as a learning aid for young users.

All programs use BASIC and I note with interest that the author has acknowledged speed limitations of the language by offering a high proportion of coded independent programs. There are a number of advanced simulation programs which, while being lengthy, will give long term entertainment. For the better of arcade type games, there are a fair proportion of "tapping" games. Inevitably, however, these games are all restricted by the use of BASIC.

For those seeking something more useful, there are several routines including an assembler and a compiler routine. I consider the inclusion of the assembler to be significantly forward. The program is quite readable providing the ability to assemble, disassemble, save and load machine code and run the code. The book is almost worth buying for this program alone.

The quality of the book is good with all listings legible and with adequate instructions and program descriptions. At the price, well worth a long look.

Book Title: Crazy games for your Commodore 64
Authors: H. Renko & S. Edwards
Publisher: Addison-Wesley
Price: £3.95

Here we have a very handy little book of programs of all types. These authors have found an interesting blend of games and novelty programs. I was particularly pleased to see routines for the well known "Black Box" game and a program to generate father parsons. Overall there are thirty listings ranging from a rather amusing adventure to a Frogger look alike.

A tolerable amount of additional information is given with the programs, particularly where some theory of operation is required. Overall an excellent little book which represents good value and offers something for everyone.

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