

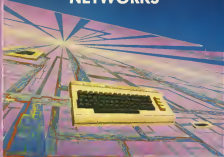
# Commodore **HORIZONS**

**The Independent Commodore magazine**

117 August 1984

**BIT SWITCHING EXPLAINED • FLIGHT SIMULATOR  
UTILITIES AND LANGUAGES REVIEWED**

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## Submitting articles

Commodore Horizons welcomes readers' contributions — either articles on program design or articles about the typical details required with a main design program — details, wherever possible, to be printed out on plain white paper, stapled by a computer. We cannot guarantee to return every article to the author's attention, so please keep a copy. If you want to have your program listed and this must include a stamped, addressed envelope.



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It starts here — the largest Software File ever, with games and utilities galore for the 64 and the Vic 20, both unexpanded and with Super Expander

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Technical expert Jack Cohen copes with most of your programming and hardware queries, including alternative mix garbage collection and machine code

### Competition

Microsoft offers three lucky readers the chance to win software for the 64, with a year's free subscription to the new Microsoft 64 network service

## EDITORIAL

**REDLAM ON BLIND** — it's not a matter of case. It's a case of when, where, what and how. No, this isn't a philosophical reference; nor is it an introduction to a discussion of the finer points of philosophy. Instead it's a reaction to the Just Commodore show.

The Maxwell Hotel isn't the most inspiring of buildings. The place is surrounded by a footcoper one-way system and the entrance suggests that it leads to a vast car park rather than an open-air level. The show itself occupied two large halls. Striding between the two, Commodore were draped across the hall's more commercial displays of hardware, to the surprise of the mainly American and Japanese visitors waiting to embark on the last stage of their pre-show tour. The Commodore staff who stayed in the hotel from setting up on Wednesday to dismantling on Saturday night became most sympathetic. Not only did they lose sight of the outside world for the duration, but they lost sight of each other as well, conversations by walkie-talkie instead.

Downstairs in the show was the corner of the two halls at Radio Luxembourg clapped out with the likes of Amigaquest, Linussoft and Bubble Bus. This left exhibitors with speech synthesizers looking for magnetic expansion bins, but curiously avoided the presence of wordle files. Unused flycatchers were as rare as an unexpanded game from Linussoft.

Upstairs was the quietest end of the show (and not just because we were there). So privately, despite all the surrounding to and fro, the most popular stand here was a computerized version of wordle — tradition that hand continues. But the hardware stand upstairs was the new Commodore stand, although it was the peripherals which attracted the most attention from Commodore owners. The Plus 1, which breaks away from Commodore's customer change for home users, comes with a range of matching peripherals. They're all very nice, bearing a pleasing resemblance to the Amiga line range. More importantly, the disk drives are fast to five times as fast as the 1541, and are used to be compatible with the 64. So if you own a 64 you'll have to invest in matching drives, but you'll gain in speed.

This should bring a sigh of relief to disk users — and an end to the old charges of false-loading estimates being faster than slides.



## LETTERS PAGE

### German ham

PERHAPS you could pass on the following information to Steve Baldy (May '84) and all other "Germans" with Commodore computers.

Station DL4 FRG, operator Helmut Isenberg, has programs for the Vic 20 and the 64. An article on these — without listings — appeared in the first edition of a new German magazine called "64er" in April. The program allows for transmission receipts, CQ call, test, timing to tape, transmitting from tape and automated taping of messages. Made of transmission is RTTY.

Give Helmut a call, and you'll probably get all the information you need.

Now to a request. Are there any UK readers who'd like to exchange listings for the Vic 20 for listings for the Vic or 64 published in German magazines?

I'd be pleased to hear from those who'd like to add a few new games or utilities to their collection. Likewise I would

be pleased to receive program listings for music or graphics on the Vic 20, as well as utilities for machine code programming.

Incidentally, Commodore rates in the UK should be checked that software prices are — compared with German prices — almost relatively low, the average price for a game on disk here being about £15 at present exchange rate, and with very few copies — usually imported British programs — of courses being available (by David Perry-Pearce, Eggenfeldweg 20, D-6100 Gross-Ufer, W. Germany).

### Window no-go

I OWN A 64 and wondered if you could give me some help with a short program to create a window of five lines which would set itself up — as in the window in The Matrix.

A J Molyneux  
West Norwood  
London

THE BEST way to do this is to set up a split screen, with graphics in the top half and text below. Unfortunately this requires a Commodore machine code program, and

can't be done in simple Basic.

### CompuThink again

COULD YOU get me in touch with Mr R W Gregory, who had a query on CompuThink done in the Answer Book section of the June Answer Book?

I have a CompuThink Think Computer Board (DD C84 CTL F2) which, in conjunction with your advice, should solve my problem.

A McCann  
103 Tindal Lane North  
London Mail  
Preston

LAST WEEKENDS — are you not there? (Since we don't have a record of your address we've granted Mr McCann's wish that you'll be able to take advantage of his kind of help.)

### Lively play

PLAY FOR LIFE is an organization for promoting cooperation between parents, teachers and the top trade and industry to create life-affirming playthings for children.

Play for Life is currently compiling a guide, and it is intended to include a section on computer programs. Our primary concern is for playthings for the five to twelve year olds, but our interest extends to children of all ages. It would be most grateful if any software producers who feel their publishable suitable programs would send us their

The criterion for inclusion goes that the programs should be constructive, creative, entertaining. Thus we are looking for utilities that encourage the users to extend themselves, and their imaginations. Graphics and music utilities are excellent examples.

The sort of games that we're looking for are, may be harder to qualify, perhaps because there are so few of them? Action, strategy, strategy, strategy games are definitely not! Decisional power, simulation are probably excluded. A lack of overt violence is no qualification, such games may still be aggressively competitive. So what are we looking for? Simulations that depend on understanding, role play games where the player helps others, arcade games that require eye coordination and reflex reactions, but not if they depend on a suitable reflexive and aggressive, and how about multi-player games that require the participants to work together?

We are greatly encouraged by the increasing ability interest in Play for Life. In fact, meeting in February received an extremely

sympathetic coverage on BBC Radio 4 and positive interest has been already shown by some of the quality press, not only in the Play for Life area, but also specifically in appropriate computer software.

Keith Oller  
Folkestone  
Goldsmith Avenue  
Creechington  
Kent, Surrey

This is the chance to try your wares — send your tips, comments and compliments to Letters Page, Commodore Magazine, 12-18 Little Newport Street, London WC2N 6LD

'Rock McSteel of Hardware  
Meat Eddie Sponge in  
Software!'



## PC and Z seen

COMMODORE'S plans for the business market are becoming more ambitious. ITC general manager Howard Lazarowitz claimed at the Fifth International Commodore Show that with COM's policy of self-sufficient manufacturing and aggressive pricing, Commodore could become "IBM's major PC-compatible rival."

The IBMPC compatible machine runs on a 68 010 8088 chip, with 256K expandable to 512K. Storage is on dual 5.25K disks, and ESD2 and Commodore formats are provided. There's a touch screen with a range of display format options.

Users will be glad to know that the Microsoft Flight Simulator works faultlessly. Commodore's John Collins commented that the PC is "Marvellous different to the Microsoft computer" — in which it is based — "in look, function and design."

The PC is intended for launch in early 1983.

The "2080 "Zoo Machine" is in its earlier stage of development. The main chip is a Unix-compatible 68010, with 256K user RAM and 128K for system handling.

Memory can be expanded to 512K. The Zoo Machine features full 16-bit addressability, with dual expanded 2 billion disk drives and a 20 MB hard disk controller.

## COMAL coming

NEW software from COM software announced at the Show included COMAL, PILOT and LOGO language programs and an Assembler.

COMAL, available in August for the 68, is a structured language based on Pascal. PILOT and LOGO are to be sold as two separate packages.

The Assembler package will enable you to program in assembly language directly onto the 68.

# New CBM micros debut at Show



Commodore Plus/4 — the 68010 chip, built on silicon

COMMODORE'S two new lower priced, the Plus/4 (formerly the 684) and the Commodore 16, made their UK debuts at the Fifth International Commodore Show in London on 15th of June.

Both machines operate on a new 68010 chip, version 3.3, which means that COM software can be run on the Plus/4 68 010 and Commodore 16 programs will not be compatible.

The Commodore 16 comes in a "file-style" multi-prop card designed for the first-time user, it has 73 programs in its ROM, as well as a including full graphics plotting capabilities and editing. There are four cursor keys and a "help" key, which highlights programming errors.

The C16 has two joystick ports and 121 outputs (12 outputs at 4 function levels, plus blank). The display is 40 columns by 23 lines. There are two sound generators, a cartridge port, and a new type of cassette tape port to connect the existing C1501 cassette deck.

The C16 offers 128 user RAM with 32K ROM, and will be sold in the form of a starter pack with the compressor, cassette deck, introduction to Basic part 1, and "tutorial" games for £129.99.

The Commodore Plus/4

"See between the Commodore and the V304 in terms of facilities. At the moment there are no definite plans for the future of the V304.

The Plus/4's major selling point is its low price in software packages, which are priced at 5004 and accessed through the function keys. There's a word processor, spreadsheet, database and business graphics package — the same range as you'll find on Sinclair's Q1, which costs 1000.

The four packages can store and exchange information through the Plus/4's screen windowing facility, which allows two packages to work simultaneously on the screen.

Further conveniences include a new style case similar to the forthcoming Japanese MSX machines, with four control keys arranged in a diamond

shape, an escape key and a reset button.

The Plus/4 is compatible with the 5.25K disk drive but is being marketed as a "package" with the SP2001 5.25K disk drive and the MP2002 disc master or MP2003 disc-wheel master in an ideal small business system.

The Plus/4 will cost £249, and 64K the C16 should be available in September.

New peripheral include the MCS201 seven colour 40-metre printer, at £199, the MP2001 40 cps disc master at £249, and the DS20101 disc-wheel at £199. All are compatible with the V30 30 and 64 as well as the new machine.

The 1342 disk drive will replace the 6841 at the same price, £229, and the new cassette deck, the 1531, for the C16 and Plus/4 only, will cost £64.95.



The Commodore 16 — for the 68010 chip user

# Thorn-EMI to show TOTL 64 commitment

# Haig call-up

THORN-EMI Computer Software Distributors will be attempting to grab a large slice of the Commodore software market over the next few months.

Thorn's plans are based on the Creative Sparks label, a range of educational games from the USA's Horsons, and the TOTL programme for which Thorn-EMI are now the UK's sole distributors. The Horsons programme includes several titles such as *Great Britain*, *Pool Challenge*, *The Pit* and *Boxer's Footie* for the 64, and *Harold's Chase* and *Skinner* for the Vic.

Educational titles include *Kids in Keys*, *Formulas*, *Story Machine* and *Alphabet*



See More info are printed throughout the magazine and

Thorn has titles scheduled throughout 1985.

At the Horsons press launch, Thorn-EMI's Henry Riches emphasised the importance of a solid dealer network, reasonable profit margins and good technical support, all of which the company hopes to supply.

The TOTL utility programme includes *InfoScan*, a CIBED database for £49.95 on disk, *Spoken*, a spelling checker for £24.95 on disk, *Text and Label*, which together form a complete mail/labelling system for £44.95 and £24.95 on disk.

For the Vic + 16K there's *TOTL Label 2.1*, a mail/labelling program at £19.95 on cassette.

## Soft toys

MANY major software houses had new products at the Show. Microsoft's *Cover the Car* was accompanied by a soft toy version of that very thing, which is being sold at £1.50. An economy program and game featuring the Mr. Nice characters are in the pipeline.

The *Colours* series design softy was also on show, accompanied by the design

Smart *Book of Bright Green Softies*.

Albion's *Guardian* is a faithful version of the Williams arcade classic. *Defender*, complete with London, Moscow, Paris, Bombay and Peking. Also on show were *Single Empire*, a Phoenix derivative, *Ion of Elgar*, *Panic Planet* and *Link*. Each game costs £7.95 on cassette.

*Beats* has produced the *Quadrillion* disk, which combines the *Word Wizard*, *Label Printer*, *Printer Printer* and *Advertiser* programs for

£14.95. Also on show were pet related items of a sophisticated war game, *Snake Ferox*, and a knowledge-testing program for deaf children, *Keycaps*.

Robin's long-awaited *Death* has made its debut on a giant video screen. This Star Wars version features sophisticated 3D effects.

Also appearing was *Slings* II, an arcade type escape game in which you play a guard at a POW camp.

Amey's *House of Usher* and Ice *Hunter* proved popular, if the marketing is put hold of an unexpected jolt in any measure, and the GAC for a graphics/animation sound utility package at £14.95 on cassette on disk was produced.

Finally the Paradise Group showed *MacCats*, a range of Amey's owned software products on disk which enable you to synthesise, arrange and print out music in your 64.

The disks, which cost between £11 and £45 may be accompanied by a range of music keyboards when they are distributed in the country. For further details contact Dennis Jarrett, MacCats UK, the Paradise Group, The Metropolitan, Enfield Road, London.

COMMODORE's American *Software Magazine* second issue and Beta Systems. The issue covers several appointments in former US Secretary of State Alexander Haig.

Haig, not familiarised by his knowledge of the computer industry, is the latest in a line of appointments made after long groups of executive resignations, predicted by the departure of Commodore founder Jack Tramiel in January.

Tramiel, meanwhile, is reported to be planning to set up his own rival to Commodore, having sold "all or most" of his facilities plans to the company.

New working titles in *Business* in addition to the *6400* for plans to invest himself. Tramiel's new company will apparently include his sons Leonard and Sam. Rumour has it that CIBED chairman Irving Gould's opposition to Tramiel's soon becoming involved with Commodore sparked Jack Tramiel's resignation.

Whatever the truth behind the boardroom battles, it will be ironic if Jack Tramiel's new company, which may be producing a rival to the Apple Macintosh and IBM PC, enters into conflict with Commodore itself when the Commodore IBM PC-compatibles are released but the market is 1985.



Haig - it's his career



Cover - *game* software for all

# CES — pointing to tomorrow

Chris Jenkins reports on software trends at America's Consumer Electronics Show, where the giants of the hardware and software market display their state-of-the-art wares

CHICAGO'S Consumer Electronics Show is a massive event, which acts as a showcase for the software and hardware products which will be hitting the market in the next few months.

Our man in Chicago was most impressed by the great strides which are being made in games technology. The industry seems to be going over towards interactive adventure-type games rather than arcade shoot-'em-ups, so we can expect the UK market to follow suit in the coming year.

Notable programs included Summer Games, from Epyx, an 8-event Olympic simulation for the 64. Billed as "the Games that the Russians DID attend", Summer Games is one of several athletic programs — HES and Autumn have similar games.

Also notable was IBM's Baseball Dig, an "educational" program with impressive graphics illustrating the



Summer Games is among the Olympic ones



Summer Dig — the dinosaur one

history of dinosaurs, their distribution and extinction.

First Star's Spy vs. Spy is based on the popular *Mad Magazine's* long-running cartoon series. You have to appoint a building with twenty rooms, searching for loot and secret documents while placing bombs to eliminate the opposition. Again the program features impressive graphics.

Adventure International's Incredible Hulk game is one which is really popular in this country for the IBM 64 version costs \$9.95 on tape or \$13.95 on disk, and is the first in a series featuring Marvel Comics super heroes.

Although American software prices don't seem to be dropping, the quality of programming is improving all the time, and as reported in *July's* *Microzone*, a number of companies are planning to make US software more readily available in this country.

## Fast data access from Wafadrive

PROGRAMMERS needing fast data access for the 64 will soon have a choice of high speed storage systems. IBM's 3870 44 is on the way, and hardware distributor Electronic Box, known for the IBM 5150 Commodore-compatible tape deck, presents a new type of fast access storage system for the Vc and its later the Commodore The Wafadrive, initially available for the standard Spectrum at £129.95, features two tape drives, each with a storage capacity of 128K. The storage cartridges, which are a special form of microcassette, will come in three sizes: 128K (28-95), 64K (33-60) and 32K (37-40).

Electronic spokesman Graham Wood claims that a high level of electro-mechanical reliability and data

accuracy is dropped into the Wafadrive, which has 80212 and Commodore outputs. A word processing package written by Hewlett Pack

software should be included in the system, which will cost about £160.

Several applications and entertainment programs will also be available in the month, planned for October.

For information, contact Graham Wood Electronics, 0294-852752.

## Soft switch to 64

THREE software boxes are getting increased emphasis in the 64 catalogue.

Mathematics Show's plans, headed by Paul Byrne at the Commodore Show, recognise the fact that "the 64 is now a very important machine". For this reason, Mathematics Show software includes various versions of Maple and Preprocessor, and new titles including a graphics adventure called Castle of Terror, Sheriff's Maths, an educational

maths game called Armed Anding and a book on Commodore 64 Member Card for the Atlantic Region.

Solomonoff, best known for a range of Dragon software, is now going over heavily to the Commodore 64.

### Development

Using a development system which turns Dragon machine code into 64 machine code, Solomonoff plans to bring out Wizard War, 197 Flight

Smashin, an eye adventure called Castle Barris, and a number of other programs by September. Solomonoff's Lucy Parker commented: "We're showing prototypes to a number of chain stores to get their reactions, and we'll be covering a lot of software to run on the 64 in the next few months."

Furthermore, E&E's report of 17 December had Linn, London (NY), Tel 81-864 3150, will be covering a number of small business packages written for the Lynx computers in the 64.

Titles include *Maths*, an add-in management system for 28-85 on disk or 33-95 on tape, *Flexi Basic*, a database at the same price, and *Chart-rite* and accounting programs.

Software support manager Mr Hill promises a high level of technical support and a free enquiry service for E&E customers.



# CYBERTRON MISSION

Fort Cybertron, the most well-protected stronghold in the galaxy. Defenders the Spinners, Drones and Cyberdrills are now on alert. The 64 room complex is bristling with the Fort's defenses. Aerial touch-down the walls with their blazing high voltage charge and wait to get for the robot's spark who glides through walls to hot panels.

Ed. V. S. 123456789 and SAC MICRO (1988) 87-88

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COMMODORE 64 VERSION

MICROPOWERMICROPOWERMICROPOWER

# 64 Valhalla faster, better

Hare today,  
yours  
tomorrow

THE LONG-AWAITED Commodore 64 version of the award-winning adventure Valhalla is now available, after long delays to the intended release date.

Legend's marketing manager Peter Moxham comments: "Although the game costs the same as the Spectrum version, £14.95, we've made considerable improvements to the graphics — the characters are now in colour — and some of the sound effects. We're also focusing on the pack's MEGA Game of the Year link, an award of which we're very proud."

Peter also pointed out that the game runs faster than the Spectrum original, so even those who just want to watch the game playing itself will get more out of it.



Valhalla — who said what?

## Crawling, talking hardware

THE IBM SHOW saw the premier of a wide range of new 64 peripherals.

Ram Electronics, meanwhile, is working on a 2M/128K RAM pack for the 64. Priced at either £K or 18K thanks to a minimum of 64 banks, the pack should be available in September at around £300.

A Ram Electronics spokesman commented that it was too early yet to say whether software would be available to exploit the RAM pack. Contact Ram Electronics, 20

Floor Road, Fleet, Hampshire, tel 02314-9858, for more details.

As for the Commodore show, Ram was demonstrating the Spectrum speech synthesiser for the 64, developed by JCB Micro Systems. The unit, mounted on a 1/2" VHS cassette, costs £14.95 and features both print and alphabetic vocabulary to form comparison from the Adman speech synthesiser, which has been reduced in price from £29.95 to £29.95.

Organ Software has

developed an Adman-compatible version of the arcade action game Truck and Field, which was presented at the show. Contact Adman Electronics through Mike Sherwin, tel 0421-740973, or at Exton Way, Harrogate, 0423-42642.

For the manually method, Metric Systems and Computers, 17 Bridge Street, Loughborough, Beds (0421-714213) demonstrated at the Show a range of 64 interfaces for MIDI equipped synthesizers. The Jellighouse Interface is a basic version costing £9.95, and for the more advanced Sol unit you'll pay £19.95.

HEMAC is also distributing software which displays programming parameters for Yamaha's PM synthesizers, and an advanced demonstrator using a £80 and 512K Opus 4 with Expanded was a popular feature of the Show.

Valiant's Turtle was up and crawling too, taking off CBM's LOGO program. The turtle should be in the shops in September at around £30, though there'll be reductions for schools.

THE GOLDEN HARE of Magesfield goes to the cream-horn puzzle based on artist Sir William's famous book, a box up for sale for Commodore users.

A new company, Harwell, of PO Box 267, London NW1 1TB, has bought the puzzle. Harwell has bought the rights to the Magesfield competition, and is now offering it to the public in a volume puzzle.

Harwell's Jeff Parnell said that the first part of the game, which will run on the 64 and the 16K, will be released on June 1st. Harwell's Puzzle will cost £2.95, as will the second part, Harwell's Puzzle, which will be released 12 weeks later.

To overcome the problem of giving the game (which will use security measures and require registered use cards).

Although the price, the Harwell is valued at £20,000, Harwell will offer £10,000 as an incentive to the resident winner.

Rather than figure up the accounts, all you'll have to do is place the location which is the solution to the puzzle.

Due to the nature of the puzzle Harwell won't be making copies of the game available for magazine reviews, but players can contact to write in if they have any advice to offer or questions to ask.



Star Harwell's Hare!



Dear Valiant, I can't go, sorry

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COMMODORE 64 VERSION



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# Splat attack

Fate Garrard aims to submarine depths to review new games

BLIND JOYSTICK will travel, as the old saying goes, and that might seem to be marooned in a variety of obscure locations from underwater to outer space. From the wild west to a haunted house.

Our submersible straggles begin in a game called *Submarine Commander*, produced by the Computer Sports branch of EMI, for a Vic 20 with 16K expansion. Here, regular readers will be well aware of the fact that I don't often over-enthusiastic about games for the Vic series, my opinion about some of them being mostly due to technical shortcomings. However, *Submarine Commander* is one of the better games available, and it was extremely difficult to stop playing it and start writing this review.

## Steering

You are put in the role of commander of a Mediterranean based submarine, and as the Vikings in the Bottom of the Sea appear your job is kind of a sort of a search-sweeping mission. There are three basic screen displays to help you in doing this, and the one that you'll probably be using most features a thousand high resolution dots, drawing of the Mediterranean sea, complete with a flashing dot representing your submarine, and several sea-finding lines representing the enemy which move around all over the place.

You have to check after them and when making target switch to another display, which this time shows what is to be seen on the enemy screen. When you've detected just one enemy of the enemy, you must come up to the surface and switch to the third display, which now shows you a perspective top view of whatever happens to be rolling on the sea.

Having got the enemy in your sights, a third point of the screen bar starts to wobble helpfully, pointing to the kill. This enemy is not just a boat, and there is a tactical choice of you coming in for some bombardment as well, in which case your only chance is to show cunning in the wind and descend to the sea bed, trying to avoid descending into it. And yes, it is possible to crash if you attempt to take your submersible onto dry land.

A wonder for game, with a lot of things to think of at once, not least of which is remembering which key to press to do what as your efforts at something a torpedo crash in your submarine blowing it to smithereens and rapidly ascending to the surface. A highly recommended game.

One of the most technical games to come our way this month is *Bob's Blunder* from Phoenix, working on the unexpanded Vic 20. In this game you take on the role of

Bob, an eccentric who is overworked and underpaid, a complaint that could be dated the coldest by miles of it.

Your job in life is to repair houses, and, like some builders, I could name, you haven't done a particularly good job on the last one that you checked, due to a new hole to the back of the normal motivation. As a result of that your overpaid and underworked boss has sent you back to the house to get the job done properly, although this game presents in itself a rather curiously unusual of the above scenario more the only thing you have to do is mend a fan.

This is even easier than it is in real life, since *Bob's Blunder* apparently believes that you can mend a fan merely by hanging into it. The fan is situated in the corner of the house and is noisy. The boss wouldn't see any architectural points, since it only consists of one mass set of walls and one screw or two in a doorway, beyond which is the fan. To get to the fan you set up against both a gas leak and when the screw only can obviously refer to its position, placed there by your workless boss.

## Ball

In the right hands this could have been turned into an interesting game, but whoever programmed it has apparently got the wrong hands for that, rather, since the game falls down on a couple of points. One, it is exceedingly dull, with not too much going on, and secondly the same lines that you're given to reach the fan is ridiculously short. Were of the screen were divided of walls and whether it's doubtful whether you'd be able to get to it in time. None of the game players in this game managed it, and in the words of the immortal bard, "I'll give it one out of ten."

Defender by any other name is still Defender, but in defence of the company who've produced the version for the 16K expanded Vic steering Software, they at least have the good grace to call it *Star Defender*, and have the word Star in extremely small print and Defender in extremely large print on the cassette entry card.

## Cleats

You see, inevitably, a host of galaxy professors, who have been chosen to save Earth from the despicable aliens who've come here to do whatever despicable alien do. In the end, they are attempting to subvert various members of the human race who have been staged enough to stand at the bottom of the screen, while at the same time steering after you space ship and trying to shoot you down. Yes, of course, have to rescue the humans and destroy the alien - who has become an arcade classic. Shoot everything, and who dares win. Never read on.

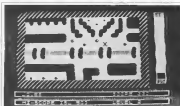
One thing which prevented Defender from following in the footsteps of Space Invaders and Asteroid and becoming a truly revered game was that you needed seven fingers to play the game that nature provided you with. Phoenix tested around like we Space Invaders trying to find the right button to press at the right time. Amongst have remained pretty faithful to the original game, although they have at least brought the number of necessary keys down to ten. This is, of course, a fair compromise.

There are various different types of alien, some more deadly than others, but only one can stand between it the particular alien should manage to get a handle to the top of the screen the better game uses a screen, which is the possibly most deadly enemy of all. Some of them follow you about, and require very deft movements to shoot them down. Either that, or a quick trip into hyperspace to reappear somewhere else on the screen. With a state to show you what's happening off screen, that is probably as close as you're going to get to having a proper version of Defender for the Vic.

You may need an additional friend to come and help you play it, but like to come a bit



Victory Here - New up 16K for the Vic 20



Space — design of Starbreeze.com

more tolerable arena is joystick. Only four keys to worry about (two Shift, for access with fingers or devices as Paul Dierker, boss over you open for a copy of the

Handtek Microgame has been showing out software for the unexpanded Vic for some time now, and *Space* shows a one of their latest efforts to convince people that all the publicity bluffs is true.

Well, it isn't. This is a copy of Space Invaders, although there are three different areas to approach rather than the one. Using either keyboard or joystick you have to get through the usual Space Invader-type stages, and then on the second screen design the arena and then fire to stay below and avoid all over the place.

Space shows a test of your reactions, an automatic aim down the screen and you have to dodge out of their way. You can shoot them as well if you want, but as they queue often come down in pairs of two or three, and your ship is wider than the gap created by shooting one of them, that will always be available.

#### Wallers

I know the unexpanded Vic has a paltry 3.5K of memory to play with, but some people (Bruce Artzer, Llanharol, Aedonson etc.) manage to produce some very good, original software for it, with original (and the keyboard Oh, well) graphics. In your walls down the future course of software computers.

Some Commodore 64 games are, and this month's price for the company that has produced the most reliable publicity campaign of 1984 so far goes to Interactive Software Ltd., for a little number called *Spies!* (their exclamation mark, not mine).

Initial scenes reminiscent with a lot of glibby shiny casts, brochures, competition news, and anything else you can care to think of. But at the end of the day we're more concerned with the quality of the game than the quality of the packaging.

I will admit that I was prepared to heavily dislike this game. Any computer relay card bearing the words "The Massive Exploitation Area (this around seems an unusual way to use STRawberry Jam)" is not guaranteed to send me rushing for the nearest joystick and keypad into action.

No when the game actually got started, it was a quite a surprise to find that it really is a good game.

The "Massive Exploitation Area" is the screen, which, in a mere display of high resolution graphics, scrolls randomly left, right, up or down, taking you and everything else with it. You incidentally, are called *Spies*, and your little blob's rim is left to avoid being caught by the screen once the walls that surround it. You can also bump into various strange plants and collect some bonus points, while trying to avoid bumping into some of the many mines that populate this "Massive Exploitation Area".

There are seven levels in all to explore, and successive shelves fully take you in the pace of the game that you'll have "no choice" of escaping from level upon. Having never seen further than level three I can well believe it. There is no escape route in each from each level: you merely have to survive for a certain length of time, which is indicated by a sliding display at the right of the screen. Survival automatically takes you into the next level where there are twice as many mines to be avoided.

Joystick response is very quick, perhaps too quick, but I found that playing it with the keyboard was even worse. One can touch it that you can define which fire keys control your movement, if you don't.



Spies! — action graphics and heavy sound

for the time. I haven't have dedicated to the task.

An interesting and unusual game that would double everything. Who knows, this could be one of those rare occasions when a game for a home computer opens a dedicated arcade machine, rather than the other way round.

Printed on the cassette card accompanying *Megawatt*, from Paramount Software, is an extract of a letter that they have apparently composed concerning this game. It says "When I saw *Megawatt* in my local dealer's showroom — I bought the cassette!" Makes a change from buying the company I support.

I have no reason to doubt the authenticity of that letter, but what I do doubt is the sanity of the person who wrote it. *Megawatt* is certainly not a bad game, but it isn't that good. I can't imagine rushing out and buying one, a BBC computer if I saw the message on it.

It is described in a magical planetary trip, store the purpose of this game is to make a run from Pluto to Earth, taking off at all the planets in route. But that is no simple pleasure trip, meet the hostile inhabitants of each planet and out to prevent you from completing your journey. These inhabitants all looked remarkably similar to me, and they all seemed to behave in similar ways as well. The only thing that made the various planetary hops different was the number of times that each set of stars had to be killed. Once to go from Pluto to Neptune, twice to get from there to Uranus, and so on.

#### Star Wars

Controlling your spaceship is quite fun, even this is one of those games that believes that more you're starved motion, you can't even guess what! This you quite often find yourself bumping randomly about the screen, bumping into walls and stars in total disregard of space traffic rules.

Periodically a few asteroids, hit-eyes from the laser line. What you do doubt, find about the place, and you can collect bonus points for making up these galactic death-tricks. But so going to pick them up with your spaceship, choosing about the James Hunt on a bad day, that is probably one to be recommended.

#### ►Play this, share about the program

Terminal Software, as has been noted before, produces better games or drives, and if their latest effort, *Triple Tournament* is anything to go by, they're moving back towards the game again. Not great by any means, but not at all bad.

*Triple Tournament* is precisely what it says it is, a collection of three games that can be played by either two players competing against each other, or by one player doing battle with the computer. For the two player option you'll also need two joystick mice, quite reasonably, there is no keyboard option on this one.

All three games are loaded in at the same time, and whatever mode you happen to be playing in you have the choice of items and rounds in succession with each one, or three rounds with just one of them. Your scores are scored up over the three rounds, and at the end of the third one the highest score instantly enough wins the game. Individually the games probably wouldn't merit an over-enthusiastic review, but presented in this way they're presented as coherent flaws and together they manage to quite a decent little package.

#### Quickies

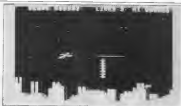
To take these in turn, *Wax World* is the old western favorite, the shoot-out. Just two opponents moving about on the screen, and whoever gets the first successful shot is wins the honor of 1,000 points. There's a collection of men, barrels and other debris between the players, and this must be shot through first before hopefully killing all your opponent.

*Space Race* is a real joystick wrecker, as you race along a corridor in space, bumping into all manner of enemy ships before attempting to dock with your base at the end of it.

Finally *Kanadian* sees you as control of a ship at sea, under attack from a somewhat wary of planes. You have to shoot the planes before they can get you in any way.

An excellent idea from Terminal Software, and with it different aspects of play, this package is pretty good value for money. Let's hope that there's more of the same on the way.

Every day has its day, and every great of



►Sights — Japanese version on the ship

program seems to have its month. Recently flight simulation programs have been appearing with the regularity of new computers, and not such for the Commodore it is called, simply, *Flight Simulator*, and is produced by Amiga Productions.

The basic camera behind every flight simulation is the same: you have to take off, fly in a predetermined amount of time for to a specific destination and then land again. With Amiga's program we have a choice of a number of airports to fly to, with take-off always taking place at Heathrow airport.

Controls are rudimentary, and the keyboard is extremely sluggish to respond, but then I don't suppose you'd expect a Boeing 747 to turn through 90 degrees in the length of time it takes to press a key. For the sluggishness is still annoying, as you see occasional left-wing in bowdlerising wandering whether you've pressed the key or not.

Screen display is generally not very good although you are presented with a nice high resolution map of the UK to show you where all the airports are. With that something without possessed by all reviewers, it managed to fly in better aspect from Heathrow via somewhere near Emsay. The strategy at Luton the 'plane never was under control, and sailed

determinedly to a crash landing with my being able to do nothing about it.

Subsequent attempts to do it better. A good flight simulation should make you feel that you're actually in the 'plane, but with this one I was aware in any doubt that I was finally controlled in terms of a bit, listening to the soft snatch commentary on the radio.

#### Packages

Software for the bit is appearing at a fast old rate now, and some of the better programs to watch out for include *Killer Wall*, from Alpha. This involves manoeuvring along a set of high resistance tunnels and corridors, shooting light bulbs, fish and bricks as you go. Getting through to the end level of difficulty is not easy, as a single mistake transports you back to the start again, but this is well worth the long loading time.

*Black Hawk* from Creative Sparks (Creative SMI) is another one worth investigating. In that you can sail across every territory in the great game *Black Hawk*. Some superb graphics as you attempt to set off the enemy, and a nice mixture of attacking and defending strategies is proposed before you'll get anywhere playing this.

ETI, whose usual releases were about as exciting as most of their records, have bounced back with something called *Crossed*, which owes a little to *Scudpad* and a little to *Space Invaders*. The end result is quite interesting, but it didn't maintain interest for long as the Grand portable mode.

Finally, *Advanced Computer Experiments* appear to be branching into the arena, with *Meridian*, *Krypan*, *Mighty Capes* and *Wind Control* coming together in one package. Only *Wind Control* proved to be of any lasting appeal, and even that didn't last for long. But you may be interested by ACE's low price — £2.99 per program.

Commodore games of 1984 so far? Well, for the Ye you'll have to go a long way to beat *Charles Snow* from Micro-Action, and the bit game of the year has really got to be the *International Soccer* cartridge from Commodore Designers! I thought you might. ■



►Wax World — hit water Luton airport



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# Money juggling — enter the spreadsheet

Do you want to play the stock market, run a business or simply keep track of your bank account? Mike Green explains how spreadsheets can alter your life

**ELECTRONIC** spreadsheets — sometimes called word files that do work a certain style, a kind of digital electronic business ledger of money, therefore in some grouped around graphs and tables formulating real business, various reports and such business making their first million. No matter who we are or what we do — we have to admit to a certain fascination with the numbers and doctors of the stock market, the numbers in shares and gains, the people who make and lose a fortune at the touch of a telephone and a swap contract to sell cow! Unconsciously it may be — but certainly all the same.

But now, the world of the cash flow analysis, forecasting the financial future, profits and loss and other necessary items has come into the focus with the advent of the electronic spreadsheet for the home user. After taking the business world by storm (VisiCalc and Lotus) the software manufacturers decided that the time of a single sheet had passed in the form of a computer — a managing old money. The result has been a host of VisiCalc relatives in concert with the word "calc" as the title for the home computer.

But what exactly does the phrase "electronic spreadsheet" mean? Or perhaps of more importance — what does the software do?

The easiest way to describe a spreadsheet is to imagine a single sheet of paper with a few columns and rows, each labeled with a letter.

The essence of the paper is that you can write down the appropriate sums in the boxes and there add them for whatever you may wish. It's like having a simple method of looking at your figures so you can understand what's going on. Think of another example of a spreadsheet, a bank statement. Again all you have is a piece of paper with figures, some being added and some being subtracted so you end up with the final total. Although the bank's business doesn't actually create the boxes, they are still there if you think about it.

## Budget restrictions

If you are concerned to juggling as many different jobs as you do — "what if?" queries you have to change all the figures and correct all the summations — which is a bother and takes time — that suppose you

enter the information for your budget onto a spreadsheet in your computer — then you have the ability to ask "what if?" and the computer will work out all the sums for you. This is quick, easy and very reliable, so "what if the mortgage drops by 2.75%?" can be answered in a matter of a few seconds.

There are many other uses for spreadsheets, like checking your bank statements, entering your accounts, calculating bank interest, budgeting for a wedding, and so on. The principle remains the same throughout. You enter all the figures and set up the structure of the spreadsheet once — and then figures move

in a great easy-way, as everyone I know thinks of ways of improving their spreadsheet afterwards, and it's a great help to be able to save columns instead of starting again.

Another small feature that is useful in practice is the ability to "fill" the rows. As you move around your spreadsheet obviously the data will scroll off the page (so to speak) as you go down or to the right. Once the data have gone it can be annoying trying to ensure you put the figures into the right column (you may have to scroll back and check, this scroll is the right hand by "filling" the data though they will stay along the top and left of the screen, and only the figures will scroll).

Column width is variable (so you can have any number of figures in each column) which is important for large figures (business accounts say) as the usual smaller figures where it's handy to get more onto one screen is good for the example.

Other features that Proforma Plus brings are graphics capability and zoom and screen (you can look for all figures over 40 for example). It is quite an amazing package for the price, and surprisingly enough the screen limit of 22 and 23 columns and rows is not as much of a problem as I thought it would be.

In view of the cost I feel this particular spreadsheet is the excellent value for money. It is available on both tape and disk from Computer Software Associates.

As far as I know Proforma Plus is the only spreadsheet at present designed to work in 80 columns. In other the VisiCalc the Commodore 64 work an 80-column early. The great advantage of working in 80 columns is that you can see much more of the page in one go than the current standard of having to scroll around a lot. The main reason for it is that the software comes from you, VisiCalc if you buy the 80-column card from Impact Design Ltd, just you might find it a little tricky if you are considering serious word processing. The only and last is that Plus Manager costs a couple of very handy bytes.

Looking at the good value first, Plus Manager saves the disk or tape and has the great advantage of 80 columns. The manual is easy-to-read, you can have changeable column width and justification, this means titles and names can be justified to the left and numbers to the right, you can "print"



you just enter the figures to spreadsheet and your computer does all the hard work for you.

Proforma Plus is the only spreadsheet I've reviewed for the Visi 28, and considering the price of £29.95 is quite amazing. There are no impressive claims of promises, and I'll spend a few minutes explaining them so they make the difference between an easy-to-use spreadsheet and software that can frustrate you.

First Proforma has a "replace" function — which means you can copy the contents of one box (or cell) so they can be copied to another box or row of boxes.

Another very important feature is the "insert and delete" one, enabling you to add a column or row (or remove it) after you've set up your spreadsheet. Again, this

any old method of having to scroll around the sheet and you can print out the contents of an individual column in spreadsheet layout, which is very useful. Another very useful feature is the ability to turn the automatic exit display off so you don't have to wait after entering a new number while the computer automatically recalculates all the formulas before allowing you to move to the next cell.

What I found lacking was the ability to "highlight", I had to enter every figure in every cell and the fact that after entering a number in a cell and pressing RETURN to get the data into the program, I then had to move the mouse or scroll wheel to the right or down before entering the next number. This may seem a little tedious, but having been used to spreadsheets which give you the option to load a new number to load a digit but in the software is fine — a simple "right" or "down" to accomplish.

Spread3 has produced a range of spreadsheets, and the one I had for review was **Banked 2** for the 64 bit 68K — 80AT for type and 111 + 70A for data. I found the program extremely flexible (guides the others you won't find to a specific stage but can use the memory of 2500 cells in an



array, you may find you could have an extremely long list of rows only. I reference cells (the A to Z of sheet) up or the more traditional stage with 13 columns or more.

All the traditional features are there, with updates, variable column width, goto anywhere (called "jump" in BasicCalc) etc. As I mentioned before you can also restrict the screen to automatically move up, down, left or right after you have entered the data, so it's ready for your next entry — a great advantage in spreading up and lowering the number of keystrokes.

Banked 2 has several "edit" features which allow you to insert and delete rows or columns. Again if you want all your figures to be integer (whole numbers) or rounded to 2 decimal places (which you would for financial sheets), a "find" facility to allow you to search for a word or formula, etc. A very attractive feature is the ability to change the colour of your sheet to suit you, and if you "fit" the table then the colour of any part of the sheet that is fixed is also changed, helping you remember that you're "fixed" that area. I use this colour feature a lot, using different colour combinations for different sheets, thus helping avoid grey, black statements that my personal accounts are, etc.

While all the software will allow you to print out your sheet, BasicCalc 2 was the only one of the three under review that would allow me to print out on my 674p printer as well as on the facility of Comodore 128 (as in my case the 6095

# BUSICALC

801) national city model. It can have a 1315 sheet (the greater advantage) "lines" after the instructions to print, but BasicCalc offers for that and all you do is enter a shifted "C" instead of the unshifted "C" which is all you need usually.

There are plenty of other features, but in the space provided I cannot list them all. I feel this is an excellent program. One the best, but there isn't yet the most important and it is particularly easy for the beginner. There is a tremendous jump in the mathematical ability (for the computer) but not for the major advantage so that it is easy to use, very flexible, and simple to understand. The formulas are not calculated approximately (only useful in saving time) and are worked out in 24 bits (2 + 42 = 12 not 104). The topic of mathematics is covered for spreadsheet and Basic users may require a text to go used to.

In practice I couldn't really find any faults for the average user. There is no complex ability, the manual I had was well written but poorly presented, and it has the annoying habit of asking what you are spreadsheet is before you load it off and which I can never remember, but really this is not good.

One additional feature, which is available if you like a professional appearance on your final product, is the ability to print text (as well as many lines or you like), so you end up with contracts and such giving a very neat appearance although this package is more expensive the cost of use makes it worth the extra for the serious user, what providing a good introduction for the beginner.

## Rolls-Royce

MathsCalc seems to be the "Rolls Royce" of spreadsheets for the 64, available from Sabre Software at a cost of 999.00, a really great investment. Originally written for larger computers it is assumed will refer to the Apple and all the spreads in the manual are for 30-columns instead of the 40 columns of the 64's Multispaces screen reader. Firstly, the presentation has of papers which contains a superbly bound volume (the book finishes in a stand for the manual, which I found looked better on the desktop than in real life as it kept slipping over when I used it) that the manual is comprehensive and well presented, with slightly glossy paper neatly printed.

The manual contains a comprehensive training section and a well written glossary describing every command and feature. Only the section on adapting programs (for example an Eplan or similar type) was inadequate and very clumsy and I never really learnt how to print out on my 674 without the 2 pages reviewing the logical stack (7) — because of the difference to the ASCII codes — although I do not see it can be

done. But wanting to use Multispaces I do doubt with the success on training.

In use the program keeps increasing the desk, a procedure I found tedious to slow me up quite a bit. The use of colour is somewhat which is a shame. But the overall flexibility of the program is the main advantage, as it seems to do just about everything.

I had all the features I've mentioned so far as this article got covered but some are even better. For example the column width is adjustable, but earlier previous programs where you have to alter all columns to the same size width, in MathsCalc you can alter individual columns in different widths. Similarly it's possible to specify that you want 1, 2, 3, 4 and 7 are 2 decimal places, while columns 4 and 5 are up to integer. All this is due to the fact that each cell, column or row has separate options for justification, width, format, etc. and you can be moved left or right justified. You can even have the C symbol in any column or row.

There is a very comprehensive menu including blank (for creating the data in a cell or group of cells) copy, delete, edit, format, help etc. The last command will enable you to call up a comprehensive help section from within the program if you've misplaced the manual. You can also copy, match, move rows or columns, fix cells, lock, formula if you want to, force calculation, edit, create or delete windows and even put a handle around your window.

If you want to save or load you can display the directory and then place the cursor over the file and press RETURN for automatic loading (very nice touch). Many features can be accessed several ways (in other words you can place the cursor over the command HELP) and press RETURN or you can just type "R" to obtain the HELP feature and I found the flexibility a little confusing in fact as I had to



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4 more screens, but with this I settled into a routine.

So how about my personal opinion? Well, there's no doubt Multiplan is exceptional and very flexible, but if you're a first-time user do you need it? I suspect not, because it has so much that you wouldn't use that it seems a waste that you're running a small business (or even a large one) for that matter (then this must be the spreadsheet for you — if you've got a 64). There's so much flexibility and so much scope that I know I'll never get full use of it, and manipulating data around is much easier than with other programs. I've found Multiplan so easy to control, edit/delete and moving columns and rows is easy and quick and one feature I really like is the ability to stage an area of the sheet elsewhere in the budget in Figure 4 you could take the income column and NAME it

"Income") and then use that name in a formula like we would never in the first look by giving the formula TOTAL = INCOME + EXPENDITURE.

There are a few more touches as well, like the little handles (called a reference card) which controls all the commands and makes it so easy to lock in place, like the HELP screen, like the use of the % symbol if necessary to the use of a bar graph, like the variety of methods of using the mouse and so on. My final point is a recommendation for the way this formulae are created, which I will attempt to replace although it's far easier to do it than write about it: if you wish to add 3 cells up you would put the mouse into the TOTAL cell and then press ' + ' to let Multiplan know you are creating a formula. Then you just move the mouse to the appropriate cell — and as you do so the formula appears on the screen. So if you

wish to copy up you will find the formula would copy your original cell ranges over row because you've moved up a row. Then you key ' + ' and the cursor jumps back to the total box, and you move up 2 places the total so the formula reads the original cell names 2 rows.

This sounds very complex, but in fact it's much easier to learn than the way, although the result on the screen can look very complicated. The aim is that you don't need to learn the complicated but you just move the mouse and the software does the rest.

Multiplan is by far the most sophisticated system I've used, and if you need that complexity then I can highly recommend it.

Spreadsheets are invaluable for home budgeting, small businesses, pay accounting, maintaining members for clubs/societies, job rates, anything where constant calculations need performing. Most software does the same thing, it just varies that pricing entry is more likely to make life easy. But for the subsequent cost the changes continue are so good to use.

Trying to save your fee money is hard as it really does depend on what you want to do. I cannot recall differences between the total I've reviewed, in all are good value for the price. If you're serious, I'd advise making up a change system at first unless you know you'll be using it a lot, in which case spend as much as you can.

The biggest advantage to spreadsheets is, as my opinion, they make doing accounts for small businesses a lot of a much better control over your money — and better in all respects. ■

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# Utilities to give your 64 freedom from Basic

*Kevin Bergh discovers five software packages which supplement the 64's Basic — and help you to write machine code games, use tapes like disks, escape from POKÉ, diagnose faults and even avoid Basic altogether*

IF YOU love your 64 but hate its primitive version of Basic, there are a number of ways you can remedy the situation. There are an increasing number of utilities available which enable you to make better use of the sound, graphics, disk capabilities and other features of the 64, and in this article I'll be looking at five of them — Scope, a language extended for games disks which compiles into pure machine code; ATTY, which lets your cassette drive to act like a disk drive; Turbo Extended Basic, which adds commands for games, sound and graphics; 64 Doctor, a built-in debugging program; and a version of the programming language Pascal.



A company named ISP has come up with a game designer language for the 64 called Scope. The short story, "the remarkable package will revolutionise programming on the 64." Well, it certainly makes a difference. Scope was invented by programmer Allan Pindell from the original version designed for the Sinclair Spectrum.

The program comes on tape or disk, with an extensive manual and demo routines. The package is housed on a large video case which a lot of companies seem to be favouring recently.

Scope supports 46 commands which allow the user to write programs in a form of assembly language that is easy to understand. Getting started is very simple, just LOAD"SCOPE" and away you go. The demo programs can then be examined. These are shown, ranging from a scored effect to a laser gun. By this time you should be fairly impressed with Scope.

To progress further you will need to refer to the manual and become familiar with Scope and its commands. The 64 page manual is very comprehensive, and should enable you to make good use of Scope. Each command is covered behind a HELP statement, and the user must associate an area for the program to be compiled in, therefore the first statement would look something like, 10 REM C000,10000,20000 (the last character on each line must be a colon).

## Commands

The manual lists the commands and their uses. There are commands for handling numbers (VAR,INC & DEC), colour and graphics (GMODE,BLW etc), playing characters on the screen (PUTC). There are a range of structural and conditional commands and a command to scroll the screen one character at a time. There are of course special commands for games and sound and a command for the timer.

ISP claims that writing time is 10 times faster using Scope, and that the code is 100% machine code. To get to the code the program must be compiled, using a 64 term command, and then saved with a utility program supplied with the package. The result is very good and very fast, but you need to calculate the start and end addresses of the code that Scope generates very carefully.

Apart from the demo programs supplied, there are many example programs in the manual to support exploration of the commands. The demo programs are also listed, along with a dictionary. ISP also intends to start a Scope user's club and a

programmer's hot line, membership will be free to Scope owners.

The overall impression ISP seem to give is that trying the program will help you become a "professional" overnight. This is not quite so, as Scope is a language, and as such will require some learning. Apart from this, Scope does come up to expectations and you can expect good results from it.



ISP claims that it will give full support to any Scope user who wishes to market a program written using Scope. It's possible to run a Scope-compiled program without Scope at the expense of your time here. Considering the speed and simplicity of writing Scope programs, it would be surprising if there weren't a market on the market soon. At £17.95 on tape or £24.95 on disk, Scope is an excellent buy and should give you plenty of "scope" for your money.

Even Melbourne House ropes another utility called ACOS+ a collection of advanced Basic commands for the 64. Melbourne House claims that it will make your 64 cassette disk an extension to a disk drive. While it certainly makes tape usage easier and more convenient, it does not even start to compete with the speed of a drive. ■

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The SID chip is more more well suited for such a commands, CLR, SOUND, SYNTH and WAIVE. These functions are to clear the SID chip, to play a note, to set an envelope and to set a waveform respectively. As with the other commands the sound commands come with explanations and small demos, but throughout the manual there is a lack of direct programs for the user. There should at least be a few routines to give the user a start for their library.



ACOS+ starts at \$195, and for your money you get a tape with the editor, a tape format program and a game written using ACOS+. There is also a 40 page manual. The object in using this package, as in using any extension to the system like on your micro, is to make programming easier and faster. The kit is probably to more used of the time most users's, that is if you use Basic. The problem with all of these packages is the constant loading before having access to the extra commands or removing programs written with the package.

#### Format

The utility must be loaded and contained below any of the features of ACOS+ can be used. Once installed, you can load the tape format program to format your cassette, which also adds a directory to the front of the tape. The usual SAVE and LOAD commands are replaced by CLOAD and CSAVE. There are additional tape commands to load and update the directory, view and erase files, save or load a block of memory and verify a block of memory.

There are several commands that enhance the 64's random files. RTAB and VTAB will move the cursor to the specified column or row, PLOT is a combination of the RTAB and VTAB commands. There are two transfer commands PEEK and POKE. There is a MOVE command which allows the user to transfer a block of memory, which could be used instead of the plot command.

The command RASTERON and RASTEROFF redraw and remove the interrupt routine. RASTERON is used to allow graphic displays to be faster. The PLAYFR command sets some parameters to set and define the player, the

command MIDDLE is set and defined as the same way allowing the user to study at any position, sports and headlines. There are all course commands for sports, with which the user can return the X and Y positions of a sports ball and set various statistics.

#### Sounds

The SID chip is not ignored by ACOS+. There is a range of six word commands to allow you use of the SID. The user can use YOUNG, SINGELINE, SAVEDRAW and PULSE along with other commands to set up and handle music of synthesis. Part of the user's manual is dedicated to explaining how to use these commands, and using the tape editor.

ACOS+ also has a demo game for users as an example. One final powerful command is LOGS. This allows the user to redefine any of the existing ACOS+ commands, or add new commands of their own in the existing commands. How about that? A utility that you can build on, what more could you want?

ACOS+ is very good, the performance comes up to expectations, and all of the commands will make life easier for those tired of using the 64's long winded Basic. The bottom line, as always, must be "do you need it" and "would it be a good purchase?" At \$195 it's certainly not expensive.

Moving along, Turbo Extended Basic costs \$245 and is produced by Acro Software. The program is cassette based and comes with a 12 page manual. The package is similar to ALCOS+, with the exception of the tape editor.

There are great range of commands, and we'll sample some of them to get a picture of the rest of Turbo Extended Basic.

The first group of commands are devoted to sports, in order to simplify sports notation and observations. With commands like BOWL, MOVE, OFF, PUT, SET and SPINTE, users can be defined, moved and deleted. The command BOWL will check for background collisions, and there is also a command for sports to score tables. MOVE does just that, moves specified units. To turn sports off simply use OFF, to turn them on, SET defines sports and SPINTE places a spin at specified locations.

#### Graphics

There are some nice graphics commands, as well as the usual ones - the by now familiar BDF (border offset), CLR (clear graphics screen) and DRAW (draw a line). There is also a TRIPLE command, a truly weirded FILL command (fills a block of memory with specified characters). There is also a MERGE command which sets up a frame screen with a specified colour, INK controls the character colour, and LINE allows you to draw a line with specified coordinates on the frame screen. LINE must be used with MERGE, which allows drawing on existing. Each pixel on the frame screen can be set or erased with PRST and PRSET. The background colour is set with PFRAME.

The last group of commands come under

the general heading of tables. There are 16 commands under this heading, so only the command list will be listed in.

The first command is POP, as used on Apple's range of micro's. This is a most useful command allowing you to remove the last returned from a GOSUB off the stack. If it was in a danger of overflowing the stack, POP can be used to pull the last RETURN address off, and send you where many GOSUB's are used. Turbo adds a PRINT AT command and a DOOR (double pole) command. There are two commands for setting memory HIM and LOM, using these commands the top and bottom of memory can be reset for each program, alternate screens or character sets.

The command KEY waits for a key press and jumps to a line specified by the actual key pressed. This is a very compact and powerful command. The user can also SWOP lines across, other commands include TEXT, REPEAT, UNTIL, and PAUSE.

#### Price

Turbo performs reasonably well and compares well to ACOS+ on its criteria, but not on the other factors, and certainly not on presentation of tape and manual. ACOS+ also covers this package on price, a very important point to many of us.

If you are in a lull, if, how about a 64 Doctor? It will only cost you 129.95 for that is ENTIRE for tape, and your 64 can get treatment in the privacy of your own home.



The package is produced by Computer Software Associates, and takes the hard work out of detecting hardware faults. 64 Doctor consists of a tape or disk with a 9 page instruction manual. To use the program, simply load and run it.

The program has a personal name containing of the keyboard, printer, disk drive, TV, Audio, camera, joystick and RAM. The user can select between these areas and perform a number of diagnostic tests.

Using the video display or TV monitor allows the user to see how the unit, so that the display and colours are at the best position possible. The Audio test runs through a scale on each voice of the SID chip if you can hear the scales then all is well, if not that something is wrong, although it's not clear what? The

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Keyboard and display are 3-dimensional across the screen, and allow you to test the stick by moving it. The first buttons may also be tested. Both ports may be tested and a list of possible faults is given if the test fails.

The Keyboard test is fairly comprehensive, and allows the user to test most of the keys, display them on the screen, and marks them as they are passed. Obviously if there is a fault here then it is fairly serious, and your machine will need expert "diagnosis". To test the drive a blank disk is needed. The SAVE, LOAD and read-write functions are tested as well as the internal DOS functions. This program can search for all of the ASCII characters three times.

#### Checked

The cassette disk test (also to be checked) also will check all of the normal cassette operations and report any failures. The 64's RAM can be checked, this can be a rough check or a continuous check (overnight). There is an auto test which will test the drive, RAM and memory displaying the results on the screen. The checks, whether auto or single, will be passed or failed, and noted as checked.

There is not much more one can say about the utility, except that it could be useful for minor faults, but how do you test the drive if your disk is faulty and the program won't load?

From Oxford Computer Systems comes Oxford Pascal for the 64. They claim that this version is a complete implementation

of Pascal, and in addition takes full advantage of the 64's features.

The package comes on disk or cassette, and has demo programs and a game. There is a comprehensive manual and a list of conversions for the manual. The program will test a bug, which Oxford Computer Systems say they are working on. The disk



version is priced at £49.95, and the cassette version at £34.95.

Pascal allows you to escape from BASIC, and potentially gives you a faster, more flexible and complex language. Programming in Pascal is more structured than in BASIC, and Pascal programs need to be compiled and saved before use. There is a resident compiler which will compile and

then execute programs for testing. Full sized messages are given.

One disadvantage is the amount of RAM left when the Pascal editor and compiler are in memory, but the memory available can be extended by disabling the compiler and compiling source programs from disk. If there is still not enough room for your programs, then they may be chained together with certain limitations.

#### Factor

The package comes with many 1-0 commands as well as commands for the editor and compiler. Compiling and testing programs is very fast, perhaps five times faster than BASIC. Pascal programs are generally easier to write and follow than BASIC, but there are some limitations on the programmer. OCS Pascal includes a powerful multi-output Spine editor.

Basic graphics become very simple to use, so many FORBIS and PDBIS, just simple commands. Text windows are supported, and colour is also treated. So not only are you getting another language, but also many powerful commands as in an extension to Basic.

OCS has now developed a Microcomputer program which will be used as an educational utility. This will enable the main body of a language compiler to be generated quickly and easily, making production time and development costs smaller. Hopefully this means that we'll be seeing further compilers for a range of languages for the 64, and we'll be looking at these writers as they become available. ■

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JOHN CLARKE, acting as a development manager for CompuLink, explained the role of CompuLink and the CompuLink ADP Network Service:

"ADP and CompuLink are positive developing CompuLink. Essentially I'd like to see the service becoming fully scale, as Microsoft is independent from ProTel. Our aim is to provide a sort of market place, allowing you to wander through the rooms and see the sort of facilities which we can provide. Obviously the service will be similar to Microsoft in some ways, and different in others, for instance, initially we won't have the huge database which Microsoft has of its through ProTel, but I feel that we have more to offer in terms of technical capability, among other fields, and we're hoping to attract software which will enable CompuLink users to access ProTel."

### Research

CompuLink is now a working service, but numbers of modems available are being kept down until more checking has been done. "It's not an insurmountable problem — we should be shipping our modems in large quantities by July — but at the moment the BPSUK members who have been given access to modems are helping us to research the system."

All the four CompuLink Share, where we talked, the CompuLink stand was handing out questionnaires which John hoped would give a better idea of the ser-

vice service the public expected from CompuLink.

"Obviously some of the ideas we have are already well established. We'll be offering downloading, through a system called CompuLink, and an automated service by which you can exchange messages with other users. We're negotiating with a major bank to offer a banking service, though this idea isn't finished yet. There's an area we call The Denial, where you can just browse through seeing what other users have in any or what software they can offer. So far in the past software is considered it's going to be very much a matter of owner opinion, but of course we'll be offering commercial software for downloading as a reasonable price. Part of the reason why commercial software licenses are allocated to CompuLink is that we're incorporating a security system into each modem. Software downloaded from the system will not run without the modem in place — and that's not just any modem, but the specific modem which was used for downloading. We've also done the best we can to make sure that the signal quality is reliable, and there's an error checking protocol which should make the whole system very reliable."

### Facilities

CompuLink's main system makes it appear very easy to use, almost perhaps than the nearest competitors — CompuLink, CompuLink and ProTel. "I sometimes get confused using CompuLink systems, but CompuLink made me through whatever you

# Time make modem

With computer-availability  
becoming one of the  
Chris Jenkins talks to  
and Microsoft.

need to do, and makes it easy to find the software you want to use. It covers the flexibility of CompuLink to make greater than that of most other systems, as we're not really trying to compete in a mass. We might not be able to offer such a large database, but then the ProTel information service hasn't already been seen also by Microsoft users? What we're trying to do is give users the services they want — they'll be able to do things like ordering books, records, tapes, bank transactions — and we'll charge a small percentage on each transaction, as we will on just software which is sold through the CompuLink system."

CompuLink's slow start is designed to attract service providers, so that once the system is fully operational a large range of facilities will be available. For the first three months the modem control will be available only to mail order firms CompuLink, but for the American it will be available from computer dealers. "The cost of the modem control will be £99.99, and this includes a year's free subscription to CompuLink. Subsequent years will cost £26. We have a 1200/15 baud system at the moment, although in London there's a 1200/1200 system which we're making available to software houses for uploading programs. Hopefully there'll be a complete 1200/1200 and Apple network eventually. CompuLink line charges will work out at something like 66 per hour at peak times."

### CompuLink

John Clarke clearly believes that there is a market for CompuLink to develop in competition with the long-established Microsoft. "What we have here is a great way of putting out information — for instance, what about a service offering electronic "reports" or fact sheets or computer magazines? You could look through for articles you'd missed on a subject at which you were interested, then order a copy at home if printed out. That's just one idea — obviously the more you think about it the wider the range of possible services becomes. The point is, we only buy communications systems on the basis of what's there — what we're trying to do is to make sure the CompuLink gives them what they want!"



John Clarke of CompuLink. Photo by Peter D. Jones for the author.

# to your choice

able information networks now  
of the industry's growth areas,  
to Computer's John Clarke  
and Ian Rock

**MICRONET** representative Ian Rock explained that the service was launched in March 1983 and has about 700 thousand subscribers.

"Essentially Proton is a massive information service, and Micronet forms part of it, in a wholly independent organization. Micronet does three things — it provides communications facilities, so that data you've input on to your system you can send across programs and so on.

"There's also a bulletin board, where you can leave any kind of message you want, either personal messages or computer problems or miscellaneous messages. There's now also a section for games, so database-driven player games, strategy game written by Mike 'Inchworm'."

"The second thing Micronet does is to offer the ability to download software. Currently BBC, Spectrum, Apple and the Atari can access around fifty free programs and fifty commercial ones. This Friday, we will be available for the Commodore 64, and games software will be about 30% cheaper than it would be if you bought it from a shop."

## Leaps

Ian went on to explain that MICRONET members were helping with the development of the tel service, and that ultimate founder Mike Harrow, Bubble Bus, Linnards and Superhit would be making software available. "One trend is that we're adding to our own games software — there's a lot of scope for us to provide business, educational and utility programs — we'd like to push all three areas equally."

Future plans include a service called Executive Micronet and an expanded education service. "Head Start will be a home learning service providing educational software for 4-12 year olds and that parent School Link will start in the Autumn, and that's a service dedicated to secondary schools. We're looking in the future towards things like electronic homework." Leaving aside the question of how popular that idea would be with the children, Ian returned to explain Executive Micronet:

"It will act as a database of information for the small businessman, giving soft-ware

software and providing, for instance, examples of form letters. Ultimately, we'll have a range of downloadable software, mainly for the Micro series.

"The third main area of Micronet is entertainment, which is more apparent because it's an instantly updatable service. As far as the UK's concerned, it will have a large database not of news, reviews, film titles, interviews, details of courses and so on."

It is clear that it's taken the long to introduce a tel service on Micronet because alternative efforts have been made to make the system 100% reliable. "There were technical difficulties to be overcome — for instance, someone making 'errors' is not reliable as they might have been, and they're now giving way to hard-wired modems.

"Once you've got your 64, you'll need a modem and a firmware cartridge. The modem we recommend is the Modem 3000, which plugs into the new standard Telecom jack socket. The cartridge actually does the downloading of the software, and you will find that there's no alternative to this cartridge commercially available. The cartridge will be about £50, and the modem £70 or £80. Since the modem has already been approved we aren't having to wait like other manufacturers are."

## Charges

To get Micronet all you need to do is buy the modem and its cartridge, then fill in an application form. Standard charges are

£10 per quarter, with extra for telephone connection time. "That must seem pricey at all peak times at local rates, charges tend to be about 40p per hour. The words 'infinite hell' tend to strike fear into people's hearts, but as I say most people don't become subject to the 5p per minute daytime connection fee. The other charges you'll see in your bill are for any items that you've ordered through the 'infotopians' service, and charges for commercial software you've downloaded."

With around 3½ million "home access" lines made to Micronet in the month of April, it's clear that the service is one of the most popular aspects of Proton. "Micronet has brought Proton to the attention of the mass at the start, and as many ways has been the saving grace of Proton. We're aware that we have to stay ahead — Micronet is an entrepreneurial service, and we're planning to take people away from the use of computers for themselves. Commercial computers as we know them will change — there'll be a real reason to have a computer as the focus as part of an information service."

Ian's experience that the rising costs for Commodore's retail service, Compuserve, will be more than Micronet's, is a personal one. "We've blazed the trail and paid the penalties of being first in the field. The question is whether Compuserve will have it on us — at any rate, it's an expanding market and the competition will be a good thing." ■



Ian Rock of Micronet. "The question is if it's a good thing."

# Night Pilot 64

WILLIAM FONG's Night Simulator program reproduces a light plane's view as it soars from 1000 feet, hounded by total darkness.

You'll need plenty of practice before you're able to control the plane. Try to level out on a fairly high altitude and start a gentle descent.

Keep an eye on the altimeter and use W for up and N for down. The first press will level you out; the second will change your altitude one way or the other.

Also keep an eye on TILT. Press A to tilt left and D for right. It's particularly important to stay on an even keel when you're seeking a runway.

Speed is controlled by = and - in increments of five units. Left is a full speed will decrease by one MPH per second.

DISTANCE is the distance to the middle of the runway. It's a visual display of position; press E, to return to the cockpit display; press H.

Lower the landing gear with the space bar to land. A beep will be heard if speed or fuel is too low.

If you hear an engine alarm when the program is RUN, press RUN/STOP, start 0000 0000 and press "7" when asked. Repeat if necessary. ■



Test your flying skill with William Fong's program

```

0 REM ( NIGHT FLIGHT / BY WILLIAM FONG
1 PRINT"?" POKES2251.0 POKES3250.0 50-10000 C#752296 H#0 H#0 SP#020 S1#5 D#0
2 POKES42296.5 POKES42277.0 POKES42276.0 POKES42270.129 POKES42276.129 P#470 PP#300
3 POKES4273.0 POKES4272.0 U=-1 AT#0 F#0 RL#30000 DMT(P#0C1)+1000; D1=2000
4 PRINT"### / ###
5 POP1=1009 PRINT"0 1. *# ***** 0.1 " NEXT
6 PRINT"###
7 PRINT"###
8 PRINT"#####
9 FORI=44070479 POKESC+1.0 FORESC+1.100 NEXT POKESC+72.0 POKESC+72.7
12 PRINT"#####
14 PRINT"0 ALT1 000 Y0. 0100 0010 0100 0100 0100 0100 0100 0100 0100 0100
15 PRINT"0 1-0-10 000000 0100 0100 0100 0100 0100 0100 0100 0100 0100 0100
16 PRINT"0 0100 0100 0100 0100 0100 0100 0100 0100 0100 0100 0100 0100 0100
17 PRINT"#####
18 PRINT"#####
19 PRINT"#####
20 PRINT"#####
21 PRINT"##### ALTITUDE FT
22 PRINT"##### DISTANCE 01
23 PRINT"##### MINDERPER RIRGE 01P
24 PRINT"##### SPEED MPH
25 POKES4276.0 SETR F#4.003 SP#0P-1
26 POKES4296.0 POKES4290.129 POKES4207.6 POKES4286.200
27 IFR#="RND#1 THEN P"INT"?" H#0 POKES3201.0 POKES3200.9 POKES4273.100 G0T05
28 IFR#="R"RND#0 THEN P"INT"?" H#0 G0GUB1000
29 IPRC#978 THEN POKES3201.0 POKESC+72.32
30 IPRC1000 THEN POKES3201.10 G0T0100
40 IFR=1 THEN 90
41 IFR#4000P#70 THEN POKES4276.0 POKES4276.30 POKES4273.30
42 IFR#="0" THEN RT=RT+1 IFRTC=1 THEN RT=1
43 IFR#="X" THEN RT=RT+1 IFRTO=1 THEN RT=1
44 IFR#="X" OR R#="U" THEN G0SUB500
45 IFR#="0" THEN H#=#+1 IFR#0=1 THEN H#=#
46 IFR#="D" THEN H#=#+1 IFRD=1 THEN H#=#
47 IFR#="R" OR R#="D" THEN G0SUB500
48 IFRND100.05 THEN H#=# DMT(RND1000)-1 G0SUB500
49 IFR#=" " THEN SP#SP-5 POKES4276.0 POKES4276.17 POKES4273.100
50 IFR#="+" THEN SP#SP+5 POKES4276.0 POKES4276.17 POKES4273.100

```



Connective 64—diskette  
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Comptons User

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Address \_\_\_\_\_

To:

AD-6



**TEAM (M)**  
Computer  
Software  
Distributors



```

320 PRINT"#####"
321 PRINT"#####"
322 PRINT"#####"
323 PRINT"#####"
324 PRINT"#####"
330 PRINT"#####" RETURN
331 PRINT"#####"
332 PRINT"#####"
333 PRINT"#####"
334 PRINT"#####"
340 PRINT"#####" RETURN
341 PRINT"#####"
342 PRINT"#####"
343 PRINT"#####"
350 PRINT"#####"
351 PRINT"#####"
352 PRINT"#####"
353 PRINT"#####"
354 PRINT"#####"
361 PRINT"#####"
362 PRINT"#####"
363 PRINT"#####"
380 PRINT"#####" IF A#=-1 THEN PRINT"#####"
390 IF A#-2 THEN PRINT"#####"
399 IF A#-1 THEN PRINT"#####"
420 FOR S=4276.0 TO 4276.129 FOR K=4276.20 RETURN
430 PRINT"#####"
440 IF A#-1 THEN PRINT"#####"
450 IF A#-1 THEN PRINT"#####"
461 IF A#-2 THEN PRINT"#####"
470 FOR S=4276.0 TO 4276.17 FOR K=4276.40
480 RETURN
490 PRINT"#####"
510 IF A#-1 THEN PRINT"#####"
520 IF A#-1 THEN PRINT"#####"
530 FOR S=4276.0 TO 4276.129 FOR K=4276.20 RETURN
540 PRINT"#####"
550 IF A#-1 THEN PRINT"#####"
560 IF A#-1 THEN PRINT"#####"
570 FOR S=4276.0 TO 4276.129 FOR K=4276.20 RETURN
580 PRINT"#####"
590 IF A#-1 THEN PRINT"#####"
600 IF A#-1 THEN PRINT"#####"
610 IF A#-1 THEN PRINT"#####"
620 PRINT"#####"
630 RETURN
640 PRINT"#####"
650 IF A#-1 THEN PRINT"#####"
660 IF A#-1 THEN PRINT"#####"
670 FOR S=4276.0 TO 4276.129 FOR K=4276.20 RETURN
680 PRINT"#####"
690 IF A#-1 THEN PRINT"#####"
700 IF A#-1 THEN PRINT"#####"
710 IF A#-1 THEN PRINT"#####"
720 FOR S=4276.0 TO 4276.129 FOR K=4276.20 RETURN
730 PRINT"#####"
740 IF A#-1 THEN PRINT"#####"
750 IF A#-1 THEN PRINT"#####"
760 FOR S=4276.0 TO 4276.129 FOR K=4276.20 RETURN
770 PRINT"#####"
780 IF A#-1 THEN PRINT"#####"
790 IF A#-1 THEN PRINT"#####"
800 FOR S=4276.0 TO 4276.129 FOR K=4276.20 RETURN
810 PRINT"#####"
820 IF A#-1 THEN PRINT"#####"
830 IF A#-1 THEN PRINT"#####"
840 PRINT"#####"
850 IF A#-1 THEN PRINT"#####"
860 PRINT"#####"
870 IF A#-1 THEN PRINT"#####"
880 IF A#-1 THEN PRINT"#####"
890 IF A#-1 THEN PRINT"#####"
900 IF A#-1 THEN PRINT"#####"
910 PRINT"#####"
920 FOR S=4276.0 TO 4276.17 FOR K=1 TO 100 STEP 2 FOR S=4276.1 NEXT
930 PRINT"#####"
940 PRINT"#####"
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1870 PRINT"#####"
1880 PRINT"#####"
1890 PRINT"#####"
1900 PRINT"#####"
1910 PRINT"#####"
1920 PRINT"#####"
1930 PRINT"#####"
1940 PRINT"#####"
1950 PRINT"#####"
1960 PRINT"#####"
1970 PRINT"#####"
1980 PRINT"#####"
1990 PRINT"#####"
2000 PRINT"#####"

```

# WALKER



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# Design a new character set for your Vic 20

David Shepherdson demonstrates how to give your Vic a painless face!

**THIS CHARACTER** Workless program is one which I developed from an older one developed to help me design my own Vic 20 character for a program as, at that time, there was no suitable program available. The original program ran on the K&M and, although it was effective, it was rather clunky. This version will fit into an unexpanded VIC-20 (in +1K) and by entering the following in either a direct command, or within another program, it will fit into a +18K VIC.

POKE 44170: POKE 44030: SYS 64314

In this case, remember to take out the POKE 4414 and POKE 44030 in line 68.

First I would like to describe what the program does and how to use it, then what various routines do and other points of interest.

To use the program, simply load it and run. There are no parameters, unusual POKEs or a, but I do recommend saving and verifying it once you have entered it.

Once started, an eight by eight grid is displayed with letters arranged Top to Bottom, and numbers on their side. To

blank it a square, simply enter the co-ordinates letter first, then number. If you decide that the letter not to have that particular blank added, then simply re-enter the same co-ordinates. This will remove the blank. When you are either satisfied with the display or simply wish to see what the character looks like, then press 'F'. When a second or so later VIC will display, on the left of the grid, alongside each row, the decimal value of each row. These values are the required hexadecimal figures for placing into your own programs in DATA.

(Character workless program)

```

0 DIMC(7,7):IS=71:OS(7,7) CLR
10 PRINTCHR$(347):"PRESS ANY KEY TO CONTINUE"
15 BOPCR$="DHEK10C03"
20 CR$="#####"
25 OSUB60000 POKE700,104
30 OS=34879:OS=OS-1:SA=95-4:SC=7999:CO=38720:POKE59,29:POKE64,50
40 TLB="#### CHARACTER WORKSET"
45 IFPEEK(7170)=24RNDPEEK(7679)=0 THENOS
50 PRINTTLB:FORJ=0TO31:POKE7150+J,PEEK(32700+J):POKE54,PEEK(32600+J):NEXT
60 POKE54,0:POKE59,29:POKE75,0:POKE190,0:POKE58,0
70 OSUB100 GO70000
80
100 PRINTTLB
110 FORI=0BET0000155TEP42:FORJ=0TO7:J=J+1:POKEI,79:POKEJ,CO,0
120 NEXTJ:J=J+1:FORI=170:POKE5C+I,1+128:POKE5C+I,CO,0
130 POKE60+I,1+128:POKE60+I,CO+1,0:NEXT I$=177
140 FORI=70707056293TEP92:POKEI,0:POKEI-5,5:SA=0
150 POKEI+CO,0:POKEI-5,CO,0:NEXT POKE190,0
160 PRINTCR$:RIGHT(CR$,2),"ENTER LETTER FIRST," PRINT"0" TO SEE VALUES"
170 PRINTCR$:RETURN
180
200 PRINTCR$:" " CHR$(157):CHR$(157),
210 OSUB5000 IFRA,10:CR$="#####"
220 PRINTTLB:V=ASC(09)~4
230 OSUB5000 IFY(09):0:THE000
240 PRINTTLB:CO=100:SC=V*2+4:IFPEEK(CV)=160 THENOS=79
250 POKEV,40:V=0:V=0:GO70000
300
300 POKE190,0:POKE204,0
310 GETA:IFRA="":THE010
320 POKE204,1:IFRA="":THE1000
330 V=ASC(48):RETURN
  
```

Continued on page 34

# ATTENTION! ATTENTION! ALL COMMODORE USERS!

Do you see tapes? Are you sick and tired of waiting for your programs to be loaded/saved through the tape? Then you need a **TORNADO!** Tornado allows you to Save/Load/Verify your Basic/machine code programs faster than a COM 64 disk drive does! Due to popular demand Tornado now comes with new and more powerful commands plus extra instructions to assist you in writing fast versions of your existing machine code/Basic programs. Tornado is available on tape for COM 64 and 60+ Vtc 20.

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## New Available on the Commodore-64 747 Flight Simulator



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```

540
600 PRINT CSR;RVR IF (PEEK(650)=0)GOTO620(157)=64:THEM600
610 RETURN
620
1000 SP=9500 FORJ=8T07 ZX(1,6)=SP FORJ=1T07 ZX(1,7)=ZX(1,6)+J NEXT
1010 SP=SP+200 NEXT
1020 FOPJ=8T07 TX(1)=0 FORJ=8T07 @PEEK(ZX(1,7)+1)@160THEM1040
1030 TX(1)=TX(1)+200 M(1,7)=1
1040 NEXT PRINTLEFTS=(P(9)=J):TX(1)
1050 NEXT
1060
1200 RR=CHR$(16):OR=CHR$(148):PRNXTOR=(RR;"E");OR
1210 PRNTHVARPLE "R"("O"OR"NT "R"("O"OR"ESTR&T", POKE199,0
1210 ORTR IPRA="":THEM1210
1215 IPRA="E":THEM1200
1220 IPRA="C":THEM1200
1225 IPRA="B":THEM1200
1230 IPRA="O":THEM1200
1240 ORR("O"OR"ANDRR"O"O":THEM1210
1250 GOTO4000
1260
1400 PRINTLR FORJ=10-10:255 PRINTLEFTS=(OR;J);
1410 FOPJ=8T07 POKE1500+J TX(1)=NEXT
1420 PRINTTR(2)=CHR$(20):"R":SP(15):CHR$(144):"R":SP(15):CHR$(144):"R":SP(15):OR
RR="31":"R"
1430 GOTO6000 FORTR=RR:147: POKE50-10:240
1440 GOTO1100 FORJ=8T07 FOPJ=8T07 IFJ(1,7)=1THEMPOKEZX(1,7)+100
1450 WR(1,7)=0 NEXTJ:J GOTO2000
2000
3000 IPRA="PEEK(1000):AND120="+64:ORR(1000):AND112)=7000THEMRETURN
3010 PRNTROR;"INCORRECT MEMORY" CH
37000 SAVE"BO WORSHET":0
47000 "COPY"WORSHET":0

```

You may find page 57 to see what your new character looks like (as it exists, the program will print it as four different colours) or by pressing  $\Delta$  you can return to the grid to continue to alter the shape, or by pressing  $\square$  you can start a block. If you enter sides  $\Delta$  or  $\square$  you can end the program and your VIC will read it as power up.

### Characters

Now, as far here it does what it does because of the difficulties of reading the Commodore Cursor and Colour Characters in a magazine, I've used their character numbers instead with the exception of line 30 which is explained in line 11. To save time when entering the program, I suggest that you use the Colours & Cursor keys themselves.

A quick reminder of the ones I need might be useful:

Then use CHR\$( 07) = Cursor Down, 08 = Reverse On, 09 = Cursor Home, 0F = Red, 30 = Green, 31 = Blue 14 = Black 146 = Reverse Off 147 = Clear Screen & 157 = Cursor Left (By using integer variables in line 6 instead of normal numeric variables within a DIM statement, about a third of a k was saved and by using loops to fill, quite a lot of memory was saved.

In line 21 the GOTO10:6000 just checks that the screen is on the correct position. That of course is more important than just because of the screen POKEs within the program but because of the Characters set requirements. The POKES 701, 144 now use  $\Delta$  - STOP key in case of accidents. However, it is still possible to stop the program by  $\Delta$  - STOP with  $\Delta$ STOPOR

To exit the one, just add POKEX 7100, 2 or less 25

To save memory and time, I have standardised the most regularly used variables within many of my programs. Instead of VIC = M(10) etc, I decided upon OR = M(7) 50 = OR --- and so on. The way, instead of trying to remember which name I gave to any of the used characters in a particular program, I just put which character and use  $\Delta$  with the line flag. For example, the white ones character (M(7)), I always call  $\Delta$  by having some association between your program and it's meaning how much time you can save.

Line 45 merely stops the screen up on the auxiliary character as if you are running the program for a second time. One point that I have not seen with any program yet published is that when defining characters, the screen will be blank and nothing happens (not to happen for a minute or so) I have noticed an extra POKEX to the screen, where a cursor action is pointed into one of the screen's characters at the same time to give the user the impression that something is happening and that the VIC has not gone away to sleep.

### Grid

The steps at line 60, 100 200 etc are just instead of using "RR" as a column to separate each column for easier reading. These are obtained by starting a line number, pressing CTRL and RR 100 together, then  $\Delta$ RR 70 and 70 and finally SP(15). You should now have an entire dash and space. Press return and hit to check this. You should have a line number without anything following it.

The next section POKEXto the screen for

data by eight and each screen letter and numbers. Lines 300 to 350 is the M(10) characters before using GETS. If a byte is trapped and will only accept 'A' to 'Z' for the first digit, and '0' to '9' for the second, although other will accept '0' to see the value.

In line 340, Q is set to an inverse space, and PEEK(Q) checks to see if the location pointed already holds an inverse space, if so, then it changes QO to a grid pattern character. Lines 360 to 500 are simply the GETS - routine. The position this routine sends to the Keyboard Buffer and then (340) causes the screen to flash. After the character is entered, this is set out.

### Options

Lines 600 and 650 are a true "Any key to continue" routine. Instead of using GETS - to check for a key press, POKEX does not check for Shift keys, this routine does. By PEEKing both 197 and 215 it is possible to check for ANY key. Locations 199 checks for the usual keys, if no key is pressed then 197 holds the value of 64. Location 215 checks for Shift, CTRL & Command keys. If none of these is pressed, then 215 holds zero.

Lines 1000 to 1050 work out the values of the blocks on grid. 3,700, it is set to 1 if a square is blocked in, if not, it is left as 0. This is in case you want to re-work the grid.

Lines 1100 to 1150 are just your options, the OR = Reverse On and OR = Reverse Off 150-1600 read your VIC to Power Up status.

1000 to just prints the defined character examples and then it shows the grid and returns you to the main program.  $\square$

# Control your 64 — master bit switching

John Crowell explains a crucial programming method

**THE COMMODORE 64** is a computer that works with an efficient keyboard matrix of memory, the best around cheap at the moment, with a simple and extremely flexible operating system — that is if you are capable of taking on the considerable amount of pain and perspiration required to access most of the goodies that the best selling machine has to offer.

The handbook which accompanies the machine is dreadfully inadequate, so if you intend to do more than play games or run other people's programs, it will not be long before you start looking for additional (and local) computer clues for more practical information.

## Knowledge

The *Commodore 64 Programmer's Reference Guide* will no doubt be your first port of call. This certainly contains all the information that you need to become a proficient programmer, but unfortunately the guide straggles a little that wastes knowledge of those on the part of the reader. Other books have therefore heavily filled this gap — and as time goes on more and more and quite a few considerably worse than others.

However, with perseverance and hours at the keyboard, you can reach the stage where one's programs can become useful and worthy of exposure to others, especially in the area of textual software. For as soon as its use, practice and sound are accepted, things become terribly complicated.

Unfortunately, unless you intend to Simons's *64* as one of the many projects which are available, hard of course the

disadvantage with these utilities is that they immediately reduce the market for your software to only those users who have that specific, perhaps, 1 you want to be able to use the dreadful basic 1 commands with confidence.

Most of the commands are adequately explained in the literature and with patience their application will be understood. I have struggled with this problem for nearly six months now and the light is beginning to dawn through. I managed to clarify most of my difficulties by diligent investigation and good old fashioned leg bashing. My biggest problem was trying to find out what was meant by the following —

POKE 1000, PEEK(1000) AND 101

AND 10100, PEEK(1000) OR 10

These statements were used regularly by published programs and in the manuals and books covering the Commodore 64, but nowhere could I find an explanation of how the commands actually worked. Only once did I discover to derive into machine code how the *peek*-*drop*, but had I known before what was happening things would have been much clearer during my attempts to write in and out locations on the 64's memory map. For that is what the two statements are all about, bit switching.

I hope that the following will help to clarify this topic for you. If you wish to see full details from the original *Compendium of the 64* drive a computer that you fully understand the logic of these.

Your 64 contains basically memory of over 64000 memory locations that are used by the software either pre-programmed into the computer or the form of Read Only

Memory (ROM), or by that which you enter through the keyboard or from some outside storage source such as tape, disk or cartridge. A number of these memory addresses or registers are put aside by the manufacturer to have special functions, for instance, to control on or off sound channels, video blank, *reset*—*output* drivers, etc. One of the major advantages of the 64 is that these locations can be manipulated and different functions executed by the programmer.

Before we can look at how to carry out these operations, it will be necessary to take a look at how the memory addresses or forms are built up. Any one address or location consists of one byte, and as most of you will know a byte can store numerical values. It does this by switching on and off bits. Each byte consists of eight bits or switches and each one of these bits can represent a binary digit.

## Binary

There is not room here to discuss binary mathematics in detail, however the information is available in any introductory textbook on computer programming. In short, binary is a number system which uses only two digits, 1 and 0, and any number can be represented in binary inside the computer. The binary numbers are represented by pairs of characters, with a pair for 1 and no pair for 0. It is so therefore for 00 or 01, 10 or 11. Hence, any byte's value can be represented by the eight switches. For example 00001000 represents 10 decimal.

As this system only uses two numbers, 0 and 1, it is known as binary. Of course, our normal numbering system is based on 10 numbers, 0 to 9, and is therefore known as decimal.

The location of the number meaning from the right hand side provides the power of 10 by which each digit is to be multiplied. Let us take an example, decimal 1234 — (see figure 1).

The result of a binary comparison is determined as exactly the same manner except that the location of the digit meaning from the right hand side determines the power of 2 by which each number is to be multiplied. Let's take a look at a binary number and examine how it breaks down into decimal — (see figure 2).

If the above makes sense to you we are now in a position to return to the original discussion of switching these various bits within bytes.

1	0	0	0	0	Decimal
0	0	0	0	0	Location
<hr/>					
1 × 10 <sup>3</sup>	+ 2 × 10 <sup>2</sup>	+ 3 × 10 <sup>1</sup>	+ 4 × 10 <sup>0</sup>	= 1034	Power 10
1000	+ 200	+ 30	+ 4	= 1034	Result

Figure one — decimal comparison example



1	1	1	1	0	1	1	0	Binary
7	6	5	4	3	2	1	0	Location
-----								
1x2 <sup>7</sup>	1x2 <sup>6</sup>	0x2 <sup>5</sup>	1x2 <sup>4</sup>	0x2 <sup>3</sup>	1x2 <sup>2</sup>	1x2 <sup>1</sup>	0x2 <sup>0</sup>	=214 Power
128	+ 64	+ 0	+ 16	+ 0	+ 4	+ 2	+ 0	=214 Result

Figure two — Binary to decimal translation

Why should we want to do that? Well, each of these individual bits writes a byte exactly sets it to a *one* or its own right, and various combinations switch on or off the special functions previously mentioned. For instance, take a look at address 5A7D in the Programmer's Reference Guide. The upper 4 bits of this address control the location of the access memory which, can be moved to anyone of 16 different locations plus the one that is automatically defaults to on powering up the set. If that is not completed enough, bits 1,2 and 3 control the location of the character memory.

Now the bit(s) from right to left in accordance with their numerical power as in the table, in other words bit 7 has set to 1 of 4 bits or address to 1, that is to have a *one*, you can XOR the byte with decimal 64 (2 to the fourth power). This XOR clears the whole byte and replaces it with a 16, or in binary, 00010000.

The problem is that practically all of the bytes in the set store just a variety of operations as we have seen with XOR, and in many instances you will want to be able to switch on or off a specific bit without affecting any of the other bits. Obviously it will not be possible to do this by XORING a single decimal number. However, this can be carried out by using our OR and AND commands illustrated right back at the introduction to this article.

#### Bits and bytes

The OR statement in keyword manuals sets individual bit of the original byte and compares it with the corresponding bit of the OR byte. If one OR the other of the bits is on, that is a 1 then the resulting bit will be given a 1 in this specific bit number of the bit on, the resulting specific bit will be a 1. Therefore, if we wished to change bit 4 to a 1 without changing any of the other bit settings within a particular byte,

we should XOR 007E (PERF. 4507E OR 16).

The AND keyword behaves in a similar manner to the OR, and examines each individual bit of each byte and compares it to the corresponding bit of the AND byte, but this time it sets the bit on only if both the bit is on and the second bit is 1's.

Let's take the original byte as 00001110 or decimal 10.

Original address 00011011 = 31  
AND with 126 = 11000110 = 126  
Resulting byte 00000110 = 6

Therefore ANDing 10 with 126 clears bits 4,5,6 and 7. This would be written as XOR 126 (PERF. 0000126).

The information as to which bits should be switched is often different source is given in the Programmer's Reference Guide, and aimed with the stress to carry out these operations you will find that the Commodore 64 is by a very accessible and powerful machine. ■

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# COMMODORE SOFTWARE FILE

## Solitaire

Andrew Oswald of Brooklands built this program for the Commodore PET 20.

IN THIS version of the popular game the pips are displayed as solid blue circles, and spaces as empty blue circles. When a pip is pushed up the hole it occupied becomes an empty blue square.

To move around the board use Q for up,

A for down, C for left and D for right. Pick up pips using S and set down using P. The object of the game is to remove all the pips from the board by jumping over them as in draughts — and in this version it's impossible to draw.

```

50 R=2000 R1=7500 R2=20515 R3=7755 B=01 B1=07 B3=209 PRINT"3" P1=197
60 FOR Y=0 TO 10 FOR X=2 TO 4 GOSUB 1000 NEXT X NEXT Y
70 FOR Y=0 TO 10 FOR X=2 TO 4 GOSUB 1000 NEXT X NEXT Y
80 FOR Y=11 TO 12 FOR X=2 TO 4 GOSUB 1000 NEXT X NEXT Y POKER2.5 POKER3. B1=Y=0
90 K=PEEK(P1) DR=22*(K=0)+(K=25)=22*(K=17)-(K=37)-(B1*(K=1)-B7*(K=42))
100 IF DR=0 THEN DR=07 THEN GOSUB 500 GOTO 90
110 IF DR=-22 OR 22 OR 10 OR -1 THEN H=50000 GOTO 90
120 GOTO 90
200 LR=R2 POKERL.6 R2=R2+DR R3=R3+DR POKER2.5 RETURN
300 IF DR=0 THEN PEEK'R3)=B AND Y=0 THEN H1=R2 H=H3 POKER3. B3 Y=1 RETURN
305 IF DR=0 THEN RETURN
310 IF DR<0 THEN PEEK'R3)>C>B1 OR Y<1 THEN GOTO 300
312 H2=R2 H=H3 DE=H/H+H/2 IF DE=0 THEN POKER4. B Y=0 RETURN
313 IF PEEK(CB)>C>B THEN POKER4. B Y=0 RETURN
314 POKERH. B1 POKER5. B POKER6. B1
315 IF Y=1 THEN Y=0 RETURN
320 IF DR=0 THEN RETURN
350 IF Y<1 THEN RETURN
352 IF PEEK'R3)>C>B AND Y=1 THEN POKERH. B Y=0 RETURN
500 GET#0: IPR#="" THEN 500
1000 POKER=22*(K+Y).6 POKER1+22*(K+Y). B RETURN

```

## Sea Copter

The game for the 40 series from Simon King of Chatham, Lincoln.

IN SEA COPTER your task is to land on a sea oil rig at the height of a storm. Visibility is nil, and you must rely on flashes of lightning to see the landing pad. The wind buffets you as you hover, and you must counter gravity by pressing "P" to lift, "A" to move left, "D" to move right.

On the right of the screen are your

coordinates. Watch out for windpuffs, fuel and droopy fuel, which must be lower than 3 when you land.

The program must be run twice for the second effect to be heard.

### Program notes

Intelligence 3-4  
 Set up graphics 3-10  
 Update screen 10-21  
 Lightning timing 23-31  
 Fuel keyboard 31-35  
 Update spirit position 40-50  
 Crash handling 100-200

### Loading handling 100-240

Note separator for loading 200-240  
 Spirit data 1000-1070

### Controls

Y Pointer to display ship location  
 C/D Reverse between mode and screen  
 P Press  
 T Lightning timer  
 K Spirit X coordinate  
 L Spirit Y coordinate  
 D Wind direction  
 PE Spirit collision flag  
 F Fuel left  
 G Droopy rate

```

0 PRINT"3" POKER3200.0 POKER3201.0 Y=53040 C0=54272 POKER54296.10 POKER54276.0
1 POKER54276.120 POKER54276.240 REM NUMBER COPTER 3 BY SIMON KING
2 POKER54276.8 1#0 H=25+INT'RND(1)+5000 Y=55 G=INT'RND(1)+20-20/2
3 F=1# POKER+21.3 POKER2949.13 POKER+439.1 POKER2941.14 POKER+48.4 POKER+28.3
4 POKER+37.5 POKER+36.7 FOR I=0 TO 199 REM0 POKER1+802.0 NEXT I
5 PRINT"#####"
6 PRINT"#####"
7 PRINT"#####"
8 FOR I=5001 TO 50025 POKER1.5 POKER1-03.10# NEXT FOR I=50075 TO 50025 POKER1.5
9 POKER1-03.10# NEXT POKER2.5 POKER+2.4+24 POKER+1.4 POKER+3.4 Y PE=PEEK(V+31)
10 PRINT"#####"

```



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```
140 IFR=F300FF=FCTHEH00000000
150 IFR=F300FF=FCTHEH00000000
170 IFR=FCTHEH0000000000
175 IFR=FCTHEH00000000
190 IFR=F4200FF=4200DFC=42THEHP=F+1 00T0000
195 IFR=4200FF=4200DFC=42THEH0000
210 IFR=F10200FF=10200DFC=102THEHP=F+42 00T00000
220 IFR=F10200FF=102THEHP=F+32 00T00000
230 IFR=F10200FF=102THEHP=F+32 00T00000
240 IFR=F10200FF=C102THEHP=F+32 00T00000
250 IFR=F10200FF=10200DFC=102THEHP=F+6
260 IFR=F00000FF=FCTHEHP=F+12
280 P=F-2 IFC=0THEHP=0
301 PRINT"#####" = IFR,FFTHEH0000000000
302 PRINT"#####COUNTS"
303 IFR=0THEH00T0000
304 FORQ=1T0000 NEXT
310 P=F-2 FL=FL+1 00T0100
320 FL=1 FORQ=1T04
330 PRINT"#####PRM OVRD" POKES3,200
340 FORQ=1T0500 NEXT POKES3,0
350 PRINT"#####PRM OVRD"
360 FORQ=1T0500 NEXT NEXT
370 P=10,GETR,REM" 00T0100
380 DTR"100",100",100",100",100",100",100",100",100",100"
390 DTR"100",100",100",100",100",100",100",100",100",100"
400 DTR"100",100",100",100",100",100",100",100",100",100"
1000 F=INT(RND*1400)+1 RETURN
1005 IFR=42THEHP=URN
1010 IFR=42THEHP=URN
1015 IFR=102THEHP=URN
1020 P=F+6 RETURN
1025 IFR=42THEHP=URN
1030 IFR=42THEHP=URN
1035 IFR=42THEHP=URN
1040 P=F+6 RETURN
1045 IFR=42THEHP=URN
1050 IFR=42THEHP=URN
1055 IFR=42THEHP=URN
1060 IFR=42THEHP=URN
1065 IFR=42THEHP=URN
1070 IFR=42THEHP=URN
1075 IFR=42THEHP=URN
1080 IFR=42THEHP=URN
1085 IFR=42THEHP=URN
1090 IFR=42THEHP=URN
1095 IFR=42THEHP=URN
1100 IFR=42THEHP=URN
1105 IFR=42THEHP=URN
1110 IFR=42THEHP=URN
1115 IFR=42THEHP=URN
1120 IFR=42THEHP=URN
1125 IFR=42THEHP=URN
1130 IFR=42THEHP=URN
1135 IFR=42THEHP=URN
1140 IFR=42THEHP=URN
1145 IFR=42THEHP=URN
1150 IFR=42THEHP=URN
1155 IFR=42THEHP=URN
1160 IFR=42THEHP=URN
1165 IFR=42THEHP=URN
1170 IFR=42THEHP=URN
1175 IFR=42THEHP=URN
1180 IFR=42THEHP=URN
1185 IFR=42THEHP=URN
1190 IFR=42THEHP=URN
1195 IFR=42THEHP=URN
1200 IFR=42THEHP=URN
```

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# Address

Chris Paine of St Albans wrote this program for the 88.

ADDRESS is a computerized version of the

"little black book" it keeps track of names, addresses and phone numbers with the option to save or load addresses.

It also has a useful feature which enables you to find an address without going through the whole list.

Options include ENTER ADDRESS, INCREASE, DECREASE, PHONE NUMBER, VIEW,

VIEW, VIEW, INCREASE, PHONE NUMBER, VIEW ADDRESSES, which shows the whole list, and FIND ADDRESS, which finds an address given a surname. There are also LOAD and SAVE options.

The program can be adapted for the 70 by changing the PEEKs at line 20 which controls the screen colour.

```
10 DIM M(2000),A$(2000),S$(2000),L$(2000),D$(2000),P$(2000),C$(2000)
20 FOR I=2000 TO 0 STEP -1:POKE32000+I,0:POKE34000+I,0:PRINT"ADDRESS BOOK REVISED"
30 PRINT"***** CHRIS PAINE'S
40 PRINT"***** ADDRESS BOOK
50 PRINT"***** (REVISED EDITION)
60 PRINT"***** BY C. PAINE"
70 PRINT"ADDRESS ANY KEY TO CONTINUE."
80 GET:IF A$="" THEN GOTO 90
90 PRINT"*****
100 PRINT" 1) ENTER ADDRESSES"
110 PRINT" 2) VIEW ADDRESSES"
120 PRINT" 3) FIND ADDRESS"
130 PRINT" 4) SAVE ADDRESSES"
140 PRINT" 5) LOAD ADDRESSES"
150 PRINT" 6) SELECT NUMBER"
160 GET:IF A$="" THEN GOTO 170
170 IF A$="0" THEN GOTO 170
180 A$(A$)=A$:IF A$<>"0" THEN GOTO 190
190 D$(A$)=D$:S$(A$)=S$:L$(A$)=L$:P$(A$)=P$:C$(A$)=C$
200 GOTO 2000+I:370,380,390,400
210 I=I+1
220 PRINT"ADDRESS NO. ",I
230 INPUT"SURNAME OF PERSON ",S$(I)
240 INPUT"NAME ",A$(I)
250 INPUT"NO. OF HOUSE, STREET ",S$(I),C$(I)
260 INPUT"TOWN ",D$(I)
270 INPUT"COUNTY ",L$(I)
280 INPUT"POSTCODE ",P$(I)
290 INPUT"TEL. NO. ",D$(I)
300 PRINT"NO. ",I
310 GET:IF A$="" THEN GOTO 320
320 IF A$="R" THEN GOTO 330
330 PRINT"MORE?"
340 GET:IF A$="" THEN GOTO 350
350 IF A$="Y" AND C=50 THEN I=I+1:GOTO 220
360 GOTO 300
370 FOR I=1 TO 5
380 PRINT" ",S$(I),", "
390 PRINT" ",A$(I),",R(C)
400 PRINT"ADDRESS ",S$(I),",",D$(I)
410 PRINT" ",D$(I)
420 PRINT" ",L$(I)
430 PRINT" ",P$(I)
440 PRINT"TEL. NO. ",D$(I)
450 PRINT"PRESS ANY KEY."
460 GET:IF A$="" THEN GOTO 470
470 IFS=1 THEN P=99:GOTO 300
480 NEXT
490 GOTO 300
500 I=1:INPUT"ENTER SURNAME OF PERSON ",S$
510 PRINT" ",S$,", "S":FOR I=1 TO 5
520 IF S$=A$(I) THEN PRINT A$(I),R(C):FOR I
530 NEXT
540 IF P=99 THEN PRINT"SURNAME ",S$,",...NOT FOUND..." :FOR I=1 TO 1000: NEXT:GOTO 300
```

```

550 INPUT "ENTER ONE OF THESE NUMBERS ",K:FO=0:GOTO300
560 PRINT "CORRTR TYPE REPLY "
570 GET#A:IF#A=""THEN#0#
580 IF#A<>"Y"THEN#0#
590 OPEN#1:1,"ADDRESS"
600 PRINT#1,B
610 FOR#A=1TO#
620 PRINT#1,B#A#;PRINT#1,B#A#;PRINT#1,B#A#;PRINT#1,B#A#;PRINT#1,B#A#
630 PRINT#1,B#A#;PRINT#1,B#A#;PRINT#1,B#A#;PRINT#1,B#A#;PRINT#1,B#A#
640 GOTO300
650 PRINT "CORRTR TYPE REPLY "
660 GET#A:IF#A=""THEN#60#
670 IF#A<>"Y"THEN#60#
680 OPEN#1:1,B,"ADDRESS"
690 INPUT#1,A
700 FOR#A=1TO#
710 INPUT#1,B#A#;INPUT#1,B#A#;INPUT#1,B#A#;INPUT#1,B#A#;INPUT#1,B#A#
720 INPUT#1,B#A#;INPUT#1,B#A#;INPUT#1,B#A#;INPUT#1,B#A#;INPUT#1,B#A#
730 GOTO300

```

## Mines

*Small version of Asteroid*

MINES is a very simple game, the object being to clear up as many mines as you can in forty seconds. At the end of this time the remaining mines will explode. You score

five points for each mine and twenty-five

points for each field you clear.

X = Left, K = Right, L = Up, and ; =

Down. 0 = mine, \* = body-trapped mine.

The listing for the unexpanded MINE is as

```

1 REMINDEFIELD
2 PRINT"#####MINE"
3 GET#A
4 IFR#=""THEN1
15 X=10:Y=77#2:SC=0:ND=0
20 B=7:CI=36879:SI=36876:SE=36877:VO=36878
30 TI#="#####"
40 POKECI,B
50 POKEYO,15
60 PRINT"###"
65 POKE(X+Y),01
67 FOR#A=1TO#
68 POKE7688+INT(RND(1)*500),42
69 NEXT#
70 FOR#A=1TO#
71 POKE7688+INT(RND(1)*500),87
72 IFR#(X+Y)=87THEN#A#200
73 NEXT#
110 GET#A
120 IFR#C1THEN#310
130 PRINT"#####TI#
135 PRINT"SCORE#";SC
160 IFTI#="#####"THEN#300
170 IFR#=""THEN#10
210 POE50*(Y),32
220 IFR#="Z"THEN#A#-1
230 IFR#="K"THEN#A#+1
240 IFR#="L"THEN#Y#-22
250 IFR#=";"THEN#Y#+22
255 IFR#K(X+Y)=42THEN#300
260 IFR#K(X+Y)=87THEN#300
270 POKE36876,220
280 SC=SC+5
290 S#S-1
320 POKE36876,B
330 IFR#>1THEN#300
310 PRINT"#####FIELD CLEARED"
NO=NO+1:POKE1,200

```



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```

320 IFN0=1THENB=9 SC=SC+25
330 IFN0=2THENB=19 SC=SC+25
350 POKE69,B
360 PORT=1T0600:HEXT
370 GOTO400
390 IFY<7600THENY=Y+22
390 IFY>8164THENY=Y-22
420 POKE(X+Y),B
430 GOTO130
500 POKE54,220
510 POKEC,9
530 FORL=15T060STEP-1
530 POKEV,L
540 FORM=1T0300
550 HEXTM
560 HEXTL
590 POKE64,0
590 POKEV,0
595 PRINT"J"
595 IFSC<NTHENH000
597 H0=SC
599 PRINT"#####HELL, SOME A NEW HIGH SCORE!",H0,SC=0
599 GOTO600
600 PRINT"#####YOU SCORED ",SC
605 INPUT"#####WHOTHER GAME Y/N":H0
610 IFH0="Y"THENJ
670 PRINT"J"
690 END

```

## Meteors

A program for the unexcused kid in town. Another example of Microsoft

ON METEOR ATTACK, you sit in a ship down on the left-hand side of the screen. You can move up and down, and have to shoot the meteors which fly at you from right to left. If one gets past you, you lose a life.

The number of lives depends on the skill

level you choose. At level one you only have one life, and the meteor's move faster. Your remaining lives are indicated in the top right-hand corner of the screen and your score at the top left.

### Program notes

- 10-80 Introduction
- 40 Sets up lives and colours
- 50 Sets variables
- 60 Randomness for meteors
- 70-140 Sets up screen
- 150-200 Checks for key input to move

- 210-250 Checks for score so if meteor has passed
- 300-320 Checks if you have run out of lives
- 400-420 Fire routine
- 500-540 Randomness meteors
- 600-630 Increases score if you hit, prints explosion
- 700-730 Input skill level
- 800-840 Checks for whether game you sit on
- 1000-1040 Instructions

```

10 Q=7300 C=30620 S=7722
15 POKE36079,40 POKE36078,15
20 PRINT"J":POKE656,120
30 DOSUB1000
40 DOSUB700
45 FORM=1T05L:POKE7690+M,62 POKE30415+R,8 HEXTM
50 X=1 Y=1 DN=1 DV=0
60 GOTO500
70 POKELFO-X+22*Y,7 POKEB=X+22*Y,90
80 POKEB,62 POKEC,8
90 PORT=1T05L:HEXT
100 POKEB=X+22*Y,32
110 PRINT"#####SCORE =",SC
130 PRINT"#####LIVES =",L
140 POKEB,32
150 GETM
160 IFQ=7745THENH100
170 IFH0="R"THENQ=Q-22 C=C-22
180 IFQ=8164THENQ=200
190 IFH0="2"THENQ=Q+22 C=C+22
200 IFH0="."THENQ=Q-200

```

Continued on page 27



# Mastercode Assembler for the Commodore 64

Full Commodore 64 Assembler/Disassembler



**£14.95**  
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**Mastercode is a substantial and complex program of use to anyone interested in writing machine code on the Commodore 64. Its features include:**

- Machinecode monitor
- File Editor
- Disassembler
- Assembler

Mastercode is a full featured assembler. It accepts labels, variables and equations within assembly language programs. It is possible to store programs anywhere in memory, even in parts occupied by the Assembler. Programs can be saved to either tape or disc.

#### The Machine Code Monitor includes:

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The Disassembler will translate into assembly language the contents of any area of memory whether the 64's ROM or a user program. Output may be sent either to the screen or a printer.

#### The File Editor includes:

- ENTRY OF NUMBERED LINES OF ASSEMBLY LANGUAGE INSTRUCTIONS ■ LISTING INDIVIDUALLY OR IN BLOCKS OF PREVIOUSLY ENTERED LINES ■ DELETION INDIVIDUALLY OR IN BLOCKS OF EXISTING LINES ■ RENAMING BOUNDS OF EXISTING LINES ■ PRINTING OF ASSEMBLY LANGUAGE FILES TO TAPE OR DISC ■ LOADING OF ASSEMBLY LANGUAGE FILES FROM TAPE OR DISC ■ ADDITION OF A BLOCK OF MEMORY SPECIFIED BY THE USER TO THE USER'S ASSEMBLY PROGRAM

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```

218 X=X+2X
228 IFX=28THEN300
238 IF (B-X+22#Y)=7702TNEHX=X+1X
248 POKE36878,B
258 GOTO78
388 P=P+1
318 IFP=>L THENGOTO388
318 POKE7695,P,32
328 GOTO58
488 FORI=1TO18
418 POKE9+I,45
428 IF (B-X+22#Y)=(O+1)THENGOTO688
438 POKE9+I,32
448 NEXTI
458 GOTO218
508 A=INT (1+17#RND#8),J
518 R=R#2
528 B=7722+R
538 UF=38442+R
548 GOTO78
688 POKE36877,228 FORL=15TOLSTEP-1
618 POKE36878,L,POKE9+L,42,POKED=1,42,NEXTL,POKE9+L,32
628 POKE36878,B SC=SC+18
638 GOTO58
788 POKE36878,B PRINT"#####INPUT SKILL LEVEL      (1 TO 5)"
718 INPUTL
728 IFL<5ORL<1THEN788
738 PRINT"O"
748 RETURN
888 PRINT"#####YOU SCORED" ,SC,POKE36879,27,PRINT"#####
      YOU WANT ANOTHER GO?"
918 INPUT"#####Y/N" ,R18
928 IFR18<"Y"ORR18R#>"Y"THEN1888
938 IFR18="Y"THENRUN

```

## Hangman

HANGMAN is a simple version of the old game. To play, the word or words are entered and HANGMAN guesses. The computer then displays a dash for each letter. When correctly more than one word the words should be separated by a division (/) sign.

To guess letters just press the appropriate key. If correct the display will show the letter in place, if not another guess will be added to the hangman man.

Press \* to display the full word and the computer will display an asterisk to play the game again.

Also: For games from *Andrew Shead's* *Book* — see *using the Super Computer*

```

188 CLR PRINT"O" INPUTW$ PRINT"O" LE=LEN(W$) :DIRR$(LE),BL$(LE) :B=-1
118 FORN=1TOLE :R#R(X)=RND#256#X,1 :NEXT
128 FORN=1TOLE :IFR#R(X)="" THENBL$(X)=R#R(X) :NEXT
131 BL$(X)="*" :NEXT GOSUB280
148 C=8 GET# :IFC="" THEN148
141 IFR#"*" THENPRINT"#####",W$ :GOTO268
144 FORN=1TOLE :IFR#R#R(X) THENBL$(X)=R# C=1
145 NEXTX :IFC=1 THENGOSUB280
146 IFC=>8 THENGOSUB228
158 GOTO148
288 PRINT"BTAB(222) :FORN=1TOLE PRINTBL$(X),NEXTX RETURN
228 B=B+1 :IFB=>8 THENFORN=1TO4 :POKE38553+B,2 :POKE7693+B,328 :NEXT :RETURN
221 IFB=1 THENFORN=132TOSTEP-22 :POKE38481+X,1
      POKE7681+X,118 :NEXT :RETURN
222 IFB=2 THENFORN=108 :POKE38423+X,2 :POKE7783+X,128 :NEXT :RETURN
223 IFB=3 THENFORN=23TOSTEP-21 :POKE38423+X,2 :POKE7783+X,78 :NEXT :RETURN
224 IFB=4 THENPOKE38458,2 :POKE7778,68 :RETURN
225 IFB=5 THENPOKE38472,2 :POKE7752,87 :RETURN
226 IFB=6 THENPOKE38494,2 :POKE7774,182 :POKE38516,2 :POKE7796,182 :RETURN

```

```

227 IFB=7THENPOKE38471,2 POKE7751,77 RETURN
228 IFB=8THENPOKE38473,2 POKE7753,79 RETURN
229 IFB=9THENPOKE38537,2 POKE7817,78 RETURN
230 IFB=10THENPOKE38539,2 POKE7819,77
240 PRINT"#####"
241 PRINT"#####OTHER GAME? Y/N"
242 GET# IF#=""THEN242
243 IF#="Y"THEN100
244 END
250 PRINT"#####CONGRATULATIONS"
251 PRINT"#####OTHER GAME? Y/N"
252 GET# IF#=""THEN252
253 IF#="Y"THEN100
254 END

```

## Connect 4

Andrew Stans' version of Connect 4 and the code for Super Expander

THIS GAME uses the graphics commands of the Super Expander because "the children like the way it shows moves"

Two players take turns placing disks by entering the column number. There are

seven columns in which six disks can be placed.

When a player gets four counters in a horizontal, vertical or diagonal row (win or record the winner and start a new game.)

```

5 CLR PRINT"O" GRAPHICS COLOR1,3,5,8 S1#="8" S2#="8" S1=0 S2=0 C#5
10 F0#0=1708 B#H#2,XX100,100T00#100,000 N#HTX
20 F0#0=1707 B#H#2,100,XX100T000,XX100 N#HTX
40 CHR14,2,"1 2 3 4 5 6 7"
50 K1=150 K2=250 K3=350 K4=450 K5=550 K6=650 K7=750
71 Y7=650 Y6=650 Y5=650 Y4=650 Y3=650 Y2=650 Y1=650
50 CHR18,1,"BLUE" CHR18,5,S1# CHR18,9,"RED" CHR18,12,S2#
58 CHR16,1,"OR 0 TO RESTART"
60 CHR18,1,"COUNTER IN ROW"
61 GET# IF#=""THEN51
62 IF#<"1"OR#>"7"AND#<"0"5"THEN51
65 IF#="0"THEN SCHLP GOSUB400 PRINT"O" GRAPHICS GOTO10
70 IF#="1"THENXX1 Y#Y1 Y1#Y1-100 GOSUB300
80 IF#="2"THENX#2 Y#Y2 Y2#Y2-100 GOSUB300
90 IF#="3"THENX#3 Y#Y3 Y3#Y3-100 GOSUB300
100 IF#="4"THENX#4 Y#Y4 Y4#Y4-100 GOSUB300
110 IF#="5"THENX#5 Y#Y5 Y5#Y5-100 GOSUB300
120 IF#="6"THENX#6 Y#Y6 Y6#Y6-100 GOSUB300
130 IF#="7"THENX#7 Y#Y7 Y7#Y7-100 GOSUB300
150 IFC=6THEND=2 COLOR1,3,5,8
161 IFC=2THEND=6 COLOR1,3,5,8
192 C#0
193 GOTO60
300 COLOR1,3,C,0" CIRCLEC,X,Y,32,20:PRINTC,X,Y
310 RETURN
400 GRAPHICS PRINT"##### BLUE OR RED"
405 PRINT"#####ENTER 0 OR R"
410 GET# IF#<"0"AND#<"R"THEN410
415 IF#="0"THEN#1=#1+1
420 IF#="R"THEN#2=#2+1
425 S1#=STR$(S1) S2#=STR$(S2)
430 PRINT"##### STARTS-0-R"
435 GET# IF#<"0"AND#<"R"THEN435
440 IF#="0"THEN#6=COLOR1,3,5,8 RETURN
445 IF#="R"THEN#2=COLOR1,3,5,8 RETURN
455 S$=LIST

```

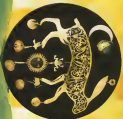
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THIS ARTICLE has been written to show that using Relative files is more\* included in the article are 4 subroutines for file handling, 2 general purpose routines and a program for creating Relative files.

File handling is one of the most important techniques in system micro-computer programming. Good file design and handling is a great asset to any program, whereas bad file design and handling will spoil even the best of programs. Consider now only two types of files, Sequential and Relative, though there is a noticeable lack of information as how to use a Relative file. Sequential files are slow, and have their length limited by the amount of space memory available after loading the program. This is because a Sequential file must be read into memory before any records can be read from the file.

Relative files, on the other hand, can be used by loading only the record required into the memory. This has two advantages, the first is that in a large file the records near the end of the file can be accessed quickly without waiting for all the prior records to be read. The second advantage of Relative files is that the length of the file is generally limited by the amount of space available on the disk, not the memory available on the computer.

### Relative

This will allow larger file lengths, the maximum being that the disk drive has a limit of 780 records with a maximum length of 234 characters. This limit will allow files to hold up to 7780 of data. The main drawback with relative files is that the maximum record length used by us when the file is first set up, the record length cannot then be altered by the file. Relative files are formatted on the same way as Sequential files but, as stated earlier, to load and save Relative files the record number must be used to position the record in the file. The record number is usually calculated by a "handling algorithm", which is described fully in the section "Creating record number".

Before writing a program which uses Relative files, the file must be already on the disk. Program 1 creates a blank file ready for use by another program. Program 1 asks for the file name, record length and maximum number of records. When calculating the record length adjustment to allow 1 character after every field as a separator, it is recommended that you allow a few spare characters as space for later developments as the record length cannot be changed later. For an example of calculating record lengths see page 13 of the 1340 users manual.

### Sequential

When calculating the maximum number of records allow at least 1 above the estimated maximum as the handling algorithm needs to have enough spaces in its file. The reason for these spaces will be explained in the section "Creating record number".

There are three general routines included in this article, (1) set the maximum number

## PROGRAMMING

# 1541 files made clear

Tony Morrison-Smith explains techniques for using relative files on your 1541 disk drive

```

7 REM ***** PROGRAM 1 *****
8 :
9 REM ***** CREATE BLANK FILE *****
10 OPEN S,8,15
20 INPUT "FILE NAME : ",FN$
30 INPUT "RECORD LENGTH (MAX 254) : ",RL:(IF RL<1 OR
    RL>254 THEN 30
40 INPUT "MAX NO. OF RECORDS : ",RM
45 PRINT/PRINT "PLEASE WAIT-CREATING FILE"
50 OPEN S,8,2,ENC+"",L,"+CRS(RL)
60 GOSUB 900
70 RL=INT((RM+1)/254)*254+RM+1-8)
80 PRINT#15,"P"CRS(2) CRS(8) CRS(8)CRS(1)
90 PRINT#2,"END" GOSUB900
100 CLOSE2+CLOSE1:PRINT "FINISHED":END
900 INPUT#15,A,B,C,D:IF A=0 OR A=50 THEN RETURN
910 PRINT A,B,C,D:STOP:RETURN

```

```

1 REM **** GENERAL ROUTINE 1 ****
2 RM = 25 : REM MAX NO. OF RECORDS

```

```

6000 REM **** GENERAL ROUTINE 2 ****
6000 :
6000 REM **** DISK ERROR ****
6010 INPUT#15,A,B,C,D : IF A=0 OR A=50 THEN RETURN
6020 PRINT A,B,C,D : STOP : RETURN

```

```

5700 REM **** GENERAL ROUTINE 3 ****
5700 :
5800 REM **** POSITION ON RECORD ****
5810 RL=INT(RM/254)*254: R2=RM-R2
5820 PRINT#15,"P"CRS(2)CRS(8)CRS(8)CRS(1)CRS(1)
5830 RETURN

```

```

5900 REM **** SUBROUTINE 1 ****
5900 :
6000 REM **** CREATE RECORD NO. ****
6010 RM = 0: FOR I=1 TO LSH(8)
6020 RM = SHASC(HEX$(A0,I,1))
6030 NEXT I
6040 RM = INT(RM-(INT(RM/254)*254))+1
6050 RETURN

```

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Turn to pages 64 and 65 for this month's selection.

of records, it sets the disk error and 2) positions the disk drive's read-write head at the record required.

1) — This is a one line routine which sets R4 with the maximum number of records. This must be set as it is used to calculate record numbers.

2) — This is the standard routine for the 194 disk drive. The routine reads the error channel at line 6140. If the error flag is set to 0 it is an error or 90 it is a record not found then the routine returns. Any other error is repaired by line 6100 and the program stopped. If the error is not critical then the read error flag can be returned by typing COM1 (return).

3) — This routine positions the read-write head at the disk drive in the record required. The first C1000 is the channel number. The last two C1000 are the record number where R4 is the low byte and R1 is the high byte of the record number. The last C1000 positions the read error head at the start of the record 0 is the first character.

### Routines

These routines are all used by the following set of subroutines and therefore must be included in any program.

Creating a record number is achieved by using a hashing algorithm. A hashing algorithm is a routine which takes a key field, for example a persons name in an address program, and converts the key field into a record number. The hashing algorithm used in subroutines 1 takes the string A4 and converts it into a record number by adding each ASCII value in the string and then dividing by the maximum number of records. The remainder plus one is the record number. The reason one is added to the remainder is that record number 0 is invalid. It can be seen that this method will cause records to have the same record number, which is why spaces must be left in the file. The spaces in the file do not use up any significant memory in the disk, as they are read as empty records, but they do allow for an overflow in the record numbers.

When the following routines try to save a new record, if the record number is already taken then the routine moves to the next record number until an empty record is found to save the data into. If too many records try to go to the same area in the file then the loading and saving ones will overflow dramatically. In this instance the file must be reworked with the maximum number of records increased to a new type of hashing algorithm.

### Loading

As stated in this article are two ways to load a record from a Belville file. 1) load record from a known record number and 2) load a record with a known key field.

1) — Load from a known record number is shown in subroutine 2. Before this sub-routine is called the file name (FNM) and record number (RN) must be assigned. Line 6110 sets the error flag to 0, opens the channel channel and the Belville file FNM. The read-write head is positioned at the record required and the disk error

channel is checked in line 6120. Line 6130 inputs the first 200 of data the line 6140 checks to see if the record is empty, i.e. it holds only the character 0 in the disk error = 50. If the record is empty then the channels are closed, the error flag is set to 1 and the routine returns.

Assuming the record is not empty, line 6145 repositions the head at the start of the record again and line 6150 loads the record into memory. Line 6160 checks for any disk error and then line 6170 closes the channels and returns to the main program. NOTE: Line 6150 can be altered to read your own individual record format.

2) — Load a record by key field is shown in subroutine 3. This routine is similar to sub-routine 2 with the address of line 6250 to 6265. These lines compare the first area of the record (KEY) with a known key (A4).

If A4 and KEY are not the same then the record number is increased by one in line 6260. If the record number is greater than the maximum number of records then the record number is set to one. The next record is then loaded and the process repeated until an empty record is found or a match is found between A4 and KEY. If a match is found then the record is loaded by line 6270-6275. Line 6275 can be altered to read your own individual format.

There are two subroutines for saving records to a file, 1) overwrite existing record or 2) known record number and 2) save new record. As with all the subroutines in this article the file name (FNM) and record number (RN) must be assigned prior to using these routines.

1) — Overwriting a known record is shown in sub-routine 4. Line 6310 opens the

```
6090 REM **** SUBROUTINE 2 ****
6095 :
6100 REM **** LOAD RECORD BY KEY ****
6110 EF=0:OPEN15,8,15:OPEN2,8,3,FMS
6120 GOSUB 6000:GOSUB 6000
6130 INPUT#2,KEY
6140 IF A=50 OR KEY="" THEN EF=1:CLOSE2:CLOSE1:RETURN
6145 GOSUB 6000:GOSUB 6000
6150 INPUT#2,X15,X25,X35,X45
6160 GOSUB 6000
6170 CLOSE2:CLOSE1:RETURN
```

```
6180 REM **** SUBROUTINE 3 ****
6190 :
6200 REM **** LOAD RECORD BY KEY ****
6210 EF=0:OPEN15,8,15:OPEN2,8,3,FMS
6220 GOSUB 6000:GOSUB 6000
6230 INPUT#2,KEY
6240 IF A=50 OR KEY="" THEN EF=1:CLOSE2:CLOSE1:RETURN
6250 IF A=KEY THEN GOTO 6270
6260 RN=RN+1 : IF RN=FN THEN RN=1
6265 GOTO 6220
6270 GOSUB 6000:GOSUB 6000
6275 INPUT#2,X15,X25,X35,X45
6280 GOSUB 6000
6290 CLOSE2:CLOSE1:RETURN
```

```
6300 REM **** SUBROUTINE 4 ****
6305 :
6310 REM **** OVERWRITE RECORD ****
6320 OPEN15,8,15:OPEN2,8,3,FMS
6330 GOSUB 6000:GOSUB 6000
6340 IF="" THEN
6345 PRINT#2,X15,X25,X35,X45
6350 GOSUB 6000
6360 CLOSE2:CLOSE1:RETURN
```

command channel and file (PMS) The read - write head is positioned on line 6330 and the error channel checked. Line 6330 sets the field delimiter (DD) and line 6340 sets the record. The disk error channel is checked on line 6330 and line 6340 checks the channel and returns to the main program. NOTE: Line 6340 can be altered to read your own subroutines format.

3) - Same new record is shown in subroutines 3 and similar to subroutines 4 with the address of lines 6430 to 6470 which skip through the file to find an empty space if the record number required has been used previously. NOTE: As with the other routines line 6460 can be altered to save your own format.

### Delete

Delete record is shown in subroutines 4. It is recommended that before this routine is used, you should check that the record number is correct by displaying the record contents, as this routine is irreversible. Lines 6510 and 6520 open the channels and position the read - write head. Line 6530 saves the character in which is the empty record number. Lines 6540 and 6550 check the error channel and close the channels. It will be seen from this article that using Refletec files on the 1541 disk drive can be very easy using these routines. A word of warning though! If you miscalculate the maximum number of records and you fill the file with records, two things will happen. The first is that record access times will increase dramatically and second,

when you try to save one more record than your maximum, subroutines 3 will go into a non stop loop!

\*Variables used in the code

- A = Disk error number
- AA = Key field
- AL = Disk error info
- C = Disk error track number
- D = Disk error block number

- EF = Error flag
- FMS = File name
- LES = Record key
- SL = Record length
- SM = Maximum number of records
- SM = Record number
- MS to MS = Field variable (always set required)
- ZS = Field delimiter

```

6398 REM **** SUBROUTINE 3 ****
6399 :
6400 REM **** SAVE NEW RECORD ****
6410 OPEN#5,8,15:OPEN#2,8,2,PMS
6420 GOSUB 5800:GOSUB 6300
6430 INPUT Z,LES
6440 IF A=55 OR RES="*" THEN TMS=6460
6450 RS=RS+1 : IF RS=SM THEN RS=1
6455 GOTO 6420
6460 ZS=" ",ZS=ZS:GOSUB 6900:GOSUB 6900
6465 PRINT#2,Z,LES,ZS:ZS:ZS:ZS:ZS:ZS:ZS
6470 GOSUB 6300
6475 CLOSE#2:CLOSE#5:RETURN

6498 REM **** SUBROUTINE 4 ****
6499 :
6500 REM **** DELETE RECORD ****
6510 OPEN#5,8,15:OPEN#2,8,2,PMS
6520 GOSUB 6800:GOSUB 6300
6530 PRINT#2,"*"
6540 GOSUB 6300
6550 CLOSE#2:CLOSE#5:RETURN

```

## DISPLAY AD INDEX

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## ANSWER BACK

### Simple Simon's

I AM INTERESTED in having Simon's Basic for my 64, and wondered that a custom version disk and program contacts. Since I don't yet own these programs, will I get "Denise our parents' messages?"

Could you make some suggestions on how to draw graphs of mathematical functions?

Lastly, I am interested in the possibilities of using the 64 for the control of appliances such as central heating systems. Could you suggest any books that might help?

David Phear  
Wymondham  
Norfolk

THE CHIBRO message will not appear on power up, but only if you try to address one of the non-erased devices.

A program to plot a star curve is given on page 126 of the Programmers' Reference Guide for the 64.

Try the 6800 Applications Book by Rodney Stiles, published by Sybex, which should still be available from computer specialists. The chips used in the 64 are of the same family and use the same instructions.

### Total garbage

I AM WRITING a large program on the 64 which involves creating disk files and processing them. The trouble is that I get terrible delays during program execution, and once I make intensive use of using arrays which I purge. I think the delay is due to "garbage collection".

Could you explain "garbage collection" and advise on how to get rid of the delay?  
D M MacDonald  
Glasgow

GARBAGE collection is a

problem with the 64 because of the Basic 2 language. Strings are stored in memory starting from the top of RAM downwards. Automatic garbage collection takes place when the pointers in the bottom of string storage reach the pointers in the top of array. The redundant strings are removed and the remaining ones are moved upwards in memory, thus leaving space for more strings.

For example, if you define `AB = "string"` and then set `AB = "memory"`, the first of memory is redundant, but still remains in memory until BASIC garbage collection is performed. If you build your strings using GET then memory usage is limited, as follows: `"00"`, `"000"`, `"0000"`, and so on.

Your solution is to reinitialize the program so that data is stored in RAM by pointing the new PEEKing the data to new memory. Another is to build several strings at once, then extract what you need using MID\$.

The time taken for garbage collection is given by  $40000^2 \cdot N + 10^7 \cdot N$  where  $N$  is the number of strings created.

### Banks of the 64

IS BASIC the programmer's character facility of the 64? I have been frustrated by the limitations the place on memory available for the usual program. Who does 2K of character set before MR BASIC is 128? I have a suspicion that the Programmers' Reference Guide is wrong in this, but I can't understand what it's telling me. Can you help?  
S J Chorro  
London

THE 64 because you are putting your character set in the first 1K bank of the 64. The 64 stores up to 16K, which is Bank 0, 30000-FFFF. As you'll see, putting your character set in the bank then lowering the top of Basic to prevent the set from being overwritten restores the available memory to 16K-1K = 15K. If you use Bank 1 (20000-FFFF) then more memory will be available. Try the following program:

```
10 FORBANK=16
20 FORBANK=17
30 FORBANK=18
40 PRINT "BANK 16"
50 PRINT "BANK 17"
60 PRINT "BANK 18"
70 FORBANK=19
80 J = PEEK(BANK*16)
90 FORBANK=16
100 FORBANK=17
110 FORBANK=18
120 NEXT
130 END
```

The program is rather slow, since it is in Basic. Your character set will now reside at 4016 to 5199, and you can alter the existing set, which the above program copied into RAM by PEEKing the appropriate address within the above range using the formula `PEEK(4016 + (N-1) * 16)` for the address to PEEK your one eighth of the character required. Then PEEK your 7 to the position of the character required measured from the start of the character set and "N" is the "Nth" bit of that character. If you prefer to watch the character changing then `DO` is the best bit.

### No NEW's is good . . .

I wondered if it's possible to some machines to link together two separate programs loaded independently into RAM. On the 64 the resident program is NEW'd when loading another program. Is it possible to avoid this?

MACHINE CODE programs can be loaded into the 64, and the resident program is then not NEW'd. The program must not overwrite itself, and the resident program is not NEW'd. The program must not overwrite itself, and the resident program is not NEW'd.

As for these programs, by loading from within the program (called overwriting), and providing that the called program is not larger than the calling program, then the new program will run successfully and return the variable from the 64.

Of course the resulting listing will be the called program, not the original, but you can get around this by reinitialing the original program as the last line of the called program.

You can stop the program from executing the first run by giving a line such as `GO`

A + A + 0 - 0 - 0 - 0 - 0 - 0  
denise@commodore

### Basic bottom

COULD YOU tell my hope to move the bottom of Basic above the high resolution screen area, as shown on page 127 of the Programmers' Reference Guide? I have tried driving the values of memory locations 40 60, which results in the program apparently loading in the right place. Typing BASIC produces a listing of the program, but BASIC produces a SYNTAX ERROR. I've searched the Guide but have failed to find any explanation.

Jon Morris  
Teddington  
Middlesex

The FORN44, POWN44, POWN44, CLR ( = RETURN), where 4 is the value of the high byte address.

### Watson commands

I OWN A Vic 20 with a 16K RAM pack and Dr Watson's assembler. I would like to know the best way to add more programs via CHRGET, such as VDU, INK, SOUND, L.S., TIME, MIA, PAPER, programmable function keys and so on. Also is it possible to use variables, or to make an extension of the Basic system by changing the vectors?

M Greenaway  
Teddridge 4016  
York

THE CHRGET routine is in BASIC, and therefore can be changed to point to your own version of the routine, which would interpret the required key-words and direct the computer to your own collection of instructions ("SO/NB", and so on). Before changing CHRGET, you must disable interrupts with NMI, and after the change return with CLI.

If you need help with a technical query or problem write to:  
Jack Cohen,  
Commodore Reviews  
13-15 Little Newport  
Street, London  
W1P2 2LG







# Micronet modems make connections

*Solve the puzzle and you could be one of three winners of Micronet Modern systems for the Commodore 64. Tony Roberts sets the problem — just connect up and you could win!*

MICRONET IS offering over 1500 words of networking equipment at prices as low as this month's competition. A year's office prices, communications coverage and modems are on offer to the three winning entries.

The members of the Mail Nook group club have all joined together to establish a network connecting all their members providing all the computers are switched on. It's quite possible to send a message from any individual to any other. Even though any one message can be sent out more than 100 times, just as long as a subscriber's machine powered-up computer, that computer will re-transmit the incoming message until the message reaches its destination. Even a disconnected computer doesn't get in the way as incoming message is still connected through you as long as the total journey between the powered-up computer is not more than 1000. It'll get there.

All went well and one day Peter and John both left their machines switched off suddenly no-one could get a message through to Clive or Nialla. How's it map shows the network where do the two go first?

Nearly all as the code letters for the job's boxes, and complete the no-breaker in an eye, sending an original message in Clive's words or less. "I would like to join up with Micronet because..."

The Micronet service for the Commodore 64 will open in August. Micronet already has 10,000 users who enjoy the facilities of electronic mail, bulletin boards, daily computer news and features, downloadable software and equipment shopping for their

computer keyboards.

Micronet is brought to your computer screen via Personal and your telephone line. Its 50,000 "pages" of information are used as night machine computers throughout the country.

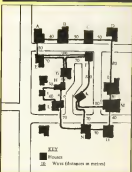
Using your 64 and the Micronet communications package, developed by OE Ltd, designers of the award-winning VTX 8000 modem, you'll be able to download commercial software at up to 30% less than retail prices, play the 1000-player game Starline, send and receive electronic messages, and more. For more details see the overview in Micronet's first book in this month's Profile section.

The winners of Peter's Melbourne House competition will each receive a copy of Henry Horne or Horse God's Statue for the 64. They are, Richard Taylor, Penwortham, John Connolly, Southsea, M N Daniel, Chislehurst, J Owen, Baiton, Mark Bachelor, Wareham, Nicola Murray, Torquay, Michael Dick, Ladbroke, Paul Kennedy, Exmouth, Gregory Hartman, Ashford, M M Taylor, Romford, Jay Nicholson, Torquay, E Wilson, Bafflegae, Anthony Papp, Southwood, Lolo Phillips, Aylesford, M E Francis, Chichester, Gene Hays, Swanton, Michael Kelly, Sussex Doleval, Niall Schwede, Oxford, D Gumble, Dreythorpe, S C C Gow, Coventry.

The winner of the Break Move Group's competition is Richard Pope from Torquay.

The winner of our special Commodore Show competition is Howard Kremen of Colton Coon, London. Howard's prize is a 1041 disk drive.

Send your answers to Competition Corner, Commodore Horizons, 12-13 Little Newport Street, London WC2R 3AB — to arrive no later than the last working day in the month on the cover of this issue. The name of the winner, and the solution to the puzzle, will be published in the issue after next.



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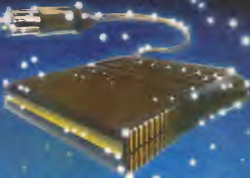
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# FUN WITH SPEECH 64!



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**SPEECH 64** is the first speech synthesiser for the Commodore 64. It's available only from CURRAH, and costs only £29.95. **SPEECH 64's** features will give you, your family and friends lots more fun with your computer! Its sister unit **uSPEECH** — for the *Highly Spectacular* — is a smash hit in the UK and over 10 other countries and has *been* awarded the CTA Product of the Year accolade.

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