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Submitting articles

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



SUNSHINE

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More book reviews, this month covering the subjects of machine code, getting more from your Vic, and using Basic subroutines

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Jack Cohen once again sits at the QWERTY keyboard and tries to answer your most baffling technical queries

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Comline Graphics offers ten readers the chance to win copies of Party Pipes and Moby Maze

EDITORIAL

COMPUTER IS THE latest in a small, but growing, number of databases designed to attract home micro users. Unlike its main rival, Microsoft 886, Computer only serves Commodore micros, though the usage may be expanded later.

For £99 you receive a 1200/73 1200/1200 modem, the necessary software protocols and one year's free subscription to Computer. You will be able both to upload your own messages and programs, and download free and commercial software. The modem will also help to prevent piracy, since downloaded software will only run on the micro used to access the program.

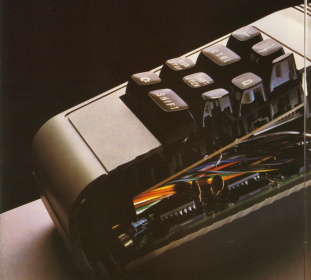
Computer plans to offer a number of different services, including teleshopping, telebanking and even telepublishing. A range of information providers will be invited to contribute to the system, as will the software houses.

However, Computer's profession, notably CompuServe, the Source and Microsoft, have not with only limited success. Microsoft, for example, was launched in March 1981, but 18 months later only has about nine and a half thousand subscribers. The technology may be here, but the great leap forward still has to be taken.

In part, this is due to the price of modems. The number of people likely to subscribe to networks such as CompuServe would be a great deal higher if modems cost £50 or less. However, the price of modems does appear to be drifting downwards, albeit slower than we would like.

The other reason why networks have so far failed to realise their full potential is that they have not really made use of the medium on which they are based. Networks cry out for interactive facilities which will allow users to link up with each other and with databases. A network which just imitates the post office or the yellow pages is only duplicating services which already exist.

What is needed is imagination, and the perseverance to make the imagination work.



Are you only using

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

The computer's brain barely ticks over.

To really stretch it, you need more interesting software programs. For example, record keeping, interactive education, stimulating adventure games or word processing.

And for those you need peripherals.

Like a Commodore disk drive, a really fast storage and retrieval system with a vast memory.

Or a Commodore cassette unit, the inexpensive way of loading and storing programs.

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LETTERS

PAGE

Dataview address

I READ with great interest a news item under the heading of "DATAVIEW VALUE" in the September issue of *Commodore Horizons*.

I shall be grateful if you could correct two points — first both the products mentioned in the news item are published by a new company, Dataview Wordcraft Limited and secondly the address of Dataview Wordcraft Limited is Radix House, First Street, Colchester, Essex, Telephone No. (0206) 869414. Ann Fry Marketing Manager Dataview Wordcraft Ltd

Merge solved?

A SUGGESTION I would like to make, regarding a query J.D.W. Sumner of Devon made in your Answer Back section regarding merging of listings, is that it is possible to overcome this problem without the need to purchase any specific software.

On the 84 carry out the following — Load or type in first section of program then enter in DIRECT MODE

Print(46). Follow this by entering NEW then load or type in second section of program, then enter again in DIRECT MODE Print(44), 1, Print(44).

When LIST is now carried out the two sections of programs will have merged and can be RUN as one program.

This is also possible on the Vic 20 if you first Print(Print(40)) and Print(Print(44)) then enter the first DIRECT commands as previous. Follow this by entering second section of program and then enter again in DIRECT MODE Print(Print(44)) Print(44) where X and Y are the values obtained previously.

The list numbers for the two sections must be consecutive in any overlapping will cause — duplicate existing list numbers.
Kevin J. Moran
Walsley
Tisbury

Mister Angry

HAVING purchased your magazine for some months I decided to try some of your programs for my Vic 20. Having spent a number of hours typing and checking they still won't run. I have checked them over and over again and I am 100% sure that they are as they appear in your magazine. I have tried them on three machines and all I get is a mass of symbols on the screen.

I don't expect you to print this letter in your magazine and even if you do I won't see it, because after all the hours of tearing my hair out I will not be buying your magazine ever again.

Yours Angry
M. J. Knapp
West Maitland
All Commodore Workcraft Software File programs are received on cassette, loaded, checked, printed out, and the program is reproduced photographically. This doesn't leave much room for mistakes. Since Mr Rodgen won't be reading this, perhaps one of his schoolfriends will explain this to him.

Blush blush

IN RESPONSE to a query from a J.D.W. Sumner regarding a merge routine for his '84, you recommended a software package from Supersoft.

As the reader was obviously 'not' writing his own programs, I was surprised that you did not recommend the excellent book *The Working Commodore* by David Lawrence, published by Sanslow Books.

Among the routines listed are 'MERGE', 'RENUMBER' and 'DELETE'. At a cost of £5.95 this represents a much greater value than any software package, particularly as there are many other useful routines in the book.
B. J. Chisham
AFFO 13

We just don't like to blow our own trumpet!

Castlepoint club

MANY THANKS for your excellent magazine. It's a pleasure to have trouble free listings.

I have only been taking your mag for three months but I am frightened to ask about back copies. When did you start?

I would be pleased if you could mention our club. It's just been formed and we'd like more members. It's the Castlepoint Commodore Computer Club.

The club offers a social library, bulk purchase offers, outings and excellent teaching by a brilliant young man, John Crocker.

Membership is £5.00 per year, £2.00 if you are unemployed, and 50p for meeting which is fortnightly.
J. Gillin
150 Church Parade
Canvey Island
Essex

ALL BACK ISSUES of *Commodore Horizons*, apart from the first, Dec 83-Jan 84, are available from our subscriptions department.

This is the chance to air your views — send your tips, comments and compliments to Letters Page, *Commodore Horizons*, 15-18 Little Newport Street, London WC2E 8LD



Making
micro
music

THE CAPITAL Region Information Centre, part of the Micro-Electronics Education Program, is producing a booklet for music teachers and students entitled "Microcomputers and Music Education".

Following an introduction to the subject, the booklet will contain a list of useful software and hardware currently available, with a full section on the Commodore machines.

Organiser Nick Pickett said that despite the Commodore machines not being approved for use in schools by the Department of Mechanical and Electrical Engineering of the Inner London Education Authority, any information on the subject would be gratefully received.

To contribute information or get hold of the booklet, which should be available in September, contact Nick via the Music Department, Middlesex Polytechnic, Trent Park, Uxbridge, Middx.

Mermaid launches
disk doctor

NEW COMPANY Mermaid Software has launched the first of a series of educational and utility programs.

Doctordisk is compatible with the 1541 disk drive and all 154 format drives including the Prodrive 07080.

It's a disk repair program which will retrieve corrupted data, recover data from disks with slight physical damage, and allow the data to be saved on a new disk which is given an identical header.

Mermaid's Harold Wolpert describes the utility as "an invaluable utility for serious disk users, saving hours of work in cases where disks are damaged or worn by excessive use."

Doctordisk comes with a free blank disk as well as the main

GAMES CREATOR, from Microsoft, is the latest in a line of programs designed to let non-programmers produce games.

Launched at the PCW show, the 84 Games Creator is written by David and Richard Darling, authors of the Galactic Games Designer for the Vix 30.

Games Creator comes with three games ready to play: Bomber, Hawk Fined and Snake Pit, which cover maze, platform and Scramble-type scenarios. The program is menu-driven, and allows you to specify the type of alien used, movement patterns,



backgrounds, shooting rules, sound effects, music, sprite shapes, explosions and so on. Microsoft's Jim Mack-

enzie commented "Games design languages like BP's Scope are excellent in their way, but for users who don't want to learn a new language we've put together Games Creator. We think it will be a big success with games players of around 12 years old and upwards, but we've also found that it's a help to more advanced programmers who want to try out games ideas before writing original programs."

Games Creator costs £12.95 on cassette and £15.95 on disk; contact Microsoft, The Mirror Group, Halfords Circus, London.

Eureka! — £25K reward

EUREKA!, an epic arcade adventure from new computer developer, looks likely to set new standards of complexity — and there's a £25,000 "reward" at stake for the first person to complete it.

Dominic Whelaney — grandson of author Grein — and Mark Strachan have set up the company with the intent of "blending the talents of many people into works of art." Eureka! consists of five adventure games, written by Fighting Fantasy author Ian Livingstone, and five arcade games. All the coding has been done by the Hungarian programmers of Andromeda Software.

The game is released in a single £14.75 package on October 1st, and any mail orders made before that date will have a guaranteed delivery date, so as to give a fair chance to all purchasers. Eureka! will be released to shops at a later date.

The epic contains around 1500 of coding, and operates on a multi-load principle. Completing each arcade section allows access to the next part of the adventure, which is set in five different periods of history — Prehistoric Britain, Roman Britain, Celtic Britain, World War Two Germany, and the present day Caribbean.

Your mission is to find the shards of a shattered moon crystal, and the reward of

£25,000 will be paid to the first person to achieve this.

Dominic Whelaney said "we're keeping figures pretty fairly secret, but some of my grandfather's books would lead themselves well to computer games, and we might also do something based on a certain character. There's very little limit to the ability of Andromeda Software's programmers!"

Contact Demand through Tigress PR, 127 Faver Park Road, Peters, London, phone 81-871 1135.



Doctordisk — "invaluable"



Whelaney & Strachan — get it

Elite on the street

NEW SOFTWARE company Elite have plans to dominate the Christmas market with two games releases based on US television series currently popular in the UK.

Elite's first release, the wincefully named Korokoni Wolf, is a multi-screen arcade adventure in which the hero has to recover all the pieces of the missing Dragon Amulet. There are over 60 screens, and the program is being marketed as a rival to the popular Jet Set Willy.

Elite's forthcoming release are licensed from 20th Century Fox and Warner Brothers, and

are based on the TV series The Fall Guy and The Duke of Hazard. Elite spokesman Steve Wilson said "We think American programmes are a better bet than British ones, since they seem to appeal to the same sort of people who play computer games. Although these titles have been licensed from America, the software is British. We're hoping that The Duke of Hazard will be the Christmas number one game."

Elite games for the 64 will cost 46.95 on cassette and 48.95 on disk. Contact Elite at 25 Bradford Street, Walsall, 0822-611215.

The Cheetah, the RAT and the Interpod



Interpod — used by Cheetah Marketing

PARC ELECTRONICS, one of the UK's leading electronics sub-contractors, has taken over the sole marketing and manufacturing rights to Interpod, the intelligent interface for the 66 and Vii developed by Oxford Computer Systems.

OCS has recently experienced financial problems, and though the future of the compiler software for which the company is best known has not yet been decided, Interpod seems safe. Parc will be marketing the unit, which

provides RS232 and IEEE interface facilities, through Cheetah Marketing, another recent acquisition. Prices will be set at 159.95.

Cheetah is best known for a range of software and hardware for the Spectrum computer, but IBM related products are in the pipeline. The first will be an infra-red cordless joystick, E.A.T., which is claimed to have received impressive pre-launch orders, with the launch set for the start of September.



Korokoni Wolf — passing for Jet Set Willy

The computer game is DEAD...

Words for free

SOFTWARE Publisher Dataview Wordcraft Limited, producer of the Wordcraft 40 program, has produced a free eight-page brochure summarising the benefits of word processing.

The full-colour booklet explains in straightforward terms some of the jargon associated with the subject, and deals with the ways in which wordprocessing can make or save money for small businesses.

For your copy, write to Ann Rye, Marketing Manager, Dataview Wordcraft Limited, Radio House, East Street, Colchester, Essex CO1 2NA.

COMMODORE



Commodore's 64000

Stack cuts cartridges



Stack's masterboard and programming aids

COMMODORE software and hardware producer Stack Electronics has cut the price of its Programmers Aid cartridge for the 64. The series of cartridges provide utilities such as Basic extensions, fast tape operations, and two pass assemblers. The cartridges are recommended for use with Stack's four slot masterboard.

Also newly announced is the Stack 100 series cassette-based compiler. Priced at £14.95 including VAT, it's intended to achieve more professional programming through speeding up Basic software.

Contact Stack at 200-208 Derby Road, Bostle, Liverpool, L20 8LN, phone 051-933 5511.

Cumana talks tape drives

DISK DRIVE manufacturers Cumana, previously best known for its Dragon video peripherals, will launch a "floppy tape" drive for the Commodore 64 and Vis 20 in October.

Development engineer Carl Adams described the system as being "similar to the Wa-drive system available for the Spectrum, but a totally independent design."

The floppy tape system works using loop micro-cassettes containing 1600 inch tape. Various lengths of tape will be available on the micro-cassettes, with a 60 foot tape giving around 11 and having a 95K capacity.

Retail prices should be about £180, with an option of connecting another drive at a lower price, as not unspecified.

The onboard processor will allow the Cumana drive to be connected directly to the Commodore machines with no special interface.

Contact Cumana at Pines Trading Estate, Broad Street, Guildford, Surrey, GU1 3BA, 0483-300111.

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THE CHOP SHOP

— sending software on the airwaves

A new Radio 1 computer show and a revised Esperanto for micros — Trevor Taylor explains all to Chris Jenkins

THE "BROADCASTING" of software — now a familiar concept due to the growth of networks such as CompuNet and Milnet — is also possible in a much more direct form. Transmitting audio signals on ordinary radio wavelengths is also possible, though Trevor Taylor met with some scepticism when he first mooted the idea.

"At the time I was working in BBC television, and it occurred to me that if home computers record software on ordinary domestic cassettes, which are fairly good in quality, considering the quality of our broadcast chain it high we should be able to broadcast software. On *Tomorrow's World* we often reported on other people's innovations, and I thought it would be a good idea if we did some interesting ourselves."

Taylor's idea was to broadcast ten seconds of audio signal which viewers could record and load into their computers. "The producer wanted to keep down the amount of this horrendous noise, and decided that ten seconds was all an early evening audience waiting for Top of the Pops would tolerate — though there were those who thought it was better than some of the things Top of the Pops was putting out!"

Simulation

Though some experts had advised Trevor the system wouldn't work, and others thought it would, the only way to find out was to try it. Two ten-second programs, for the Apple and the ZX81, were to be transmitted, though everything did not go as planned. "The transmission, in December 1982, was live, and of course it wasn't possible to rehearse it. It didn't work in the studio, because we set up a simulation of the program the viewers should have picked up, but the presenter failed to wind the tape back to the start. As a result the studio demo didn't work, and we passed on to the next item. However, the broadcast transmission worked fine! Before the programme was off the air we started getting phone calls telling us that the program worked, and by the following Monday we had hundreds of mail, many of the letters including listings of the program. The system proved to be fairly robust,

many people had just placed a microphone in front of the TV loudspeaker. Following the instructions in the Radio Times."

The program, written by Trevor, required the viewer to type in his name, which then appeared along with those of the *Tomorrow's World* team in a scrolling credits display. It was a fairly simple start, and the big problem was that the programs had to be machine specific.

"I then discovered that the Dutch network NOS had been doing this for some time, and had been working on Basivode, a system by which you could run programs on a wide range of computers. The demand

for more useful programs which had been generated by the *Tomorrow's World* transmission gave me the idea for *The Chip Shop*, combining the ideas of transmitting software regularly and looking at applications as well as hardware."

Hobbycoop

Taylor travelled to Holland to talk to NOS, and found that the Dutch program *Hobbycoop* had been transmitting software designed to appeal to electronics hobbyists. "They tended to be technical, and *The Chip Shop* wasn't going to be their sort of program. Basivode, the Esperanto of computers, was developed by an NOS technician, a Philips engineer and a programmer with the Dutch equivalent of the Open University. The first version of Basivode had a lot of problems, many of which were overcome with Basivode 2. We're now announcing the release of Basivode 3+ in September, upgrading Basivode 2 in two areas: firstly in the number of machines it supports, and secondly in the bulk of it — there are now more six-screen prompts."

The Dutch Basivode always allowed for the Commodore computers, but now for the less popular Sinclair Spectrum. Basivode 3+ now covers the Commodore 64, the Vic 20 plus 803, and the 3000, 4000 and 8000-series machines, as well as many other popular micros including Acorn, Oric, Dragon, MSX and so on.

"We've also revised the manual, putting it through one technical editor so that it's consistent. The interesting thing is ▶



Trevor Taylor — "There should be much more computer coverage"

■ that part of the licensing deal with NCR is that we are required to produce Bascode as not-for-profit. That's why the book and the cassette cost only £3.85, which is our production cost, and why it's sold through the Broadcasting Support Service, which is a non-profit making registered charity."

The first series of **The Chip Shop**, fronted by popular TV personality Barry Norman, took some of the NCR programs and tried to establish the sort of software radio listeners wanted.

"The general reaction was that people weren't too interested in games — they wanted useful programs, though they didn't always tell us what they meant by 'useful'. For the new series we're aiming to broadcast programs which motivate the demand — they either perform some function which allows you to undertake something, as they're instructive in some way."

Treyce maintains that the reaction to games is not an indication that **The Chip Shop** misses the younger audience — "The last program we transmitted included a questionnaire, and from the replies we think the age range covered is very broad — young users to pensioners. Bascode is not very good at doing games anyway, since the graphics and sound capabilities have to be cut to the lowest common denominator."

Feasible future plans include building up a subscriber library, putting out a program each issue which listeners can use as building blocks for larger programs.

Radio 1

One disadvantage of the first series of **The Chip Shop** was that the software had to be transmitted at a different time to the editorial content. "The software was transmitted at 21 minutes past midnight, two nights a week on Radio 4, primarily because we couldn't broadcast for very long at peak times. It caused problems in

that many younger listeners couldn't stay up that late to record the signals, so we're now partially overcoming the problem. The new series, starting in September, will have the software transmitted early in the morning, on Radio 1 starting on 30th September at 0915. The transmissions will be repeated the following Saturday at 0355. We think it's socially more acceptable to get up early rather than to stay up late."

Independent

Even though licensing figures for the last series are about 1 million, and with the addition of the Radio 1 slot for the new series this figure should double, the software transmissions can't probably be transmitted at peak times. Even Radio 1 listeners to the new slot on Saturday mornings, at 7.10 to 7.45am, wouldn't stand for it! The new 12-minute slot in the Mark Page Show, presented by David Freeman, will give a few brief computer news stories and plug the Bascode transmissions on the following day. The Radio 4 **Chip Shop** will still be presented by lively Barry Norman, though Radio 4 will no longer be transmitting the software.

The Chip Shop suffers from the disadvantage of being a BBC programme which must demonstrate independence from the BBC computer. "It's a potential minefield for us to go on air and criticise a machine, because we'll be accused of favouritism towards the BBC. For the same reason we did very little about hardware specifically in the first series."

Treyce tries to treat the BBC computer as being produced by an entirely separate company. "I think it's very important that the BBC's commercial interest in one machine should have no effect on the editorial content of **The Chip Shop**, and there's been no pressure put upon me to plug the BBC machine. It's up to me to convince the listeners of our independence."

Fairly for this reason **The Chip Shop** tends to concentrate on applications rather than "bits". "As far as the Commodore machines are concerned, I don't feel there's any time to wave a British flag — if the new machines are interesting we'll take a look at them, and if they're good we'll say so."

"We're also in a very different position to a computer magazine, because we have to appeal to an audience which has not necessarily switched on because they're interested in computers. Frankly the magazines are in a much better position to do reviews of new equipment than we are — they can devote several pages to it, with photos, whereas I may only be able to give it two or three minutes."

Format

The new Bascode 2+ has been developed by **The Chip Shop's** own software engineer with the extensive cooperation of the manufacturers of the machines involved. "We also sometimes contract outside programmers for particular jobs."

The new Radio 4 series features a letters slot, a revised format for news headlines, and three-second reports from Tokyo and

California. "Aside from that we're working very much with the successful format. There are a couple of specials, the first of which is our second week on the air, the 22nd of September, when we're planning a very large outside broadcast from the PCW show in Olympia. We'll have a big stand there, and we'll be organising a number of events which will be recorded and edited for display. One feature is an All-Stars spot in which a panel of industry celebrities will be available to answer audience questions, with special features on small businesses, journalists and so on. The other special we have planned is a live outside broadcast from Newcastle — a sort of Silicon Glen report — and on the 10th and 16th of November we hope to be live from Tokyo, though that's not yet confirmed."

The Chip Shop consists of Treyce, plus two production secretaries, a reporter, a researcher, a software engineer, a technical clerk and the two presenters Barry Norman and David Freeman. The three offices in the BBC's Langham building — soon to be demolished to make way for a new broadcasting centre — are packed with computer equipment and stacks of software and press releases. With 150,000 letters generated by the last series, it's amazing that there isn't more time and resources devoted to computer programs.

Response

"For the first two weeks of transmission we topped the response charts — people were clamouring for the Bascode kit. Bascode hadn't even been published, except on the program, though a couple of magazine-writers and a first arc on ITN. We couldn't afford to advertise Bascode through something like the **Radio Times**, due to the expense involved, but we're still looking at various ways of publicising it — we've been for people to fill in order forms rather than just write in to us, since we've noticed that people know exactly what we're offering. All BBC premises will have order forms, and we're going to try a handful more sort of periodical — but weekly half-pages in the **Radio Times** would cost tens of thousands of pounds."

For the moment you should contact **Broadcasting Support Services**, PO Box 7, London W3 6SL, for more details on Bascode. Each pack contains a manual explaining what Bascode 2+ is and what it can do, how to write Bascode programs, and how to load broadcast software. The cassette includes translation programs for all the machines covered — you just load up the one for your machine, and tune in to **The Chip Shop**.

Future plans may include Bascode 3, which may handle sound and graphics better — and a TV series? "I think there should be much more computer coverage — more radio programmes covering more specific subjects, as a TV series — but I don't feel there's space for Bascode transmissions on TV. Television would be a natural progression, and the broadcasting of software is only one part of what we're doing, and not necessarily the most important part — it's just the one which has caught people's imagination." ■



Barry Norman — Radio 4 slot

Mega-zap



THOUSANDS OF 64 owners like nothing better than a "blitzkrieg" good mega-zap — so here's one, Zeta 7 from the very variable Megal is claimed to be a version of an American arcade game, brought out as software before it hits the arcades. It's programmed by Mike Wacker of Fire Ant fame.

Forgetting the tedious details of color-powered positron accelerators and Detach defense spheres, what you're left with is a "through-the-window" scene of various effects. On-screen readouts indicate your pod's status as you fight all the badies, which manifest themselves in waves of various numbers and shapes, including the grand old Starship Enterprise.

There's not much more to say about Zeta 7 — it's very straightforward, with some good sound effects and endless scrolling backgrounds. A good hot fire alien blaster.

Program: Zeta 7, 64
Supplier: Megal, 90 Regent Street, London
Price: £7.95
Graphics: 7
Sound: 1
Complexity: 4

It's magic



WYE VALLEY SOFTWARE'S Merlin owes something to Ultima's Fat Fat, in that the object of the game is to fly around the screen picking up treasures and depositing them safely. There the similarity ends, in that Merlin depicts you as a cloud-riding wizard rather than a jet-powered space-man. The forces of Evil set out to stop you, and to combat them you must fling magical lightning bolts and collect skulls, gems, frog's legs and so on to pop in your pot. If a bubble manages to parachute into the pot then your force is ruined. A good game, the only reservation being that each of the four screens is broadly similar. Still, well worth having.

Program: Merlin, 64
Supplier: Wye Valley Software, Panton House, Gainsbury, Herefordshire

* Soft * * Hits * The good, the bad and the ugly reviewed by our hard-playing team

Price: £6.95
Graphics: 7
Sound: 5
Complexity: 4

Gothic, novel



THE EVIL DEAD is the first release from film distributor Palace, and has received a lot of media attention due to its associations with the splatter movie of the same name. Fortunately the game itself is all good healthy fun, and though there aren't any great surprises it's the kind of thing which can keep you playing for hours.

An introductory book explains the scenario, a forest summer house viewed from above, in which you must protect your four friends and yourself from attack by the spirits of the Evil Dead. Various weapons can be picked up to help you in your fight, but beware! possessed humans split into four fearsome segments.

The battle to avoid dismemberment is

fast and furious, and overall Evil Dead is an excellent debut from Palace Software. Great spooky Gothic music too.
Program: The Evil Dead, 64
Supplier: Palace Software, 271 Postonville Rd, London
Price: £6.95
Graphics: 7
Sound: 7
Complexity: 5

Half and half



WITH STRATEGY and simulation games rapidly overhauling straight shoot-'em-ups in the popularity polls, it's no surprise to see that some of the best games now coming out combine elements of both forms.

Each *Battle of Midway* from FDS and you'll see a perfect example. The game is a simulation of the crucial WW2 USA/Japan air-sea engagement. The manual — which I've seen only in preliminary form — explains that although the game is not overly complex, it needs some study. This is quite true. The main screen shows the deployment of various air and sea fleets, and you use your cursor to direct the movement of your US forces. Your task is to defend the island of Midway and six Japanese aircraft carriers.

An air attack on the island is depicted with a marvellous arcade sequence in which the plane zooms through the air trying to avoid your tracer fire.

A short review like this cannot serve to give anything other than a brief idea of what promises to be an enthralling game.
Program: Battle of Midway, 64

Full steam ahead



A TONY CROWTHER spectacular, Loco establishes itself immediately as a clinic. The top section of the screen depicts an old-time locomotive chugging across a beautifully-detailed background, while the lower section gives a map of the rail layout. Using the joystick to select tracks, you must avoid explosive-laden toddlers and

attacks from aircraft and zeppelins. Smoke screens and steam blisters aid you, but you must make it to a refuelling depot before you grind to a halt and become a sitting target.

Wonderful music ripped-off from Frankel Loco, and attractive graphics (not astonishing, but well-designed), make Loco a winner. One of the rare cases where the box illustrations don't give an erroneous idea of the game, and there are screen shots too.

Program: Loco, 64
Supplier: Alligata, 178 West Street, Sheffield
Price: £7.95, disk £11.95
Graphics: 9
Sound: 9
Complexity: 5

Supplier: PMS, 401 Stanley Station Road, Coventry
Price: £8.95 cart., £12.95 disk
Graphics: ?
Sound: 5
Gameplay: 9

Psycho 8K



PRODUCING games for the 8K Yu is difficult. Producing good games for the 8K Yu is very difficult. Producing them at £1.99 must be near impossible. Mastertronic has done it with Psycho Shopper. Nervy if this sounds more like an advert than a review, but that's the way it goes sometimes. . . .

As you'll see from the screen shot, the graphics are chunky but respectable, and there are four screens — although it's so hard to get across the huge maze to screen one that I haven't got any further. Hazards include vicious Grammes, deadly traffic and runaway steamtrains, and politician Arthur must collect gold coins on the way to the supermarket.

A graphic, and a clear improvement on Mastertronic's first batch of games. Let's hope there are more to come.

Program: Psycho Shopper, Vic + 8K
Supplier: Mastertronic, 46 George Street, London
Price: £1.99
Graphics: 4
Sound: 3
Gameplay: 7

An up-and-under



PROVING once again that the state-of-the-art programs come from the good ol' U.S. of A., Statesoft's *Flip & Flop* hits a new high in perspective graphics programming. Statesoft is a new company which is licensing US games and adding a fast-learner and new packaging. The results should be excellent.

Flip & Flop is out in the Zoo of the

Take a fall



THE ORIGINAL and greatest, and still the best despite numerous imitations, *Pitfall* by Activision offers hours of play for the dedicated joystick basher. As Pitfall Harry you race through a seemingly never-ending jungle avoiding snakes, tar pits, alligators, fires, swamps and spidersweb, searching for treasure and trying to beat the 20 minute limit.

This one really is a classic, though it sets no new highs for graphics or sound. Strategy and timing is all, and there isn't a prison accelerating hyper-blaster in sight, thank goodness.

Program: Pitfall, 44
Supplier: Activision
Price: £9.99
Graphics: 4
Sound: 5
Gameplay: 9

Go West



YET ANOTHER new company, Taken, and another interesting range of products.

West is a text adventure with graphic interludes, set in 1884. You are on the track of a gang of robbers. The usual adventure conventions are adhered to, and the vocabulary seems to be good, around 200-300 words.

There are a few oddities — in particular, if you don't type "SHOOT" quickly enough, your life ain't worth a plugged nickel. There's also a section where you play postman with the robbers, and an odd feature by which if killed you instant to the start, and will eventually find yourself standing over your own corpse.

Lovely graphics, drawn with Taken's Panorama system, but only the one screen. Had there been more *West* would have been even better.

Program: West, 44
Supplier: Taken, Curran Building, 181 St James Road, Glasgow
Price: TBA
Graphics: 5
Sound: 5
Gameplay: 6

Pigeon pie



ANOTHER new company, Grinnin Graphics, has produced *Pretty Pigeon*. Like *Aliquid's Loco* it's by Tony Crowther, and like *Loce* it's fairly. *Pretty* the pigeon flies through a smooth-scrolling landscape of motorways, computer shops and castles, picking up wings to add to his new. Cats, fences, kamikaze planes and twig-stabbing sparrows serve to test up the action, and *Pretty* orders back with evasive manoeuvres. Nice easy music and nice levels of difficulty. Look out Jeff Minter, the pigeons are coming. . . .

Program: *Pretty Pigeon*, 44
Supplier: Grinnin Graphics, Alpha House, 10 Carver Street, Sheffield
Price: £7.99
Graphics: 9
Sound: 9
Gameplay: 9

Ice cream



I'D HAVE THOUGHT! Big ladder-aid. Continued on page 22

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platform games would have had their day by now, but Atari wishes to combine an otherwise with **Ice Hunter**. The scenario is unusual — how many other games can you name in which the hero is an Eskimo (answers on a postcard to Commodore Computing International)? The hero, Thorak, has to traverse the crevices in search of ice blocks, which have to be carried to the raft he has waiting. Dragons and mutated walrus try to stop him, but can be killed by dropping blocks on these heads or paralyzing them with the help of a Power Pill. Many Atari games are innovative — this doesn't happen to be one of them. It's a fair game for all that, and fans of this kind of program could do a lot worse.

Program: Ice Hunter, 64
Supplier: Atari, 9 High Street, Harley, Surrey
Price: £6.95
Graphics: 3
Sound: 3
Gameplay: 6

Space squaddie



WRITTEN BY Clifford Ransford of 64 Games Book fame, the Pentad-powered **Star Trooper** is another mega-zapper, unrelated so far as I can discern to Heinlein's Starship Trooper. The best intro music yet (just wait for Doctor's offering next month), and also if unremarkable graphics. Armed only with a joystick and a laser you fly around exterminating aliens, and try to dook with a mothership to replenish your fuel. Not bad.

Program: Star Trooper, 64
Supplier: Midwinter House, Castle Yard House, Castle Yard, Richmond
Price: £3.95
Graphics: 6
Sound: 5
Gameplay: 6

Bombs away



FOR THOSE of you who have asked (repeatedly) for a Flight Simulator for the

16K: **Yes**, here it is. Bearing in mind the limitations of the machine, **Bomber Mission** is excellent — good advice, interesting screen display, plenty of options and a challenging game.

You pilot a WW2 heavy bomber, and must select a target and a weapon load before taking off. The joystick and function keys are used for steering and control of throttle and flaps. Attacks by enemy fighters, which can be shot down using your radar screen, can cause instant destruction or simply a fuel leak. As with all good flight simulators, after attacking the target and flying home you face the hardest part — landing!

Program: Bomber Mission, Vic + 16K
Supplier: Commodore
Price: £1.99
Graphics: 6
Sound: 3
Gameplay: 5

Think political



DISTRIBUTOR Amphion has set up a division called Braingames, which intend to concentrate (just) on thoughtful strategy games rather than on zappers. First offerings include **Farms Quest** and **Election Trail**, which is a simulation of the American elections. The game, for one or two players, is menu-driven and features convincing map displays, fund-raising, opinion polls and hidden voting factors after the outcome, and after 20 moves each side the votes are counted and the result displayed.

Intending to use a company dedicating itself to more intellectual games, Election Trail is a particularly good start if you have ambitions to be the next Ronald Reagan. **Program:** Election Trail, 64
Supplier: Brain Games, Amphion Group, Richmond Road, Brighton
Price: £7.95, disk £9.95
Graphics: 3
Sound: 3
Gameplay: 4

On the run



ONE OF MANY compilations of advice

entrainers currently available for the 64 — including Danbar's **Winter Olympics** and Ocean's **Dukey Thompson's Decathlon** — the American version of **Ice Hunter** is faced with stiff competition. Based on the arcade Track & Field, Decathlon features all ten events, including three first-run, hurdles, long and high jump, shot put, discus, javelin and pole vault.

Each event is represented in marvellous graphics with top-class animation. The only possible criticism is that the method of joystick control is very awkward — you have to wobble the stick back and forward to make your athlete move. Admittedly I can't think of a better method, and all the Olympic games have adopted it, but it's a pain.

Program: Decathlon, 64
Supplier: Activision
Price: £8.99
Graphics: 9
Sound: 7
Gameplay: 6

For mutant camels



ANOTHER from Talent is **Kalah**, supposedly based on a traditional Arab game. It presents you with two sets of six 'pits', with a larger pit at each end of the two rows. Each of the 12 small pits is filled with a number of stones, and the aim of the game is to move the stones from pit to pit until you gain some obscure numerical advantage.

Nice graphics and music do not a great game make, and Talent would be better advised to ignore Arab's offering than a good time in future.

Program: Kalah, 64
Supplier: Talent
Price: TBA
Graphics: 6
Sound: 5
Gameplay: 4

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Featuring 50 separate screens, three levels of difficulty, one or two players scoring, Hall of fame and joystick compatibility or user defined keys, Cliff Hanger is set to be THE Commodore games playing sensation. Available from any good software store for just £7.95.

shoota
ids, then
ota you!

In the shops
from November 23rd

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ALTHOR - PAUL BURN

Ever wondered what it would be like to face the fierce white water in a top class canoeists slalom run? Well wonder no more because you can enjoy the fast action thrill of competitive canoeing from the comfort of your own armchair with *Shoot the Rapids*.

It's a game that involves real skill because you must move your joystick to simulate paddling action. You must get through the gates of the slalom course in the fastest time possible, while avoiding the river bank and rocks. There are also extra hazards like rogue speed boats and interfering beavers to worry about.

This multi level game features increasingly difficult river courses with superb graphics and smooth scrolling along the river. Qualifying times have to be reached to move onto the next course.

With Hall of Fame, one or two player scoring and joystick compatibility, *Shoot the Rapids* is probably the best sports action simulation game devised to date. Available from any good software store for just £7.95.

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EVERYONE knows the pirates — they are easily recognizable by their wooden legs, discolored parrots nailed to their shoulders, and their language: "Aaaaah! I'm lost...!" "Oh, you mean SC4-Y-WARE pirates! Well they speak a different language, don't they?"

There has recently been a lot of talk and some action about software piracy. The talk has been about crooks who copy commercially marketed software. The action has involved a few court cases by established software houses.

I'm not going to sit myself up as judge, for or against copying, but I will express my opinions in general.

To copy software that has already been marketed, and to market it in any form, would seem a clear case of theft. The law ought to deal with this area as it does with literary copyright. In fact there are some existing laws that try to cover this area.

To buy a piece of software and copy it for a friend or to put it from tape to disk is not so clearly a case of piracy.

The large game companies claim that they are losing millions every year from such copying. Of course if software companies start taking individuals to court, when they are only making a copy for "Fred" down the road, it prevents them with at least a large PR problem. How do they justify prosecuting their customers?

The only other avenue open to them is to protect their software.

What's that? Did I hear several large software companies screaming, "but we do". In six years I have seen just two pieces of software which have been seriously protected, and at the last count I owned 700 items, all originals!

Of course people want to put their favorite games or utilities on disk, and good protection could allow that.



houses along with their copying services.

What's this might be a good idea and a good deal, you may well get a better deal in the long term by having each program individually protected to ensure that it will take anyone a good deal of time to break into or copy it.

A note here for readers and software houses — apart from the copiers already

variety of ways could copy it. Any good programmer would not allow you the luxury of access to this information. It is very easy to have the wrong start and end address placed into the tape buffer with any program in the header virtually unavoidable.

Some programs have built-in protection on them that the loader may be got at by a load from a machine language monitor, which makes copying very easy and is careless on the part of the software house. There are a few points that should be noted for use on any program. The first file should have an auto-run with confining start and end addresses.

Second, every program can be assembled, the way key should be disabled where possible, and programs should be hidden with checks in the code for a proper load.

Included here are a few limited programs to help you get the elements of protection and to encourage software houses to produce protection that will be unbreakable!

The first program is an auto-run — it is set up to save a Basic program with an auto-run on it, it is by no means foolproof and could be enhanced in many ways, but it does give the general idea. There is a disassembly of the code for you to study and a Basic loader to make things easy. The Basic loader should be stored and saved. On testing it checks will be made for correct entries. If all is well the program will give you the format for saving a program. The filename is optional.

In general, the program stores the start and end addresses of the program to be saved. Next, a piece of code is transferred to MSDA; has search and the Basic pointers changed to enable it to be saved. The Basic pointers for the program in RAM

Software Protection

If we just talk about the 64, there are now copiers that allow you to copy from tape to disk, disk to tape, tape to tape and disk to disk. There is also a utility which will allow you to Turbo load your programs, not that turbo loaders offer any protection at all, they simply speed up loading times!

Of course the companies that are producing the copiers are getting a lot of flak from other software companies, and magazines are in cases being asked rather strongly not to carry adverts for such products.

The most sensible course of action for anyone wishing to prevent prying eyes seeing your programs, is to prevent it by protecting the programs properly.

This is not simple, but it is possible. The best place to start is by always knowing what the competition is offering to the public in terms of copiers. This will enable a good programmer to ensure that the latest range of copiers will be useless against your programs. Data copying companies are currently offering protection to software

mentioned, there is the faithful audio copy. On most cassettes this is fairly easy, but the 64 is fairly fussy about the levels used, and whilst audio copying remains a possibility it is difficult.

There is a way of protecting against audio copying, but the general opinion is that the expense involved in doing this is too great.

The first thing anyone wishing to copy a program from tape will do is to try to load the first part and guess as much information as possible. For different reasons this is usually difficult. If a program will not load and be examined then the following command will give you the header information:
OPEN(0)=header(0)

In direct mode this will find the first header and stop the tape. At this point the name of the program and the start and end addresses are to be found in the tape buffer.

There may also be a program loaded in the header. At this point you do have a lot of information about the program and it is a

are then restored, and another save is executed. When the program is loaded it will auto-run, disabling the stop key, loading and running the next program on tape.

As mentioned before, this is not an unbreakable auto-run, but it works! An addition to this might be to assemble the program to be saved and to unassemble it before execution; the extra code needed would look like this:

```
LDA #100  
STA 100  
LDA #100  
STA 100  
LDI LDY #100  
LI LDA (SPR),Y  
FOR #100  
STA (SPR),Y  
INY  
BNE LI  
INC 100  
LDA 100  
CMP #100  
BNE LI  
RTS
```

This routine would scan and assemble the whole of normal RAM on the first pass (having) and unassemble the same area on the second pass (loading). The main program could be hidden, if it is a Basic program then the start of RAM could be changed; using locations 43 & 44, the screen could be moved.

Any cartridge that is plugged in to the 64 has its own code. Most of this is readable code and therefore can be copied. The complete cartridge can be copied on to a device of your choice, but this is not so simple.

However, portions of code or all of the code in a cartridge can be transferred to another part of memory and then copied. Of course all jumps and branches will need to be reset — this can be a huge job and will require some skill.

As mentioned earlier, programs can be hidden and assembled to fool anyone trying to make sense of them. There are a number of ways of doing this and a number of steps that should be taken. The following routine could be used before saving the program with an auto-run, thus adding several layers of protection.

There is more than one way of hiding programs from prying eyes. If we stick to Basic programs the most obvious and easiest is to disable the LIST command; this can be done by altering the contents of the vector labelled RPLPOP at 8036 and 8037 hex. It can be simply disabled with the following:

POKE 715,200:GOTO 0:END

This will disable the list command, but there are other possibilities. To return to normal enter:

POKE 715,161:GOTO 0:END

Now enter the following to direct mode: POKE 714,126:POKE 715,161:GOTO 0:END

If you are foolish enough to try the list command now the list will reset.

Any of the vectors, OPEN, CLOSE, SAVE, LOAD etc can be treated in the same way. If they are not needed they can be disabled or pointed to another system. The best thing to do is to point them at a routine of your own. The one below deals with the run — stop and reset keys:

3000 LDA #0A (new low byte)
3002 STA 8028 (place in stop-vector)
3004 LDA #0C (new high byte)
3006 STA 8029
3008 LDA #00 (stop-vector points here now)
3010 RTS

COMB KEYS

The result of calling the above routine is to disable the run — stop and reset key, by pointing it to a routine at 8028 hex that simply disables the keys every time they are pressed. The above technique can be used on all vectors, even the interrupts, although that is a little more delicate.

However, back to hiding programs. The next technique is to fiddle with the Basic

```
1 REM THIS IS HIGHLIGHTED
10 PRINT"FIRST LINE"
20 PRINT"SECOND LINE"
30 PRINT"THIRD LINE"
40 PRINT"FOURTH LINE"
5000
```

line number pointers. This can only be easily done from a machine language monitor. The idea is to take the first pointer and change it to point at the last line in the Basic program. To illustrate this I have included a five line Basic program as a demo.

First enter and save this small Basic program, then enter your monitor. If you don't have a monitor, it should be easy enough to get hold of a copy of Jim Barlow's Supervisor 4 from ICPLUG. Enter the following command:

M 0000 0000
This should give you the display below.

The first pointer is at locations 8000 — 8003 hex. They should be changed so that the first line looks like this:
:0000-00 01 00 01 00 0F 20 34

Having made the changes, exit the monitor and list the program. You should only see one line, which will be the first one. This technique can be used on any program, no matter what Basic RAM starts. Simply change the first pointer to look at the end of the Basic program. The end of a Basic program is locatable by using a monitor to search through until the 3 zeros are found.

```
10 POKE8280,16:POKE8281,7:PRINT"1"
20 GOTO 10
30 END
40 REM ADDRESSING TO OTHER RAM
50 REM 50
60 REM 60
70 REM 70
80 REM 80
90 REM 90
100 REM 100
110 REM 110
120 REM 120
130 REM 130
140 REM 140
150 REM 150
160 REM 160
170 REM 170
180 REM 180
190 REM 190
200 REM 200
210 REM 210
220 REM 220
230 REM 230
240 REM 240
250 REM 250
260 REM 260
270 REM 270
280 REM 280
290 REM 290
300 REM 300
310 REM 310
320 REM 320
330 REM 330
340 REM 340
350 REM 350
360 REM 360
370 REM 370
380 REM 380
390 REM 390
400 REM 400
410 REM 410
420 REM 420
430 REM 430
440 REM 440
450 REM 450
460 REM 460
470 REM 470
480 REM 480
490 REM 490
500 REM 500
```

This indicates the end of the program. Using Supervisor the following command should work:

M 0000 0000 00 00 00

Before we move on, it may be interesting to note that we can have control and colour codes work directly in our programs as you can with the BASIC in mode 7. Again this can only be done by using a monitor.

For example, using our Basic demo program we can remove the REM in line one and highlight the line. To do this enter your monitor with the Basic program in

PC	BR	AC	SR	YR	BP						
:0000	30	00	00	00	F6						
:0000	00	10	00	01	00	0F	20	34			
:0000	40	4F	53	20	49	53	20	40			
:0010	47	47	40	4C	49	47	46	54			
:0010	45	44	00	3C	00	0A	00	99			
:0020	22	44	49	53	53	54	20	4C			
:0020	49	4E	45	23	00	40	00	14			
:0030	00	99	23	53	45	43	4F	4E			
:0030	44	30	4C	49	4E	45	22	00			
:0040	53	00	1E	00	77	22	54	40			
:0040	49	52	44	20	4C	49	4E	45			
:0050	22	00	65	00	30	00	99	32			
:0050	46	4F	53	52	54	40	20	4C			
:0060	47	4E	45	22	00	00	00	00			

Basic mode

memory, and change the SF at location 8000 hex to 17 hex. The first line should then look like this:

:0000-00 10 01 01 00 12 20 34

Now exit the monitor and list the program. If you got it right, line 1 is highlighted. This is not possible from Basic, as the code for reverse an S12 hex needs to be inserted. Trying to do this from Basic will give the reverse symbol, as simply 'B' at the box.

Some of you may have already realized that it is possible to enter other codes in the same way. Here is one more for a start; enter the monitor and look at the program with:

M 0000 0000

Now change location 8000 to 1C, which will give you the following:

:0000-00 10 01 01 00 1C 20 34

Exit the monitor and list the program. The

PC	BR	AC	SR	YR	BP						
:0000	30	00	00	00	F6						
:0000	00	10	00	00	00	00	22	30			
:0000	20	21	00	00	00	00	00	00			
:0010	00	01	00	02	0F	0F	00	00			
:0010	70	00	49	50	00	77	02	0F			
:0020	00	70	02	7F	0F	04	00	0A			
:0020	70	00	30	30	7F	0F	00	00			
:0030	01	00	00	7F	0F	0F	00	00			
:0030	70	00	00	7F	0F	0F	00	00			
:0040	00	7F	0A	7C	0F	0F	00	00			
:0040	00	0F	00	27	00	00	70	0F			
:0050	00	00	00	00	0F	04	00	00			
:0050	00	0F	00	1F	00	00	20	44			
:0060	02	00	00	00	0F	00	00	00			

17's flag

mind boggly — a real listing. Have fun with this one, try any code that you fancy!

Finally, a machine code routine that points to a Basic program elsewhere in memory, so that when it is loaded and listed, only an SYS number is visible.

There is a disassembly listing and a memory dump included — the disassembly listing looks a little odd, but all will be revealed. This could be a way to enter this by using the memory dump. To do this enter the following from your monitor:
M 0000 0000

This will display the necessary locations. Now enter the SYS dump from the previous page.

Having done this, save it off and then exit the monitor and list the program. If all is well you should be presented with the following:
0 SYS0000

A little explanation is needed here. Locations 0000 and 0005 hex are set to the end of the program which is 00000 hex. Location 0003 and 0004 are the first Basic line numbers (yes in this case). The 000 hex in location 0004 is the SYS instruction and locations 0006 to 0009

include contain the Ascii codes for the call (0004).

When a RUN is performed it goes to location 0001 decimal, 00001 hex. If you look at this address on the disassembly you can see what happens.

The first instruction at 00001 hex branches to 000A1 hex where it should find the loadable program.

Do not forget to enter and save this program, we will come back to it later. The next two instructions clear the screen, a RUN is placed in the keyboard buffer for later use and the start of Basic is moved to start at 0000A hex. The subroutine from 0002C to 0004D moves the screen to 00170 decimal and the screen is cleared again. Finally our new Basic area has the first location set to zero and the routine finishes.

At this point the RUN in the keyboard will be executed on the Basic program which should be at that location. The way to save or load a Basic program into the area this routine is set for is with the following from Basic mode:
POKE 43,195:POKE44,1:POKE 2154,0:press return >

Whenever this routine is tagged onto the beginning of a Basic program the whole thing should be saved from the monitor, with:
S"filename",00,0001,save

Where name represents the end of the Basic program, remember the 3 zeros. It can then be reloaded as a normal Basic program and executed.

The routine from 000A1 to 000C8 hex is a two pass assembler. Any Basic program that is going to be saved with the above routine should first be loaded into 2016 decimal and put through the assembler. To do this load the routine at 000A1, load the Basic program and enter:
SYS 007-Cpress return >

Now save off the program. As it is now assembled it is unsaveable, and will not

PC	SR	AC	SR	YR	SP
:00000	00	00	00	00	00
0000	07	00			LEA #0000
0001	00	FC			STA #FC
0002	07	00			LEA #0000
0003	05	FB			STA #FB
0004	00	00			LDY #0000
0005	01	FB			LEA #0FB0, Y
0006	04	FF			SCR #00FF
0007	01	FB			STA #0FB0, Y
0008	00				INY
0009	00	FC			INC #0FC
000A	00	FC			INC #FC
000B	05	FB			LEA #FC
000C	07	00			CFP #0000
000D	00	00			SNL #0000
000E	00				RTS

000A: the routine that scrambled it must be loaded into memory and called again before any attempt is made to RUN the program.

This should give you some good ideas about protecting programs, and may well keep you busy for a while adding your own routines. A final thought for now on protection: how would you stop someone from reading or loading your programs in any way at all, even with the OPEN1 instruction. That should keep you busy, although I can tell you that it is possible!

There is no ultimate protection method, and we have covered enough ground to start with, but have hardly touched on the subject. I hope the above gives the software houses some ideas or inspiration, as I wish them luck and do not support anyone wishing to make a profit on these tricks.

Readers will, I hope, be keen to learn what is possible with their own programs, and may well come up with ideas to help the process of protection along.

Kevin Bergin

0000	00	000
0001	00	777
0002	00	000
0003	00	000
0004	00	000
0005	70	777
0006	32	777
0007	00	5A
0008	31	00
0009	00	000
000A	00	000
000B	20	00 02
000C	07	02
000D	30	00 0F
000E	07	02
000F	00	70 02
0010	00	00
0011	00	70 02
0012	00	70 02
0013	07	00
0014	07	00
0015	00	00
0016	07	00
0017	00	00
0018	00	00
0019	00	00
001A	00	00
001B	00	00
001C	00	00
001D	00	00
001E	00	00
001F	00	00
0020	00	00
0021	00	00
0022	00	00
0023	00	00
0024	00	00
0025	00	00
0026	00	00
0027	00	00
0028	00	00
0029	00	00
002A	00	00
002B	00	00
002C	00	00
002D	00	00
002E	00	00
002F	00	00
0030	00	00
0031	00	00
0032	00	00
0033	00	00
0034	00	00
0035	00	00
0036	00	00
0037	00	00
0038	00	00
0039	00	00
003A	00	00
003B	00	00
003C	00	00
003D	00	00
003E	00	00
003F	00	00
0040	00	00
0041	00	00
0042	00	00
0043	00	00
0044	00	00
0045	00	00
0046	00	00
0047	00	00
0048	00	00
0049	00	00
004A	00	00
004B	00	00
004C	00	00
004D	00	00
004E	00	00
004F	00	00
0050	00	00
0051	00	00
0052	00	00
0053	00	00
0054	00	00
0055	00	00
0056	00	00
0057	00	00
0058	00	00
0059	00	00
005A	00	00
005B	00	00
005C	00	00
005D	00	00
005E	00	00
005F	00	00

155 Digibo

0060	00	00	LEA #00
0061	00	00	STA #0000, Y
0062	00	00	STA #0000, Y
0063	00	00	DEX
0064	00	00	MPL #0000
0065	00	00	JBR #0104
0066	00	00	LEA #000
0067	00	00	STA #00
0068	00	00	JBR #0100
0069	00	00	LEA #0000
006A	00	00	STA #0000
006B	00	00	STA #0000
006C	00	00	STA #0000
006D	00	00	STA #0000
006E	00	00	STA #0000
006F	00	00	STA #0000
0070	00	00	STA #0000
0071	00	00	STA #0000
0072	00	00	STA #0000
0073	00	00	STA #0000
0074	00	00	STA #0000
0075	00	00	STA #0000
0076	00	00	STA #0000
0077	00	00	STA #0000
0078	00	00	STA #0000
0079	00	00	STA #0000
007A	00	00	STA #0000
007B	00	00	STA #0000
007C	00	00	STA #0000
007D	00	00	STA #0000
007E	00	00	STA #0000
007F	00	00	STA #0000

◀ C851 85 2E	STA #2E	C894 A9 81	LDA #881
C853 A9 8D	LDA #8ED	C896 AA	TAX
C855 8D 32 83	STA #8332	C897 A8	TAY
C858 A9 F2	LDA #8F2	C898 28 BA FF	JBR #FF2A
C85A 8D 33 83	STA #8333	C898 A9 88	LDA #888
C85D A9 83	LDA #883	C89D A2 88	LDI #888
C85F 8D 82 83	STA #8382	C89F A8 88	LDX #888
C862 A9 A4	LDA #8A4	C8A1 28 8D FF	JBR #FFD8
C864 8D 83 83	STA #8383	C8A4 A9 F8	LDA #8F8
C867 A9 88	LDA #888	C8A6 8D 28 83	STA #8328
C869 85 9D	STA #9D	C8A9 A9 F4	LDA #8F4
C86B A9 81	LDA #881	C8AB 8D 29 83	STA #8329
C86D A2 81	LDX #881	C8AE A9 82	LDA #882
C86F A8 81	LDI #881	C8B0 8D 28 D8	STA #8828
C871 28 BA FF	JBR #FFBA	C8B3 A9 88	LDA #888
C874 A9 88	LDA #888	C8B5 28 D5 FF	JBR #FFD5
C876 28 8D FF	JBR #FF8D	C8B8 8A 2D	STX #2D
C879 A6 2D	LDX #2D	C8BA 8A 2F	STX #2F
C87B A4 2E	LDI #2E	C8BC 8A 31	STX #31
C87D A9 28	LDA #828	C8BE 84 2E	STY #2E
C87F 28 D8 FF	JBR #FFD8	C8C0 84 28	STY #28
C882 68	RTS	C8C2 84 32	STY #32
C883 A9 83	LDA #883	C8C4 A9 F4	LDA #8F4
C885 8D 82 83	STA #8382	C8C6 8D 29 83	STA #8329
C888 A9 A4	LDA #8A4	C8C9 A9 8D	LDA #8ED
C88A 8D 83 83	STA #8383	C8CB 8D 28 83	STA #8328
C88D A9 88	LDA #888	C8CE A9 88	LDA #888
C88F 85 9D	STA #9D	C8D0 28 58 A6	JBR #A65E
C891 28 D5 FF	JBR #FFD5	C8D3 28 88 A6	JBR #A68E
		C8D4 4C A8 A7	JMP #A7AE

Continued

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Drawing on the 64's artistic abilities

C P Whitecombe looks at three graphics packages — two for budding painters, one for handling sprites

NO DOUBT, dear reader (in common with most other 64 owners) you have a love/hate relationship with your electronic marvel. We all know that the 64 has excellent sound and graphics capabilities, but we are also painfully aware that it is not easy to get the best out of this machine. Fear not! Help is at hand with an ever increasing number of software packages designed to do away with some of the more long-winded procedures required by CBM Basic. Three such offerings are **Paint Pic**, from Karna, **Penhouse** from Taitex, and **Mirrorsh's Go Sprite**.

Paint Pic is a console based colour drawing program, which offers you a blank screen upon which you can let your artistic talents run wild using a circular cursor as a pen. There are 4 different coloured pens available at any one time, enabling you to draw in 3 colours (you 4 is the background colour) at the touch of a button. Pen, border and character colours can all be changed by single key operations. In 'pen' mode you are drawing points or lines of one dot width. In 'brush' mode this can be expanded to give thicker lines up to eight dots wide. Other commands available in this mode allow you to have 3 colours on the brush at the same time, which can be rotated along the brush length to give repeated colour patterns.

Help!

There are various 'standard' shapes which the program will draw for you, including straight lines, triangles, circles, ellipses and arcs. All the closed shapes can be pen-filled by switching on the appropriate colour before pressing the required command key. In addition to 'pen' and 'brush', there is a text mode which permits the use of the 64 character set anywhere on the screen. If you have drawn something that you particularly like, you can duplicate it, either as it is, larger or smaller, the same way round or inverted.

Although it is possible to draw quite pretty pictures with **Paint Pic** it is rather slow and generally not very impressive. The HELP screen are poorly designed and, as with, are no HELP at all. The same applies to the manual. At £18.95, I find **Paint Pic** overpriced. Contact Karna at Unit 11, Horseyhoe Park, Haverhill Road, Pangbourne, Berkshire, OX9 7JH.

Penhouse, on the other hand, is really

rather good. While the tape was leading I slipped through the manual and was pleased to see that it was well written and quite easy to follow.

The first screen presented is a menu of all the (1 or 2 key) commands along with their functions, (e.g. FC/FB Colours). Hitting the SPACE bar will take you to the Picture Screen. Hit it again and it's back to the MENU.

At the bottom of the Picture Screen is a 'soft line' which gives the program status, e.g. current colour position (x,y format), colour and texture selected and one or two other bits of useful information. If you want to use the bottom right lines of the picture you can turn the 'soft' off.

To move the cursor about you use the cursor keys or (better still) a Joystick in Port 2. It travels at quite a steady pace at first, but things get fast and furious if you hold the stick over! Pressing the FIRE button will place a dot in the current position. You can erase a point by selecting the background colour and overtyping the error. To draw a trail of points, just hold down FIRE and keep going!

If you make a complete hash of things

you can 'Wipe the whole screen before anyone notices. For those with something less than 20/20 vision, the area around the cursor can be magnified. Just the job for those important little places! As with most programs of this type, you don't have to worry about trying to draw 'perfect' circles, etc. All the 'regular' shapes are taken care of for you. Drawing an ellipse, for instance, only requires you to blank the 2 Foot 03 and a point on the circumference. The rest is done for you.

On discovering some of your lines in the wrong place, worry ye not. Type Z and 'Hi' any part of the offending strip with the cursor... it simply disappears. Nothing is complicated with **Penhouse**, from making pretty coloured patterns is easy, using the DT (Define Texture) command. A Texture in this instance) is a block of 64 (8x8) pixels filled with data in the pattern of your choosing. You can Define 23 of these blocks, labelled 0 to 2. (A slight bug here displays them in the wrong order, but never mind).

Picture

Select your Texture block whenever you wish and place anywhere on the screen. Shapes can also be filled with these blocks in place of 'straight' colour. A set of BLOCK commands permit the repositioning of any particular feature to a different point of the screen, either as an identical copy of it, as a mirror image (horizontal or vertical). To move a block a small distance the Drag command is the one to use. To erase a block use Block Erase (note that which clears the marked section but leaves the rest of the screen intact). A Text command allows the use of any letters or numbers from the keyboard. You cannot use the Graphic symbols, although this does not present any problems as you can make your own Graphic characters using the Define Texture routine.

When you colour your picture ▶



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Parasprite — excellent results, good screen!

As you must remember that a block of 16 Pixels can only have 2 colours; 1 foreground and 1 background. Each one, however, have any combination of all the available colours so there is plenty of scope for the more artistic amongst you. It is, perhaps, advisable to draw your original sketch on top of the characterised screen colour scheme(s). This will show you where the sides of each colour block are so that you can get as many of your lines as possible to coincide with these edges. With a combination of good colour schemes, Define Textures, a little forethought and your own unobtained ability, excellent results can be obtained which you can store on Tape or Disk for later retrieval.

As you have, no doubt, gathered I liked this program a lot. It was fun! It's very easy to follow and even I managed to get the hang of it quite quickly. As I mentioned before, the manual is unusually good. Well Merix... almost. I don't like the constantly flashing cursor, but then I've got to find something to moan about, haven't I? Price is £17.95 on tape or £29.95 on disk. Contact Talent at Curzon Building, 101 St James Road, Glasgow, G61 5JZ 2128.

Sprites

If you've ever tried programming the dreaded sprites into your 64, then you will know what a jolly task it is! Anything that promises to minimise some of the drudgery involved has got to be worth a look.

Go-Sprite is a cassette program that enables the user to draw up to 32 sprites on the screen and try them out in any sequence. The first screen shown is the one on which you draw the object of your fantasy. This is made up of an enlarged grid (for designing on), a sprite display box which shows what it really looks like... right size and colour and a set of commands (KCPDS). All that is required to enter an instruction is for you to place the cursor

over the appropriate icon and hit the 'View' button. Along the bottom of the screen is a 'Painter Box': the colours being selected in the same way as commands.

Each square on the large grid represents one dot of the sprite which will appear to blue when 'lit', or in white (background colour) when in 'dark' mode. When drawing in the Hi-res mode you are limited to 2 colours... 1 foreground, 1 background. In Multicolour mode there is the added attraction of 3 foreground and 1 background, but at a price. The definition is not as good because each vertical column is now 2 dots wide. On completion of the design, the sprite can be viewed back to front, upside down, stretched horizontally

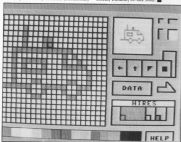
or vertically, or in Negative form. This reverses the foreground and background colours. You can, of course, view the screen should you make a fool of yourself!

Once happy with your creation, you go to the next screen for sprite selection and copying. At the top is a 'Carousel' of 7 windows. Below is a Selector which allows you to scroll any of your 32 sprites into view, 7 at a time. Each of the sprites is assigned a position in the Priority Stack. This decoder which will be in front of which it superimposed. The resulting overlay can be seen in the sprite Display Box. While at this stage you can copy or erase any design.

Animation

Finally we arrive at the Animation Screen. This is when things really start to happen. There is a white strip running down one side... the 'film' Running across it is a version of the 'Carousel' from the previous screen. Sprites are transferred onto the Carousel as and when required in order to make up an animated sequence of up to 256 frames.

When the film is run the final result of your labours will be revealed in all its mobile splendour. Once you are satisfied that the sequence is correct you can prepare your sprites for use within your own programs. To do this you need to convert them into Basic data statements, using the CONVERT program so kindly supplied on the B side of the GO-SPRITE tape. (Although it is on cassette don't be put off; it uses Picocontrol, so takes under 1 minute to become operational). All the screens have HELP boxes which refer you to a section in the manual. I especially like the use of icons: it makes it all so much easier — and faster! Everything works. Not a bug in sight. This is the sort of standard all software packages should aim for. Excellent. Go-Sprite costs £29.95 from Mitronsoft, The Mirror Group, Holborn Circus, London, EC1A 3JG. ■



Go-Sprite — not a dog in a dog!

STAR GAME

BMX RACER



by John Shay from



ability to produce 20,000 tapes per week.

Solar now has a total of 14 games for the Commodore machines, and two new programs are due at the end of September.

With new premises at 77 West Drive, Bury, Lancashire, Solar Software looks set for further success, and at 13 years John Shay is a director of a very successful company.

John's next 64 game for Solar is a multi-screen epic based on a Chinese legend. He says it will be the best yet, but while you're waiting you can type in **BMX Racer**.

The object of **BMX Racer** is to ride along the course, jumping cones and sampling over the flags at the end. The speed at which you are travelling affects the distance you jump, so it has to be judged carefully. You are allowed three attempts before the game finishes.

Hit an obstacle or fall to make the jump and you'll take a warty fall! Use 2 to slow down, X to speed up, / to jump.

Program notes

- 0-15 Set up variables
- 16-170 Set up and print scrolling ground
- 250-300 Test for jump and carry it out
- 310-400 Check if bike is at ramp
- 400-490 Crash routine
- 500-600 Reset variables and increment score
- 600-900 Sound routine
- 9000-10000 Introduction and data set up
- 2000-2900 Data for sprites, characters and screen

Happy BAKING!

```

0 V=0:SC=0:LI=0:GOTO 900
1 K=1:R=PEEK(53273)
2 POKE251,0
3 POKE54277,0:POKE54279,0
4 POKE53298,0:POKE53281,0
5 POKE54296,15
6 POKE252,2
7 R=200
8 Z=1
9 POKE252,2
10 POKE53272,(PEEK(53272)+RND(40)+10)
11 R=PEEK(53279)
12 IF V=1 THEN POKE 16963,67
13 IF V=2 THEN POKE 16965,67
14 IF V=3 THEN POKE 16919,67
15 POKE53269,3:POKE53259,200:POKE53291,68:POKE2841,213
16 PRINT"## SCORE# ##PARE RIKES"
17 PRINT"#####":SC
18 PRINT"#####":LI
19 PRINT"#####SPEED R#####"
20 R#=""
30 PRINT"#####":R#;R#;"#";R#;R#
35 R#=""
40 PRINT"#"
41 POKE 54279,00
42 POKE 54277,00
43 POKE54273,66:POKE54272,60
50 R#(0)="
60 R#(1)="
70 R#(2)="
80 R#(3)="
90 R#(4)="
92 R#(5)="#####
94 R#(6)="R#(0)+
96 R#(7)="R#(1)+
98 R#(8)="R#(2)+
99 R#(9)="R#(3)+

```



```

99 R#(0)=R#(0)+*
100 R#(1)=R#(1)+*
101 R#(2)=R#(2)+*
102 R#(3)=R#(3)+*
104 REM--POKE-IN-SCENARY-DATA-
105 IF PEEK(2)=3 THEN 171
107 POKE2,3
110 FOR#0 TO 3
120 FOR #=1 TO LEN#(R#)
122 C=ASC(HEX$(R#(R#),#),1)
123 D=1
125 IF C%256 AND C%212 THEN D=#
130 IF C=195 THEN D=#
132 IF C=199 THEN D=#
134 IF C=200 THEN D=#
135 IF C=201 THEN D=#
138 IF C=# THEN C=C-128
160 POKE (4#480C)+(256#R#)+(C-1)+1824,B
165 POKE (4#480C)+(256#R#)+(C-1),C
166 NEXT#,#:PRINT#43 PRESS RETURN TO START*
168 DET#:#IF#C%CH#(1) THEN 169
170 GOTO1
171 M=1824
172 FOR#0 TO 40:POKE16732+#,32:POKE16900+#,32:NEXT#
173 FOR#0 TO V#2 STEP 2
174 POKE16732+#,71:POKE16733+#,72:POKE16900+#,72
175 POKE16732+#+4,6:POKE16733+#+4,7:POKE16900+#+4,7:NEXT #
176 IF V# THEN POKE16900,32:POKE16918,32:POKE16963,32
177 FOR #=(V#2)+16 TO (V#2)+25 STEP 2
178 POKE16732+#,72:POKE16900+#,72
179 POKE16732+#+4,2:POKE16900+#+4,2:NEXT#
200 POKE3325,3:POKE33248,168:POKE33249,172:POKE2040,208
205 S=519432
210 IF PEEK(251)<118 THEN R=PEEK(53279)
211 IF(PEEK(53279)/R#(1)=1 ANDPEEK(251)<119 THEN POKE2040,212:GOTO470
212 Z#2=1:IF ZC# THEN 230
213 Z#4=INT(C/7):GOSUB 200
215 IF #=0 THEN POKE2040,F:#=1:GOTO230
220 IF #=1 THEN POKE2040,F+1:#=#
230 SET#:#IF #=1 THEN 208
231 POKE33250,200+#
232 IFPEEK(197)=L2AND K#1 THEN K#K-1
233 IFPEEK(197)=Q2AND K#2 THEN K#K+1
234 IFPEEK(251)>150 THEN 300
239 IF PEEK(251)>120 THEN 230
240 IF PEEK(251)>180 THEN 250
245 [F#=#/" ANDH#(H#)=1:J=#:J=#
250 IF G# THEN G#=#-1
260 IF G# THEN F#208:POKE2040,F
270 IF H# THEN 297
275 IF I# THEN POKE33249,PEEK(53249)-3
280 IF I# THEN POKE33249,PEEK(53249)+3
290 J#J+1:IF J#4 THEN I#I+1:J#0
295 IF I#2 THEN H#0
297 IF PEEK(251)>115 THEN 310
300 GOTO 210
310 IFPEEK(251)>115 ANDPEEK(251)<118 THEN L#:#=#:F#210:POKE2040,210
315 IF L#<2)THEN #=#:L#=#:R=PEEK(53279)
317 IF #=1 THEN 340
320 POKE33249,PEEK(53249)-3:L=L+1
330 GOTO 210
340 IF PEEK(53249)=172 THENF#208:POKE2040,F:L#=#:#=1:GOTO360
343 IF(PEEK(53279)/R#(1)=1) THEN 470
345 POKE33249,PEEK(53249)+3:L=L+1
350 GOTO210
360 REM
365 REM
370 REM

```

Continued on page 37

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```

388 IF (PEEK(53279)/RND1)=1 THEN 400
389 D=1:GOTO458
400 F=212:POKE2848,F
458 RSH
455 FORL=1 TO 50:NEXTL
460 SYS19794:GOTO508
470 RSH---
475 POKE2848,212
478 IF PEEK(53249)>171 THEN 498
480 POKE53249,PEEK(53249)+2:FORL=1TO18:NEXTL:GOTO478
490 GOTO 458
500 IF D=0 THEN 550
505 PRINT"*****          * * 18CELL DONE ** *":SC=SC+1
506 IF V=C THEN PRINT"*****":SC:PRINT"MP":GOTO560
507 FORR=1TO1580:NEXTR
508 POKE828,SC:POKE829,LI:POKE830,V
509 CLR
510 SC=PEEK(828):LI=PEEK(829):V=PEEK(830):
512 V=V+1:PRINT"CF":POKE2848,208:IF=208:GOTO1
518 PRINT"*****          * * 18CELL DONE ** *":SC=SC+1
519 FORR=1TO1580:NEXTR
520 POKE828,SC:POKE829,LI:POKE830,V
521 CLR
524 SC=PEEK(828):LI=PEEK(829):V=PEEK(830):
525 LI=LI-1
528 IF LI<0 THEN PRINT"CF":POKE2848,208:IF=208:R=PEEK(53279):GOTO1
575 PRINT"*****          * * 18CELL DONE ** *":LI
580 PRINT"*****          * * 18CELL DONE ** *":LI
585 PRINT"*****          * * 18CELL DONE ** *":LI
590 GETR:IFR=C:CHRR(13):THEN 598
595 IF=208:POKE2848,F:R=PEEK(53279):POKE53269,8:POKE53249,172
597 POKE53248,8:POKE53249,8:RSH
600 FORR=1TO380:NEXTR
610 POKE828,SC:POKE829,LI:POKE830,V
620 CLR
640 SC=PEEK(828):LI=PEEK(829):V=PEEK(830):RETURN
660 RSH
610 POKE54276,8
620 POKE54276,12
630 POKE 54277,12
640 POKE 54276,129
650 POKE54273,50
660 POKE54276,129
670 RETURN
900 RSH
904 POKE54276,32
940 POKE 54276,33
960 POKE54276,32
970 RETURN
980 RSH
1000 IF PEEK(12)=3 THEN 1
1005 PRINT"*****          * * 18CELL DONE ** *":R=PEEK(53258,8):POKE53281,8
1010 PRINT"*****          * * 18CELL DONE ** *":R=PEEK(53258,8):POKE53281,8
1020 PRINT"*****          * * 18CELL DONE ** *":R=PEEK(53258,8):POKE53281,8
1030 PRINT"*****          * * 18CELL DONE ** *":R=PEEK(53258,8):POKE53281,8
1035 GOSUB 1500:GOTO1
1040 RSH---POKE---1H-DIFF
1510 R(0)=(2.5#4096)+1024
1520 R(1)=(2.5#4096)+512
1530 R(2)=(4#4096)+2048:B=C:G=0
1550 RESTORE
1555 IF B=3 THEN 1600
1560 READ R:IF R=-1 THEN B=B+1:C=0:GOTO1555
1570 POKE R(3)+C,R
1580 C=C+1
1590 GOTO 1555
1600 POKE56334,PEEK(56334)/RND254
1610 POKE1,PEEK(1)/RND251
1620 FORR=0 TO 515:POKE(2.5#4096)+R,PEEK(R+53248):NEXTR
1630 POKE1,PEEK(1)/RND

```

Continued on page 19

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The WYSIWYG principle

Three business programs investigated by Trevor Doherty — a word processor and two spreadsheets, And WYSIWYG explained

A WORD PROCESSOR is often one of the first "serious" pieces of software in which personal computer owners invest. The Commodore 64 is one of the best home computers for word processing, due to the excellent keyboard and readily available printers and disk drives. A large number of 1.541 disk drive owners were fortunate enough to get a free copy of Commodore's own **Keywrite** word processor with their drive — which no doubt is true, but a lot of Commodore printers!

Because so many people already have Keywrite, a software house selling a rival word processor must have an uphill struggle, with a large chunk of the market unlikely to buy their product, however good.

Perfection

Any word processor must have certain fundamental features. The most basic allow text to be typed in from the keyboard, viewed on the screen, edited and stored as required, printed out and then stored for later retrieval. The ability to perform these, plus additional features that most of the better processors allow, means that even a two-fingered typist can produce a perfect printed output.

Wordcraft 64 (£49.95, disk) is the latest version of a word processor with a long pedigree on Commodore machines. The program comes with a "dummy" protection device which plugs in to joystick port two. There is a 80 page manual and a little card which fits round the 64's function keys and

shows their use — an idea which shows the careful thought which has gone into the product.

On loading the program you are confronted with a lurid multi-colored screen (fortunately I quickly learned to change the colours to something more realistic). Wordcraft works on the WYSIWYG principle — What You See Is What You Get.

Wordprocessors fall into two categories, those which format on output to the printer and those which format as you type; Wordcraft falls into the latter category. You type on the screen the way you expect it to appear in the printed output. I'm afraid that I'm not convinced that this method is actually successful as the 40 column screen available on the 64 — the screen scrolls sideways to allow a typical 80 column document to be input and you have to scroll from side to side to read the finished document on the screen. One advantage of this method is the text isn't littered with embedded format commands.

Wordcraft uses a "value", a coloured bar across the screen on which you set margins and tabs. This feature is very easy to use. Other features include search and replace — for example, you ask the processor to find every occurrence of the word "bank" and replace it with "love". The ability to take text from one document and combine it with another is provided with the "merge" facility, and a "fill file" allows names and addresses to be inserted into standard letters. Disk saves from

within the processor is very easy, and text files can be loaded by setting up the directory and using the cursor to highlight the correct file to be loaded — no need to remember the exact name.

The ability to output text to a wide range of printers is one of Wordcraft's strongest features. Each printer supported has a printer definition file on the disk, covering a good range of the most popular printers. My HP5-804 worked fine. The clever thing is that if you have an unusual printer you can define your own printer definition file and save it on the disk; nearly half the manual is devoted to this useful feature.

Conclusion? A product of the highest standard, particularly strong on printer support, good value for money. But I'm afraid I couldn't get on with the sideways scrolling on the screen of a document wider than 40 columns.

Formatting

A spreadsheet is another piece of software likely to be high on the list of non-games software purchases. A spreadsheet allows the computer screen to be used as a large sheet of paper ruled into rows and columns, by formatting the screen into a series of "cells" addressed A1, B1 etc. Rather like playing Tetris!

Virtually any task that can be done with a calculator and pencil can be carried out and subsequently saved for future use or printed. Once a sheet of calculations has been set up, it is then easy to amend individual cells, and see the effect on the other dependent figures. Thus if you had a sheet showing your household budget you could see the effect of, say, a higher mortgage repayment on your finances. This feature is called "what if" calculation.

One feature which most spreadsheets offer is "replicate", the ability to copy a cell or range of cells so that similar calculations can be carried out elsewhere on the sheet. This allows, for example, similar loading to be carried out in each of twelve monthly columns by just defining the calculations in the first month and then replicating it. I use a spreadsheet as a means to carry out many tasks, such as keeping track of my bank account.

Autovcalc 64 (£29.95 disk, £14.95 tape) is a recent entrant to the market. It is advertised as "100% machine code" which should give it a speed advantage over its rivals which are part or all written in Basic. In practice I found the speed advantage was slight and negated by other disadvantages.

Command

After loading Autovcalc you define the size of the blank sheet, and the screen displays the familiar spreadsheet format of rows and columns plus a command line; the first time I tried to use it I tried to type in some headings but found I couldn't get anything to appear on the screen; a clever examination of the 5 page leaflet provided (which gives details of each of the 19 function commands) showed me that to enter text you have to press "F1" and then press the Roman key before you can type a heading or label into a single cell. The same



Wordcraft 64 — "a product" of the highest standard

thing applies with 'I' for data and 'F' for formula. This seems to me a tedious arrangement, and I found the extra three key-strokes per cell slowed me down. Other spreadsheets are able to distinguish between labels and formula input by the initial key-strokes.

Limitation

Automatic also irritatingly blanks the screen during each calculation, a limitation other spreadsheets avoid. Calculation can be on request by using the command 'c' or automatic calculation can be selected, but this strangely takes place when you perform a subsequent operation, not immediately following entry of the number in question.

Two features I did like very much were the ability to change the width of individual columns, and the 'home' key which takes you back to cell A1 from anywhere on the sheet. No facilities are offered to insert extra columns / rows, delete them or move about. It is possible, however, to delete the contents of an individual cell. A limited replicate function is available allowing single cells, rows, columns or blocks of cells to be copied, but not expanded. Thus you cannot easily carry out similar calculations in each of several columns without entering them all individually.

Each time you type something in and press 'return' the cursor jumps in a direction dictated by its previous movement; unusual and annoying. Much more serious was that I managed to 'crash' the program twice. The first was caused by the 'command key' at the bottom of the screen not being protected. I inadvertently used the cursor key and typed in the wrong place on the screen. When I pressed 'return' the program crashed. The second occasion was when I inserted by trial to save a file to tape instead of disk.

To sum up I'm afraid I cannot recommend this product, despite the competitive price. There are better spreadsheets for the money, for instance Super-soft's **Basicle**.

PS (000.95, 004) is a spreadsheet with a difference. What sets it apart from others

Amsoft 64 — competitive price

available for the 64 is a facility which lets you add functions by programming your own, in Basic, saving them on disk and recalling them from within the spreadsheet. This powerful facility means that the spreadsheet can be customised to carry out specialised calculations beyond the ability of a normal spreadsheet.

PS is based on **Practicable** and offers the same facilities, with the addition of the programmable function. **PS** comes with a 122-page manual divided equally between the standard **Practicable** features and the additional **PS** features.

Formulae

After loading **PS** you select your sheet size, up to a maximum of 2000 cells. You may choose the column width, and cell columns may be a different width from the rest, to allow long titles. Labels, data and formulae may be typed straight in and **PS** can usually decide which are which. One drawback is that the screen display is just in upper case. Calculation is performed on request only by pressing 'I'. Replication is easy using the 'I' key, but only allows a

single source cell to be used at a time, although this may be expanded into a range of target cells. Insert, delete and move facilities are all provided.

PS has some unusual facilities which are not often seen in 64 spreadsheets. You can change the representation of numbers to graphical format, and use **PS** to plot bar graphs which look very good printed or on the screen. **PS** allows you to sort both alphabetically and numerically and to search for a number, word or formula. Titles can be fixed so that they do not scroll off when moving round the screen. All the above features are shared with **Practicable**.

The unique **PS** programmable facility is covered in the second part of the manual; twelve additional facilities are described and included on the disk to get you started. Examples include a facility to carry out a sum in primary and secondary order and a feature to erase all the data from your sheet whilst leaving the titles intact. Program listings are given in the manual so you can see how it's done. The possibilities are limitless. To use the programmable facility you first recall your program from disk and then execute it as often as you like at the relevant places on your spreadsheet. Only one add on module may be used at a time, but several could be called, one after another from within the same spreadsheet.

I think **PS** is an excellent product, but the market for it is limited to those who need more than a good ordinary spreadsheet can provide. If you don't need the add ons, **Practicable**, which is about £25 cheaper would seem a good bet. ■

Contact address:

Wendcraft 64, Dearview Woodcraft Ltd, Radio House, East Street, Colchester, Essex, SS26-6PH44

Richard Shepherd Software, 21-25 Elmwood Lane, Crippenham, Slough, Berks, SL236-4JH4

Practicon, c/o Public Image PR, 62 Tottenham Court Road, London, W1P-0BB 6225.

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COMMODORE SOFTWARE FILE

Split screen

A feature of SuperPaint creates the 40 program.

THIS IS A Basic loader program which

creates a split screen. The 80 rows window area is variable, by POKEing 50439 with the start coordinate and 50440 with the end coordinate of the window area required. SYS50439 sets the cursor and SYS50440 turns it off. The program sets hardware interrupts and raster values to change the

graphics mode of the screen as desired points. It would be ideal for creating a split screen such as those used in adventure games, with text in the lower half of the screen and hi-res graphics in the upper half.

Other applications are limited only by your imagination!

```

10 R=50339:T=0:C=0
20 READ I:IF I=-1 THEN 40
25 POKER,D=T+D:R=R+1:C=C+1
30 GOTO 20
40 IF T<16789 THEN PRINTCHR$(147):PRINT" DATA VALUE ERROR":END
42 IF A<50440 THEN PRINTCHR$(147):PRINT" NUMBER OF DATA ITEMS ERROR":END
50 PRINTCHR$(147):PRINT" USE SYS(50339) TO CALL HIRES WINDOW"
52 PRINTCHR$(17):PRINT" SYS(50440) TURNS OFF WINDOW"
54 PRINTCHR$(17):CHR$(17):CHR$(18):" TO CHANGE AREA OF HIRES WINDOW"
56 PRINTCHR$(17):" USE POKES50439,Y FOR START OF WINDOW"
58 PRINTCHR$(17):" POKES50440,Y1 FOR END OF WINDOW"
60 PRINTCHR$(17):" HIRES WINDOW AT 8192 TO 16191 IN MEM"
62 PRINTCHR$(17):" USE NORMAL CLEAR HIRES AREA ROUTINE"
64 PRINTCHR$(17):" IE, FORK=8192 TO 16191:POKE$,0:NEXT"
66 PRINTCHR$(17):" ADJUST COLOUR MEM FROM 1024 TO 2023 TO"
68 PRINTCHR$(17):" SUIT AREA RESERVED FOR HIRES WINDOW"
70 END
100 DATA120,169,197,141,20,3,169,196,141
101 DATA21,3,173,17,208,41,127,141,17
102 DATA208,169,151,141,18,208,173,26
103 DATA208,9,1,141,26,208,28,96,169,1
104 DATA44,25,208,208,3,76,49,234,173
105 DATA17,208,201,27,240,3,76,249,196
106 DATA173,17,208,9,32,141,17,208,173
107 DATA24,208,9,8,141,24,208,169,151,141
108 DATA18,208,169,1,141,25,208,104
109 DATA108,104,176,104,64,173,17,208,41
110 DATA223,141,17,208,169,21,141,24,208
111 DATA169,0,141,18,208,76,238,126
112 DATA120,169,49,141,20,3,169,234,141
113 DATA21,3,173,17,208,41,223,141,17
114 DATA208,173,24,208,41,247,141,24
115 DATA208,173,26,208,41,254,141,26,208
116 DATA88,96,-1

```

Ski slope

This game for the unexpanded PC-20 comes from *Soft Works* of Weyport

THE OBJECT of *Ski-Slope* is to avoid the trees for as long as possible while collecting hearts and diamonds. If you take a jump you get more points, but to do this you must be going at least at medium speed. You get a bonus life after 3000 points, and

the game changes after three minutes.

Use the cursor keys to move left and right, and control your speed with X for slow, Z for medium and C for top speed. Break a leg!

```

0 PRINT"### SKI-SLOPE M BY NIALL"
10 PRINT"### USE CURSOR KEYS FOR MOVEMENT LEFT AND RIGHT."
15 PRINT"### X=SLOW SPEED(STARTING SPEED)."
20 PRINT"### Z=MEDIUM SPEED."
30 PRINT"### C=TOP SPEED."

```

Continued on page 44

```

32 PRINT "X PRESS A KEY."
33 GET I: IF I#="" THEN 35
40 SC=0: BM=0: HT=0: JP=0: LI=3: TI#="000000": LJ=1: LK=1: POKEL=57,129
48 L=7918: G=20
55 POKE 36876,6: POKE 36877,129
60 PRINT " "
70 PRINT "XXXXXXXXXXXXXXXXXXXXXXXXXXXX"
75 PRINT "XXXXXXXXXXXXXXXXXXXXXXXXXXXX"
90 GOSUB 1000
95 IF PEEK(L)=88 THEN 300
96 IF PEEK(L)=90 THEN SC=SC+10: S=1: DM=BM+1: IF G=5 THEN SC=SC+10
97 IF PEEK(L)=93 THEN SC=SC+20: S=1: HT=HT+1: IF G=5 THEN SC=SC+20
98 IF PEEK(L)=102 THEN GOTO 3500
100 POKEL,8: POKEL,30728,0: POKE L,32
102 IF S=1 THEN S=0: GOSUB 3100
105 L=L-22
110 FOR PR=1 TO 9: R=PEEK(L+PR): NEXT
120 IF R=31 THEN L=L-1: GOTO 140
130 IF R=23 THEN L=L+1: GOTO 140
132 IF R=32 THEN G=10
133 IF R=25 THEN G=15
134 IF R=34 THEN G=1
139 IF RND(1)<.65 THEN GOSUB 2500
140 IF L=7908 THEN L=7901
150 IF L=7921 THEN L=7928
160 SC=SC+1: IF G<11 THEN SC=SC+1
170 IF G=1 THEN SC=SC+1
174 IF LK=1 AND VAL(TI#)>480 THEN SC=SC+500: LK=0
176 IF LJ=1 AND SC>3000 THEN LJ=0: LI=LI+1
180 GOTO 30
300 POKE L,42: POKE L,42
305 POKE 36877,0
310 FOR PR=1 TO 600: NEXT
320 LI=L-1: IF LI<8 THEN 400
330 GOTO 50
400 PRINT " SCORE="; SC
401 PRINT "X **"; BM
402 PRINT "X **"; HT
403 PRINT "X **"; JP
404 PRINT "X TIME="; TI#
410 IF SC#0 THEN HC=SC: PRINT " NEW HIGH SCORE!!": GOTO 440
420 PRINT "HI HI - SCORE="; HC
440 FOR PR=1 TO 1000: NEXT
450 PRINT "PRESS SPACE TO PLAY"
460 R=PEEK(L+3): IF R<32 THEN GOTO 460
470 GOTO 40
499 END
1000 X=INT(RND(1)*20)+1
1002 IF RND(1)>.5 THEN Y=INT(RND(1)*16)+1: PRINT TAB(X) "****": GOTO 1020
1005 IF RND(1)<.1 THEN PRINT TAB(X) "*" : GOTO 1020
1008 IF VAL(TI#)>300 THEN PRINT TAB(X) "*" : GOTO 1020
1010 IF Y<16 THEN G=0
1012 IF VAL(TI#)>300 THEN PRINT TAB(X) "****"
1020 LI=RIGHT$(STR$(LI), 1): PRINT "SCORE="; SC: " TIME="; RIGHT$(TI#, 3) " H" / LI
1040 RETURN
3100 REM RAMP
2500 RD=INT(RND(1)*20)+1
2505 RD=RD+8076
2508 FOR CL=RD TO RD+1108 STEP 22: POKEL,30728,8: NEXT
2510 POKE RD,102: POKERD+22,98: POKERD+44,99: POKERD+66,98: POKERD+88,98
2530 RETURN
2590 REM NOISE

```



```

3100 POKE36878,15
3185 POKE 36877,8
3110 POKE 36876,228
3120 FOR M=1T05:NEXT
3130 POKE 36876,8+POKE 36877,128+POKE36878,6
3140 RETURN
3450 REM JUMP
3500 IF Q=15 THEN 100
3510 IF Q=1THEN BR=5
3520 IF Q=18 THENBR=4
3525 POKE L=22,32
3530 GOSUB 1000+POKE L,8+POKE L=22,32
3535 FORPR=1T00+NEXT
3550 FOR Q=1T0BR
3560 GOSUB 1000
3570 FORPR=1T0 Q+NEXT
3580 POKE L,8+IF Q=1THEN POKE L=44,182
3590 POKE L=22,88
3600 NEXT
3610 IF PEEK(L)+22=88THEN 300
3615 SC=SC+50
3617 IF Q=1THEN SC=SC+50
3619 JP=JP+1
3620 GOTO 100

```

Bongo Maniac

These short integrated PLB programs, from
Alec Corbridge and Stephen Ward of

Maniacs

THESE THREE short sound and graphics routines could be incorporated into your own programs.

The first is Computer Maniac, which is the sound of a computer going mad!

The second is Sound and Colour, which gives a synchronized sound and colour effect.

The last is Bongo Drums, which represents the sound of someone beating wildly on the bongos.

```

2 PRINT"*****"
3 PRINT"NO MAN IN COMPUTER MANIAC"
4 PRINT"*****"
5 PRINT"*****"
10 POKE36878,15
20 C=INT(RND(1)*50)+175
30 S=INT(RND(1)*255)+1
40 POKE36879,C
50 POKE36878,8
60 FORT=1T0100:NEXTT
70 GOTO20

2 PRINT"*****"
3 PRINT"NO SOUND & COLOUR"
4 PRINT"*****"
5 PRINT"*****"
10 POKE36878,15
20 S=INT(RND(1)*55)+175
30 C=INT(RND(1)*50)+1
40 POKE36879,C
50 POKE36878,8
60 FORT=1T0100:NEXTT
70 GOTO20

10 S=36878
20 S7=36877
30 S6=36876
40 S5=36875
50 S4=36874
60 POKES8,15
65 POKES5,128
70 POKES7,255
75 POKES8,8+FORT=1T050+NEXTT+POKES8,15
80 POKES6,155
85 POKES8,8+FORT=1T050+NEXTT
90 RESTORE GOTO50

```

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Street Bomber

Tony Shadbond of Darford, Kent, sends this 44 game
STREET BOMBER is a version of BOMB, in

which your aeroplane is running out of fuel and you have to bomb the buildings below you to rubble in order to make a safe landing.

Use F1 to drop bombs.
Program uses
Lines 0-3; level of play

Lines 3-6, define characters
Lines 100-113; set up screen
Lines 113-118; control movement
Lines 120-180; drop bombs
Lines 2000-2005; sound effects
Variable A - plane position, P - bomb position, BOMBS - bombs left.

```

0 INPUT "LEVEL 1-EASY 2-HARD 3-IMPOSSIBLE",A#
1 IF A#="1" THEN BOMB=500
2 IF A#="2" THEN BOMB=300
3 PRINT "PLEASE WAIT" : IF A#="3" THEN BOMB=200
4 POKE56334,PEEK(56334)AND254:POKE1,PEEK(1)AND251:FOR J=0TO2000:
POKE12288+J,PEEK(53248+J)
5 NEXT:POKE1,PEEK(1)OR4:POKE56334,PEEK(56334)OR1:FORO=12288TO12295:
NEXTJ:POKEO,J:NEXT
6 DATA 0,128,192,252,170,127,44,0
7 POKES3272,28
40 FOR T=1TO300:NEXT:POKES4272,17
100 PRINT "XXXXXXXXXXXXXXXXXXXX"
101 PRINT "
102 PRINT " ^
103 PRINT " ^
104 PRINT " ^
105 PRINT " ^
106 PRINT " ^
107 PRINT " ^
108 PRINT " ^
109 PRINT " ^
110 PRINT " ^
111 PRINT " ^
112 PRINT " ^
113 PRINT " ^
114 FORA=1104TO3023:POKEA,0:POKEA+54272,1:POKEA-1,32
115 IF PEEK(A+1) > 0 THEN GOTO 2000
116 GETA:IFA#0">" THEN I=1
117 IF BOMB<0 THEN GOTO 120
118 PRINT "ATAB(32)BOMB:IFA=2022 THEN GOTO
119 NEXTA
120 BOMB=BOMB-1:POKEA,0:FORP=A+48TOR+(1000STEP48:IFP=1984 THEN GOTO 150
121 POKEP+54272,1:POKEP,81:POKEP-40,32:POKEA,0
122 IF PEEK(P+48) > 0 THEN POKEP+48,32:GOSUB1000:GOTO150
123 NEXTP
150 POKEP-40,32:POKEP,32:GOTO118
1000 POKEP,42:POKES4296,15
1001 FORI=0TO0:POKES4277,9:POKES4276,129
1002 FORG=1TO1000:NEXTG:POKES4273,6:POKES4272,205
1003 POKE54276,0:NEXTI:RETURN
2000 POKEA,42:POKES4296,15
2001 FORI=0TO0:POKES4277,15:POKES4276,129
2002 FORG=1TO2000:NEXTG:POKES4273,6:POKES4272,205
2003 POKE54276,0:NEXTI:PRINT "UNLUCKY":T=1:FORO=1TO1000:NEXT:
BOMB=400:GOTO7
3000 FORB=1TO10:POKES4277,15:POKES4276,33:FORI=0TO1000STEP2:
POKES4273,I:NEXTI
3001 POKE54276,0:NEXTO:PRINT "WELL DONE":FORG=1TO1000:NEXT:GOTO7
53248 AJ)

```

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Slipping a disk too many

Pete Gernard looks at floppy games, and on
the whole is pretty much disk-gusted

When a program has had a vast amount of pre-release hype projected around it, it comes as something of a relief when the program concerned actually lives up to expectations. Such was the case with Commodore's *International Secret* cartridge.

However, when the program does not perform as the press releases, hand-outs and pre-release publicity would have us believe, then the disappointment with the program is that much keener. *Alice in Wonderland* falls regrettably into this latter category.

Written by the same programmer as Audiogenic's earlier success *Masterblaster*, this disk and joystick essential game does have quite a good opening scene, albeit very poorly scrolled around the screen. The game starts when an animated Alice jumps down a rabbit warren and falls down and down and down. You have to move her around and collect baskets, keys, food and drink, whilst avoiding bumping into lamps and pictures. When Alice lands, you then have to use the keys collected earlier to move through a variety of doors of different sizes (which is where the food and drink come in, to make your character grow and shrink in size), to find rooms which look like a way to see the boss.

Jabberwocky

Being hit by a flying disk signals the end of this part of the game, and you are presented with a few lines of text from the *Alice in Wonderland* book while waiting for the next part of the program to load.

This time you're out in the garden, with a cheshire cat grinning amiably at you while a pipe-smoking waterpiper Mowse dodges around rings everywhere. Alice has to jump around and collect bread-and-butterflies and sucking horses (which turn invisibly into croquet balls in part four of the game), avoiding the aforementioned smoke rings and trees which throw particularly violent flowers loop spinning everywhere.

The third part of the program I found to be the most tedious of them all. The action has now moved on to a chess board, featuring Alice and two white knights on one side, and Tweedledee and Tweedledum

(with a little help from the Jabberwocky) on the other. Alice has to get from one side of the board to the other, using the knights to temporarily contain her opponents. Her speed of movement is similar to *see the boss*, and once you've put a knight on the Queen's Road 7 square it appears impossible to move it again a *bugger, penitence!*

The final part of the game is a ridiculous game of croquet, complete with flamingo as mallet (but no hedgehog as croquet ball).

Two levels of skill are offered to you at the start of the game, although there didn't appear to be much difference between any of them that I could detect. Not a game I can imagine returning to very often: nice graphics, shame about the game.

Regular readers of this illustrated magazine will recall a review a few months ago of a game called *Forbidden Forest*, written by one Paul Newman, and released over here by Audiogenic. The review was pretty favourable, although the hope was expressed that there might be some better software on the way shortly.

Well, *Caverns of Khazia* is the next offering from young Newman, and if the standard of this game is anything to go by, he's a mighty fine programmer who is improving all the time. This is essentially an adventure game, but with one major difference from most of them. Not only

does it rely entirely on the use of graphics, but also you only control over the player in via a joystick rather than the keyboard.

You have a number of screens to explore, and these are depicted on the screen in a glorious 3 dimensional display, which scrolls in all directions as you move your hero around the place. He can throw and climb ropes (which produces some fabulous graphical displays at times), crawl along his stomach, jump all over the place, and also shoot any of the many snakes that come at him. Falls of a great distance are to be avoided, as is bumping your head on a rock above you. Five lives are awarded in all, and you're reminded of any lives lost by a number of tombstones at the top of the screens.

Isolate

This is not an easy game to play, and the beginner will do well to practice moving about at the top of the caverns before plunging in and taking on the game itself. In one place, where the going gets rather tricky, there is an excellent tip to help you out. Also, and this is a criticism of all games that rely on the joystick to perform a number of different functions, it is all too easy to try and move the controller and end up placing a seed on the door of a tomb.

That aside, this is a very worthy follow up to *Forbidden Forest*, and if enough gamers/tombstones have got sick drives it should do very well indeed.

Another from Audiogenic, *Frankie Frenchie* is aptly named. I guarantee that anyone who buys a copy of this game will be driven frantic by the musical background that accompanies it.

If this game was played in total silence, it would be a reasonable (but not a great) piece of software. However, each of the ten screens has a (supposedly) different piece of music being played while you're on that screen, and the quality of the music is quite superb. Some of the tracks being played are a little obscure (Kaleidoscope by Paul Simon surely won't be known by too many people?), but their rendering is simply wonderful.

Even on the initial display, before you start playing the game, there's a spirited rendition of Crazy Little Thing Called Love, the Queen number.

Well, the game itself, *Frankie*, is a ▶



Alice in Wonderland — graphics good, game pretty?

telephoto engines, one day happens to wander across a magical telephoto network. Pools of gold sit around all over the place, and you have to get them all. However, those pools of gold are guarded by various creatures, and one touch is as they were dead. Life is made a little more complicated by the fact that you can't go through telegraph poles, and have to climb up and around them, whereas the aliens can march smoothly through.

Interludes

Apart from the music, nothing much changes from level to level. It does get a bit harder, but not by much. An interesting interlude is offered between some of the levels, which it's worth playing to get to see. On the first interlude, we see our hero being chased and finally caught by a massive frog, but on the second one Freddie has his revenge, and after being chased off one side of the screen by the frog he re-appears driving a massive tank and blasts the frog to smithereens.

So, for all those who like trying to make the most of one, a game to keep an eye (and ear) out for.

One company who've gone into disk-based games in a big way is Microdeal based in Cornwall, and the rest of the disk games looked at this month belong to them. Microdeal, as we all should know, made their name by producing a lot of good Dragon software. Unfortunately, with only a couple of exceptions, they don't seem to have got the hang of the 64 yet.

Grabber is an unusual variation on the maze theme, with two mazes instead of one. Eight treasures are divided up between the mazes, and it is your job to go around and collect all of them. However, the mazes are guarded by what Microdeal refer to as Gloopies, and they have a habit not only of bumping into you and killing you, but also of making off with your treasures after you've safely stashed it away.

You creep around from maze to maze by pressing the fire button, which is a convenient way of getting out of the way of a particularly nasty gloopie. On some of the later levels the only possible way of completing the game is by continuously swiping around. This is because in some cases you've represented by a conventional looking character, who can't walk through



Forbidden Planet — a disk drive favourite

walls, while the character in the other maze is simply a square box which has the magical ability to bounce walls aside so though they were impenetrable. Thus by jumping from one character to another you can get your way out of some pretty sticky situations indeed.

Delicious

Some pretty crude graphics are used throughout the game; I expect to lose a lot to something a bit more dramatic than just expanding a square in both directions. Also the sound, as with a lot of Microdeal games in fact, is tedious howling on the cassette, and although I don't particularly like playing games in silence this is one occasion when I happily broke all the rules and played on in blessed peace and quiet.

An infomaster start from a company whose reputation precedes them this.

You see a full page advertisement for a game, and you immediately begin to think that perhaps the game is going to be a bit special. **Arms 2000** does not live up to its advertising, and indeed it was quite hard to remember what the game was about without referring to my notes when it came to writing the review; but the sign of a good game.

It is one of those offerings where you start off in the middle of the screen, and have to shoot the variety of aliens who march relentlessly towards you all the time. In common with most Microdeal disk games there are absolutely no instructions supplied either with the disk or on the screen, so a couple of lives will be lost while

you try and figure out which just the joystick ought to go in. Part 2 is the answer, if you happen to buy a copy. Another good thing about this game is that it started the cassette music going when it finished loading. Why is that? It's totally unnecessary, and one can only assume that the program isn't yet totally at home with the 64.

Nothing in particular changes from level to level. More aliens appear in the time honoured tradition, but nothing else seems to happen. A game that I, and everyone else here at the lovely Gerard games centre, became very quickly tired with.

Most of you will probably be familiar with the game of Frogit, or things as it is sometimes called, but for the benefit of the Tivian Monks amongst us, here goes with a summary of Frogit.

Snake

The game takes place in the frozen wastes of the arctic, where you, a cheerful little penguin, suddenly find yourself being attacked by hordes of ferocious snakes. In order to get rid of the snakes you have to push blocks of ice around, and hopefully pin the lighters against the sides of the screen by doing so. Points are scored for every snake killed, and in this Microdeal version of the game you also get points for every block of ice moved, regardless of whether or not it succeeds in getting rid of one of the snakes.

The original game I liked, and can remember spending many a tea pause plecc in a van (not to get my name on the highest score list. This, however, is not a worthy reason of that original program.

Not a game that will down well here, and since our games team covers most age groups I can't really see this doing very well.

The remaining Microdeal games are definitely in a class above the previous ones, and **Danger Ranger** had me playing it for a long, long time.

You control a little man whose job it is to collect 100 keys from the Chamber of Prisms. The Chamber of Prisms is in fact little more than a collection of yellow planks across the screen, with a handy transporter at the bottom to take you back up to the top should you step on it. Five planks in all, with two keys per plank, each one is guarded by something or other. Microdeal refers to them as floating ones,



Grabber — don't get caught by the gloopies

radioactive bats, and saving eyes.

Your little man has the ability to move left or right, jump or duck, and fly at any of the hazards that confront him. If you manage to collect all ten keys you are then taken onto the next level, which is very difficult to get through. You have to run along a series of blocks, watching out for drops of acid and the four demons that guard this level. Unfortunately, the drops of acid appear at random, and since you start off at the top of the screen and they move very swiftly downwards, you can guarantee on losing at least one life on this level.

Speed out

If you manage to complete this it's back to the first stage again, but with more hazards and to get you. An interesting and entertaining game; nothing special in the way of graphics or sound, but a fine idea and one that has been nicely implemented.

This Cudbert challenge seems to get everywhere, and now we find him deep in Cudbert in Space, a game that bears more than a passing resemblance to Jupiter from Ultimate.

Cudbert has been sent on a mission of plunder in the form of the Moroccan solar



Danger Ranger — collecting keys and avoiding acid

system. On landing on each planet, you have to refuel Cudbert's ship by flying around in your jet-propelled way to a number of fuel dumps conveniently sited on the screen. To make life more interesting, you can only carry one fuel 'pod' at a time, and the longer you take to collect them all, the more meteorites come flying across the screen at you. You can shoot them down, but by the time you're on the last couple of pods there's so many of



them that you're almost bound to lose at least one life.

Challenge

After acquiring enough fuel, you have to whip around and collect as much treasure as you can before you're forced to take off and land on another planet. To escape the tolls of having every level looking considerably the same, occasionally you will get an engine malfunction and have to send a pilotless shuttle to obtain spares from some spot whose co-ordinates are given on the screen. Meanwhile, the evil Moroccans have planned a bomb on your spaceship, so this shuttle is also involved in a race against time, to get back and take off before the bomb explodes.

This is quite a challenge. Well, I usually managed to survive.

After that it's back to the main game again, and more heads down, no constant, mindless alien blasting. Good fun, even if it isn't particularly original.

As an overall conclusion, the standard of disk based software isn't yet up to the higher quality arcade games, and once again we can only sit back and wait for the better software that is sure to come from someone, somewhere. ■



Cudbert in Space — plundering the Moroccan

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THIS IS YOUR chance to win a copy of Sunshine's best-selling *Companion to Disk Competition*, by David Lawrence and Mark England. The book is the authoritative guide to making the most of the 1541 disk drive, with simple introductions to the theory and practice of disk storage, backed up with programs for manipulating the disk directory, recovering "accidentally" lost, merging files and displaying the structure of the disk operating system.

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difference between sequential, relative and random access files, this is the book for you! Normally £2.95 is the price, but ten lucky winners will receive five copies from Sunshine. Simply answer the ten questions and complete the entry form, then send your entry to *Companion to Horizons Disk Competition*, 12/15 Little Newport Street, London WC2, with your name and address, to arrive no later than the last working day of October. Prizes and competition rules apply.

- 1) What is the name of the process used for driving a disk into "Tracks"?
- 2) What is the meaning of the abbreviation BAM?
- 3) What is the microprocessor found in the 1541 disk drive?
- 4) How many bytes can be stored in one sector of a 1541 disk?
- 5) How many tracks are there on a formatted disk?
- 6) Is it dangerous to remove a disk when the RED light or the GREEN light is lit?
- 7) What is the proper name of Commodore's new "Fast" disk drive?
- 8) And what is the name of the 1541's immediate replacement?
- 9) What is the 1541's normal device number?

10) Which is NOT a disk command: SCRATCH; VALIDATE; RENAME; NUMERATE; COPY

Takeover (complete in 10 words or less) — "You should never slip a disk. . ."

Delving into disk drives

A further adaptation from *The Commodore 64 Disk Companion*
by David Lawrence and Mark England

THE FIRST one that anyone makes of a disk is to store programs. There is no doubt that, if you enjoy computing and use your 64 more than occasionally, the difference in speed with which you can access programs makes the cost of a disk drive worthwhile compared to a cassette recorder.

At the same time, it is always surprising how little care most people take in the loading of programs that they have spent long periods developing, failing to save regular updates when a program is being developed, failing to check that a program has been properly saved, keeping only one copy of important programs and allowing disks by leaving them around exposed to the elements. Given below are one or two common-sense rules when it comes to saving programs.

As you develop new programs, SAVE them regularly. Like any other means computer, the 64 can lose programs if there is a momentary surge in the electricity supply, or if someone kicks the plug, or even because in your programming you manage to upset the 64's equilibrium. How much work you will have lost will depend on how long it has been since you last saved your program. If a program is being entered rapidly, you should not normally expect to enter lines for more than 15 minutes without saving the program. When a program is being debugged, so that relatively fewer changes are being made, perhaps you might increase that period to half-an-hour. It really depends on how much you are prepared to lose, but you can depend on the fact that if you do not save programs regularly you will, sooner or later, lose an important program that has taken a long time to enter.

Saving

In order to embark on a policy of SAVING programs regularly, you need first to know the command which will store a program on the disk drive. If you have previously been working with a Datamax cassette recorder, then you will have become used to the format:

```
SAVE"<PROGRAM NAME>"
```

```
to SAVE a program or:
```

```
LOAD"<PROGRAM NAME>"
```

when LOADING a program back into memory.

With your disk drive installed, the situation changes slightly. While the 64 can work perfectly well with the 1541, it is designed to

know which of them is being addressed at any one time.

Devices

To overcome this, 1541 drives are built with the ability to change their device numbers so that a command can, for example, be issued in the form SAVE "PROGRAM".9 to access one of the drives, leaving device 8 left completely unattached. There are two ways in which disk drive device numbers can be changed, in hardware and in software, that is to say you can either make a modification to the equipment itself or you can use a program to make a temporary change. Of the two, if you are going to be permanently using more than one drive, the hardware solution is by far the best. It normally involves making a small cut in a single track of the printed circuit board inside the drive. Details of this are given in the 1541 manual but they are not very clear and, frankly, we would recommend that when you purchase your second 1541 you do so on the understanding that the dealer will do the two minutes' work involved. If your dealer hesitates at the idea then perhaps you might consider finding one who knows what he is doing.

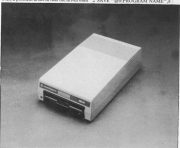
Tricks

To change the device number of a disk drive with a program is not difficult (see Chapter 10), but it can become tedious, since it has to be done every time the drive is switched on. Even so, if you are merely borrowing a friend's drive for the day, the software solution is a better one than ripping his drive to pieces.

To make saving a program easier and to encourage yourself to do it, it is a good idea to build a program saving facility into each program you develop, along the following lines:

```
1 GETC 0
```

```
2 SAVE "0<PROGRAM NAME>".0
```




```

VERIFY "PROGRAM NAME",A ;
STOP
) REM

```

Including such a routine in a program has the virtue that you are unlikely to save the program under the wrong name due to a typing error. It can be saved simply by entering GOTO 2 as an added bonus, it means that all your programs can be started with a uniform GOTO 1 if you do not wish to use RUN and skip out any needed variables.

Two features of this routine need some explanation, the command VERIFY and the modifier 'a' at the beginning of the program name.

One of the main reasons for building the SAVE routine into the program is chosen is that it can then be combined with VERIFY. The purpose of VERIFY is to check that a program stored on a specified device is the same in every respect as the program currently in memory, so that a program has been correctly SAVED. The format of verify is:

```

VERIFY "<PROGRAM NAME>",
<DEVICE>

```

where PROGRAM NAME is the name of a program stored on the device. Note that it is not important that the name of the program on the disk is the same as the name that you have allocated to the program in memory. The name of the program is stored on the disk's directory but not with the program itself, and no name is stored in the memory of the 84 for the current program. All you are doing is giving the disk drive the information to find a particular file.

Verify

Unlike the cassette recorder, the disk drive requires no work from the user when VERIFY is employed. In the little SAVE routine in the previous section, the drive will automatically search out the program which has been SAVED without the user intervening.

Fig 1

BYTE REMARK	
0	Type of file in use
1	0 = Unused or Deleted file
1	1 = Unused SEQential file
1	2 = Unused PRoGram file
3	3 = Unused USeR file
4	4 = Unused RELative file
128	128 = Closed DELeted file
129	129 = Closed SEQential file
130	130 = Closed PRoGram file
131	131 = Closed USeR file
132	132 = Closed RELative file
1	Track of first block in file
2	Sector of first block in file
1-18	File name padded with shifted space (CHR\$(80))
19	Relative files — track of first side sector of file Other file types — Not used
20	Relative files — Sector of first side sector of file Other file types — Not used
21	Relative files — Length of second Other file types — Not used
22-23	Not used
24-27	Only used when disk is SAYING an OPENing a file with 'a'
28-29	Number of blocks in this file

Fig 2

```

10 DIM DIR(10) : DEF = 0
20 GOSUB 1000
30 FOR I = 0 TO DP - 1
40 PRINT CHR$(4) DIR(I)
50 NEXT I
60 END
1000 REM *****
1010 REM READ 1st DIRECTORY
1020 REM *****
1030 DP = 0
1040 OPEN A,DEV,"A"
1050 GET #A,TS : GET #A,TS :
1060 GET #A,TS : GET #A,TS :
1070 IF TS = "" THEN CLOSE # :
RETURN
1070 GET #A,TS : GET #A,TS
1080 GET #A,TS
1090 IF TS(1) CHR$(4) AND TS(2)=""
THEN 1060
1100 IF TS = "" THEN 1060
1110 TS = ""
1120 GET #A,TS
1130 IF TS(1)="" THEN TS =
TS + TS : GOTO 1120
1140 DIR(DP) = TS : DP = DP + 1
1150 GOTO 1060

```

In no respect the disk drive is a little less easy to use than the Cassette recorder. When you wish to save a program for a second time on tape, all that you have to do is rewind the tape and issue the SAVE command — the previous program will be overwritten. Not so with the disk drive, for it is specifically designed to prevent you from making the mistake of accidentally overwriting a file by unwittingly SAVING another of the same name. This is fine in most circumstances but when successive versions of a program are SAVED it can become a little fiddly. The Disk Operating System (DOS) provides a facility to overcome this problem in the form of the modifier 'a' attached to the front of the name of a file (whether a program file or any of the other kinds described later — with the exception of relative files).

When the DOS comes across a filename which begins with 'a', it immediately scans the current disk to see whether there is a program with the same name as the specified filename *less* the 'a'. If there is not, then the program is stored normally. If there is a program of the same name, the program being SAVED replaces it on the disk — the previous version will not be recoverable since it is overwritten.

Corrupt

A note of caution has to be sounded over the use of 'a', due to the fact that the routine which runs the facility has a 'bug'. On disks which are becoming full, you will sometimes find that the use of 'a' will successfully save the file named, but will corrupt other files on the disk. The reason for this is that 'a' scans, under some circumstances, so far as register in the Block Allocation Map (BAM) the current picture of the sectors on the disk which it has used or which it has freed, so that subsequent files are SAVED in places they should not be.

There are several solutions to this problem: 1) include a VALIDATE com-

mand in line 1 of the little SAVE routine earlier in this article. This reconstructs the BAM and ensures that there will be no corruption, the only drawback being that it can take longer to VALIDATE than it does to format a disk. 2) Start off by calling the program something like TEST1 and, each time you SAVE it, LIST line 1 and change the number on the end of the program name. This is perfectly simple but it does take up a lot of disk space while a program is being developed. 3) Ignore the bug — it will very seldom, if ever, affect you. 4) First of all, use RENAME and SCRATCH, two housekeeping commands, to create a much more stylish and secure method of SAVING programs and other types of file.

Value

The process of keeping a valuable program safe does not end once you have stored it on a single disk. Disks can be damaged or accidentally corrupted in some way. If a program is worth keeping, then you should always have a second copy of it stored somewhere safely away from where you normally keep your disks.

In addition, don't neglect the relative safety and reliability of tape for backup copies of important material. A serious disk drive fault can be extremely frustrating if you still require copies of the required programs on a disk. If experience is anything to go by, most people starting out with a disk drive will ignore this advice, at least until the first occasion on which they totally lose a program on which they have been working for weeks.

In last month's article, we included a brief description of the disk directory. Now then

Fig 3

```

10 OPEN (A,I): OPEN ERR, #""
20 DIM DIR(10)
30 GOSUB 1000
40 FOR I = 0 TO DP
50 T = ASC(DIR(I)) : IF T(1) AND T(2) = "" THEN PRINT NEXT DIR(I),A
60 NEXT I
70 CLOSE # : CLOSE I
80 END
1000 REM *****
1010 REM READ DIR. INTO DIR
1020 REM *****
1030 DP = - 1 : NT = 0 : NS = 0
1040 TR = NT : NS = NS
1050 PRINT "D", "U", "A", "TS"
1060 PRINT "D", "U", "P", "S"
1070 GET #A,TS : NT =
ASC(TS) + CHR$(80)
1080 GET #A,TS : NS =
ASC(TS) + CHR$(80)
1090 IF TR = 18 AND NS = 8 THEN 1040
1100 PRINT "D", "U", "P", "S"
1110 FOR I = 0 TO 7
1120 GET #A,TS : GET #A,TS
1130 DP = DP + 1
1140 DIR(DP) = ""
1150 FOR J = 0 TO 29
1160 GET #A,TS
1170 DIR(DP) = DIR(DP) + LEFT$(
TS,CHR$(8),1)
1180 NEXT J
1190 IF NT=8 THEN 1040
1200 RETURN

```



we have taken the function of the directory, it allowing the user to examine the contents of a disk and to alter the Disk Operating System to find specified files on the disk, rather than granted. In this section we shall take a brief look at the directory, its layout and the way in which it may be directly accessed by the user.

In last month's article the overall layout of the tracks which make up the directory is given. Examining the table shows that the directory is held on track 18 of the disk, beginning at sector 0. The first sector of the directory is given over to the Blank Address Map, but the remainder of track 18 is reserved for the details of individual files on the disk. Each of these sectors is capable of holding the details of eight files. Given that there are 17 sectors on track 18 of the disk, simple arithmetic shows that the maximum number of files which the disk can hold, regardless of how much space is free, is 136, or 144.

Within the overall structure of the directory, the format of the entry for a single file is given in Table 1.

The file types, stored in byte 0 of the entry, can be made use of in an UNSCRATCH program, where file types are altered to simulate files which were registered in the directory as having been deleted.

Floname

The first track and sector bytes, and the floname itself, can be used by a program to trace through the sectors allocated to each particular file and then to display the name of the relevant file against each sector on the disk. In normal use, the purpose of these bytes is to allow the DOS to search through the directory for a specified floname and then to find the beginning of a file which it has been instructed to access.

Relative files are in fact made up of two quite separate sections, one containing the data and the other recording where the sectors holding the data are on the disk. The table shows that the start address of this second part of a relative file is held in bytes 19 and 20, while the first length of each record in a relative file is held in byte 21.

Bytes 26 and 27 are new to us, but their use is quite simple. When a file is SAVED or OPENed using the 'dfr' modifier to specify that any previous file of the same name and type is to be overwritten, these bytes serve the purpose of holding the starting track and sector until the new file has been created.

Directory

Finally, when the directory is displayed for the user, the size of each file in terms of the sectors used is given with it, and this figure is stored in bytes 28 and 29 of the file entry.

In all, each individual file entry in the directory takes up 32 bytes (8*2). In order to space the eight possible entries regularly within the 236 bytes of the sector, two extra bytes are added to the end of the first seven entries. These bytes contain no useful information, their purpose is solely to allow the DOS to scan along the directory in steps of 32 bytes.

There are two main ways in which the directory may be read: (1) By loading it into memory with the command LOAD "F", CDRN), where DEV is the device number of the particular drive. When loaded in this way, the directory is stored in much the same manner as a program file, and any program presently in memory is lost. Loading is possible because the 'F' indicates to the DOS that it has to translate the directory as it is on the disk into program file format, treating each entry as if it were a

program line, supplying the zero bytes to finish lines and space for link bytes. In other words, the format supplied to the 64 when the LOAD "F" command is entered is entirely different to the format of the directory on the disk track.

(2) By reading the directory from the disk under program control. The 'DOS support' software provided first with later 1941 provides a test means to accomplish this and print the contents of the directory to the screen without interference to the current program. It is, however, quite possible to read the directory from BASIC. Given in Figure Two are two short programs which will load the contents of the directory into an array, the first by reading the directory file much as a program file would be read (see Chapter 8), and the second reading the disk more directly.

Arrays

The DOS supplies the directory in the form of a program file, with every floname built into a separate line and the whole thing properly structured with link bytes and so forth. There is no point in trying to compare what is being read by the GET statements with the contents of the table at the beginning of the chapter, since there is almost no relation between the two. What is being read here is not the directory itself but the translated version of the directory supplied by the DOS.

Figure Three gives a program for reading into an array from disk.

Lines 10-20: This section controls the execution of the program, its three main functions are to open the error channel and call for the allocation of a disk memory buffer, to call up the next module, and then to print out selected lines from the array Dfr.

Lines 2000-2200: The overall function is to read the contents of the directory into the array Dfr.

Lines 2300-2500: The contents of a single sector are read into the buffer and the buffer pointer set to the beginning of the buffer. The first sector to be read will be track 18, sector 0.

Lines 2670-2900: The first two bytes of the sector, which are pointers, are obtained and stored in the two variables NT and NS, standing for Next Track and Next Sector. On the first pass through the module, the sector picked up will be the BAM, so the program immediately moves on to the next sector.

Fig 4

```

10000 GOTO 13000
11000 DEF FN *****
12000 READ READ 1541 DIRECTORY
13000 READ *****
14000 SP = 0
15000 OPEN ADEVN0,"F"
16000 GET #A,TS : GET #A,TS
17000 GET #A,TS : GET #A,TS
      IF TS = "" THEN CLOSE #A :
      RETURN
18000 GET #A,TS : GET #A,TS
19000 GET #A,TS
20000 IF TSC <= CDRN0 AND TSC <=""
      THEN 13000
  
```

Lines 1098-1099: The buffer pointer is set back to the beginning of the block, then the right file names contained in the sector are successively read. This involves displaying the two-angled leading bytes and then obtaining the next 30 characters. The 30-character entry is then placed in a line of the array DIR.

Lines 1099-1100: If the next track pointer indicates track 0 at this stage it is a sign that the sector which has just been dealt with is the last in the directory.

Given the flexibility of the means provided by the LOAD "F" method and the DOS support facility to print the directory, there are few occasions on which it is worth reading the directory directly. One use, however, might be whenever an operation is to be performed on multiple files. Very few commands could be used with the pattern matching facilities that the 1541 supports. With a little bit of programming, however, it is relatively easy to construct routines to carry out an operation on a whole series of files which match a certain pattern, and this depends on the ability to read and make use of the information contained in the directory.

Figure 4 gives a program which will repeat an operation on a number of files.

Lines 31000-31100: The module to read the filenames from the directory using the first of the two methods illustrated in the second section of this article.

Lines 32000-32100: These lines compare two strings, one of which is the name of a file taken from the directory, the second being a string input in the next module

which is the pattern against which all the disk files are to be matched. The pattern may be set up using the "*" and "?" indicators. The only important product of the module is the value of the variable SAME. If the filename being considered by the module matches the pattern, then the value of SAME will be set at minus one, otherwise it will be zero when execution of the module ends.

Lines 33000-33200: This section is the main control module, which first calls up the module at line 31000 to read the directory into the array DIR, then sends successive file names to the preceding module for comparison with the pattern input by the user. An action facility is provided in the form of the constant TEE, which records the type of the file. You can make use of this in the current program but you might like to employ it to exclude certain file types from an operation, regardless of their name.

Module

In actual use, these would need to be another module specifying exactly what action was to be performed on a file which matched the pattern. This extra section would be written as another subroutine and would be called by the GO500 at line 31100. Note: Since there is no valid line number at 31100, the routine cannot be run successfully in its present form — you must first add the new section specifying the action to be performed. Given below is an example procedure illustrating the use of the REPEAT facility.

to ENTER and SAVE the REPEAT program given above.

2) Take a disk which contains no important files (something may go wrong!) or format a new disk and SAVE on it three files with different names — the content of the files is irrelevant but the filenames should be less than 16 characters long.

3) LOAD the repeat facility and amend it by entering the following new or changed lines:

```
3100 GO500 3000
3200 DIM *****
3300 DIM K$NAME ALL FILES
3400 DIM *****
3500 OPEN 12,DIR,15
3600 C$= "FILENAME?" + NL +
      "?*?" + NL
3700 PRINT + 1,C$
3800 CL:GOTO 10
3900 RETURN
```

4) SAVE the amended program under the name REPEAT.

5) RUN the program and, when asked to enter the pattern, simply press RETURN which enters a single asterisk indicating that any filename will be acceptable as a match.

6) When the program terminates, load the directory and you should find that every one of the files on the disk has a "2" at the beginning of the filename. If so, you have successfully carried out a procedure which would be impossible by means of normal pattern matching. ■

The *Dictionary of Disk Commands*, by David Lawrence and Mark England, is published by Sumsoft Books at £7.95.

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Q: Which spreadsheet accepts complex conditional statements?

A: Autocalc 64 can handle statements as complex as $IF\ a1 < 4,000\ OR\ a1 > 10,000\ AND\ a2 = 500\ THEN\ b1 = 0.$

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Cracking the code

Book: *Mastering Machine Code on your Commodore 64*
Author: Mark Greenfield
Publisher: *Hayfever*
Cost: £7.95
Reviewer: C. H. Roberts

I am usually very wary of any book that claims to be able to teach you something quickly and easily, especially when the subject in question is M/C. However, in this instance, the author's claim is not too exaggerated.

The book is well laid out in sections that follow an quite well from each other. The style is easy on the brain and each new topic is adequately explained with example programs.

The book begins with a 'tutorial' of all the Assembly commands and programming modes of the 6502 chip. Also included here is a listing of SUPERMON — a 6510 Assembler — for pos to type in. Unfortunately, I could not get the program to work for me. Although it was being SAVED on the tape, it refused to come out of hiding when asked to LOAD. There is also a more obvious error that tries to start you off at the wrong memory location. If you don't have an assembler of your own to test it, you could have a problem.

Section 2 shows you how to use your new-found knowledge to great advantage. Topics covered include hex/octal screen scrolls, Sprite manipulation, Interrupts, Music, Random and Hi-res graphics. There is also a sub-section showing how to add extra Basic commands. All these subjects are well explained and are shown to work by some excellent routines that could easily be used to good effect within a larger program.

Section 3 contains all the ROM routines and explains how to use them. An Appendix has the usual contents — memory maps, Kernel jump table, ASCII charts, etc.

Considering the subject matter, the book is very readable as well as being instructive and I think the author is to be congratulated for his efforts. For anyone wishing to learn M/C on the

64, I would recommend this book ... but with some reservations ... (that SUPERMON being!

Manual labour

Book: *Getting the Most From Your Hi20*
Author: Mark Lambert
Publisher: *Practice-Hall* — (Mono Year 6/84)
Cost: £2.95

Review: David Stephenson
 Hi20 is a book that picks up where other guides and manuals leave off. So says the publisher's bladed Personality, I would say that the manual it picks up from is the one supplied with the machine by Commodore. However, if you do not wish to delve quite so deep into the Via as the Reference Guide takes you, then this book will make an excellent second or third addition to your computing library.

Section one takes you step by step through many small programs. The programs range from simple print routines and how to display them effectively, to quadratic equations, matrix demon and even how to incorporate a joystick into your programs. The chapter on graphics is

clearly, you should have no problems creating them. One thing I do feel however, is that some of the programs could be tidied up a little and more use could have been made of multi-statement lines. Otherwise, an excellent book for the beginner, and quite a useful book for the more advanced user.

Worthy but dull

Book: *Basic Subroutines for Commodore Computers*
Author: Edric Adams
Publisher: *John Wiley*
Cost: £20.50
Reviewer: Duncan Dawson

Edric Adams makes no claim to harness the Via-Pei-128M's graphics or sound potential. His *Basic Subroutines* contains a 'no frills' library of modules designed to facilitate sorting and conversion operations of the 'typical' bitmaps to square miles and 'Dynes to Newtons' type. They will run on most members of the Commodore-Pei family and, with minor amendments, on many other 'Basic' micros.

If you are the kind of chap who regularly needs to convert, say, Rankine degrees into Kelvin degrees, you will probably be able to do so on



an excellent, one of the cheapest I have seen. Anyone who is unsure on just how to obtain and use User Defined Graphics should find that this section will answer about 99% of their questions.

In Section two, there are 18 application programs ranging from balancing your checkbook to a matrix tutor. All the programs should fit into the unexpanded Via and, as character codes are used in the listings instead of control

your pocket calculator to half the time. But — one touch this — Adams has devised a handy little routine that automatically corrects poor spelling of tricky words like Fahrenheit or Reservoir.

The range of subjects covered in these 500-odd pages is impressive; topics include angles, arcs, business profits, capacity, energy, compound interest, logarithms, percent, volume measurements and many others.

A useful reference tool to have on your shelf, should you ever need a program to calculate your examination schedule or create millimetres or memory data Newtons per square mile (sorry, not), but one which, I fear, offers little greater benefit and will less fun value to the average micro user.

Well in advance

Book: *The Advanced Commodore 64 Handbook*
Authors: Peter Lupton and Bruce Robinson
Publisher: *Century*
Cost: £5.95
Reviewer: Phil Thomas

Let us suppose you are an enthusiastic user of the 64, who is proficient in Basic and would like to go further. You have examined Commodore's *Programmer's Reference Guide* but find parts of it too technical. You would particularly like to experiment with sound and Hi-res graphics, to understand Basic Assembler, to understand the Basic Interpreter and to add a few extra commands to Basic. The trouble is that you have been unable to find a suitable book to make you.

Look no further! This superb volume is the very thing you need. Intended as a companion to the *Commodore 64 Handbook* by the same authors, it stands on its own as a well-written, informative and useful volume for any beginner's bookshelf. As well as covering the points mentioned earlier, it provides a comprehensive guide to the use of disks and printers in a manner far superior to Commodore's own offerings. Add to this numerous listings of program examples and utilities, and you have a publication which is hard to resist.

This is indeed a book to dip into at random and explore in depth. It is packed with information presented clearly and logically, with several helpful appendices. It would almost be worth £8.95 for the Hi-res routines alone. My only criticism is of the index, which is practically non-existent, but compared with the rest of the book this is a minor blemish. Highly recommended!

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ANSWER BACK

Cricketer stumped

I HAVE THE complete records of the cricket club going back 55 years. Using my 64 I should have no difficulty in storing details of every match, but I should like to be able to sort out individual performances and accumulate career statistics for the players — several hundred over the years. Can you advise me on a program which would carry out this statistical sorting, collating and averaging, or do I have to set about working out my own program?

*D J Ross
Bristol*

THESE ARE several commercial databases which could help you out, such as Superbase and VisiStar. However, you will have access limitations if you're using a 1041 disk drive because of the amount of information you need to store.

You may need a CDM 8150 double disk drive which can be driven from a 64 using my A-D, B-D-E interface.

It may be possible to use a 1541, but it would require a lot of planning and you would have to use many disks, with the restricted sorting which would result. If you use one record per match, and each record stores details of players, scores, and so on, then you multiply by the number of matches per year and by 85 years, you'll find that an enormous amount of disk memory is required! If you have to use several disks, you're limited by the searching one disk at a time.

Two pass assembler

I USE THE Doctor Watson series assembler from Honeyfield on my Vic 20. Recently I have read about a new program with a "two pass" assembler. Could you explain the difference between

"two pass" and a normal assembler?

*K J Thompson
Warrington Mayor
Warrumbidgee*

BEST ASSEMBLERS use the "two pass" system by which forward addresses are calculated on the second pass. Using a label for a forward address which is not defined until later in the program causes you to deal with it by a single pass assembler, which would report an error instead. One pass assemblers can only deal with already referenced labels, but the two pass assembler has the reference from the first pass.

Don't overwrite

I HAVE A 64 and an learning machine code using the assembler printed in May's Commodore Horizons. However, I don't want to destroy any of this program when I store the machine code. So how do I protect the Basic programs from overwriting?

*P G Watts
Buckingham
Ave*

TRY USING the positions \$B000 to \$CFFF, which gives you 4096 bytes for code. Alternatively you could lower the top of Basic to protect your machine code program from being overwritten by Basic variables. To lower the top of Basic to \$7160 (\$8000) F04E:64,128, and then you can also use \$B000 to \$BFFF for your programs.

Brother Vic

I HAVE A Brother EP22 electronic typewriter, which I wish to link to my 64 and use as a printer. However, none of my local Commodore or Brother dealers has any idea as to what cables are needed to link the two. The EP22 has RS232C and several other ports and reviews have mentioned that it is compatible with the 64.

*David J Cooper
Warrington
Ave*

YOU WILL need a Vic 1014 cartridge, available from

Commodore dealers. This cartridge plugs into the rear port of the 64 and converts the 25 and ground outputs into the pins or wires necessary for RS232 standard.

The cable should be connected as follows, use an RS232 cable with 25 pin D type connectors. At the printer end connect up pins 1 (transmit) 3 (receive) 7 (ground) and 20 (data terminal ready). Your printer may instead should show which pins relate to the above.

At the computer end connect pin 5 (clear to send) to the wire from pin 20 (status), otherwise as above.

The wires to pins 1, 2 & 3 may need to be crossed over depending on which way the printer interface is implemented.

Superbase sorted

I AM HAVING a problem with the Superbase program. Having loaded the program from disk and inserted one of my own data disks, I can print or display across 80 columns once only. The output then defaults to all columns and no primary or secondary command of any sort will cause the output to return to 80 columns. It needs a QUIT and reload to do the trick.

My second problem is an inability to get any printout from cartridge-loaded programs. CalcRosh and Diary 64 from Handle are both 64 compatible, but

despite trying all combinations of device numbers I invariably get the message "DEVICE NOT PRESENT". Both programs behave perfectly otherwise, if the difficulty is one of printer incompatibility, how come I can achieve excellent printout over 80 columns from Easycript? Finally, what are the pos's and cons of disk and cartridge?

*Robert Law
Ox*

VERSUS OF Superbase for the 64 previous to V. 1.00 have a problem with Commodore interfacing. Contact Precision Software.

01-108 7166, and they will arrange an exchange for an updated version. It may be that the Handle programs also have some difficulty with your Commodore interface — contact Handle on 0440 770000 to check.

Cartridge loading is by far the quickest and most reliable form of software loading. The main disadvantage is that constant reconnection and disconnection of cartridges may lead to damage of the cartridge slot. You could consider investing in a reliable multi-disk motherboard to alleviate this problem.

1520 and Easycript

I HAVE JUST bought Easy Script to use with my 64, 1541 disk drive and 1520 printer/plotter. Problems arise when I try to print on the 1520, with odd lines appearing on the status line. The 1520 itself is working adequately.

*Margaret Papp
Paisley
Scotland*

HAVING checked Easycript on my 64 and 1520, I can advise you that it should work as follows. Press "RT" and "P" for output, then "R" to set the device number. Enter 4 in response then RETURN, and exit from output mode until you have entered the text you want printed.

You'll need to use secondary addressing to use the 1520 with Easycript. Examples (each one to be preceded by the control character) 02,08 gives pos color BLACK; 02,0F gives BLUE; 02,10 GREEN; and 02,11 RED. Using 02,48 gives 80 characters per line; 02, 4F gives 40; 02,5F gives 20; and 02,11 gives 10. Finally, 02* resets the printer.

If you need help with a technical query or problem write to
**Jack Cohen,
Commodore Horizons,
12-13 Little Newport
Street, London
WC2R 2LQ**

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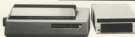
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Meet Percy & Monty

Win two games for the £4 from Greenlit Graphics in Tony Roberts' contest

LIFE IS never boring at the Hell Nook Micro-Club... this month they're all playing *Dungeons Adventure*, and things have become so heated that Kevin, Yvonne and Zoe have all built cardboard models of the Dungeon in an attempt to outwit the others.

One of them has got it wrong, however, and will come to a sticky end. Look at the three diagrams and decide which is the odd one out — each maze is viewed from a different angle, remember.

If you think you've solved the puzzle, complete the tie-breaker in an apt, amusing and original manner in fifteen words or less, and send your entry with your name and address to Competition Corner, Commodore Magazine, 12/13 Little Newport Street, London WC2E 8LN.

Two lucky winners will each receive copies of the Greenlit Graphics games for the £4, *Percy the Potty Pigeon* and *Monty Mole*, which cost £7.95 in the shops.

Percy the Potty Pigeon is a fast-moving arcade game written by Tony Crowther, in which you must help Percy build his nest and avoid speeding cars and other hazards. *Monty Mole* features Mr Arthur Scagill and his Piping Pickets, out to stop poor Monty from collecting coal from the dangerous mines. It's another Tony Crowther spectacular.

So the tie-breaker is 'I'd like to run a Greenlit through my £4 because...'

Normal competition rules apply.

The winners of August's Microsoft competition are Simon Jeffrey of St Austell, Caroline Butterworth of Bangor Regis and Steve Curwell of Widnes. Each winner will receive a communications cartridge and modem which will enable the £4 to be linked to the Microsoft network service.



1. Screen



2. Tunnel



3. End

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