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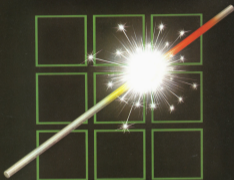


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IBM's new machine may undercut the business market — but what does it offer you?



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Paging on the 64

Adrian Warman explains how you can manipulate Basic

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Readers' programs including 64 utilities and 7th music

REGULARS

Letters

Comments, platters, loading tips and Computer Plus

News Desk

Changes at the top at IBM, the 64 leads into trouble, and the C64 Computer Store

Answer Back

Jack Cohen tackles the latest batch of technical queries

Profile

We talk to Sara Galbraith of Fine Publishing, about plans to attack the 64 market



Competition

Win AIRWOLF games, posters and watches from Elite

Editorial

THE RECENT management changes at Commodore UK, coupled with the lack of confidence displayed by retailers, has led to a general air of uncertainty. The departure of Howard Sawers was explained by the claim that having put the Coby plant into production, his aims had been achieved. However, the current pricing problems with the 64, which stem from the cuts in the Plus+'s price, must have accelerated his departure. The loss of marketing manager David Corvax was understandable in the resulting situation.

Now Nick Beatty, formerly of IBM, must take up the mantle of UK general manager, and deal with a disgruntled dealer chain and a disappointed public. Corvax faith is being placed in the business machines, though most of you will be more interested in the C128 and the enigmatic Amiga machine. It remains to be seen whether Beatty, and whoever assumes the duties of marketing manager, can restore the position of Commodore in the home computer market as the shadow of Jack Tramiel's Atari looms ever larger.

Next Month

Magic Mouse

SMC's artistic mouse put through its paces

Pascal, COBOL, and Forth

Looking at the alternatives to Basic

Plus

Competitors, news and reviews

EDITOR Christopher Jenkins **PRODUCTION EDITOR** Barbara Hajek **EDITORIAL SECRETARY** Geraldine Smith **GROUP ADVERTISEMENT MANAGER** David Lake **ADVERTISEMENT MANAGER** Simon Langston **ADVERTISING EXECUTIVE** Simon LaFosse **MANAGING EDITOR** Brandon Gore **PUBLISHING DIRECTOR** Duncan Scott **TELEPHONE (ALL DEPTS) 01-437 4143 UK ADDRESS** Commodore Horizons, 12/15 Little Newport Street, London WC2H 7PP **US ADDRESS** Commodore Horizons, c/o Business Press Int'l, 205 East 42nd Street, New York, NY 10017 **95 BUCKINGHAM GARDENS** UK £10.00 for 12 issues, overseas surface including US and Canada £18.00 for 12 issues, US and Canada airmail US\$30.00 for 12 issues.

Commodore Horizons is published monthly by Scott Press Ltd. Typeset by DeSign Ltd, 11-6 Dallingway Street, London EC1. Printed by Skivvies Press Ltd, Fraser Way, Whitstable, Kent. Distributed by BM Distribution, 14-18 Trinity Gardens, London SW6, telephone 01 274 8611, when 242 545. ISSN 0264-4154. Registered at the post office as a newspaper.

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SUBMITTING ARTICLES Commodore Horizons invites readers' contributions, either program listings or articles. Articles should be typed, double spaced with a wide margin. When possible programs should be submitted on cassette or disk with a printout on plain white paper. Please keep a copy of your submission — do not send your only copy. Please include an S.A.E. if you wish your submission to be returned. All submissions must be your own original work.

ABC



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HARVIC DATABASE Database, for example, is a brand new, cartridge and disc based software package. It is specially designed for both, first time and experienced data base users.

For those of you who need to collect and store information for easy recall, data base can make life easier. The basic package includes a mailing list and 4 different print programs.

TECHNICAL DATA

CALC RESULT The financial spreadsheet for the 64, that's ideal for all those domestic functions, such as loans, mortgages, home budgeting, stock portfolios, tax planning - let alone all those bills in the office too. Calc Result will make calculating, budgeting, simulation, construction and financial planning for 8000, 4000 & 100 a breeze - large or small. This easy to learn package comes in two versions - Calc Result easy (cartridge based) and Advanced Calc (disc and cartridge based with pedagogical manual).

TECHNICAL DATA

- **Spread sheet** size 64 x 204 x 32 pages
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- **Printing**, Flexible printing formats set to most popular printers
- **Graphs**, Histogram with scroll through feature rows and columns for printing
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- **Help**, Easy help screens available, at all levels
- **Calc Result** is also available in eight European languages

Applied Calc Result describes a larger number of applications in the area of: **PERSONAL AND BUSINESS FINANCE** · **STOCKS AND SHARES** · **STATISTICS** · **MATHEMATICS**

The user of Calc Result will find among the applications given many useful examples of how to get the most from Calc Result.



The Handic supermarket basket is full of "goodies" for your Commodore 64. Here is a brief description of what they all are! Don't forget - if you need any more information, either clip the coupon (and this column '67) or give us a ring.

1 Max 64

An outstanding Machine Code Monitor (cartridge based)

2 Teletext

Communication cartridge for use with the CBM 64, link up with Data-base like the bank or supermarket, over the telephone line.

3 SuperBox 64

An expansion unit for the Commodore, which features three independent cartridge slots. IEEE interface that is totally transparent, has multi-user capabilities with IEEE, and a reset switch which activates a cold start on the computer. This unit will connect up to 3 cartridges at the same time, which means frequent saving between programs simple and reduces wear on the cartridge slot.

4 No! No!

No! No! (No! 64) is a relay cartridge for the CBM 64 and VIC 63 which has almost endless applications, such as control of burglar alarms, garage doors, door locks, electric radiators, lamps, transmitters, model railways, etc.etc.

5 Disc-based games

Handic has a set of disc based games for the Commodore 64, all are great fun and superb colour graphics. At around \$5 each. Why not treat yourself to a few?

Quantity discounts are available on request - dealer enquiries are also welcome.



6 Diary 64

An ideal program for keeping track of telephone numbers, addresses, appointments, schedules, in fact the ideal time manager for all your whereabouts.

7 Stat 64

The statistical CBM cartridge which aids 18 new commands to your Basic language. An excellent programming aid for all you statisticians.

8 Graf 64

A CBM cartridge that turns solutions of equations into graphical analysis, what you might call a plotter jobber.

9 Handic Auto Modern

This modern is the expanded version of the Videotex modern (see illustration). When used together with the Handic Teletext Base 64 this unit enables you to set up your own data base with information.



Videotex Split-Speed Modern

This Split-Speed modern is especially designed to connect with computers over the telephone line, its facilities include auto-dialing, line control, etc. (BT approval applied for).

10 NESSE

A standard V.24 (RS232C) interface for connecting the CBM 64 to printers and other peripherals.

11 Bridge 64

A cartridge bridge game for the intelligencia.

12 Forth 64

A Forth generation programming language for people who know what they are talking about, and want to know even more.

Checklist

COMMODORE 64 - SOFTWARE

CALC RESULT ADVANCED	99.00	A
DIARY 64	49.99	
BRIDGE 64	19.99	
STAT 64	19.99	
NO! NO!	35.00	
NO! NO!	34.99	
SPRINKLE	39.99	
FORTH 64	29.99	
800 CORE BASED DIARY	12.99	

DISK BASED GAMES

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INNOVATION	12.99	
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Netted again

THANK YOU for the thorough and largely accurate review of COMPUKIT in the January issue of Commodore Magazine. I would like to correct a couple of mistaken impressions and comment on one or two of your observations. The review is not run by Commodore and they have no shareholding in COMPUKIT. TELESERVICES LTD. which is an independent company, Commodore market the modem, contribute to a section of the database and have supplied software for sale, along with several other companies, on Compuserve. They have also provided a large number of free educational products.

As for making money out of COMPUKIT, it is Commodore's profit on the modem which is funding the free first year subscription. They will make money from subscription sales but the users too benefit from cheaper prices. None of our subscribers have commented on the "complexity" of our prices and you are the first of the many reviewers to feel this.

The majority of users will access COMPUKIT in the evenings, upload the occasional page of text or small program or buy

software at a price clearly displayed on screen. They will pay what they see for software, a penny per page or 1K of program uploaded and nothing for being connected. If you can suggest a less complex tariff than this I would like to discuss it with you.

The names such as The Jungle, The Snake, Software Park are a matter of taste and may not be to everyone's liking as you observed personally. However, most people seem to like them. Our aim is to do myself some computer communications services and to give a more magazine-like flavour.

Thanks again for the review which made all the points well — particularly the one that the Commodore modem is the only one to give you both COMPUKIT and MICROMIT.

J J Clarke
Commodore Manager
CompuKit Referrals

Desktop tips

I HAVE one of those popular home computer desks with the C2N Datamate on the desk top by the side of the computer, and the monitor on the shelf just above it. Two tape programs have recently given me considerable loading difficulties. I have now

enclosed the Datamate in an earthed metal case made of thin sheet steel, with a hinged lid to make access easy. This seems to have cured my troubles by shielding the tape from RF and magnetic fields. I intend now to screen the inside of the C2N664 case with aluminium kitchen foil stuck on with double-sided sticky tape. Hope this will be a helpful tip for some of your readers.

A Mitchell
Thursbury
Aston



VIP updated

THANK YOU for your review on VIP TERMINAL which appeared in the April 1985 issue. We are pleased to advise you that VIP TERMINAL now includes a 1200/11 baud option, thereby resolving most of the problems that John Cochran found in this review.

G J Bennett
Managing Director
Imper Software

Musical notes

MANY commercially produced games programs contain recognisable musical themes. This facility is

something I'm trying to develop in my own software, but I'm not sure where I stand as regards copyright. Could you please advise.

Jim Coxon
North Shields

IT'S a problem almost as likely as that of software piracy. Many companies use music without authorisation, and Musictronics was recently forced to discontinue using the music from Michael Jackson's Thriller as their game Chiller. To be strictly honest you should enquire with the British Phonographic Industry, 279 Regent St, London W1, 00-029 8442, if you wish to purchase rights to use previously released music in a commercial product.

Print and plot

I AM trying to start a user group for the IBM 1520 printer / plotter with the aim of exchanging programmes, tips / tips etc. I would be grateful if you could mention this on the letters / news page of your magazine.

Anyone interested should contact me by letter (SASE) or on:

Postal Mailbox: 10219612
CompuKit Courier: 308 1
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85 Birchwood Road
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Cheetah

Marketing



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34 Rue Street, London EC2R 3EU,
Tel: 01-853-4504. Telex: 95645G.

64 under threat?

Ariola gets RamJam

THE FUTURE of the 64 looks uncertain following the threat by major retailers Lasker and Boots to discontinue selling the machine.

Boots' Assistant Merchandise Controller Peter Frost blamed Commodore's pricing on the Plus/4 for the current problem. "We like Commodore on the Plus/4 at £158, we sold them that it would add confusion to an already confused marketplace. Effectively Commodore's price structure is geared to the old situation."

Boots has now dropped the C16, and will not replace



existing stocks of the 64 unless profit margins can be restored. Boots' current price for the 64 is £149, while Lasker's price is £128.

Lasker's computer buyer Philip Hickson commented "We are clearing out our demo

models, and will not be stocking the 64 any more because the cost price is more than it is being sold for in the marketplace."

Neither Lasker's nor Boots' intent to order the C128 until existing computer stocks have been cleared.

A Commodore spokesman said "Commodore is naturally concerned about the reversion in which the trade is operating. We are actively looking at ways to alleviate the retailers' problems and over the coming weeks will be discussing with our customers the best way to do this."

ARIELAHOFF has agreed to market software from RamJam.

Three Days in Cyprus, RamJam's follow-up to the successful Valley 17, was to have been distributed by Palace, Marklew Tims, Palace sales manager commented "We had great fun working with RamJam on Valley 17, but they weren't under any obligation to place their next game with us. They know that we have our own games to work on — Caudron has just come out and we're now working on the next batch of ideas — and it's clear that Ariola has a bigger institutional base than Palace."

Ariola's future plans include marketing more software licensed from American software labels such as Electronic Arts, Broderbund and Bantam Inc. These will include utility programs such as the popular PaperClip word processor package.

Gerrard goes

DAVID GERRARD, appointed as CRM UK's marketing manager shortly after Christmas, has now left the company.



Commodore's David Gerrard leaves for STC

Gerrard, formerly with telecommunications giant Plessey, is believed to have clashed with financial controller Arthur Scott after the departure of Howard Starbuck. Gerrard, who was appointed by Starbuck, accepted an offer from STC Telecommunications in early April.

Gerrard is now working as international marketing manager for STC in America. As yet, Commodore has made no indication what plans have been made to replace him.

Centronics utility mushrooms

MUSHROOMS SOFTWARE'S 64's electronic printer interface utility package is now available.

Centropix offers the ability to print the whole Commodore character set plus control codes, and both hi- and low-resolution stamps, including screens generated with Kexis Plot or Doodle. Partial screens dump down to full plots can also be achieved.

The interface software can be located almost anywhere in memory, and an auto-relocater allows it to avoid existing programs. Control codes can be translated into English abbreviations, and space can be counted.

Centropix's other facilities include assignable function keys, built-in buffer and compatibility with Macintosh's Extended Basic package, which adds 18 commands to 64 Basic.

Centropix costs £11.50 on disk, £9.50 on tape, and Macintosh can also supply suitable connection cables. Contact the company through Krypton Computers, 193 Kensington Rd, London NE27, 02470 3510, for more details of Centropix and special prices on Centronics printers.

walkers on the road on May 16, contact Lennox Jones at US Gold, Unit 10, Parkway Industrial Centre, Henrage Street, Birmingham, BT 4LY, 021-379 5026.

US Gold's long walk

CHARITY begins at home, they say, and US Gold's contribution to the Soft Aid compilation tape isn't the end of the story.

Twenty of the company's employees are taking part in a 26-mile marathon fund raising walk in Birmingham in conjunction with independent local radio station BRMB. US Gold's Lennox Jones said that the fund-raising event, which would raise money for Minsop, Save the Children and other charities, was expected to be a big success.

"We'll be aiming to raise as much money as possible for those charities by getting people to sponsor our walkers."

"Remember it's all in a good cause!"

If you'd like to sponsor a

Fifo goes RS-232

IF YOU'RE having problems with RS-232 interfacing, a new product from Fifo Computers might solve your problem.

The Fifo RS-232 interface plugs into the user port at the back of the 64, 51-44 or Hi 28. Using the Commodore RS-232 female firmware, it allows you to connect your micro to either a suitable printer or to a modem.

The interface has a 25-way D connector which can be male or female. The Fifo interface comes with a 1-year guarantee and costs £24.95. Contact Fifo on 01-290 8832.



Ariola's Fund Manager

Meanwhile Ariola's promotional exercises go on: they've just given away a Commodore 64 as part of a monthly draw contest for purchasers of their games. The hit Lode Runner, which contains a screen customising option, will be the subject of a competition with 50 £100 mini-Kragerwans as prizes.

For more details, contact Ariola's at Alphaphie House, Palace Street, London SW1.

Commodore's GM



COMMODORE UK has a new General Manager. Nick Bessy, 38, has replaced Howard Stanworth, who left the company in February.

Bessy was formerly the key strategist behind IBM's retail marketing division. In his twelve years with IBM, Bessy served as a salesman, and

rapidly progressed after some notable successes to marketing management positions. After two years in New York as marketing planning manager for Canada, Japan and Australia, he returned to the UK as IBM operations manager.

Bessy's latest post at IBM was as head of the team dealing with marketing of low-cost products such as the IBM PC. In view of Commodore's recent launch of a PC-compatible machine, Bessy's appointment seems to confirm that Commodore's plans for the future rely heavily on increased penetration of the business market.

The Forsyth Protocol

THE FOURTH Protocol, Frederick Forsyth's bestselling thriller, is to be released as a computer game.

The IBM tel version is published by Hutchinson Computer Publications in May. The game is an interactive adventure in which the cold war has hot up. The game plays an MI3 agent whose job is to prevent the detonation of a nuclear warhead somewhere in England.

The game operates through icons, windows and multiple-choice questions. There are three phases — the first sees you operating a computer in your London office to try to

obtain clues, the second deals with tracking down the nuclear device and the third represents the SAS assault on the KGB's secret base.



The Fourth Protocol will cost £12.95 on cassette and £12.95 on disk. For more information contact HCP, 17-21 Conway St, London W1, 01-587 2811.

COMMODORE HORIZONS will be hosting its own Commodore computing show in London this October.

The show, at the Hammer-smith Nevada, will take place on Saturday 26th and Sunday 27th at Conventry and will cater for users of the 64, C16, Plus/4, 128, Vc, 30 and business machines.

The show will feature exhibitions from all the major Commodore software houses, hardware manufacturers and

dealers, plus computer use and advice centres.

There'll be special sections for business and educational software, and how many to use and do. We'll give you more details, meet our staff, but exhibition was grand. The Centre of Computers Marketing Exhibition Ltd for more details on 01-890 1442.

Look out for more details of the Commodore Horizons Show in future issues of the magazine.

CBM International shares down again

COMMODORE International's shares have hit an all-time low on the US market.

Like by the company's 74% drop in earnings in the quarter ending December 31, Commodore's share prices have also been affected by rumours, denied by Commodore, that the company has promised an extra \$7m to the newly acquired Amiga unit.

Sales of the 64 have been poor since Christmas, and with the relative failure of the Plus/4 and C16 in the US market, large stocks of

hardware are failing to shift from the warehouses. Market analysts are predicting a poor year overall for Commodore International, with slightly better results predicted for 1986.

The CBM is seen as a last attempt to make money from a shrinking market for cheap home computers, while parallel players more faith in the future of the Amiga machine. In the UK market the order of the importance of the machine will probably be reversed.

Ultimate Entombed

ULTIMATE's follow-up to The Lord of Karnath will be Entombed. The 64 game is another 2-1/2-hour historical paper-arcade adventure, featuring the story of King Prostron.

Entombed will cost £9.95, and should be available by the time you read this. For more details contact Ultimate at The Green, 110 City St in South, London, 01-580 2400.



PSS's two tribes

PSS's WAR, since Britain Theatre Europe claims to be an accurate representation of the aftermath of a breakdown in the Geneva Arms Talks.

Based on accurate information from NATO and the Ministry of Defence, programmer Alan Steele's game begins with a crossing of the West German border by Soviet tanks. The game, like PSS's earlier Bank of Midway, contains menus, tables, map displays and arcade sequences of aerial and tank attacks. As commander of the allied

military forces your task is to neutral the opposition by skillful deployment of your resources. There are three play levels: conventional, limited nuclear, and all-out.



Like PSS's account of war-mongering, the game includes music by Lennon and McCartney — Give Peace a Chance. Contact PSS at 452 Stoney Stratton Road, Coventry, 0263-467056.

Galactic

There aren't many variations possible on the age-old theme of Galaxians, but when it's done well it can still be a very exciting game. Solar's version for the CIB is a conversion of a program for earlier machines, but stands up fairly well.

Compared to the similar Xagins Wars from Cynesol, Galaxians is perhaps inferior

graphically but superior conceptually. As usual, the baddest stream in from the sides of the



screen, whirling and diving, then form a pattern at the top. Your gunship moves left and

right at the bottom, and all you have to do is zap the baddest as they dive down at you. The animation is a bit flabby, but to make up for it the sound effects are very good — it just goes to show what can be done with a little imagination, even when you're limited by the CIB's sound chip.

You have the traditional three lives, and there are lots of screens to get through. What more could you want? Well, it would be nice to have something which isn't a conversion.

and ideally a totally original idea. Well, I expect most CIB owners are first-time computer users, and you may well be happy to play versions of the classics for the moment. I'm looking forward, though, to seeing more originals and fewer clones on the CIB.

Program: Galaxians, CIB
Supplier: Solar
Price: £6.95
Graphics: ★★★★★
Sound: ★★★★★
Gameplay: ★★★★★

Magic!

It's some time since Palace's last release, last year's successful The Evil Dead. The time taken to develop the follow-up, Cauldron, is some measure of the huge amount of effort which has been put in by what must be one of the most talented programming teams in business.

Cauldron is an arcade adventure in which you play a

witch with a leadable amble — to become Witch Queen. You must fly around the world — a beautifully-detailed scrolling background — seeking magic keys which enable you to enter more screens in search of the ingredients necessary to make a potion. The way is blocked by hostile bats, birds, pumpkins and ghosts, among other nasties.

Every aspect of this game shows incredible attention to

detail — the shifting mists, hilarious title screens, brilliant animation, ingenious plot and clever designs. Most of the ran-



doms to finding out what you're trying to do, so here are

a few tips — don't try to mount your broomstick until you're on a safe spot, and work out early on how to replenish your magic powers as you'll soon run out of bags.

Magic — go out and buy it instantly.

Program: Cauldron, 64
Supplier: Palace Software
Price: £7.95
Graphics: ★★★★★
Sound: ★★★★★
Gameplay: ★★★★★

Off-base

Imagine it back — in some far time — with this effort, which in the final days of the original company was taken to the States in order to try to raise some financial backing. I don't know if they had any success, but you can see the point — the game is so American that it would be more appropriate coming from US Gold.

This is a complete implementation of a non-league game of baseball, including one and two player options, selectable team colours, control of the batters and fielders, and all the excitement associated with American sport — shrewdness, flag-



waving, patriotic music and all.

The action is represented in a perspective view of the whole field, with close-ups of the batter's diamond on a quasi video screen. If you're pitch-

ing, you can control and see and height of pitch with the joystick, and if you're batting you can control the hit and the runners. The skill lies in either watching or fielding the ball and knowing it on the pitcher

or the appropriate base, but beyond that I have no idea what's going on. Baseball is fairly similar to rounders, but the selective recipe (no commentary, and the game manual doesn't actually tell you what you're trying to do, it wined in vain for the promised demonstration to appear).

So what we're left with is a graphically interesting, generally well-performed game which is absolutely baffling. If you don't know, like me, what "steal", "slide" and "post-field" mean, all I can advise you to do is to read "Peanuts".

Program: World Series Baseball, 64
Supplier: Imagine
Price: £9.95
Graphics: ★★★★★
Sound: ★★★★★
Gameplay: ★★★★★

Running

Loke Runner is pretty long in the tooth, however, it's been a huge success in the States, and is now available through Aristonart.

It's the great-granddaddy of all laid-on-and-play-for-no-games, with your intrepid hero scampering up and down ladders collecting chests of

gold. To permit an agent of the bungling Empire, who will clutter you with a chance. Their movements are pretty intelligent, so you'll need to trap them by digging holes with your laser gun. This will trap them and force them to drop their gold boxes, which you can then pick up if you move fast. You must beware of falling into your own pits.

There's a full range of player

options including extra lives, next level, spiral control and so on, plus a continuing feature



which allows you to design your own screens.

Although I wouldn't

normally recommend this sort of game, since it's an idea which has been very much overused, Loke Runner is surprisingly enjoyable, and it's certainly fun playing it again.

Program: Loke Runner, 64
Supplier: Aristonart
Price: £11.95 (one), £24.95 (disk)
Graphics: ★★★★★
Sound: ★★★★★
Gameplay: ★★★★★

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The kick inside

There have been a few attempts to set computer games inside a computer before now, but none have coded up as well as Alligata's *Hypocyclot*. It's not that the layout of microprocessors, data buses and resistors is

particularly realistic — unless your 64 is some kind of extra-terrestrial expert version, the inside won't look anything like it.

However, the graphics are very colourful, and the baddies are fast-moving and particularly nasty, including distractions, charges, lightning, poison and status spikes.

You control your patrol craft around the circuit. It flips its face in the direction you're moving, and releases powerful

energy bolts along the circuit. Some of the baddies follow the lines, and will be easily spotted.



Others fly along above the circuitboard, and take much more skill to destroy.

The ultimate aim of the game is to destroy all the 50 baddies in each wave and protect your base. There are various bonuses, extras for hitting particularly nasty bugs, and so on.

Watch looking out for...

Program: *Hypocyclot*, 64
Supplier: Alligata
Price: £7.95
Graphics: ★★★★★
Sound: ★★★★★
Gameplay: ★★★★★

Rootin' tootin'

Tycoon Tex is one of the better C16 efforts so far. Released by Gemline at the same time as two other C16 programs, *Nargon Wars* and *Perils of Doom*, it's also a reasonably original idea, which makes a nice change.

Tex is a gun-toting oil tycoon whose mission is the control his pipeline defouling it from all sorts of horrors — breaks in the line, booby springs, fighter attacks, aces and bombs.

You control Tex's speed as he dashes along the pipeline,



and make him jump to avoid the breaks. There's a time limit for the completion of each of the three stages — desert, ice

and surface — but as you increase the pressure in the pipeline builds up, so it's more likely to burst. If the oil

pressure drops to zero, or if you run out of time, you're lost.

You have six lives and ninety-nine levels to complete, with options including keyboard joystick, sound on/off, and so on. The background graphics are nice though the foreground characters aren't remarkable, and the sound's OK.

All in all, it's a decent production, and I suppose we should be grateful that the basic idea is fairly original.

Program: *Tycoon Tex*, C16
Supplier: Gemline Graphics
Price: £8.95
Graphics: ★★★★★
Sound: ★★★★★
Gameplay: ★★★★★

Bumper cars

Krazy Kar is a version of the ancient arcade game which has been converted for the 64 a couple of times before, notable as *Bumping Buggies* from Bubble Bus.

It's a very straightforward game, in which you control a car over on a road/rail from

above. You steer from left to right, and can also accelerate and decelerate using the



joystick. Once you reach a certain speed, you are able — goodness knows why — to

jump over your opponents, all of whom are land locked.

The opponents come in various shapes and sizes, ranging from towers to tanks. They all appear to behave pretty much the same though. You can destroy them by nudging them into the crash barriers, although this will cause you to lose speed.

There are narrow bridges and water jumps to negotiate before you get to the end of the course, and there are four

phases — the four seasons — to complete. The music is nicely orchestrated, but was "Chitty Chitty Bang Bang" a contemporary classic?

Very simple, but interesting graphically, though not interesting in play.

Program: *Krazy Kar*, 64
Supplier: UKC
Price: £8.95
Graphics: ★★★★★
Sound: ★★★★★
Gameplay: ★★★★★

In the pipeline

This is a follow-up to the original *Super Pipeline*, which was much praised when it came out last year. I can't see any point in covering the original buying SPL, but for those of you to whom it's new, here's a résumé.

You control Foreman Fred as he patrols a water pipeline. A tank at the bottom top of the screen unloads into the pipe, which winds across the screen to a barrel at the bottom. The pipeline is attacked by multi-talented nasties including pneumatic drills, sawpills and showers of tanks, which damage the line and let the water leak out. You must lead a workman to the leak, and defend him with your pegger until he's fixed the break. Once the barrel at the bottom has

filled with water, your workers jump up and down with glee and you move on to the next screen, which features a longer



pipe and more, nastier enemies (including the infamous Vesuvius Pipe Spitter).

The whole game is

accompanied by the excellent theme music which is Tardus's trademark, in this case a medley of ragtime favourites.

Jolly good Fun it it's new to you, but, as I say, hardly such a huge improvement on the excellent original that it's worth having both.

Program: *Super Pipeline 2*, 64
Supplier: Tardus
Price: £8.95 (vnc), £11.99 (disk)
Graphics: ★★★★★
Sound: ★★★★★
Gameplay: ★★★★★

Rock on

Rock'n'Bob is the latest from Activision, and features the usual high standard of graphics and music.

It's a bit American, since the theme, high-rise construction, isn't really a familiar one for the UK audience. Still, certain things are universal. In this

case you have a 100-story building to construct, and you can play either against a clock



or to score maximum points with the lines allowed. Each

storey has a blueprint, and the girders slide around the floor forming and reforming patterns. You have to control your little man to lay on the girders, and twist around so the stress is fixed in the right place according to the blueprint.

Some of the storeys are three screens across, so it gets pretty complicated, and you have to be prepared to twist down girders in the wrong place and

rearrange them later.

The whole thing is accompanied by breathtaking music of a really high standard, with some effects I've not heard used on the SLD chip before.

Program: Rock'n'Bob, 64
Supplier: Activision
Price: £5.99
Graphics: ★★★★★
Sound: ★★★★★
Gameplay: ★★★★★

Whirlybird

Super Hero is a very complex and challenging helicopter simulation, which, due to Quind US's non-exclusive licensing agreements, is available over here both from US Gold and Audigonic. Don't be confused when you see the two packs side-by-side on the shelves; the game is the same in each case, but Audigonic has used two cassette and US Gold one.

In each case you are presented with a detailed cockpit display and well animated background graphics. There are over 39 missions to mission, showing details of radar, bombing patterns, of

temperature, fuel, armaments, speed and so on. You use the joystick for main control, and



can select from four missions. In instruction mode, the on-board computer takes you through a series of exercises

designed to familiarise you with the vehicle. Explanation lets you explode and map out

demands that you reassemble and defend the area surrounding a secret desert base.

The game obviously sets out to be as realistic as possible within certain limits, and it succeeds in so far as the complexity of flying a helicopter is concerned. Bearing that in mind, this certainly isn't a game for fans of the million tapper — it's a simulation which will demand a great deal of effort to master, and will prove very satisfying if you're willing to put in the effort necessary.

Program: Super Hero, 64
Supplier: US Gold, Audigonic
Price: £19.95, £8.95
Graphics: ★★★★★
Sound: ★★★★★
Gameplay: ★★★★★

Shadows

It's interesting to compare Shadows to Ultima's Staff of Karnath. Both are multi-screen arcade adventures involving a lone hero threatened by various monsters, searching a mysterious landscape for magical items to help him complete a vital quest.

In the case of Shadows, the hero — in fact there can be up to four players — moves

around the land of Andas through scenes of forests, mountains and wastelands. Using



the joystick you can aim and fire your crossbow (if you can find it), and control keys allow you to open chests, search for

invisible traps, get magical objects, inventory your possessions, plant with monsters in novel options this, but not half as much fun as hacking them to death, and look for secret entrances.

The monsters aren't that terrifying if they tend to snipe at you furiously while making whining noises. The worst are the Shades, which will whisk you off to a previous location, meaning that you have to retreat your steps.

There's a save-checking your experience and strength, and you'll die if it falls to nothing through too many encounters with monsters. Overall the game does an quite interesting, though it hasn't been received with much fan.

Program: Shadows, 64
Supplier: Durell
Price: £7.95
Graphics: ★★★★★
Sound: ★★★★★
Gameplay: ★★★★★

Clam jam

Greg's Revenge is the sequel to the first game based on the popular American cartoon series BC, Quest for Tires. I'm not that familiar with the cartoon, so some of the funny go over my head entirely — why, for instance, does Thor, the everman searching for the meaning of life, have to collect

clams? And what has to do with the Scroogian Grog?

Well, the game's quite playable. Thor roams around on a unicycle, and you must control him along the mountain paths and through the darkened caves in his search for clams which he ground randomly. A map of the mountain helps you avoid the horrible Grog, but only your skill with the joystick can stop you from plunging over the cliff or heading into the wall.

Once you've collected enough clams you can pass over a tollbridge onto the next screen, where you're



controlled by Trindocytic. This is the latest in a line of computer games which I feel are only over partially

successful — like comedy records, once you've heard the joke once it ceases to be amusing. Still, you might want to ring along with the chorus, and in the case of Greg's Revenge there's enough skill in the game that you may well be tempted to "play it again".

Program: Greg's Revenge, 64
Supplier: US Gold
Price: £9.95 (one), £14.95 (two)
Graphics: ★★★★★
Sound: ★★★★★
Gameplay: ★★★★★

Your starter for 64

Trevor Doherty reviews Precision's Superbase Starter, a budget introduction to the pleasures of databases

A DATABASE package will allow you to store, sort and retrieve information — in fact to generally manipulate all sorts of records of all sorts of things. Coupled with a spreadsheet and a word processing package, almost any task requiring organised your home or business can be carried out. Of all the database packages available on the 64, Superbase has long been my favourite; easy to get started with, but where you become experienced it is capable of carrying out the most sophisticated data-processing tasks. In fact, for some home users Superbase is probably too powerful, providing many facilities that are rarely used. Precision Software has recognised this and come up with SUPERBASE STARTER (D39.95, disk only). This should open up the pleasures of using this highly regarded product to many who have hitherto at the £90 price tag of the full Superbase.

Superbase Starter comes complete with an excellent manual, the first section being a tutorial to get you started, and the rest of it is a detailed reference section. There is a good index. When you send off your user registration card you can also obtain an audio learning cassette for £4.99. As if this weren't enough there is a 'Help' screen explaining each of the main facilities. The manual takes you through setting up your file file; the inevitable names and addresses file which is probably one of the early ones you will have for a database.

The procedure is very simple; first design your record layout on the screen (each file can have up to two screens of data per record), decide how long you want each piece of data to be, whether it is to be letters or numbers, or both. Then you have designed the screen you can set colours to highlight certain fields if wished. The file design is then saved and data can then be entered.

Each file can have up to 64 fields with a total of 1800 characters. A database can have up to 33 files associated with it, the number of records per file only limited by disk space. Once you have set up your data it can be recalled, individually user record at a time, or records matching certain criteria can be selected and output to screen or printer. A screen dump of any record can be done at any time. Calculations can be

carried out, either as part of the record (for example a 'total' field derived by adding up several fields) or on a selection of records within the file. Events can be easily modified or deleted, and it is also possible to add further fields to an existing file once it has been set up and containing data, a feature rarely seen on database products.

The operation of Superbase Starter is via a series of menus accessed by the function keys, but you can also enter commands

Superbase Starter contains the convenient software.

Also included on the disk, is a label utility which enables you to select fields from the required records in your file and produce labels. You can also buy 'Shipping Labels', ready to run applications for two different business tasks at £9.99 each. These include 'Club Membership', 'Estate Agents' and 'Cash Book'. There is also available for 'Sharebase' application packages covering such things as record collections etc. There are three applications on each Sharebase disk at £17.95. Once you have bought Superbase Starter you can upgrade to the full Superbase for £29.95, or just add an additional 'start' and a 'report' facility at £9.99 each.

The main difference between Superbase Starter and Superbase is the programming, reporting and advanced writing facilities which exist on the full version. Superbase allows four screens of data per record with up to 127 fields, duplicate search 'keys' and has a macro writing facility.

Precision has just released Superbase 2 with some additional utilities. Existing users can upgrade. How can you decide which version you need? Unless you have a very complex application in mind, probably Starter will be all you require. The programming facility in the full version is a real boon if you have to run a lot of repetitive tasks on a large database, or set up custom designed applications to suit your particular requirements. It is easy to use, being an extension of Basic.

I've really got to grips at all about Superbase Starter, and would recommend it in preference to Micro-Magic (Available) at the same price, which I found difficult to use. Doherty's DPM is cheaper (£24.95), and good, but only offers a fraction of the facilities of Superbase Starter. If the American PFS:FILE (Software Publishing, £74) were cheaper I might consider that as an alternative. The upgrade policy, ready to use applications and the ability to link with other software, particularly Easyscript, is a real bonus for Superbase. As it stands, no contest; if you want an easy to use database for your 64 which provides powerful facilities I would say Superbase Starter won't disappoint you. ■

directly thus avoiding the menus, a feature I much applaud. The 'maintain' option allows you to carry out backups, format disks, look at directories and most importantly to 'import' and 'export' files. This important facility means standard sequential files can be read in to Superbase Starter, maybe produced by a spreadsheet.

Upgrade

Similarly you can 'export' data to other products, such as a word processor. If you are using Precision's own SuperScript or EasyScript word-processors, there is a special facility which lets you, for example, write names and addresses to a 'DB file' which can then be merged with a standard letter to produce personalised mailshots. A most comprehensive range of printers is supported, standard Commodore, RS201, and Parallel (Centronics) interfaced. If you have a Centronics Printer you can use a cheap cable on the user Port, because

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Electropop on the 64

The month's creative focus is on micro music, with an exclusive preview of Island Logic's Music System, a round-up of keyboards, and the latest on MIDI interfaces. Band aid courtesy of Mark Jenkins and Chris Jenkins

ISLAND LOGIC'S Music System for the BBC II seems to probably be the best sound package available for that relatively limited machine. Given the superior SID chip and extra memory available on the 64, there's no reason why The Music System couldn't become a very powerful piece of software.

Well, it's not only powerful — it's AWESOME (this term, normally reserved for Jeff Minter games, is being used here for the first recorded time in connection with 64 music).

The 64 Music System, which should be on the market by the time you read this, not only includes sound synthesis, composition, editing and music print-out features, but has been extended to include MIDI features. As with the BBC version, the whole thing is controlled by pop-up menus and icons which enable you to place on the Apple Mainstage.

Island plans to market two versions, the Advanced Music System at under £30 and the Compact Music System, a one-screen out-down version, at around £15.

AMB consists of six modules accessed via a control screen. Each screen has a command flag which allows functions to be selected, and graphics and icons to show you what you're doing at any time.

The Editor section allows the user to record pieces of music played on the QWERTY keyboard or MIDI synth. Sections can be defined and repeated, and the Postmap allows "cut and paste" functions so that different voices can be assigned to different musical lines. The



Synthesizer offers a large selection of predefined sounds, and full control over the SID chip's capabilities. This module includes a sequencer which allows a tune to be played through while the sound envelopes are being changed — after things there interrupts!

Keyboard

The Keyboard, which can be used with Commodore's Music Maker software, allows music to be played in real time, with the displayed note values changing according to how long the note is sustained (1). There's an automatic metronome to help you keep time.

The Printer allows full musical scores, along with lyrics (if again, to be printed out on a wide variety of printers. There's even a facility for loading your own printer driver software in case your device isn't standard.

The Linker allows large compositions to be made up from different files. Each module can contain repeats, sections, and its own keys and time signatures.

Lastly, the revolutionary MIDI module allows any standard MIDI interface to be

used to control a MIDI equipped synthesiser. The module can be used to record and play back multitrack polyphonic MIDI files. Up to six overdubs can be made, up to a capacity of 4800 notes. MIDI files can be used to play a MIDI synth or the SID chip (at a maximum of three voices, of course). Files can be edited and recombined if desired.

Island plans to make available a MIDI interface which should market at under £30 (compare this with SIBL's £99 interface), though there are no plans to sell this interface in a package with The Music System. The Compact Music System will probably be made available on cassette, and will be similar to the AMB Keyboard module, with around 30 preset tones.

SYSTEM software of Scotland has collaborated with Island's own programmers to produce what may well be the only music software package you'll ever need. Despite sounding fearfully complicated, it's easy to follow the icon-driven program. Cheaper than MusicCalc, offering more facilities than Ultratalk or



any of the keyboard package software, allowing control of MIDI synths (which are now coming down to the £300 price mark), and perhaps best of all, contained on one disk, The Music System may turn out to be the only piece of music software for the 64 that's worth serious consideration. ■

Island Logic, 22 St Peter's Square,
London W6



"ticks and dots" musical notation is very clear, and the speed and accuracy of the scrolling display unmatchable by any other system.



Hitting the right keys

You can't play tunes on a QWERTY keyboard — so which of the many music add-on keyboards on the market is the best?

ASIDE FROM the slimly Music Maker keyboard from Commodore, which is a fine start for musical beginners, there is now a wide choice of full-size music keyboards available for the Commodore 64. However, the hardware tends to be fairly standard, it's the quality of the software and the possibilities for expansion which will probably influence your final choice.

NEI's CME49 is one of the latest contenders. It's a full-sized four-octave keyboard in a slim plastic case matching the popular NEI synthesizers. Coming £225, the CME49 has a positive action similar to that of most modern synths.

Connectivity

The big attraction of the CME49 is its MIDI compatibility. MIDI — the Musical Instrument Digital Interface which has become standard on most synths and computer musical instruments — allows the exchange of note information, tempo, programming changes and so on between instruments from different manufacturers — something of a godsend in the current atmosphere of incompatibility.

The CME49's MIDI connection comes from the cartridge plug which clips into the back of the 64. Unfortunately the MIDI interface itself costs around £100 from NEI, though there are cheaper alternatives available.

The CME49's software is tape based, and contains a master program and library of preset sounds. The main menu offers the options Edit Play, Polyphonic New Sound, Monophonic New Sound, MIDI master keyboard, Disk-Tape Operation, and Help files. Most of these are self-explanatory. Edit Play enables you to scroll through the catalogue of preset sounds, some of which are very well designed. There are good Harpsichord, Piano and String polyphonic sounds, but the best ones, which use modulation effects such as vibrato and tremolo, are the monophonic ones (not only at any time! Mixamo, harmonica and so on). There are also some special effects like UFO and Explosion.

The Edit function allows you to change any of these sounds or make up new ones. Although you can control the Attack, Decay, Sustain, Release, Filter Mode, and so on, not all of the 64's possibilities are exploited — you can't use sound filters or separate ADSR settings for each voice.

The MIDI master keyboard option allows you to define a split point on the CME49, then play two MIDI synths (or keyboardless synths) separately from the CME.

Although the software included isn't very ambitious, NEI has plans for a very extensive, expensive, possibly a second sampler, and so on. Looking at the CME49, you must remember that the software has no compositional elements at all — you can't store tunes and replay them. However, the forthcoming software should allow this, and it's perhaps better to get a simple initial package with expansion possibilities than a spend more money on a seemingly more sophisticated system which might not be expandable in the future.

The LVL Lvlr-1 keyboard is less ambitious than the NEI, again it's less compositional facilities too. It's Organ Master software package, but this time there's no MIDI interfacing possibility. Again, the keyboard, which has a strong metal construction and costs £75, plugs into the card tape port.

Synth

The Organ Master software comes on disk or tape, and has two main modes, Organ and Synth. Like the NEI software, this means a set of preset sounds and a sound editing page. The Organ page allows you to edit the preset sounds, which are packages written by the NEI package's, but also allows preset organ voices, tremolo, and filter on/off. Unusually, there is also a Single Key Chord feature, by which major or minor chords can be played on the filter (I just by pressing one key). An excellent feature for inexperienced players, though not one in which you should place too much reliance — it's not a good way to learn music.

In Synth mode, the bottom half of the screen is devoted to the way for a display of the SID chip parameters, which are controlled by various QWERTY keys.

ADSR, filter, waveforms, sync, envelope, master pitch (the tuning to other instruments) and so on are all set in this way, and can be monitored and recalled by pressing the Synth Voice Index key B. However, it doesn't seem possible to save settings (except to disk for later use).

The LVL system is mechanically sound and bug-free, but seems hampered by the

software author's lack of knowledge of synths. Physically, as "Lvlr", the use of the single-finger chord feature, and even the name of the software package, "Organ Master", betray the fact that he is more familiar with easy-play preset tone organs



LVL's Lvlr-1 system

than with modern synths offering many inter-programmable voices, sequencing, dynamic sound control, and so on. It all adds up to give the package an old-fashioned feel.

Most modern is the Music Maker system from Sequential (formerly Sequential Circuits), makers of the immensely successful Prophet Five, One, Six, Ten, and SixTrak synthesizers.

The Music Maker keyboard is an impressive-looking three-octave affair which plugs into the joystick port, leaving the cartridge port free (though for what, we're made clear).

The software bundled with the keyboard isn't bad, though it's not ambitious. The master display shows a keyboard, a range of eight preset sounds, and parameters for the sound currently selected. The sounds, which include excellent bass and piano presets, are selected using the Function keys. Parameters available to change are attack, release, white noise level, filter amount and volume. It doesn't sound much, but you can achieve some good effects. Why on earth, though, have Sequential opted to use phrases such as PING, PINGAL and DONG rather than the accepted ATTACK, RELEASE and so on? If it's an appeal to a young audience, then I can only assume that American kids are just more relaxed than we've come to assume. Anyway, the package also contains a simple Song Record option, which will record about ten minutes of your finished keyboard-bashing, then play it back in endless loops and you can't take it any more. If this has whetted your compositional appetite, you'll want to move on to Sequential's other software packages to make full use of the keyboard.

Sound Maker gives you a modern-looking screen display with "leads", "switches" and "indicators" which let you



CME49 screen, background, the keyboard

control all the parameters of the SID chip. Again, there's some unnecessarily childish phraseology, such as **WIND** for white noise, but overlooking that, the package is very good. Having designed the sounds you want and stored them out on the keyboard, you can then save them to disk for use with the compositional packages.

Song Builder allows you to GET sound effects from disk, play music against a metronome, save the results and then recall them for arrangement into complete songs. Song Sections are made up of pieces played on three voices, and sections can be chained to make a Song. Any Section can be transposed when the Song is created, so you don't have to play the same piece in different keys. The results which can be achieved are very impressive, since each Section can use different sounds, at different volumes, different tempi, and so on. The final pieces can be stored, and then edited using the **Song Editor** package.

Song Editor can store up to five edited songs on each disk used. Once you've selected the song you want to edit, a screen display shows the whole score in the form of conventional music notation, which can then be edited using functions and cursor keys.

Printout

The final package, **Song Printer**, lets you take those edited songs and make hard copies of the scores using a Commodore printer — or, if you have a suitable interface, practically any high-quality dot matrix device.

In total, the Sequential Music suite and software packages seem to cover just about everything you can do with the SID chip apart from driving into MIDI. Why bring out the packages on separate disks, though? I expect Sequential would argue that in that way, you don't have to pay for any packages you don't want. But since the



The Music Menu system with an example score printout

system forms an integrated whole, it would be foolish not to have all the packages, so I suspect that Sequential will end up making more money than they would have by integrating everything in one.

The first Commodore 64-compatible music keyboard to become available, the Autographic Microsound system, still has a lot more to offer than many other systems, including keyboard-mounted modulation sliders, a sound sampling option and possibly MIDI. However, since we're still waiting to see a working model of the completed system we'll leave the Microsound for another time.

With American, Italian and English products already on the market, and more such as the MusCalc ColorTone and Melodius probably on the way, musical 64

owners can't say they don't have a choice. The perfect system hasn't yet been produced — all the synthesis, composition and printing software on one disk, a compatible keyboard with MIDI interface built in, and so on — but no doubt it's on its way. The Japanese haven't had a go yet...

SIBL: Alted Depot, Brigade Road, Inchoewadi, Harley, Surrey, GU97 7R4110

LVI: Scientific House, Sandiway, Nottingham, GG25 998X00

Sequential: Postbus 30, 7040 AA Nijmegen, Netherlands

Tek's invaluable music box

IT'S ALL VERY well producing beautiful music using the 64's SID chip, but how do you save it for posterity? Filing on tape or disk is possible with some music systems, but most music makers will want to keep a record on audio tape.

This is where the Ducas+ comes in. It's a tiny black box with a switch and a button, featuring three trailing leads. Two connect to the DIN sockets on the back of the 64 — you'll have to disconnect your disk drive to use the Ducas — and the third lead is fitted with a five-pin DIN plug which will connect to most modern tape recorders.

When the switch is placed in the Audio position, you can record music tracks from your favourite games, or your own



compositions, onto audio tape. You aren't restricted to just the SID chip's three voices; it's possible to produce multitrack recordings up to three channels.

Tek Services, producers of the Ducas+, will be demonstrating the unit with music produced from SIBL, MusCalc and LVI at the Commodore Show on June 7th, 8th and 9th at the London Newrad.

The Ducas+ also includes a reset switch, and comes with a cassette program, **Reset**, which allows you to retrace programs which have crashed. Using the unit in the Digital position, it's also possible to produce back-up copies of your programs.

The Ducas+ costs £15.95, and is available from Tek Services, 18A, Appold St, Brick, Kent, G82Z 9J1818. Tek also supplies a range of adapter leads at around £4 each, which will allow tape recorders without DIN sockets to be used with the Ducas+.

Mixing with the big boys

Allen & Heath Broadcast's CMC 24 mixer interfaces with a 64 to make automated mixdown affordable for the serious studio musician

ONE NEW application for the 64 in music production takes owners into the realm of the massive professional studio — Allen & Heath Broadcast's latest mixing desk gives you the chance to produce a fully professional automated mix of any piece of music, however complex.

When you're dealing with several synthesizers or other instruments, effects units, a multitrack tape machine, and so on, there has to be some way of pulling together all

you to list what instruments or band members are connected to each channel.

About the Track and Take Indes, we come to the Route Patching, which controls the input-to-output assignments; there are 26 Route Patch memories and 164 Mix Patch memories available, with every channel listed and the symbols "I" and "M" representing On and Off for each channel. All you have to do is place the cursor over the channel you want to change and press the space bar to alternate between Open and Closed.

Master patterns can be changed to disk or cassette and you can put a name to each set, most obviously a song title. The most exciting part of the firmware, though, is the Sequencer, which allows you to store a sequence of "Events" (synthesizer notes or note patches) and step them along manually or from an interval or external clock — the computer can either follow the Beat Per Minute of your piece of music if you know it, or lock up directly to a drum

machine (although this needs another cheaper interface, the CMS 24).

The design of the mixer makes this



Commodore-controlled package unique in home and semi-pro recording. The setup may seem expensive, but it offers 64 users facilities otherwise unavailable without spending ten times more. ■

Joreth Musk, 40 Brunner's Lane, Bishops, Evesham, Warks, 0546-01603



Electronic Music on the Commodore 64
by Mark Jennings
covers music programs, software and programs up to £100 (28.80 from bookshops or by mail from Computing Books, 12-13 Lytton Ave, 90-91 St. James St, London WC2E 9JF, 01-403 616 for info).

the possible sounds, sending them to various outputs and balancing the volume and level of all the signals involved.

The problem with multichannel mixing is that it's an art designed by an octopus for an elephant. Apart from leading sight hands to keep control, you need a prodigious memory to recall all the changes needed even in a five-minute song. The computer specialises in infinite memory and in handling signals, so microprocessor technology was called to the assistance of the mixing engineer relatively early in the day.

The CMC accepts 24 inputs from various instruments or effects and can add six effects in any sequence to each input signal and combine the signals and effects into any one of sixteen outputs. It's ideally suited to the Powers 64S recorder, the cheapest 16-track machine now available at around £1,000. The design is very compact, so the top right hand corner there's an onboard memory section, which allows you to store sixteen patches of "Mix" and "Route" information.

Digital

The digital memory aspects were initially overlooked to save space, large numbers of routing switches making for an unwieldy design, but the memory system has its own advantages, particularly when you put the 64 in control. A multiway plug in the side of the mixer gives control to the 64 in conjunction with a CMC 64 interface carrying firmware for complex multistep functions; the interface is around £200, but as free spare you having to load software every time you use the computer.

The first main display in firmware is a Channel Index with the date and time at the top of the page; this is simply a space for

Joreth's MIDI link-up

The Joreth Music Computer system for the 64 consists of two parts, the AL25 MIDI interface which plugs into the 64's user port, and the disk software. The interface has sockets for MIDI IN, three MIDI OUTs, Roland DIN sync IN and OUT, a footswitch jack for the "drop-in" facility, a status switch, line synchroniser, and a "panic button".



For what does the system allow you to do? Basically, in conjunction with a MIDI-equipped synthesiser, plus optionally a Roland or MIDI drum machine, the Joreth system functions as an eight-track step-time or real-time recorder, with a capacity up to around 6000 notes. You stretch this limit by using repeating sections of musical information, or by linking systems together to give you sixteen-track capability.

The first display asks you to select real time — in which notes are recorded exactly as you play them on the synth keyboard — or step time, in which each note played is assigned the same time value on playback.

The main system page allows you to determine your recording options, note resolutions and tempo.

All you have to do to record a piece is to move the cursor to RECORD, press RETURN, enter a track number from 0 to 7, choose a number of beats for the cue signal, and answer "Y" to the "NEW TUNE?" prompt. Then begin to play, and the system will record your performance on the synth.

To override the remaining seven tracks you follow the same procedure, with a display at the top of the screen showing the memory space remaining. Real Time mode has varying "quantisation" of the notes to pull them into more precise time if you wish. Step Time mode is actually a modified version of Basic called Composer, which allows you to type in lines such as "E4G4C4" to define notes, or to play them on the MIDI synth's keyboard.

Conventional musical notation is used to display your compositions, and staves can also be hand-coded to a Commodore printer.

Although the Joreth system has been criticised for using idiosyncratic terms such as "part" for track and "line" for sync, it's very powerful and can be customised by users with enough knowledge to exploit the operational routine information provided.

Allen & Heath Broadcast, Pembroke House, Comptonwood Road, London W8, 01-546 3291



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commodore

A QUESTION for you — what's the best game for the CBM 64? Chess? (hears) Hold over! Manure? Rocketball? Football Manager? You name it... ask any ten owners and the chances are you'll get ten different answers, and it's the same with all the other popular micros. Everyone has their own favourite. There is, of course, one exception to this Cook rule of thumb.

What's the best game for the BBC B? No competitors: it has to be Elite from Acornsoft, the trading game/shoot-em-up/flight simulator that almost made the BBC machine worth buying last Christmas, which received nothing but universal accolades from press and public alike last winter.

Elite on Commodore 64 users should feel aggrieved no more, as that masterpiece of programming is now available as a Firebird Gold Edition version by the same Cambridge team of Budge and Bell as from May 20th.

It really is very difficult for even the best programmers to take a game written on one machine or processor, and transfer it to

another without losing that certain something that made it so good in the first place. For every success — see Tit Na Nog or Lords of Midnight — you could name just as many failures. Ghostbusters being a celebrated example. That particular basket job had every 64 owner rolling in the aisles with great mirth over the Spectrum version, the said Sons of Sinclair being as sick as the proverbial nautical avian. So, it was with great trepidation that I approached the whole idea of playing a conversion of my favourite game.

Sometimes it didn't seem right that I was sitting down in front of a Commodore (all all things), getting ready to blast Thargoids and maybe make a few fast credits trading scenarios.

While the game was loading I took a quick look at the accompanying literature. The same familiar Elite logo and artwork — good. A similar Space Traders Flight Manual — nice clear instructions well set out — again good. Ah...not so good...the same Acornsoft. Top-notch-Girl-invest-Thargoid Robert Holdstock scenario. Space

ELITE



The best of mobile

opera at its worst, recommended only for the control tips heavily voiced within its 48 pages.

The game had finally loaded, and I was met with a very BBC-like display, redesigned character set and all. Very impressive, but how did it play? After the first forty into the unknown, it became obvious that despite being made five or ten years slower than the 6400, with CBM Elite, Firebird have a very successful conversion on their hands. The marginal loss of speed has been compensated for with the enhancement of a number of features which like all good conversions



Space cadet John Cole of interstellar fame



Elite programmers Budge and Bell worked on the 64 conversion themselves

take advantage of the machine's strong points — in the case of the 64 — music and colour.

The main ship display is laid out exactly the same as before, with the black and white 'vector-scan' line graphics on the upper half of the screen (well, black and white until something moves up) and the familiar instrumentation on the lower half. Here a little variety has been added, with the various flight parameters displayed in different colours. The main scanner also shows minor changes for the better — meteors being displayed as red flags, Thargoids as green, and other ships in the familiar yellow. It's a shame that this new target discrimination didn't extend to enemy pods...but you can't have everything I suppose.

The other obvious differences are the on-screen laser sights in different patterns for each type of weapon and sound in different notes for each. Cinematics may be, but not. Some music might be included



Control the **gameplay** and warfare



Play in 3D so that they're really worth out for the Thunder

The greater extent of the Elite universe

GAME: Elite
MICRO: CBM 64
PRICE: £14.95 tape,
 £17.95 disk
SUPPLIER: Firebird

included within the game, tasks that will be given to you as you roam the galaxy...I won't spill the beans, but they sound great fun.

The leading aspect of the game has generally been left well alone, with the exception of a small pointed description of each planet when you call up the data on the system, with slight corrections of Hitch-Hikers Annual omissions. For instance, Linnit is said to be 'habited for its Zero-G Crickets and Linnian Ethel Juice.' While 'Orrery is a dull planet.' These certainly liven up the early hours of the morning when you are still struggling to scrape up

enough cash to buy yourself a military laser.

I have to say that despite expectations, I found Firebird's 64 Elite just as absorbing and challenging as the original BBC version, and it can get no higher compliment than that. It is slightly slower, but not (to my mind) significantly so, and the extra features certainly make up for this shortfall.

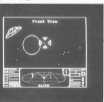
Finally, one little Elite extra I haven't told you about. Does anyone remember Tribbles? And/or Star Trek fans will know what I mean. Good luck Jim, and beam me up. ■

in the final version (remember 2047) but this has not been finished even at this stage.

As far as combat goes, the programmers have taken advantage of the extra memory available to them, so that CBM Elite has all the ship types present in the flight manual...until the BBC tape (not disk) version which gave you Cobras, Pythons and Vipers...and that was your lot! Watch out for the Ferdlancers and button down the hatches I say.

I would advise against using your previous Energy Bomb on Thargoids as well — because it doesn't work! Not a bug, just a touch of mischievous programming seditism. Before we get thousands of 'unfair to traders' letters, there is the plus side that the version for combat testing (Hannibal to Elite) has been revised so it no longer is just an straight number of kills, it's now done on a points system — and the harder the opposition the more points you get. Two 'Special Missions' have also been

The alert range when shows your choice of trading points



Approaching the planet you can into trouble with pirates

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I HAVE this theory that the type of people who enjoy playing text adventures are the same kind that like doing cryptic crosswords and word searches. The sort that would cancel an exotic holiday in order to take up the opportunity to do a Mast jig.

It's not to say that I don't enjoy an intellectual challenge. I read the first chapter of "Zoe and the Art of Motorcycle Maintenance" along with the best of them. It's just that I don't like blithely throwing myself at the mercy of some hapless programmer's idea of English Grammar and my own dexterity, as the combination of the two has proved, on several occasions, almost fatal.

Extensive research in this area has shown I am not alone in this opinion — and that's why I think Beyond are on to a winner with their new icon-driven adventure — Shadowfire.

"User" has become something of a byword recently, as perhaps it deserves some explanation. An icon is a visual representation of an object or action which is used to replace text input by the user. This type of system was first extensively used on

screen displaying the icons in your possession. No moving around with "get tool" or maybe "pick up tool" or even, "looker implements."

This idea alone would make Shadowfire interesting, but combine it with the novel futuristic "Mission Impossible" game concept, impressive graphics and sound (very well implemented) plus an optional software add-on to re-write the script as you desire full courtesy of the talented Liverpool based Dream Designs team and you are getting towards another "Gem of Midnight" type hit for Beyond both in terms of quality and originality.

Within the game, you control a team of six characters: two humans, one insectoid, one alien and two robots — a track team chosen by Empress, 'a shadow organisation dedicated to the Emperor's service'. The task is quite straightforward — you must rescue Ambassador Kryzik held prisoner aboard Zoff V, the skyscraper of the evil General Zoff, recently of the Imperial Navy. Kryzik has plans for a non-loyal private hidden in a micro-droid embedded in his spine, plans which could mean the end of civilization as we know it.



SHADOWFIRE

Beyond wrote an adventure — then got rid of the text. John Cook explains icons

"executive" personal computers, such as the Apple Macintosh, and is only now beginning to move downwards towards the home market.

In Shadowfire, if you want to pick up, say, some tools, you move the cursor to a picture of a hand carrying a cog, press fire, move it to a picture of some tools, press fire again, and hey presto, it happens — the tools are now shown on the part of the

Naturally, Zoff V is very well defended ... and you don't know where the Ambassador is being held prisoner ... and just to make things a little more difficult, you have just one hour and forty minutes real-time to complete your task.

The team starts the game onboard their own space craft moored alongside Zoff V, so the first thing to do is to get the team onto said skyscraper using the transporter. The only character that can operate the transporter is the dried blama, and naturally, as your main task is to get the Ambassador back to the Empire ship, if Mama gets taken out prior to that, you're lost.

Controlling the characters using the icons



Mast

system is really a lot easier than it first seems. I would guess it takes people a full game of constantly referring to the manual (well-written and set out incidentally before the tool really comfortably using it, but once mastered, it's a piece of cake.



Zoff



The movement screen offers directional control

Also the 3D screen, you're in your zone



GAME:
Shadowfire
MICRO: CBM 64
PRICE: £9.95
SUPPLIER: Beyond

The cursor, controlled by joystick (although there are keyboard and lightpen options) is limited to the bottom half of the screen, the top half being a permanent Mission Command screen. The left-hand side of this screen shows the stats of each team member (Attacking, Moving, Waiting, etc), and the time remaining (with pausing when it gets below 00), the remainder being taken up with a window through which short messages will automatically scroll. The middle of the Mission Command Screen is occupied by a full colour display which shows the immediate surroundings of the character you are commanding at that time in play view, a graphic of that character taking up the right hand side.

First of all, you select the team member you wish to command by placing the cursor over the appropriate graphic, and pressing fire. You then are shown that character's status screen, showing their Strength (if it reaches zero, they're dead), Agility (speed of movement), Stamina (roughly, endurance) and Weight carried.

Each character starts off with different statistics — Terk and Serriva, fast but weak — Mand, slow but powerful — Syllk — an all-rounder, Marco — invulnerable, but vulnerable — and Zerk, talented negotiator. Much of the enjoyment of the game comes with learning how to balance the various talents of the team with their weaknesses, as they battle their way through ZerkTV.

The status screen also has options to

move onto any of the other three command screens for that character (Hijack, Movement or Combat) or exit to select another team member.

The game itself plays very well ... you soon become absorbed into the Mission (especially at night), as you may require time to find Koyck. Make a map, and guard Serriva (backsmith extraordinaire) and Marco ... not forgetting that Zerk also has his linguistic uses. As for the others, well ... it is after all a sci-fi mission.

For those of you who are going to find it too easy, Beyond and Terkon have come up with a little extra in the shape of the Shadowfire Team.

Originally developed by Dave Cockleugh, the game's programmer, as an in-house utility, it allows you to change the strength of both the team and Zerk's defences, relocate objects and weapons ... generally make a really difficult (or impossible) Mission will have to wait until August for this team though, as Beyond wants you to get into the game on your own first.

So there you have it. A gripping adventure with no text, great graphics and a whole lot more.

For those into one-upmanship, no, I haven't beaten Koyck yet ... but I'm close, and I'm not going to give up until I do. Now where did I put that joystick ... somewhere back in the Golden's Dungeon was it? ■



The upper screen allows selection of teams and weapons.

The character screen shows which member you control.

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REVISION Corrections of a printing error. I would like to see the printer's control codes. If you're not in the mood for updating and checking files, then you can use the 1500 pin cartridge. There is all for you! Generally, the use of the code for help of the printer as you may using your printer in the system. Of course, you can still use the utility as though the error features don't exist. We don't aim to change condition... for each. However way you want to use your printer, you'll find the way with CENTIPEDE.

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Watch and Marvel

Super-heroine Barbara Conway weaves a tangled web with Spider-Man, visits the Emerald Isle and rediscovers The Hobbit.

POW! ZAP! KERSPLATT! Oh, terribly sorry, didn't see you there. I was just getting into the spirit of Quesada's latest brain-buster, hereinafter than most vulnerable of super-heroes, Marvel Comics' **Spider-Man**. It so happens that I'm a lifelong fan of Spider, and the wonderful world of Marvelism (and scoring and try reading 'em, you may well get hooked too) so I have been awaiting this latest adaptation from Steve Adams with keen anticipation.



Also, before you get into any further with any of the above mighty villains lined up against you, check that your own defences are intact. One of Spider's most valuable talents is the ability to throw synthetic webs at people and objects. Are you in a position to justify your nickname of the "wall-crawler" and, if not, how do you rectify the situation. And remember that, in the likes of you, climbing the wall is a simple procedure.

Spider-Man is illustrated by clever Marvel-type pictures which can be influenced by the player since items reflected will vanish from the screen. The instruction format can be considerably more complex than the usual verb/noun.

Initiates will find the accompanying mini-comic, which also contains a brief overview on the characters, fairly helpful although it has little direct bearing on the plot of the adventure. But it does give you general hints about the screen, and limit-



ation, of your powers as you assume the identity of Peter Parker, freelance photographer and super-sleazy super-hero, as you find yourself facing the likes of Otto Octavius (The Doctor) and the Emerald Entity while trying to collect and save the elusive gems. Again as in The Hulk, you will also find a bio-gem protected by a highly volatile Comic-Flag which is set to expunge anyone trying to grab the jewel.

You can talk to other characters and bring commands together e.g. "Talk to Madame Web then go South". The disk version for the 48 has the facilities to scan all the graphics, although commentators miss out on this useful time-saver.

Read the accompanying documentation about Spider and the cast-list very carefully since, without getting an important hint about the way to get certain of his powers, you may very well find yourself helpless against the villains. However many enemies you defeat, you only score points when you deposit the gems in the right place under friendly eyes.

I found Spider-Man more enjoyable than The Hulk, with plenty of puzzles and some superb graphics. Just remember, don't try to play in the sun! If you don't know who it's best!

Back to home ground, and the good news is that Level 9 Computing have brought me another game, this time a one-off adventure called **Emerald Isle**. The name-to-good news is that, although this package is well above the average standard, I'm not convinced that it meets the level of excellence we have all grown to expect from the Austin clan.

The Emerald Isle is hidden somewhere in the Bermuda Triangle, and you, as the innocent pilot whose craft has crashed into a mangrove swamp on the good, must either survive all its hazards to become King of Queens, or session at Level 9's or otherwise in mindless fate which normally punts the island's involuntary visitors.

The game is liberally illustrated with high-quality graphics which can be viewed off with a "word" command and the comment says that it is designed to be "slightly easier to solve" than previous efforts although there are still plenty of puzzles and a very wide scenario. But somehow, although I enjoyed finding my way through The City with its hot-tempered but surprisingly generous monarch, around the Desert and past the ominous spider, I felt that something important was missing. I'm not sure, but I think it may be the atmospheric puzzle which we have all learned to guess at from Level 9. Getting the phrase book helps, but not enough. Emerald Isle is an extremely good adventure, but it could do with just a suspicion more of the old Austin format.

Back to a very old favourite which has been given a thorough facelift by Melbourne House. The software house has gone back to the program which established it in the top league of adventure providers, by producing a disk version of **The Hobbit** and, if the basic

plot and relation is still pretty much the same, there are enough additions in the revised package to make it worth the attention of both newcomers and those already familiar with the perils of the golden dragon.

The game comes on a double-sided disk with the player having the option of either being able to print out maps or to have pictures and music. I'd heartily recommend at least trying the graphics (which are on side "B" of the disk) as they sure they are more of them, and they tend to be considerably more detailed, than in the original version. The music also deserves special mention. It is very easy for background music to become very irritating during an adventure, but I must offer my compliments to Neil Bertram, composer of the Hobbit "score", for achieving a remarkably Tolkien-esque series of atmospheric scores. They complement the quest very perfectly.



The disk version contains more text description as well as the typed-up graphics and, naturally, gives comprehensive saving facilities. Those who, like me, haven't played the game for nearly two years and thus have forgotten the whereabouts of several of the notorious "wizards" (maple tree Troll's clearing, the two dragons, the pale hobbit eyes etc.) will be duly grateful.

Barbara Conway's adventure advice is available for the truly frustrated. Send your Commodore 64 adventure problems to Tower of Adventure, Commodore Magazine, 12/13 Little Newport Street, London WC2H 7PP.

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Paging on the 64

Adrian Warren tinkers with 64 Basic and explains memory map manipulation

ONE OF THE FIRST 'selling-points' encountered by the prospective buyer of the Commodore 64 Computer is the fact that it has 64K of RAM. However, only about 38K of this is given to the user when the machine is first switched on, a fact which tends to be quickly ignored. Nevertheless, as readers of the Programmer's Reference Guide will be aware, it is possible to make the full 64K of RAM accessible to the User, although the means by which this is achieved are not detailed in the Guide. For historic, and trade-off reasons to gain the full 64K, are hardly described at all.

Paging

This article has two aims. The first is to show how memory map manipulation for 'paging' is achieved on the CBM 64, and give details about what can and cannot be done as a result. The second aim is to show one use of this paging ability, in a manner useful to those amongst us who harbour a secret desire to 'tinker' with Basic. Details will also be given of a few avenues of exploration for those people at fairly advanced levels of programming who are curious to investigate further.

If you were to take apart a CBM 64 computer, you would find a number of 'chips' that perform a variety of tasks such as producing sound, or pictures; and of course, the actual micro-process itself. If you start doing a few calculations (with the help of the Reference Guide), you would find that they amount to more than 80K of memory locations each needed by the system. How can this fit into a 64K machine? The answer is that the designers have 'overlapped' certain memory areas into 'pages'. For example, at memory locations 1A000 to 1BFFF inclusive, there exists both 8K of apparently available RAM, and the very important 8K of BASIC ROM, without which you could not start to program! Naturally, these two areas are not 'active' at the same time.

When the machine is first switched on, the choice is automatically made to make the Basic ROM active. The RAM is deactivated, and is said to exist 'latent'

the Basic ROM — it is still present, but obscured by the BASIC ROM. The choice of which item is active is made by programming the 6510 Input/Output port at locations 8000 and 8001. Altering the value in the data register at location 8000 enables a selection of which items are present in a variety of memory locations. (It may be advisable to refer to the Programmer's Reference Guide at this point.)

Hence if the 8 of the I/O data value is set to 1, locations 1A000 to 1BFFF will contain the Basic ROM code. Alternatively, if the bit is reset to '0', these locations will contain normal RAM.

Only bits 0 and 1 of the I/O data register affect the paging of memory in this way (although bit 2 controls whether the Character bit patterns exist in the memory — but since this is not executable program code, it will be ignored); however, between them, they do provide a set of useful combinations for selecting the various active pages. The effects of the various combinations may be summarised in the following table:

Value of Bit 1	Value of Bit 0	Effect
1	1	Normal System operation. BASIC and Kernel ROMs are enabled, as are the I/O devices.
1	0	Kernel ROMs and I/O devices are available, but BASIC ROMs have been 'switched out'. Any attempt to use any type of BASIC command while the code in these ROMs is not active would result in a crash.
0	1	A surprise here. Both the Kernel ROMs and the BASIC ROMs are switched-out. The I/O devices will still function, but a lot of work must be done to enable the computer to operate in a coherent fashion, since now there are no routines to handle interrupts, or to print a character, or even simply display keypresses.
0	0	This is a most interesting option for this section of the article. When both bits are reset to zero, every piece of ROM code is removed from memory. There are no ROMs or I/O devices. What you are left with is a complete 64K of RAM. In practice, this is highly misleading. As mentioned above, the 6510 chip uses locations 1A000 and 1B000 for its I/O register, so in fact you have 64K less 2 bytes of User RAM!

So where does this leave the average CBM 64 User? Well, we now have a new variety of ways to produce some surprises and other spectacular crashes simply by 'POKEing' into location 8001. But this in itself is of limited interest. The fun begins when you realise that it is possible to copy the data from the ROMs directly into the RAM behind them (assuming, of course, that the ROMs are currently selected). Having done this, then any removal of a set of ROMs would not produce a crash. Instead, we are left with a machine running under a 'Soft' language and Operating System.

Boot-strap

What is a 'Soft' language? More importantly, what machine(s) use them? A good general example of such a machine would be the 'ideal' CP/M machine. It has a very small ROM routine (little more than a primitive machine code monitor) built into it, which is used to access the Disk drive as soon as the machine is Reset (or switched on for the first time). The effect of

the routine is to load the operating system (or language, or machine code program . . .) that is on the current Disk into the memory of the computer. Once loaded, the program is executed.

This process is often referred to as bootstrapping, and it can quickly be seen that to use a different language (or operating system) on the computer, the User simply starts up (or "boots") using a different program on the appropriate Disk. This is obviously a lot cheaper than buying a new computer! It should now be apparent that a "soft" language resides in the RAM of a given machine.

The advantages of having a complete language and operating system in RAM rather than ROM should be readily apparent. If the code is in RAM, it can be altered. So here we are aware that one of the things on the trendy CBM 64T Simply by naming the following program:

```
100 FOR X = 4090 TO 4111
111 POKE X,PEEK(X)
120 NEXT X
130 FOR X = 57144 TO 61522
140 POKE X,PEEK(X)
150 NEXT X
160 POKE 1,PEEK(1) AND 153
```

This program takes about one and a half minutes to run and has no apparent effect. However, when the execution is finished, the Basic and Operating System for Kenolik ROMs have been switched out, and the computer is now running an copy program which reads entirely in RAM. A quick analysis of the above program would be instructive.

Lines 100-120: These lines copy the data in the BASIC ROM into RAM. Whenever a PEEK is made into the memory from 4090 to 4111 inclusive, the value returned reflects the contents of that address (usually enough). If the RAM was active, then the value would simply be the current contents of the memory location (which could alter, of course).

Conversely, if the ROMs were active, then the same value would always be returned, just as you would expect. However, a POKE into these locations will always put the data into the RAM, regardless of whether the RAM is active or not. This explains the previous line 111, which takes each byte of the BASIC ROM in turn, and stores a copy of it in the corresponding RAM location.

Lines 130-150: These lines perform a very similar task to those in 100 to 120, the difference being that this time, it is the Kenolik ROM that is being copied into RAM, rather than the BASIC ROMs.

Line 160: This line switches from the ROM to the RAM.

Why is no effect visible once this program is run? It is because as far as the micro-processor is concerned, absolutely nothing happened. It is still executing the same code for the BASIC and Operating

System — and the fact that the data for these programs is now coming from RAM instead of ROM is completely irrelevant. It should be noted that at any time, if you wish to restore the previous ROMs, simply perform a warm start (RUN/STOP/RESET/1014). This will switch the ROMs back into position.

The second aim of this article is to wander through the depths of the ROM code. It will be assumed for the rest of this article that the ROMs have been copied into RAM by the above program. It may be advisable when first experimenting to start anew with each section below by performing a warm start (as described above) and then re-executing the copy program. This will prevent any confusion from the cumulative effects of the tinkering. Later on as you grow more confident in tinkering the code, you can leave changes as they are.

The majority of the information given refers to the Basic code, since this is the main interface between User and Machine, and so any changes are more obvious in effect. However, we can start by briefly looking at some locations in the Kenolik ROM, just to get the idea.

Cursor

First of these is the cursor repeat speed. Many readers will have observed that the Programming Reference Guide mentions the system locations 'Repeat' (at 82283) and 'Delay' (at 82284), which apparently control (respectively) the repeat speed and the delay before repeat occurs. If you have noticed these, you probably tried POKEing them to see what effect they had, and were then disappointed to see that nothing altered. The reason is that these locations are just counters controlling the repeat characteristics. In order to actually change the delay and speed of repeat, it is necessary to alter the start values of these counters. These were previously stored in the Kenolik ROM, but now that the data is copied into RAM, we can get at them! Try the following instructions once you have in run the copy program:

```
POKE 40158,3
```

This location controls the repeat speed of the cursor. The default value of '3' is 4. If you make '3' smaller, the cursor will move more quickly; and making '3' larger will make it move more slowly. Similarly,

```
POKE 40159,1
```

. . . is the location which controls the delay before the cursor begins to repeat. The default value of '1' is 18. Making '1' smaller will cause the cursor to repeat

sooner; and of course, making '1' larger will produce a longer delay before the repeat starts.

There are a number of other sections of code in the Kenolik program which are interesting, such as the interrupt routine which services the clock and the keyboard. However, tinkering with these is a most complicated procedure since any error will almost certainly produce a crash. In addition, the complexity of the Operating System tends to prohibit simple alterations. We will now consider the more friendly environment of the BASIC ROMs, where there is plenty to interest the average "hacker"!

As mentioned above, the Basic ROMs form the main interface between User and Machine. As a result, it is here that we find the stored data for BASIC Keywords, System messages and prompts, and the majority of the routines that we refer to previously.

One of the more common questions asked by Commodore owners is how the "?" prompt for INPUT can be altered. There are a variety of ways — one is to make the INPUT using files rather than from the keyboard, which has the advantage that no prompt is issued unless you print one yourself. Another way that interests us in this article is to physically change the prompt symbols. The "?" character is stored at location 45845 as an ASCII character. Since its default contents are 63. Once we have run the above copy program, we can poke any value we like into this location, and it will change the prompt. For example:

```
POKE 45845,62
```

. . . will change the input prompt into a "?". Rather an interesting value to use is 18. It will appear as if no prompt is printed, but in fact this value is the "inverse" of "?" character, and so anything you type will show up in "inverse", which is a good way of highlighting User responses or questions from the computer. If you want to prevent any prompt, simply use the value 0.

Errors

As with most things, making this simple change also has side effects. The "?" characters is not used only for input prompts. It is also used as the first character in error messages. Remember the infamous "MYNTAN ERROR"; for some reason Users get so used to seeing errors that they overlook the "?" at the beginning. When tinkering with BASIC, it is important to watch out for things like this, as overlooking you could encounter some very odd effects indeed.

However, in this case the side effect is not drastic. You can without prevent the effect by entering the "?" character when you have finished your input, or the you can try and use it to your advantage. If we set the value to be 18 (which is the inverse



an character), then not only will any input characters be in "reverse", but so will error messages!

There are a surprising number of ASCII sequences in the BASIC ROMs which fall into this category. As well as all the BASIC Keywords, there are the three messages and various System prompts. There are two formats in which these messages are stored, and we will now look at them both with the help of some interesting examples.

The first type of sequence are those of standard ASCII characters, with the message terminated by an ASCII 'MUL' character, number 8. One such message (and a very important one!) is "READY", which is stored at locations 1A178-1A200 (41584 to 41856) inclusive. You will notice that this is more than the number of characters actually observed on the screen. A simple program to look at the contents of these locations would reveal the following ASCII symbols:

```
(CR), (LF), R, U, A, D, Y, ., (CR), (LF), (NULL)
```

... and note that because these are ASCII symbols, (CR) means 'Carriage Return', and (LF) means 'Line Feed'. When the computer decides that it is time to print the "READY" message, it accesses this short table and prints each character until the NULL is encountered. On the Commodore computers (when printing to the screen), the (CR) symbol moves the cursor down to the start of the next line (scrolling if necessary), and the (LF) symbol has no effect.

We shall now change this sequence slightly, so that an entirely new prompt is produced. When the copy program has been run, try the following program:

```
100 FOR X=41584 TO 41856
110 READ T
120 POKE X,T
130 NEXT X
140 DATA R, U, A, D, Y, ., CR, CR, CR, CR, CR, CR, CR
```

I will not tell you what the program does, simply that the effect is somewhat different from the usual Commodore prompt, so you must try it for yourself!

There are several other messages using this format. Locations 1A2FC-1A310 (44284 to 44310) contain the non-ASCII messages "INITIAL DISKDRIVE" and "READY PROMPT START". These particular messages are especially interesting for two reasons. Firstly, they are non-ASCII, which means that program execution will continue even though an error has occurred; and secondly, the 'T' character at the start of these error messages is not the same as the prompt that we were altering above. Hence any entering with location 41846 will not affect these messages.

The second (and more common) format for message storage is different, mainly in the way that the end of the message is determined. In the previous format, a message was terminated by the ASCII 'MUL' character. The second format indicates termination by using Bit 7 of the last character to a 'T'. For example, in the SYNTAX error list character, the codes 40A are stored as follows:

S	Y	N	T	A	X
51	59	4E	54	41	58
81	89	78	84	85	78

(Hex values to show Bit 7)
(Decimal values)

This format is by far the most important, because it is the format used for storing all the BASIC Keywords. The next section of this article will now consider how we can actually 'manipulate' BASIC Keywords themselves.

There are a large number of BASIC Keywords and Operators, and to give a full description of their use (and how to alter them) is beyond the scope of this article. However, we will discuss a little of their structure and look at the way in which some of the simpler modifications can be achieved. The table below is a summary of

data for most BASIC statements (although functions and operators are not included), the principles are similar, and shows the Keyword, the position of its first character, the normal value of its action vector, and the position of that vector. To see how the table works, we shall perform a simple change that may be of interest to those who like fiddling ways of protecting programs.

For this example, we shall alter the LIST Keyword to perform an entirely different task, namely to act as a REM. We could of course choose a 'first-vector option' such as making LIST perform a MOVE, or even to execute some of our own machine code for truly a really spectacular crash!

We can see that the vector for REM is stored at 5A02A (44002), and has the value 5A03A (44032). Similarly the vector for LIST is stored at 5A04A (44036). All we have to do in order to make LIST act as a REM is to alter the LIST vector to point to the REM routine. This is done by the following program:

```
100 POKE 41026, 40322-INT (44032/256)+256
110 POKE 41027, INT (44032/256)
Having done this, any attempt to perform a
```

"LIST" will behave as if REM had been entered instead of LIST!

Strictly speaking, the action vector for each of the keywords does not give the start address of the appropriate routine, but it is in fact now location 106. The reason is to do with the way in which the BASIC operators, but since this rule applies to all the action vectors, we can ignore it.

But what if we are bored with having to enter LIST in order to display our lines within a program? It is possible to alter the Keyword table in BASIC, so that we could make an alternative word of any length that we liked, but this is more complicated, and so we will have assume that we cannot do any more characters for a keyword than are already present in the default word. Thus, instead of LIST, we could have "TTTT" or "SHIHW". For this example, we will select the latter, namely "SHIHW". To redefine "LIST" into the word "SHIHW", run the following program:

```
100 FOR X=41228 TO 41231
110 READ S,T
120 POKE X,T
130 NEXT X
140 DATA SHIHW,SHIHW,SHIHW,SHIHW
```

From this point on, any attempt to use LIST will produce a system error. Instead, you must use the new keyword, "SHIHW".

Just as you would expect, in the same way as you can use 'L', 'SHIFT-L' as an abbreviation for 'LIST', so when you have altered the Keyword to "SHIHW", you can now use 'S', 'SHIFT-S' as an abbreviation.

I hope that this excursion into the inner depths of the System ROMs will show that even those unused to machine code programming can at least 'play around' with the system in such a way as to be enjoyable without being too difficult. ■

BASIC Keyword Table

Keyword	Vector	Normal Vector	Vector Value
END	4A000	4A100	4A000
PRINT	4A004	4A104	4A004
FOR	4A008	4A108	4A008
NEXT	4A00C	4A10C	4A00C
IF	4A010	4A110	4A010
THEN	4A014	4A114	4A014
ELSE	4A018	4A118	4A018
WHILE	4A01C	4A11C	4A01C
UNTIL	4A020	4A120	4A020
DO	4A024	4A124	4A024
LOOP	4A028	4A128	4A028
FOR	4A02C	4A12C	4A02C
NEXT	4A030	4A130	4A030
IF	4A034	4A134	4A034
THEN	4A038	4A138	4A038
ELSE	4A03C	4A13C	4A03C
WHILE	4A040	4A140	4A040
UNTIL	4A044	4A144	4A044
DO	4A048	4A148	4A048
LOOP	4A04C	4A14C	4A04C
FOR	4A050	4A150	4A050
NEXT	4A054	4A154	4A054
IF	4A058	4A158	4A058
THEN	4A05C	4A15C	4A05C
ELSE	4A060	4A160	4A060
WHILE	4A064	4A164	4A064
UNTIL	4A068	4A168	4A068
DO	4A06C	4A16C	4A06C
LOOP	4A070	4A170	4A070
FOR	4A074	4A174	4A074
NEXT	4A078	4A178	4A078
IF	4A07C	4A17C	4A07C
THEN	4A080	4A180	4A080
ELSE	4A084	4A184	4A084
WHILE	4A088	4A188	4A088
UNTIL	4A08C	4A18C	4A08C
DO	4A090	4A190	4A090
LOOP	4A094	4A194	4A094
FOR	4A098	4A198	4A098
NEXT	4A09C	4A19C	4A09C
IF	4A0A0	4A1A0	4A0A0
THEN	4A0A4	4A1A4	4A0A4
ELSE	4A0A8	4A1A8	4A0A8
WHILE	4A0AC	4A1AC	4A0AC
UNTIL	4A0B0	4A1B0	4A0B0
DO	4A0B4	4A1B4	4A0B4
LOOP	4A0B8	4A1B8	4A0B8
FOR	4A0BC	4A1BC	4A0BC
NEXT	4A0C0	4A1C0	4A0C0
IF	4A0C4	4A1C4	4A0C4
THEN	4A0C8	4A1C8	4A0C8
ELSE	4A0CC	4A1CC	4A0CC
WHILE	4A0D0	4A1D0	4A0D0
UNTIL	4A0D4	4A1D4	4A0D4
DO	4A0D8	4A1D8	4A0D8
LOOP	4A0DC	4A1DC	4A0DC
FOR	4A0E0	4A1E0	4A0E0
NEXT	4A0E4	4A1E4	4A0E4
IF	4A0E8	4A1E8	4A0E8
THEN	4A0EC	4A1EC	4A0EC
ELSE	4A0F0	4A1F0	4A0F0
WHILE	4A0F4	4A1F4	4A0F4
UNTIL	4A0F8	4A1F8	4A0F8
DO	4A0FC	4A1FC	4A0FC
LOOP	4A100	4A100	4A100
FOR	4A104	4A104	4A104
NEXT	4A108	4A108	4A108
IF	4A10C	4A10C	4A10C
THEN	4A110	4A110	4A110
ELSE	4A114	4A114	4A114
WHILE	4A118	4A118	4A118
UNTIL	4A11C	4A11C	4A11C
DO	4A120	4A120	4A120
LOOP	4A124	4A124	4A124
FOR	4A128	4A128	4A128
NEXT	4A12C	4A12C	4A12C
IF	4A130	4A130	4A130
THEN	4A134	4A134	4A134
ELSE	4A138	4A138	4A138
WHILE	4A13C	4A13C	4A13C
UNTIL	4A140	4A140	4A140
DO	4A144	4A144	4A144
LOOP	4A148	4A148	4A148
FOR	4A14C	4A14C	4A14C
NEXT	4A150	4A150	4A150
IF	4A154	4A154	4A154
THEN	4A158	4A158	4A158
ELSE	4A15C	4A15C	4A15C
WHILE	4A160	4A160	4A160
UNTIL	4A164	4A164	4A164
DO	4A168	4A168	4A168
LOOP	4A16C	4A16C	4A16C
FOR	4A170	4A170	4A170
NEXT	4A174	4A174	4A174
IF	4A178	4A178	4A178
THEN	4A17C	4A17C	4A17C
ELSE	4A180	4A180	4A180
WHILE	4A184	4A184	4A184
UNTIL	4A188	4A188	4A188
DO	4A18C	4A18C	4A18C
LOOP	4A190	4A190	4A190
FOR	4A194	4A194	4A194
NEXT	4A198	4A198	4A198
IF	4A19C	4A19C	4A19C
THEN	4A1A0	4A1A0	4A1A0
ELSE	4A1A4	4A1A4	4A1A4
WHILE	4A1A8	4A1A8	4A1A8
UNTIL	4A1AC	4A1AC	4A1AC
DO	4A1B0	4A1B0	4A1B0
LOOP	4A1B4	4A1B4	4A1B4
FOR	4A1B8	4A1B8	4A1B8
NEXT	4A1BC	4A1BC	4A1BC
IF	4A1C0	4A1C0	4A1C0
THEN	4A1C4	4A1C4	4A1C4
ELSE	4A1C8	4A1C8	4A1C8
WHILE	4A1CC	4A1CC	4A1CC
UNTIL	4A1D0	4A1D0	4A1D0
DO	4A1D4	4A1D4	4A1D4
LOOP	4A1D8	4A1D8	4A1D8
FOR	4A1DC	4A1DC	4A1DC
NEXT	4A1E0	4A1E0	4A1E0
IF	4A1E4	4A1E4	4A1E4
THEN	4A1E8	4A1E8	4A1E8
ELSE	4A1EC	4A1EC	4A1EC
WHILE	4A1F0	4A1F0	4A1F0
UNTIL	4A1F4	4A1F4	4A1F4
DO	4A1F8	4A1F8	4A1F8
LOOP	4A1FC	4A1FC	4A1FC
FOR	4A200	4A200	4A200
NEXT	4A204	4A204	4A204
IF	4A208	4A208	4A208
THEN	4A20C	4A20C	4A20C
ELSE	4A210	4A210	4A210
WHILE	4A214	4A214	4A214
UNTIL	4A218	4A218	4A218
DO	4A21C	4A21C	4A21C
LOOP	4A220	4A220	4A220
FOR	4A224	4A224	4A224
NEXT	4A228	4A228	4A228
IF	4A22C	4A22C	4A22C
THEN	4A230	4A230	4A230
ELSE	4A234	4A234	4A234
WHILE	4A238	4A238	4A238
UNTIL	4A23C	4A23C	4A23C
DO	4A240	4A240	4A240
LOOP	4A244	4A244	4A244
FOR	4A248	4A248	4A248
NEXT	4A24C	4A24C	4A24C
IF	4A250	4A250	4A250
THEN	4A254	4A254	4A254
ELSE	4A258	4A258	4A258
WHILE	4A25C	4A25C	4A25C
UNTIL	4A260	4A260	4A260
DO	4A264	4A264	4A264
LOOP	4A268	4A268	4A268
FOR	4A26C	4A26C	4A26C
NEXT	4A270	4A270	4A270
IF	4A274	4A274	4A274
THEN	4A278	4A278	4A278
ELSE	4A27C	4A27C	4A27C
WHILE	4A280	4A280	4A280
UNTIL	4A284	4A284	4A284
DO	4A288	4A288	4A288
LOOP	4A28C	4A28C	4A28C
FOR	4A290	4A290	4A290
NEXT	4A294	4A294	4A294
IF	4A298	4A298	4A298
THEN	4A29C	4A29C	4A29C
ELSE	4A2A0	4A2A0	4A2A0
WHILE	4A2A4	4A2A4	4A2A4
UNTIL	4A2A8	4A2A8	4A2A8
DO	4A2AC	4A2AC	4A2AC
LOOP	4A2B0	4A2B0	4A2B0
FOR	4A2B4	4A2B4	4A2B4
NEXT	4A2B8	4A2B8	4A2B8
IF	4A2BC	4A2BC	4A2BC
THEN	4A2C0	4A2C0	4A2C0
ELSE	4A2C4	4A2C4	4A2C4
WHILE	4A2C8	4A2C8	4A2C8
UNTIL	4A2CC	4A2CC	4A2CC
DO	4A2D0	4A2D0	4A2D0
LOOP	4A2D4	4A2D4	4A2D4
FOR	4A2D8	4A2D8	4A2D8
NEXT	4A2DC	4A2DC	4A2DC
IF	4A2E0	4A2E0	4A2E0
THEN	4A2E4	4A2E4	4A2E4
ELSE	4A2E8	4A2E8	4A2E8
WHILE	4A2EC	4A2EC	4A2EC
UNTIL	4A2F0	4A2F0	4A2F0
DO	4A2F4	4A2F4	4A2F4
LOOP	4A2F8	4A2F8	4A2F8
FOR	4A2FC	4A2FC	4A2FC
NEXT	4A300	4A300	4A300
IF	4A304	4A304	4A304
THEN	4A308	4A308	4A308
ELSE	4A30C	4A30C	4A30C
WHILE	4A310	4A310	4A310
UNTIL	4A314	4A314	4A314
DO	4A318	4A318	4A318
LOOP	4A31C	4A31C	4A31C
FOR	4A320	4A320	4A320
NEXT	4A324	4A324	4A324
IF	4A328	4A328	4A328
THEN	4A32C	4A32C	4A32C
ELSE	4A330	4A330	4A330
WHILE	4A334	4A334	4A334
UNTIL	4A338	4A338	4A338
DO	4A33C	4A33C	4A33C
LOOP	4A340	4A340	4A340
FOR	4A344	4A344	4A344
NEXT	4A348	4A348	4A348
IF	4A34C	4A34C	4A34C
THEN	4A350	4A350	4A350
ELSE	4A354	4A354	4A354
WHILE	4A358	4A358	4A358
UNTIL	4A35C	4A35C	4A35C
DO	4A360	4A360	4A360
LOOP	4A364	4A364	4A364
FOR	4A368	4A368	4A368
NEXT	4A36C	4A36C	4A36C
IF	4A370	4A370	4A370
THEN	4A374	4A374	4A374
ELSE	4A378	4A378	4A378
WHILE	4A37C	4A37C	4A37C
UNTIL	4A380	4A380	4A380
DO	4A384	4A384	4A384
LOOP	4A388	4A388	4A388
FOR	4A38C	4A38C	4A38C
NEXT	4A390	4A390	4A390
IF	4A394	4A394	4A394
THEN	4A398	4A398	4A398
ELSE	4A39C	4A39C	4A39C
WHILE	4A3A0	4A3A0	4A3A0
UNTIL	4A3A4	4A3A4	4A3A4
DO	4A3A8	4A3A8	4A3A8
LOOP	4A3AC	4A3AC	4A3AC
FOR	4A3B0	4A3B0	4A3B0
NEXT	4A3B4	4A3B4	4A3B4
IF	4A3B8		

PC compatible?

What is the PC standard? Why is IBM's PC so important? And how does the Commodore PC compare on price and facilities? Trevor Doherty answers the questions and finds out what the PC can offer you

COMMODORE have taken what for them is a unique step: they have introduced a machine which is compatible with someone else's standards. In this case the standard is that of IBM, and that is now the 'industry standard' for Personal Computers. To understand the importance of this, you need to look at what has happened to the business personal computer market over the last three years.

Revolving

Before IBM introduced their PC it began to be available in the UK in 1982, there were numerous, mainly 8-bit business machines on the market, with a bewildering variety of standards, including Commodore's own PET series, the early Apple models and a whole clutch of other machines which operated under CP/M, the first real standard operating system for microcomputers. In the UK Commodore machines were probably the biggest sellers, indeed Commodore estimate there are still over 120,000 in use today. While the CP/M operating system did offer a standard, there was still a wide variety of disk formats, making it difficult for

software to run on more than one make of machine. All this changed when the massive IBM Corporation decided to enter the Personal Computer market.

Looking at the situation in 1985, the UK scene is a whole lot simpler. There are the 16-bit IBM and IBM compatible machines taking the lion's share of the market (particularly in the Corporate sector), and then there is Apple, still selling some 8-bit Apple II's, plus the revolutionary 32-bit Macintosh. Everything else is really small beer.

So what is this IBM standard? Well, at the very least it is the ability to run the MS-DOS operating system, usually using a Intel Intel 8088 or 8088 processor chip. Preferably it also includes hardware conventional compatibility so that standard sized additional printed circuit boards (or 'cards') can be added to expand the machine, for example to add additional communication facilities. The degree of compatibility varies enormously. The major effect of this standard has been the creation of an enormous amount of software, chiefly but not exclusively, business software which will run on these machines. I counted over 800 packages listed in one of the specialist magazines. The range of the software available is simply unmatched, and thereby lies the success of the standard.

Some critics who have happened, seeing the IBM standard is not state-of-the-art, that it is stifling hardware development; but the market stability it has provided overrides all that, in the view. Success leads

to software availability and software availability leads to success, a difficult cycle to break into for any new machine. In its own way the 84 is in a rather similar position in the home machine market, thus the enormous range of software for the 84. The attempt to establish a new standard for home machines, MUX, doesn't seem to have met with much success.

One recent development in the States is that the IBM standard is starting to have an impact on the home market, as people trade up from their Apple II's. The trend is definitely towards more 'serious' home computing, as people get bored with games, and that enormous stock of IBM compatible software just cannot be ignored. The upgrade doesn't come cheap; a Commodore PC is around five times the price of a 84 with disk drive and monochrome monitor. Still, the American home computer buyers are better able to afford PC's than the UK users.

Loyalty

What about this Commodore PC? Will it make any impact on the IBM compatible market, or will it just be 'another IBM compatible'? Only time will tell, but some factors are worth considering. One, the machine is extremely compatible, both hard and software-wise. (In fact I wish they hadn't been quite so slavish when copying the keyboard, which provides the awful IBM career key arrangement on the numeric keypad — terrible to use with spreadsheet programs.) I took an IBM version of the Visiwrite word processor to the launch and it booted straight up and ran perfectly. Commodore don't claim 100% compatibility with all software, but indications are the Commodore PC is one of the most compatible machines available.

Secondly, the price, at 15% below the equivalent IBM, places it very close to the cheapest fully IBM compatible on the UK market.

Thirdly, Commodore's strength in the business computer market in the UK with the PET series could give them sufficient brand loyalty to give them a helpful boost in market share. However, by the time you read this, IBM may have announced the strongly rumored PCII with a faster processor, 3.5 inch disk drives, and probably 20% cheaper than the original PC...



Commodore's PC — could it be a market leader?



SPECIFICATION

● CPU

8088 Processor.
8087 Co-processor (optional).
4.77 MHz clock rate.

● Memory

Also RAM size.
128K RAM Standard.
Internally expandable to 512K.
Externally expandable using full length
expansion boards to 640K.
RAM size
Standard 80C.

● Display

12" CRT (non-glass phosphor green).
14" medium resolution RGB colour
monitor (available shortly after launch).

Alphanumeric B/W char resolution 64x14.
80x21 character display.
Colour and Hi-Res graphics are not in the
standard configuration at launch.

● Storage

Dual 500K/byte, 5 1/4" double density,
double sided disk drives (PC-80).
Format: IBM[®] compatible; 40 tracks,
9 sectors/track,
or

Single 500K/byte, 5 1/4" disk drive
plus 10M/byte hard disk.

● External Storage

The internal floppy disk controller is able
to handle up to 4 drives.
Controller is capable of supporting two
Winchester drives with a capacity of up to
10M/byte per drive.

● Expansion

3 full sized PC compatible expansion
slots.

● Keyboard

Detachable keyboard.
83 keys including 80 function keys and
numeric keypad.
Meets European DIN requirements.

● Interface

Parallel Printer port (Centronics
ES20C port).
Monochrome video output.
Composite B/W video output (not in the
standard configuration at launch).



● Operating System

MS-DOS.

● Language

CPL Basic.
Optional programming languages: C, Pascal,
Fortran, Pascal, Macro Assembler etc.

● Physical Specifications

Base Unit (CPU)	H: 14.5cm
CPU Base	depth 18cm
Monitor	H: 27.5cm
width 30.5cm	depth 29.5cm
Keyboard	H: 4.0cm
width 49cm	depth 17cm

● Power Supply

CPU 240 VAC 170 watts, 20Hz.
Monitor 240 VAC 30 watts, 20Hz.

● Price

£1,675 for the Dual floppy disk version,
the PC-80.
£2,795 for the hard disk model, the PC-85.

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COMMODORE PC (256KB RAM) SPECIFICATION

Compatibility	IBM PC & XT
Microprocessor	Intel 8086 16-bit processor Intel 8027 Floating Point Processor (optional)
Clock Speed	4.77 Mhz
Memory	Main 256K RAM (expandable to 640K) Video 32K RAM 8028 8K + 16K
Display	12" monochrome CRT (green phosphor) Screen format: Monochrome alphanumeric 80 x 25 Monochrome graphics 640 x 200 pixels Monochrome graphics 640 x 343 pixels Alphanumeric/alphanumeric High intensity reverse video, blinking Underlining (monochrome only)
Keyboard	Detachable 84 keys, including 10 function keys
Interfaces	Parallel port - Centronics Keyboard Serial port - RS232C Mouse Composite monochrome Five expansion slots for PC compatible PCMC Power
Storage	Dual double sided floppy disk drives capacity 360K each, or One floppy & one 10 Mbyte hard disk
Operating system	MS-DOS
Language	EN Basic

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Music Box

TWIX PROGRAM for the unexpanded Vix 20 runs from *Michael Turner of Beverly Hills, Vix 2560*

MUSIC BOX is a sound sequencer for the Vix 20. It turns your Vix into a music keyboard with a 100 note memory. When you run the program you are asked which voice you require, 1 to 4 is white notes. You then input the length of the notes you wish to play, the shortest possible being 1 and the longest 6.81.

Play your tune using all the keys except 0-8, using K or Y to insert pauses. When you've finished, press F1, select a playback voice, and after an interval of a couple of seconds your tune will play back. Press space to insert pauses in playback, and press 0 to return to the beginning of the program.

```

0 REM*****
1 REM**MUSIC MAKER**
2 REM*****@Y*****
3 REM*****,TURNER***
4 REM*****
6 CLR:IDRO<100>
7 POKE36879,D
8 PRINT"3"
9 PRINT"@"
10 PRINT"*****"
11 PRINT**MUSIC MAKER**
12 PRINT**BY M. TURNER**
13 PRINT"*****"
14 PRINT"*****"
15 PRINT**WHICH VOICE1-4**
16 PRINT"*****"
17 INPUT
18 IFR<10RR>4THEN17
20 R=INT(R)/36873
25 POKE36878,15
30 DIR<100>
35 PRINT" DURATION OF NOISE/NOTE"
36 INPUT
40 IFR>10RRC0,801THEN36
45 READP:IFP=0THEN45
50 READ2(P)
75 GOTO45
60 GET# :IF#=""THEN60
65 IF#="0"THENR#0
70 IF#="1"THENR#15
75 IF#="2"OR#="3"OR#="4"THENR#SUB115:GOTO45
80 P=ASC(R#)
82 IF#="0"THENP=79
84 IF#="1"THENP=78
85 FOR3=1TO19:NEXT
90 POKER,2(P)
95 PRINT"7":POKE36879,2(P)
100 FORD=1STOSTEP=DR:POKE36878,D:NEXT:POKER,0:POKE36879,15
105 Y#Y+1:O#Y=2(P):IFV=100THENR#0
110 GOTO60
115 POKER,0:H=VAL(R#):S#H+36873:RETURN
120 DATA1,125,87,143,69,147,82,151,84,159,69,163,85,167,73,175
125 DATA79,179,80,183,64,187,42,191,92,195,65,199,83,201,68,203
130 DATA70,207,71,209,72,212,74,215,75,217,76,219,58,221
135 DATA59,223,61,225,13,227,39,229,88,229,67,231,96,232,66,233
140 DATA79,235,77,236,44,237,46,238,47,239,17,240,29,24,0
145 PRINT"3**MUSIC MAKER MEMORY**"
150 POKE36879,0
155 INPUT"WHICH VOICE":S
160 IFR<10RS>4THEN155

```



```

165 POKE36878,15
170 FORF=1TOV
175 FORD=15TO6STEP-DR:POKE36878,D:NEXT:POKE36873+S,0:POKE36878,15
180 POKE36873+S,0(=F):PRINT"J":POKE36879,0(F)
190 NEXTF
195 FORD=15TO6STEP-DR:POKE36878,D:NEXT:POKE36873+S,0:POKE36878,15
200 POKE36879,S
205 PRINT"*****SHORT NEXT:="
210 PRINT"1-PLAY TUNE?"
215 PRINT"2-RETURN TO KEY BOARD?"
220 GETT#-IFT#=""THEN220
225 IFT#="1"THENGOTO145
230 IFT#="2"THENGOTO0

```

Errorline

TWS An utility comes from Alfred Dagh of Bielefeld, Westerland
ERRORLINE is a small but useful utility

which will aid you when typing in complex listings. When you type in a listing you're almost bound to make a mistake, with the result that the computer comes up with "Error in line XXX" when you run the program. To correct the error, you must then list the line manually. Errorline lets

you do this automatically, so that when you run a program any lines with mistakes will be listed for correction.

The program resides in memory at location 10000. It's automatically activated, and you should save it before first using it.

```

55000 run errorline-listar
55001 run -----
55002
55003
55004 run (c) a. eggl 1985
55005
55100 for i=49152 to 49230
55110 read a i 3*2+a
55120 pokei,a
55130 next
55140
55150 if r<>8861 thenprint"error in data !" i and
55160 sys49152
55170 print"errorline-listar activated !"
55180 run
55190
55200 data169,013,141,000,003,133,002
55210 data169,192,141,001,003,096,130
55220 data048,002,016,007,164,002,040
55230 data048,076,116,164,072,165,157
55240 data016,006,076,088,164,076,116
55250 data164,164,087,132,020,164,098
55260 data132,021,032,019,166,160,128
55270 data132,002,169,147,032,210,255
55280 data169,013,032,210,255,032,210
55290 data255,076,189,166,160,000,132
55300 data002,162,000,160,000,024,032
55310 data240,255,104,170,076,058,164
55320 data076,116,164

```

Send us your Commodore programs, including a cassette — and a printout on plain white paper if possible. Each listing must be accompanied by a typewritten introduction describing the program and explaining how it is constructed. We pay \$5.00 for each bug-free listing published. We cannot guarantee to return every program submitted, as space keeps a copy. If you want us to return your listing you must include a stamped, addressed envelope. If you have any problems with the programs, please write to the appropriate author. Software Plus, Commodore Magazine, 13, 13 Little Newport Street, London WC2R 7PP

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Vic 20 in depth

I HAVE A Vic 20 with a Thomson 1M4 switchable RAMpack. I would like to master machine code graphics, joystick controls and other such things. Could you recommend a suitable book which is really understood and well explained? I would also like to be able to move a character across the screen pixel by pixel rather than square by square, and to be able to colour in different pixels of a character using multicoloured mode.

A. Kishoff
Lyngholmen
Landskronika

A **SUITABLE** book for you would be *Programming the Vic to Bit West*, available from Bitbox, Star Road, Partridge Green, Haverham, Sussex, at £10.95. The following short multicolour demo comes from the book:

```
10 S = PEEK(6440): POKÉ 64, 16 FOR B = 1 TO 15: FOR A = 63 TO 90: PRINT CHR$(A); NEXT: NEXT 20 FOR A = 1 TO 90: FOR J = 0 TO 15: POKÉ 3405, J * 16: NEXT: NEXT: POKÉ 64,5
```

Back to page zero

IN SEVERAL programs I've seen the use of a get key proceed from zero page location (007). In the Commodore reference guide it specifies that location to be Control key proceed CHR\$(24); 0 = No Key. I found that it does not accept CHR\$(ASC codes), but it has its own coding which does not seem to follow any of the tables in the guide. Could you tell me if this is a mistake in the reference guide? *DM Anderson*
Hatchery
Lundon
007 (003) contains the marks value of the key proceed during the last keyboard scan. A value of 64 (004) means no

key proceed. When a key is pressed a number from 0 to 63 is stored in 003 (003) and this is compared with 007 to prevent a key repeating if still pressed. The values stored are not ASCII codes, but are controlled by the 64's ROM routines, particularly the ones at 0E400 which determine the key ASCII values. Use PEEK to derive the key values. For example:
00 X = PEEK(208) 00 Y = 64 THEN 00: REM This prevents a long line of 64's
30 PRINT X; GOTO 10
You can test your reaction time with this one, because if you hold the key for more than a fraction of a second the number of the key will be printed several times.

Joystick one-liner

IS THERE a simple one line input, such as X = RJOY (0), which will enable a program to read joystick positions? I need such an input for ON and IF... THEN statements when simulating the changing perspective of a spaceship as seen by the pilot of a helicopter. I find the Commodore books and software very difficult to navigate; books on 64 Basic hardly mention the joystick. *L. P. E. Counts*
Mill Hill
Lundon

TRY THIS one:
Q = PEEK(64000): P = Q AND 4 = 0 - 10
AND 8 = 0 - 40 * 10
AND 16 = 0 - 40 * 10
AND 32 = 0: PRINT P
RJOY is joystick 2 and RKEY is joystick 1. I had to square this one to get it all on one line! You would use it in a subroutine, with the PRINTP not in the line but ordered on RETURN together with a loop. I don't think that a one-liner is best for the program you have in mind; a text machine code routine package called from Basic is needed.
The code can be stored as data statements in the program, and then READ and POKÉ to use memory.

Wiring the stick

I HAVE RECENTLY bought a CIA joystick and a 9-pin D plug to use on my CBM 64.



The problem is, I can't find out what coloured wires go where, since the 9-pin D plug has nine coloured wires and the CIA has only 7 colours. Can you help? *Andrew Andrew*
East Ham
London
LOOKING at the 64's joystick pins, pins 1-5 are on top and pins 6-9 are underneath, in order left to right.

Joysticks use pins 1 (up), pin 2 (down), pin 3, (left), pin 4 (right), pin 5 (fire), and pin 6 (ground). Please be careful with pin 7, which carries the veto. Connecting this to the wrong input could cause damage to your computer. As you can see, only six of the nine pins on the D plug need to be connected.

The end of a file

I AM TRYING to write a Home Accounts program using a 1541 disk drive and a CBM64. I am using relative files, but have encountered a problem. In the program I need to detect the end of a file, and in the manual it states that this can be done by looking for Error 50.
I have tried this, but to no avail — all the disk drive tries to do is to input more data. I have two disk drives, and both so exactly the same, so it can't be a hardware fault. Here's a sample of my program:
100 OPEN 1, 8, 1M05
110 OPEN 13, 8, 15

```
120 PRINT #13, "1" CHR$(2) + 90 CHR$(10) CHR$(88) CHR$(11)
130 INPUT #13, A, B, C, D
140 IFA = 50 THEN GOTO "END OF FILE ROUTINE"
150 IFA < 20 THEN LD = LD + 1: GOTO 120
160 PRINT "ERROR": A; B; C; D: STOP
A M Aggias  
Bilston  
Essex
```

THE COMMAND channel 13 should always be opened first and closed last. Line 120 in your program should read:
120 PRINT #13, "1" CHR\$(2) CHR\$(10) CHR\$(88) CHR\$(11)

Error 50 is "Record not present", which is obtained by the disk reading past the last record either to INPUT # or GET #, or positioning to a record beyond the end of a relative file.

After detecting this error in your trapping routine, you must then reposition as in line 120 to a valid record, before attempting another record read. You ignore Error 50 only if you want to repeat the file (with a PRINT # command).

Filling the gap

I SHOULD be interested to know if you can recommend any software or programs suitable for the Commodore 64 on Dental Practice, accounts, and so on. At present I use Superbase 64 for accounts.

J. J. Callaghan
South Mill
Cot

FOR SMALL business accounts, you should by Mike Mangler's *Form 5 Charitable 64 Word*, Macmillan, Chesham.

If you are interested in doing your own programming, I suggest *Business Applications for the Commodore 64* by James Hall, published by Random at £5.95. It contains some fairly easily adaptable subroutines and complete programs for business users.

“dialog... ”

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First past the post

Christine Erskine talks to Sara Galbraith, whose First Publishing Company intends to be number one in Commodore 64 utilities

AT JUST 26 years old, Sara Galbraith has packed a lot into her working life — she's been a cook, a secretary, marketing assistant, and brand manager in various companies. Her experience has culminated in First Publishing, her own business dealing with integrated books and software packages.

Various, business-style software for the Commodore 64 took a back seat last year, with the wave of quality games being imported under license from the States.

Yet last September, when US Gold and the like were just getting into their stride, Sara had just registered First Publishing, and was preparing to introduce easy-to-use word processors and spreadsheets, languages and assemblers. While First is not releasing anything completely new or innovative, Sara is confident that her approach to the market is the right one.

"My main objective is to establish a reputation for quality and reliability. To build up my sort of brand reputation, First Publishing's products must be instantly recognizable, which is why we've gone for the distinctive blue and yellow packaging on both the books and the software. I mean, if you like, to become the Marks and Spencer of software — a brand people can choose because they know it'll be reliable."

Specifically, the software so far comprises **FASTWORD 64** — "a very straightforward word processor — I mean be afraid the only one you can load up and use immediately without having to wade through a manual," says Sara — a database entries First **BASE 64**, which she claims is "every bit as good as Superbase," (Precision Software's flagship product), **PowerPLAN**, a spreadsheet, **Parcal**, and an assembler/monitor. Prices range from \$19.99 to \$44.99.

Venture

The books are designed to facilitate a deeper understanding of the Commodore 64, and are definitely not for the beginner. "That's deliberate," said Sara. "I felt that there were quite enough beginners' books on the market and it was time to do something for people who were ready for the next stage."

All this is a far cry from her first job as a restaurant cook. "I was probably happy being a cook," she grinned. "But I gradually realized that I wasn't going to get very far if I carried on thinking so much!" "So I left cooking — and I hardly got the time to do any new, which is a shame — and became a secretary and worked my way up from there. It wouldn't say it was an ambition to run my own business though. I mean, two years ago, I would have found

what I'm doing more comfortable."

Her venture with First Publishing has been considerably helped by the support received from the German company Data Becker. So far, all First's titles have been licensed from Data Becker and translated into English. As Becker provided Sara with the original finance to set up First Publishing, I wondered if she was going to rely on Becker's product permanently.



"Oh no, the two companies are entirely separate — there's nothing in the contract to say that we have to use Becker's work."

"So far, I've done so, simply because it is very good. But I would like to deal with freelance programmers in this country in the next year or so."

"I'm very concerned that the company should become fully stable and established — I intend to be around for a long time. As I do have steady access to a source of excellent product, I'll use it. In two years time, though, I may well branch out and do something radical."

But why did Sara start up on her own in the first place? She was brand manager at Precision Software at the time, and doing well.

"It was frustration, sheer frustration. I wanted to be able to implement my own ideas. I had previously been at Prosource Software — a company full of very able, very experienced men, who had all the flexibility of an iron fist. I was invited to help set up an educational software division, but frankly, just not enough money was put

into it.

"Then I moved to Precision, where the product was excellent, but the marketing non-existent. It was very easy to see what could be done, marketing-wise, but impossible to get people to act on my ideas."

So First Publishing arose out of Sara's wish to be able to implement, unimpeded, her own ideas.

"I tried writing begging letters to ask for the start-up finance for a company, but that came to nothing. Then I met Becker in Germany and discovered our ideas were identical."

Data Becker also has links with three other companies, in France, Holland and the USA, maintaining much the same sort of relationship as with First. Data Becker product divisions tend to reflect the popular machines in the countries concerned, which explains why so far all First products has been exclusively for the Commodore 64, with its international success. However, that is set to change.

"We have plans to convert and rewrite for the Atari ST and the Amstrad," said Sara. "The Amstrad has done very well in Germany, as well as the UK, and we have high hopes of the ST range. One of the Data Becker people is in Hannover, and has been working very closely with Atari and knows quite a bit about the range prior to launch."

It's now nine months since First Publishing began. Sara now employs seven staff, including two full-time programmers and two sales people.

"I have the sales people on the road, talking directly to the dealers all the time. That way, the dealers get to know us as well. Some distribution does go through more conventional channels, but selling directly to the shops is often more effective."

Selling

"The company has already had its ups and downs though. We were three months late on the market with the first releases, which was very annoying. We had hoped to bring them out in October, but they didn't appear until just before Christmas, so we lost a lot of prime selling time."

"But sales have been good — surprisingly so, in fact. I feel that there is probably not a mass demand for our type of product yet, but I would certainly want to create one."

"What I'd really like at the moment is a partner who would share some of the responsibility. It really isn't at all easy doing it all on one's own." ■



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WANTED 1541 disk drive for IBM 64 call 01 208 2880 10am-5pm any condition.

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VIC cartridges wanted. C64 64 software offered in exchange. Specially needed: Asterix, Thrasher, Vangel, Woodcock 22, Aston Perry, 2000 Culture Card, Top Saverage (2A38) £11835 after 6.30pm.

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CLASS 64 The International User Group would like to see the following advice to make contact - The Source (024) 800408, Commodore (024) 70115, 715 or Miconnet (0123) 611281.

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So how was it done? It all started with a suggestion that we should prepare a package to give readers a gentle introduction to the kind of software that businesses were running on their computers.

At that stage there was no intention that it should be an ambitious package. Just a simple program that could be sold at a very low price.

We called in experts in

processing, database management, spreadsheets and graphics had been turned into a full scale suite of programs covering all four applications.

In fact the only part of the brief that remained was our original insistence that the package should be quick to learn and easy to use.

And despite all the extra sophistication that has been written into it, we decided that, as a service to our readers, the price should still be kept at the very low figure originally fixed.

Now does Mini Office operate?

Using the **Word Processor** is simplicity itself. There are none of the cryptic coded instructions that had to be mastered by people learning the early word processors.

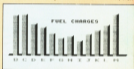
You start by selecting the size of type you prefer – either normal or double-size. The latter is a feature that you

people this could be the first time they can send out a perfectly typed letter without outside help.

Primary school teachers are also expected to make great

it again. It can also be printed out.

The **Database** program can be used to store a mass of information. It can be retrieved, in its entirety or just



Figures on the spreadsheet can produce a bar chart . . .

use of the double-size function, both on the screen and on hard copy printers.

While you are using the word processor three useful pieces of information are displayed across the top of the screen.

They tell you how much time has elapsed since you started using it, the number of words you have written so far, and how many characters you can key in before the computer's memory is full.

At any time you can press a key which tells you your typing speed. This is a most useful function, and can play an important part in increasing your efficiency at the keyboard.

You can also decide the size of the margin, the line length and the tab positions. Text can be moved from one part of the document to another.

At any time you can preview the text to see how it would look when printed out.

As with all the other programs in Mini Office, your work can easily be saved and loaded when you want to use

the parts you require for a particular purpose, whenever you need it.

The operation is so simple that a useful database can be created in minutes rather than days – and you certainly don't need any computer experience to set it up.

The powerful search facility is very easy to use. You can search for a particular word or words or you can order a numeric search – such as telling the computer to find all the numbers greater or less than the one you provide.

You can carry out multiple sorts. For instance, if you have built up a mailing list containing a list of names, addresses, telephone numbers, occupations and ages you can ask the database to provide you with a list of teachers living in Liverpool whose ages range from 25 to 30.

One powerful option allows you to replace anything on the database without having to go through the whole list making amendments yourself. You could, for instance, instruct it

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The word processor – with double size characters

business software programming, told them what we wanted and sat back to await results.

What happened next was totally unexpected. For this all came back with ideas that were to considerably expand our original brief.

In the end what had been planned as little more than a beginners' guide to word

processing had now become a word processor.

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This means they can use a micro to compose a letter, using the double-size mode, and then print it out using normal size type. For many

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DATABASE SOFTWARE

to find each reference to "teacher" and replace it with "teacher".

The **Spreadsheet** is one version of the program that handled a million uses in business computing - Visicalc. It is often pointed out that no one program alone has helped to sell more personal computers than any other.

Clearly Visicalc and its derivatives have never been shaken from their position at the top of the list of best-selling business programs.

Yet the concept is very simple - a giant worksheet of rows and columns, only part of which can be seen on your screen at any one time, into which you can put numbers, labels and mathematical formulae.

And when you alter any figure its effect ripples through the rest of the sheet, changing any totals as may be necessary.

The Mini Office version is ideal for home finance, provid-

ing you with an effortless means of keeping tabs on your income and expenditure - and enabling you to work out your own budget.

In our Spreadsheet program - as well as in the Database - we have provided



a sample file so that you can experiment with it before entering your own data.

One feature we have included which is our knowledge does not exist in any other spreadsheet is a warning device to prevent you

accidentally erasing formulae - a very useful precaution.

The **Graphics** program uses the standard business graphics - lines, bars and pie charts - in full colour. Which is something not always available on far more expensive graphics packages.

The program uses data you have already prepared on the spreadsheet. You have to identify which set of information you require to get in graph form - such as by indicating which row or column - and then which of the graphs you require.

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• **Database** (Illustrated here as from the Amstrad version which slightly differs on the Commodore version).

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■ **WHICH** type of helicopter did James Bond fly in the film You Only Live Twice?

■ **WHAT** popular TV series set in Europe featured helicopters serving a hospital?

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Then post your entry to Airwolf Contest, Commodore Horizons, 12/13 Little Newport Street, London WC2H 7PP, to arrive by the last day of June. Normal competition rules apply, and winners will be

announced in the August issue.

THE WINNERS of the April Hobbit competition have now been selected. Each of the fifty winners, who had to study the workbooks and spot the odd word out, will receive a copy of the Disk Hobbit from Melbourne House.

Ten lucky winners will get a DK/Tonks/Carruth Speeches 40 entry synthesizer, having written the best responses for our April contest. The winners are: D Bates, London; S McCarrie, Newark; J Whitford, Tadworth; C Nichols, Stanley; P Welch, Lower Bratley; I Russell, London; A Brown, Amersford; P McKee, Dingswall; P Lawler, Coxford; S Lak, London.

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