

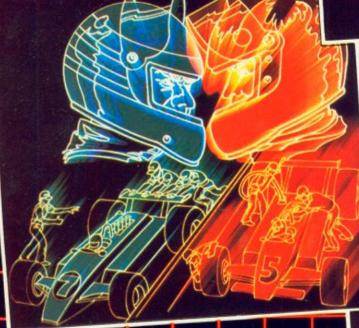


All the critics agree . . . Impossible Mission has a unique place amongst today's software classics. Superb graphics, synthesized voice and original game concept will keep you coming back for more. Already voted "Game of the Year" by British Micro Awards 1985, it is surely destined to become an all time great. Are YOU ready to face the most impossible mission yet

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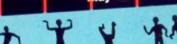


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tots of roaring engine sounds—best of all, though, Pitstop II is great fun to A Star Game."



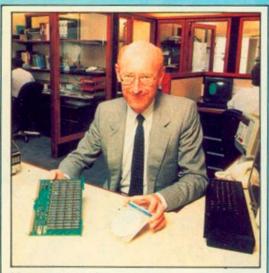
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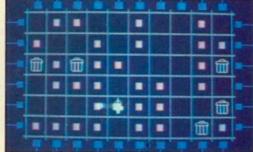
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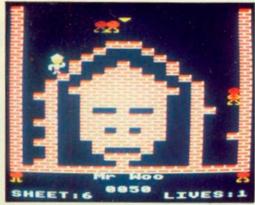
YOUR? PUTERBUCAS



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Impulse: page 58.



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Cover shot: Jeoff Thompson, karate world champion. See First Fist Then ., page 40.

- **2 NEWS:** Mirror man Maxwell takes over Sinclair; Judge calls Amstrad pirates; Acorn suspended; Robot umpires; Datasoft's Goonies next Ghostbusters?
- **9** YOUR LETTERS: Plus 4 comments, software observations, "Enterprise is wonderful", Dismon information and what's happening at Evesham?
- **23** HARDWARE HITLIST: Talking heads face-to-face interview with Anirog's Voicemaster; plus an ode to a Pace Nightingale modem.
- 25 SOFTWARE SHORTLIST: The Way of The Exploding Fist gets five-star treatment; and sneak previews of Sky Fox from Ariolasoft and US Gold's Kennedy approach.
- **32** JOYSTICKS AWAY: Pete Connor straps on his goggles and wiggles, rolls, presses and jerks his way through a variety of sticks, tracker balls and cards.
- COMPETITION RESULTS: At last it can be revealed: which one of the oleaginous mass of sneaks, cheats, slackers, and goof-offs won our "Cheat" competition.
- JOYSTICK COMPETITION: Over £600 worth of prizes to be won. There are 50 Sticks - the baseless mercury switch joystick - up for grabs.
- MELBOURNE HOUSE FIST FIRST: The Way of the Exploding Fist is just the first salvo in a veritable barrage of good games promised by Melbourne.
- TOP TEN GAMES COMPETITION: What would you play on your desert island? Name your top ten games of all time and you could win a Commodore CBM-128.
- THE QL REVISITED: A quantum leap to nowhere? John Dawson boards the silent 46 hulk floating in the depths of space to reassess the potential of the QL.
- QUEST CORNER: Hugo North has a good laugh with Bored of the Rings, dabbles 51 in assassination, and follows the trail of the Wing in Tracer Sanction.
- → SPECTRUM BIRDY: Tough times for Jovian avians this challenging machine-code 52 game illustrates the problems of collecting diamonds on Jupiter.
- COMMODORE 64 IMPULSE: Floyd the Droid can't help acting on impulse he has been miniaturised to track down chip defects in Keith Suddick's new game.
- 62 ACORN ELECTRON CHARLIE CHAN VISITS THE WOK FACTORY: Plenty of chopsticks but nothing to put the rice on. B Lewis lashes out the monosodium glutamate.
- 66 AMSTRAD FRUITIE: Hold, nudge and gamble with M K Mostowy's classy simulation of a penny arcade fruit machine. Penny arcade? Those were the days.
- SPECTRUM CHORDATA: Chuck away that cardboard Strat and get down to business. Dave Rogers' has a program that helps angst-ridden guitarists fret properly.
- AMSTRAD SPLIT: J G Fountain introduces you to split-screen techniques. Let's hope Lit does for the Amstrad what it did for Bette Davies.
- 4 SPECTRUM HATCHED FILL: If you want to lower the tone of your graphics, or heighten the contrast, A J Renton fills you in on the details.
- COMMODORE 64 SPRITES: Master interrupts are one of the most important aspects Of machine-code programming on the 64. Learn from the master, Nalin Sharma.
- **8** COMMODORE 64 STRINGS: You get a number of sub-routines to manipulate strings with this educational article from Graham Barbour. All this and bubble sorts, too.
- BBC INTERRUPTS: Fintan Culwin follows up on last month's music editor. Now how to accompany games.
- TELSOFT: A reminder of how to use 4 this useful service.
- FIRST BYTES: Pythonesque pokes, a loók at discs and bluffers guide.
- RESPONSE FRAME: Tim Hartnell **93** SOFTWARE FILE: Nine pages of programs for a wide range of home micros. helps readers with queries.
- DATEBASE: Paul Bond rounds up local, national and international micro events **U** and supplies a list of essential phone numbers.

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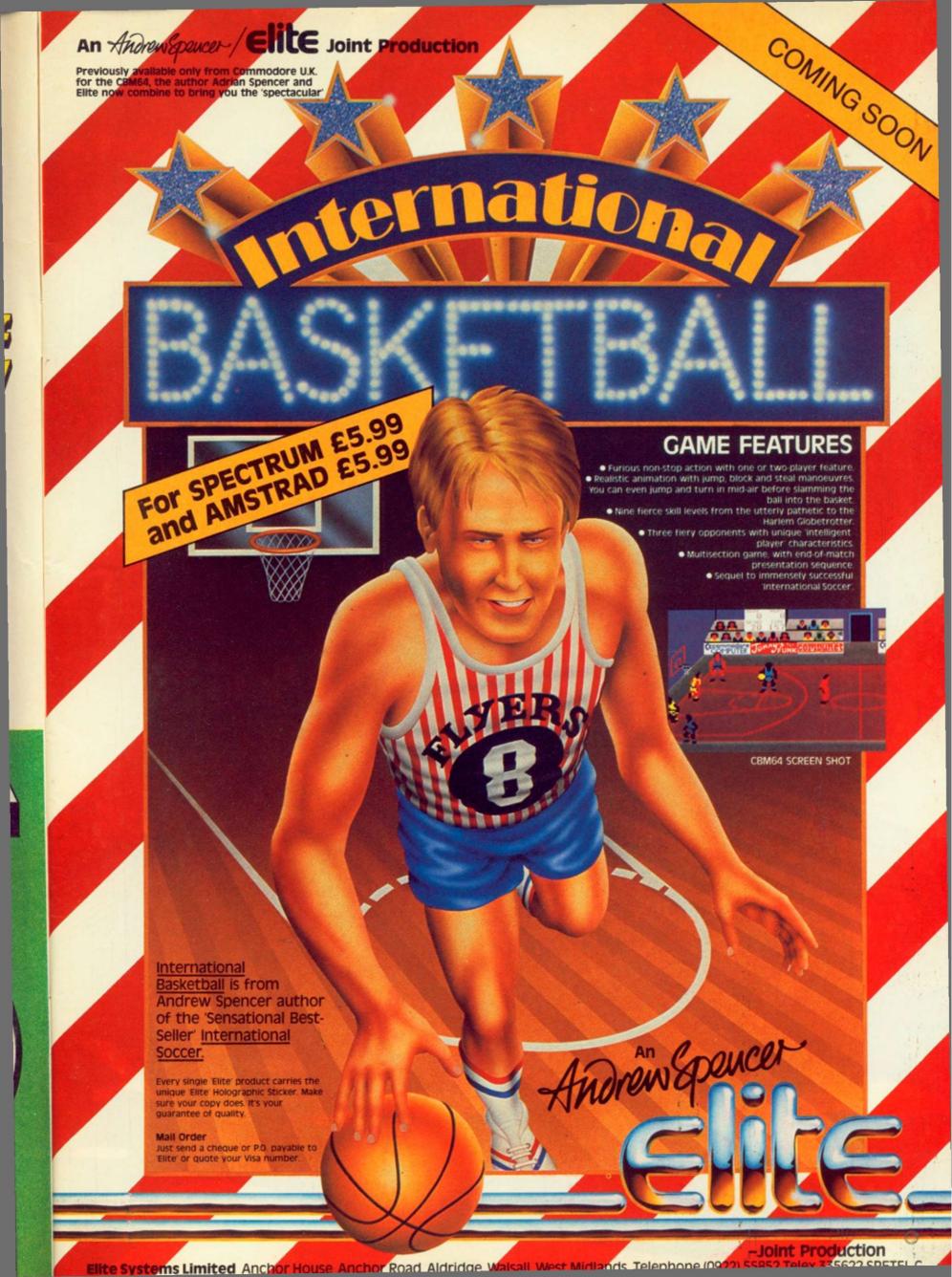
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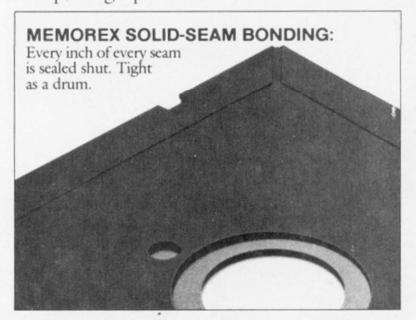
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64 characters per line on the screen!

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HOME COMPUTING WEEKLY APRIL 1984

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CRASH JUNE 1984

The cassette program is supplied with instructions for microdrive conversion.

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TASWORD EINSTEIN Tatung Einstein

disc £19.95

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A particularly sophisticated yet easy to use program. Now available on disc. The cassette version is supplied with instructions for transferring to disc.

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Five impressive print styles for your use:

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PAIALE SERIPI - a distinctive flowing font

Typical Tasprint output. Please note that different makes of printer produce different sized output.

TASPRINT (Spectrum)

Drives all the printer interfaces compatible with TASWORD TWO and can be used to print TASWORD TWO text files as well as output from your own Basic programs.

TASPRINT 48K Spectrum

cassette £9.90

microdrive cartridge £11-40

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TASPRINT EINSTEIN

disc £14.95

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TASPRINT QL Sinclair QL

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TASPRINT 464

Can be used to print AMSWORD/TASWORD 464 text files in addition to output from your own Basic programs. Drives the **Amstrad DMP-1** in addition to the printers listed above.

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THE TASCOPY SCREEN COPIERS

The TASCOPY screen copiers print high resolution screen copies with different dot densities and patterns for the various screen colours. This gives the screen copies a shaded effect which presents on a monochrome scale the colours on the screen. With TASCOPY you can keep a permanent and impressive record of your screen pictures and diagrams. TASCOPY supports all the printers mentioned under TASPRINT.

TASCOPY (Spectrum & Interface 1)

The Spectrum TASCOPY is for use with the RS232 output on ZX Interface 1. It produces monochrome copies (in a choice of two sizes) as well as copies with the shaded "grey scale" effect described above.

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TASCOPY QL

TASCOPY QL adds new commands to the QL Superbasic. Execute these commands to print a shaded copy of the screen contents. Print the entire screen or just a specified window. TASCOPY QL also produces large "poster size" screen copies on more than one sheet of paper which can then be cut and joined to make the poster, and high speed small copies.

TASCOPY QL Sinclair QL

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TASCOPY 464

Adds two new commands to the 464 Basic to give both a standard shaded screen copy as well as a "poster size" copy which is printed onto two or four sheets which can be cut and joined to make the poster.

TASCOPY 464 Amstrad CPC 464 & 664

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PLUS ...

TASWIDE The Screen Stretcher

With this machine code utility you can write your own Basic programs that will, with normal PRINT statements, print onto the screen in the compact lettering used by TASWORD TWO. With TASWIDE you can double the information shown on the screen!

TASWIDE ZX 16K + 48K Spectrum

£5.50

TASMERGE The Mail Merger

Transfer data from MASTERFILE to TASWORD TWO Letters and forms typed on TASWORD TWO can be printed with addresses and data taken from MASTERFILE. The mail merge facility allows, for example, multiple copies of a letter to be printed, each containing a different name and address taken from your MASTERFILE data. To use TASMERGE you must have one or more microdrives as well as TASWORD TWO and MASTERFILE by Campbell Systems (version 9 or later).

TASMERGE ZX 48K Spectrum

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Plug into your Spectrum and drive any printer fitted with the Centronics standard parallel interface. Supplied complete with ribbon cable and driving software. The user changeable interface software makes it easy to send control codes to your printer using the method so successfully pioneered with TASWORD TWO. The cassette contains fast machine code high resolution full width SCREEN COPY SOFTWARE for Epson, Mannesmann Tally, Shinwa, Star, and Tandy Colour Graphic (in colour!) printers. TASCOPY, shaded screen copy software for this interface (value £9-90 — see description on left) is included in this package.

CENTRONICS INTERFACE ZX Spectrum

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CZECH MATE ON SINCLAIR'S BOARD

"I AM ABSOLUTELY DELIGHTED. Robert Maxwell is a really great bloke". That's Sir Clive's gushing reaction to the financial saviour of Sinclair Research. But just how the computing public will react to a Sinclair Research without Sinclair himself in charge and still pushing the buttons is another matter. After all, with Sir Clive only acting as a research and development consultant, how can the company ever be the same again?

The enthusiasm of Sinclair's creditors may also be qualified. They'll be pleased to see some money coming their way, but disappointed at the lack of new orders. As a result Timex has already laid off 400 workers from its Dundee production line where so many Spectrums have been built.

Sinclair Research must create new products if it is to have a long-term future. The fact that the company doesn't seem to be producing more of its existing computers is understandable. At the current rate of sales, the £34 million of warehouse stock that Maxwell has inherited should see the company into the autumn — and, pessimistically, even beyond that.

If the new Sinclair does try ploughing on into 1986 with old machines the company will cease to exist: Sinclair without innovation isn't Sinclair.

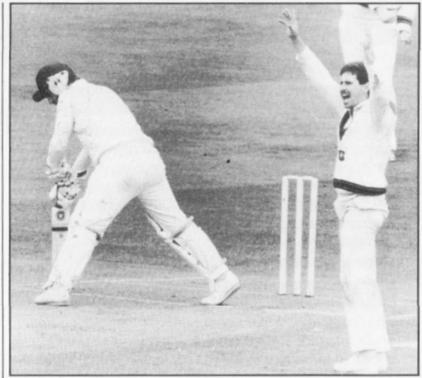
Worse, the whole industry without a steady flow of increasingly sophisticated computers will also flounder. This year for the first time it is the software houses and not the computer manufacturers who have been making all the running. They've been the ones to come up with the new ideas that keep the industry going.

But that can continue for only so long. Once they run up against the limits of machines which in most cases are several years old, there will be nothing to sustain the public's interest.

Clive Sinclair's outburst of delight at the Maxwell take-over shows his relief that the company he made great will continue to exist. Maxwell in turn must recognise the importance of Sinclair's continued participation in the firm's and the market's future.

Provided he capitalises on Sinclair's talents there may still be a British home-computing manufacturing industry for Acorn to return to when and if it staggers to its feet after its second knock-out in four months.

Editor: TOBY WOLPE: Assistant Editor: MEIRION JONES; Production Editor: IAN VALLELY; Software Editor: SIMON BEESLEY; Commercial Software Editor: PAUL BOND; Editorial Assistant: LEE PADDON; Editorial Secretary: LYNN DAWSON. Editorial: 01-661 3144. Advertisement Manager: NICK RATNIEKS 01-661 3127; Assistant Advertisement Manager: KEN WALFORD 01-661 8548; Senior Sales Executive: JULIAN BIDLAKE 01-661 8458; Advertisement Executive: KAY FILBIN 01-661 8484; Northern Office: GEOFF PARKER 061 872 8861; Advertisement Secretary: MAXINE GILL; Classified: SUSAN PLATTS 01-661 3036; Publisher: GAVIN HOWE; Group Advertisement Manager: SHOBHAN GAJJAR. Your Computer, Room L221, Quadrant House, The Quadrant, Sutton Surrey SM2 5AS. © Business Press International Ltd 1985. Printed in Great Britain for the proprietors Business Press International Ltd, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS. Tel: 01-661 3500, Telex/grams: 892084 BIPRESG ISSN 0263-0085. Printed by Riverside Press Ltd, Whitstable, Kent, and typeset by Instep Ltd, London EC1. Subscriptions: U.K. £14 for 12 issues. ABC 131, 769 July-December, 1984.



Was he leg before?

ROBOTS — HOWZAT?!

DICKY BIRD is not going to be replaced by a Dalek yet but micros could soon be helping umpires with tricky leg before wicket decisions. The Test and County Cricket Board is sponsoring research into using cameras linked to a computer to plot the probable course of the ball after it has hit someone's pads which would indicate to the umpire whether it was plumb or not.

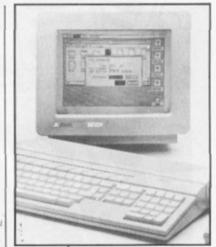
The idea comes from Jodrell

Bank Radio Astronomer and cricket fanatic Sir Bernard Lovell whose last idea for an electronic aid to show whether catches behind the wicket came off bat or pad is still at the prototype stage. This was a microphone in the bat itself — well Australian T.V. puts a mike in the stumps — with headphones for the umpire. So far Sir Bernard's most successful electronic cricketing innovation is an improved light meter used at Old Trafford.

500,000,000K

LASER MEMORY could be in our homes before Christmas. By then Atari's Rob Harding expects to be selling a Compact Disc Rom Player for the ST with a capacity of half a Gigabyte per disc — that's 500 Megabytes, enough to swallow every telephone directory in Britain — and for a price of less than £500. The only catch is that the CD Rom is read only — the technology to write to laser discs is still prohibitively expensive.

At the Chicago Consumer Electronics Show Atari demonstrated the CDRP player with a disc containing an entire 15 volume encyclopaedia. The text only took up a third of a disc with pictures and a comprehensive index filling the rest. Arcade-style laser games will



ST will have giga disk.

be possible and at the flick of a switch the machine doubles up as an ordinary compact disc music player.

SINCLAIR COUP Bob's your uncle, Clive





Ever popular Bob Maxwell — (live shows off the big wafer).

SIR CLIVE is back at the drawing | board now that Daily Mirror owner Robert Maxwell is paying £12 million to take over Sinclair Research. Desperate financial trouble had led the Bank of England to try to organise a rescue, but Sinclair is still not safe.

Timex has laid off 400 Spectrum Plus assembly workers because there are no more orders and the future of the pocket television looks shaky, because Polaroid has stopped making the long life lithium batteries for it. When the stockpile runs out Sinclair will switch to short life Zinc Carbon

Maxwell is looking for a new chief executive now that Sir Clive, who admits he is "awful at managing established businesses", has left the board to concentrate on research. Paradoxically his Metalab announced a breakthrough in wafer scale integration just days before the Maxwell deal.

The problem with conventional chip production is that on each wafer of silicon some chips are faulty so you cannot produce a complete computer on one slice. Metalab uses Ivor Catt's idea of configuration logic - a built-in circuit which checks and bypasses any faulty areas on the wafer.

AMSTRAD PIRACY **DOUBLE-DECKER**

SELLING A high-speed twincassette stereo deck which could be used to copy pre-recorded music or program cassettes was an inducement to infringe copyright according to Mr Justice Whitford in the High Court. The case is doubly embarrassing to Amstrad which makes the decks because it also supplies commercial software through its Amsoft operation.

Despite legal costs of £100,000 Amstrad intends to appeal against the ruling which was in favour of the British Phonographic Industry who are now seeking damages from Amstrad. According to BPI's legal adviser Patrick Isherwood highspeed twin cassette decks will only



Sugar "condemns piracy".

be allowed to be sold if "accompanied by adequate warning notices about the copyright infringement

notices so explicit that they are likely to make the machines unattractive to the retailer".

If the ruling stands it could be used by organisations like the Guild of Software Houses and the Federation Against Software Theft to take action against companies like Evesham Micros which makes the Interface III program copier (Don't Touch, page 14, Your Computer July 1985). Roger Tuckett of FAST has called Justice Whitford's ruling "a welcome development".

Meanwhile the new copyright law has encouraged MicroPro who wrote Wordstar - to look for a test case immediately.

Wally's paradise is a 64K Spectrum

MIKRO-GEN'S latest box of tricks will turn software pirates into a bunch of wallies - and also give Mikro-Gen's own programmers almost 50 percent more memory to

The Mikro-Plus Interface for the Spectrum is like Imagine's much talked about idea for Megagames. It's a hardware way of selling software. You pay £14.95 for a game on Mikro-Plus which overlays the Spectrum's Rom and includes a joystick port. The game itself won't be copiable because part of it is burnt into the Mikro-Plus's 16K's worth of Eproms. The rest of it comes supplied on

Shadow of the Unicorn, a roleplaying adventure with 10 characters, will be the first program supplied on the cigarette-packet sized Mikro-Plus and will be out in mid-September. Mikro-Gen's new Wally game for the Christmas period, Three Weeks in Paradise, is not only a change in style but will also be appearing on Mikro-Plus Interface.

Booked — FBI pulls the Cracker

"I was a teenage hacker" confesses Bill Landreth, alias The Cracker, in Out of the Inner Circle, a newly released Penguin book he wrote while on probation after the FBI finally caught him after a lifetime of computer crime at the grand old age of 19 while tapping into Telemail which serves NASA, Coca Cola and General Motors.

Big Blue screen blur

SORE EYES? Nagging headaches? You could be another victim of VDU health hazards. The good news according to a comprehensive report on the subject put together by IBM is that extra metal shielding could cut out the problem. These shields are already a requirement in the States but not as yet in the U.K.





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DIARY

RICHARD AUSTIN of Evesham Micros wants to thank GOSH and FAST "for their outburst against our product, Interface III, in July's Your Computer. He claims he is crying into his champagne as he celebrates the success of his product.

IT'S BEEN a bad few weeks for computers and robots. First there was the slight hitch with President Reagan's Star Wars extravaganza when the space shuttle insisted on looking for a 10,000 mile high mountain to make the laser test a little easier. Then an Edinburgh restaurant refused to pay for a Donic robot which it had bought second hand after it allegedly went beserk knocking over tables before its head fell off into a customer's lap. Now a Naughty Words Editor to stop people like the man who wrote the Amsdisk program - he sends his sincere apologies by the way - from filling up bulletin boards with obscenities has gone out of control. All messages including the word title are being censored.

ALAN SUGAR produced a bird watcher who makes recordings of wild life noises and copies them for friends, as an example of the typical tape-to-tape cassette user in the Amstrad double-decker piracy trial. The judge was not impressed.

SAD STORY from Brian Raine who went to Bournemouth Computer Club clutching his copy of Your Computer and complained that "piracy was the main activity". He was laughed at and the leader of one user group admitted that he asks his 8 year old daughter to make copies for him to avoid prosecution. Brian wants GOSH to guarantee that they will replace faulty tapes — in case software houses go bankrupt.

SOME TRANSPARENCIES from Datasoft disappeared before we saw them — Ah said Datasoft "that's because we put in a fake doubloon — somebody must have thought it was real". We are looking for a tall, one-legged man with a parrot on his shoulder.

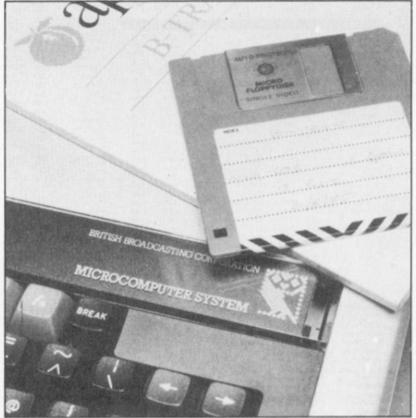
Elsie Dec

DOWN AGAIN Acorn's second problem

ACORN'S CRISIS has deepened with the suspension for the second time of its shares, which had sunk to 11p on the Stock Exchange. At the same time Junior Industry Minister John Butcher wants an end to Acorn's exclusive and lucrative BBC contract to let companies like ACT in.

According to Close Brothers — Acorn's financial advisers — "the market for home and small personal computers has become even more difficult and a further and very substantial decline has occurred in sales from the levels predicted earlier this year. This has led to a significant deterioration in the financial position of Acorn". Two weeks earlier ACT, which is muscling into BBC country with its 16-bit F1E micro, announced it had made record £92 million sales and £10 million profit.

With home computer sales running at one third of last year's in some areas Acorn finds itself sitting on a stockpile of at least 70,000 Electrons while the BBC Plus is still not selling despite a panic £30 price cut. Olivetti, which bought 49.3 per cent of Acorn the last time it needed rescuing, could increase its stake to a majority and sell off



Will Acorn be submerged by ACT?

Acorn subsidiaries like Acornsoft.

One industry analyst points out that with sales of nearly £2 billion a year "Acorn is less than petty cash to them" but if high-flying ex IBM troubleshooter Alex Uboldi,

who has been put in as emergency Managing Director, cannot quickly find a new strategy for Acorn's survival then Olivetti may pull out. Acting Chairman Alex Reid may have had his spaghetti.

FREE MODEM WITH DRIVE

COMMODORE IS about to dump £20 million worth of kit on the market at half price but most of it seems to be business machines. Meanwhile general manager Nick "smile at the rain" Bessey claims he can maintain the price of the 64 and "break the seasonal strangle-hold which has dogged the home computer industry".

Good offers on peripherals include 1541 disc drive, with disc software, plus modem and one year's Compunet subscription for £229.

Despite the launch of the CBM-128 in September Bessey says the 64 will continue through 1986. Certainly software and peripheral makers are sticking with the



Graphics Mouse expands 64.

Commodore 64.

Commodore's own Sound Studio and Sampler programs for the 64 come out at the same time as Activision's Music Studio, and Datex is showing the M/S 1 Graphics Mouse which purports to give the 64 Macintosh style graphics — at lower resolution but in colour.

If your name is MUD it's for you

BRITISH TELECOM turns dungeons and dragons into big business next month with the launch of its Multi-User Dungeon which will allow anyone with a modem and £20 to join "the largest interactive computer game in the world". MUD can accept over 100 simultaneous players and a permanent Arch Wizard will watch out for foul play.

MUD will operate from 6.00 pm to 8.00 am and all day at weekends. Originally written by Roy Trubshaw and Richard Bartle, MUD can still be played in the early hours on the Essex University Dec computer, but the BT version claims to be bigger and better

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penor	171	STARSTRIKER	7.95	3.99	Terminal	117	SKRAMBLE	6.95	2.29	Bug Byte Bug Byte	195	ANTICS POOL	6.95 5.95	3.79
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version of your game on say the CBM-64 to get rave reviews then you produce third rate conversions for other machines relying on lazy journalists not to even open the packaging before repeating what they wrote about the original. A monstrous libel on all concerned so here's an update on when you can expect to see other peopel's hits on your micro. Firebird has its Gyron team writing Z-80 Elite up in Edinburgh. Expect Spectrum Elite in September and Amstrad in October. Rumours abound that Firebird was so impressed with the shaver sorry, Acornsoft that it wants to buy the company for a million pounds - but will they have enough credits left to buy a military laser? Meanwhile Elite - as in the software house not the game - hopes to produce Spec 'n Am versions of Commodore's International Soccer/Basketball soon. Beyond is stressing that its Spec version of Spy vs Spy "features identical graphics to the Commodore". End of August sees Mirrorsoft's Boulderdash on Am. A&F's Chuckie Egg II, originally Spec, is moving through CBM-64 and Am onto other micros. Another sequel, Task Set's Super Pipeline II is going Spec. CRL who proudly call themselves the Dream Makers have made it to the Amstrad with Rocky Horror.

RUSS ABBOTT has been seized by the BBC and the only way that Basildon Bond and the rest of the Madhouse team can rescue him is by getting jokes right to unlock the doors in Probe Software's new View to a Kill lampoon . . . Rupert and the Toymakers' Party paves the way for Quicksilva to follow up with The Flintstones and Max Headroom . . . 666 Go to Hell now has a rival in Witchswift from English Software while Five Ways Software wants to unleash a plague of Rats . . . Monster Trivia tests you on 2,000 Trivial Pursuits type questions . . . Nick Faldo Golf from Mind Games is icon driven . . . Dinamic in Spain wanted to call its Frank Bruno Boxing rival Rocky but has had to settle for Rocco . . . System 3's Karate will join combat with Fist and U.S. Gold's Karateka.

ON YER BIKE Activision's Tour de force

GREG FISCHBACH brought his family over from California to Britain for the Summer. They're still looking for it.

Greg, International President of Activision, is also looking for a new U.K. chief now that Geoff Heath has left for Melbourne House.

Greg's links in the entertainment industry - he has managed the Steve Miller Band amongst others - helped him snaffle the rights to Ghostbusters which contributed to Activision's \$27 million game sales last year.

Now he gets an early glance at movie scripts but he doesn't believe "that every motion pictures is capable of being turned into home comuter software. What a game needs is hooks."

His next releae is Tour de France by Byron Turner, a cycling game endoresed by the Tour, Peugeot and king of the mountains Robert Miller. Flying Scot Bob might not be so happy if he knew Greg referred to him as "the English bicyclist".



Activision stays with racing but moves over to four wheels with the Great American Cross Country Race which starts on the 64 and

moves to the Atari. Moving the other way is the long-awaited CBM-64 version of Rescue on Fractalus — out August.

SON OF BLUE MAX **MEETS GOONIES**



Frankie's manager takes control.

So BIG has the U.S. Gold/Ocean/ Centresoft combine become that it seriously discussed taking over Sinclair when Sir Clive hit trouble. With over a quarter of the games sold in this country coming from the group already plans are in hand for a massive Autumn offensive to take more of the market. U.S. Gold will be launching sequels to proven hits - Beachhead II, Blue Max 2001 and Solo Flight II in August and Pole Position II in October all on the 64 to start with.

Goonies - based on the Spielberg film just released in America and tipped as the next Ghostbusters - is also due in October, with Zorro due the month before. Raid Over Moscow on Amstrad paves the way for CPC versions of Dambusters and Bruce Lee later. Ocean is happy with the live audio track of Relax on its Frankie Goes to Hollywood program for the 64 and Spectrum and now plans Atari and Amstrad versions.

Ocean has also signed up Japanese computer game wizards Konami - who produced the original Scramble back in '81 - to sell Konami titles under the Imagine name.

The first of these is Hyper Sports - a suitable name for the original Imagine operation before it was resuscitated by the U.S. Gold/Ocean/Centresoft combine. Next Konami/Imagine launch will be Yie Ar-Kung Fu which will find itself competing with U.S. Gold's Karateka in the martial arts battle.

THE TYPING MASTER

(The Keyboard Skills program that puts you in a class of your own)

- 'The Typing Master' program exists to teach you to type. The easily met target is 30 words per minute with 95% accuracy after 30 half-hour sessions. The following facilities help you to accomplish this standard.
- 'Sight & Type' introduces you to the keyboard with the correct finger for each key and takes you to a speed of around 12 words per minute
- 'Touch-Typing' takes your speed to around 24 words per minute at the same time ensuring that you learn the peripheral keys to the same standard as those more commonly used.
- 'Practice Exercises' gives Non-Timed accuracy oriented exercises and Timed speed/accuracy exercises. Your results are given in words per minute and percent accuracy. The target standard of 30 words per minute (and far beyond) is achieved with this module.
- 'Session Monitor' overlays the whole program to hold your hand all the way through the course from first use of the program to that final, very useful result.
- To back up this Basic version you get documentation on how to approach the course and a record card to fill-in as you progress through the sessions.
- 'The Typing Master' is not a toy. It is a professionally-written program which has as its sole purpose the teaching of typing/keyboard skills in a way that is friendly and fun. It was written by a typing instructor and it has been marketed world-wide on CP/M, MSDOS, PCDOS and other operating system-based machines over the past three years. It has also been available on Newbrain and BBC Micro (Model A or B) for over a year and is now being released for Amstrad CPC (mono or colour), Commodore 64 and Sinclair QL!
- TAPE formats of the Basic version are available from the following selected list of distributors (media and prices are shown in brackets).

NEWBRAIN (Cassette: £15.00 (no VAT)): GFG Microsystems, 36 Armitage Way, King's Hedges, Cambridge, CB4 2UE. Tel. (0223) 315120.

BBC MICRO (model A or B) (Cassette, usable with disk:

AMSTRAD CPC (mono or colour) (Cassette: £15.00 + VAT). E.C.H. Hobday, The Chestnuts, Rodmersham, Sittingbourne, Kent ME9 0PL. Tel. (0795) 24191.

COMMODORE 64 (Cassette: £15.00 + VAT). SINCLAIR QL (Cartridge: £20.00 + VAT).

P. Ashpitel, 36 Athlone Avenue, Bury, Lancashire, BL9 5EE. Tel. (061-797) 5214.

_copies of THE TYPING MASTER Please send me (Basic Version) _computer at £_ per copy (+VAT where shown). I enclose cheque/postal order for total amount:

NAME: ADDRESS:

PLEASE SEND THE COMPLETED COUPON AND PAYMENT DIRECT TO THE DISTRIBUTOR FOR YOUR COMPUTER AS SHOWN ABOVE.

DISK formats of the Basic program may be obtained from the following suppliers. They also supply a Business/Schools version which incorporates record keeping and many other facilities. Prices shown below are for the Basic version.
APRICOT, SIRIUS & VICTOR (tailored versions). (Disk: £50.00 + VAT). Anglia Business Computers, I Milton Road, Cambridge, CB4 IUY, Tel. (0223) 315580.
CP/M80, CP/M86, MSDOS, PCDOS. (Disk: £50.00 + VAT).
Microcomputer Products International Limited, Central House, Cambridge Road, Barking, Essay ICL1 8NT, Tel. (01.501) 6511.

Microcomputer Products International Essex, IG11 8NT. Tel. (01-591) 6511.

Software Limited, No. 2 Alice Owen Technology Centre, 251 Goswell Road, London, EC1. Tel. (01-833) 1173.

In case of difficulty write to:

ANTHONY ASHPITEL SOFTWARE SYSTEMS 56 London Road, Harleston, Norfolk, IP20 9BZ, England.

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 precise prediction formula can be set by the user you can
 develop and test your own unique method.



- SIMPLE DATA ENTRY All team names are in the program. Simply type in the reference numbers from the screen. Or use FIXGEN to produce fixture list automatically (see below).
 DISC/MICRODRIVE COMPATIBLE Tapes supplied with conversion instructions.
- PRINTER SUPPORT Full hard copy printout of data if you have a printer.

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 BBC B, Atari (48K), ZX81 (16K), Dragon, Apple II, ELECTRON

PRICE £15.00 (all inclusive)



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TOP 20

1	Shadow Fire	Beyond	Sp/ 64
2	Dun Durach	Gargoyle	Sp
3	Dont buy this	Firebird	Sp
4	Booty	Firebird	Sp
5	Softaid	Etheopia Appeal	Sp
6	Grand National	Elite	Sp
7	World Series Baseball	Imagine	Sp
8	Herberts Dummy Run	Microgen	Sp
9	Quackshot	Creative Sparks	Sp
10	Dambusters	US Gold	64
11	Starion	Melbourne House	Sp
12	Arnhem	CCS	Sp
13	Wild Bunch	Firebird	Sp
14	Star Strike	Realtime	Sp
15	Rocky Horror Show	CRL	Sp
16	Everyones a Wally	Microgen	Sp
17	Broadstreets	Argus	Sp
18,	Dragontorc	Hewson	Sp
19	Gremlins Death Star	Adventure Int	Sp
	Interceptor	System 3	Sp

TOP 3 BY MACHINE

Sp = Spectrum 64 = CBM 64.

Source = WH Smiths.

	1417101	1114	
1 2	R.I.P. Rockman	M. Tronic M. Tronic	Vc Vc
3	Mickey the Brickey	Firebird	Vc
1	Way of Exploding First	Melbourne House	64
2	Drop Zone A View to Kill	Centresoft Domark	64 64
1 2 3	A View to Kill Dun Darach Action Biker	Domark Gargoyle M. Tronic	Sp Sp Sp
1 2	Overdrive Classic Adventure	Superior Melbourne House	EI
3	Football Manager	Addictive	EI
1 2 3	Alien 8 Ghostbusters Fighter Pilot	Ultimate Activision Digital Ing.	Am Am Am
1 2 3	Ghostbusters Flight Path Chuckie Egg	Activision Anirog A & F	Ms Ms Ms
1 2 3	Atik Atak Revs Lode Runner	Ultimate Acorn S. Projects	Bc Bc Bc
1 2 3	Quasimodo Ghostbusters Fort Apocalypse	C. Soft Activision US Gold	At At At
1	Dorks Ditemma	Gremlin	16
2	Dark Tower	Melbourne House	16
	BMX Racers Vic 20 64 = 0	M. Tronics BM 64	16
Sp = 16 = Am =	Spectrum Bc CBM 16 El = Amstrad Ms e = Websters	= BBC At : Electron = MSX.	= Atari

WHY NOT BACK-UP?

I FELT COMPELLED to write to you after reading your News item entitled "Don't touch - Software industry at risk" in the July '85 issue of Your Computer. This article referred in particular to Evesham Micro's Interface 3 which from what I can gather allows all commercially available Spectrum software to be transferred to Microdrive but it's implications were applicable to every back-up utility released for any micro.

I appreciate the concern felt within the software industry for the sort of organised software piracy rampant today but the opinions expresed in the article seemed to me to be just a touch one sided. Especially the comment by Mr. Langdell of the Guild of Software Houses who believes that there is no such thing as an "innocent" copy. Is he categorically stating that when I transfer my tape based programs to disc for more convenient use I am guilty of a crime? That's what it sounds like to me! I find his comments not only illinformed, but also deeply offensive.

Cassette tape is an inefficient medium for storing computer data, it is slow and unreliable, and despite Mr. Langdell's protestations to the contrary, subject to deterioration with time. Unless you are prepared to fast-forward and rewind your tapes every few weeks as a matter of routine, print-through (caused by long-term proximity of data on the closely wound tape) may produce data corruption, thus rendering the tape useless.

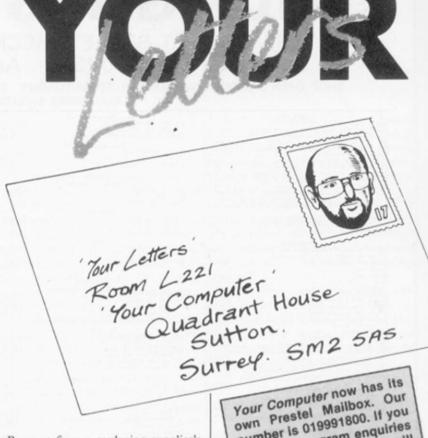
I am not suggesting that this will happen inevitably, but it is a very real risk, particularly with so-called "fast loaders" where the frequency of bits is so much higher, and the computer is pushed just that little bit further to read the tape. It is perhaps lamentable that even in 1985, the vast majority of UK home computer users still rely on tape for software and data storage, and now that alternative storage media is beginning to gain wider usage in this country it seems that there are people wishing to prevent us from making full use of them, for until disc (and Microdrive) based commercial software becomes the norm it will still be necessary for the serious home user to back his/her tapes up on to disc.

You may well condemn the producers of back-up utilities but if I might just present an analogy: If I were to buy Paraquat from a gardening supplier's shop and subsequently used it to murder my mother-in-law, would the shopkeeper be guilty of my crime? Certainly not! Back-up utilities in this era of elaborately protected software are an essential commodity. It is not the manufacturer of these utilities at fault, rather it is a small minority of illprincipled individuals who put them to perverted use, giving the rest of us a bad

May I ask how the Computer Copyright Bill, once law, is going to be policed? Will my name go onto a police computer (possibly backed up onto the odd disc or two . . . tut tut!) as a known computer addict and will I then have to live in perpetual fear of midnight raids by the crack Hack Squad?

I'm afraid that no amount of irrational pontificating is going to prevent me from making as many back ups of software as I wish. It's for my own use, I don't compute for profit, I do it for my own pleasure. I am not a criminal. Possibly Mr. Langdell would like to see the manufacturers of fast mass storage devices go out of business instead.

Rob Baxter. Manchester,



number is 019991800. If you have any program enquiries send us a message. We will try and give you an answer within a few days.

NEW ROUTINES

SPECTRUM OWNERS may like to use some of my routines.

POKE 23659,0

Makes the Spectrum crash if anything is printed in bottom part of the screen. e.g. error messages or breaks. (To disenable this routine use POKE 23659.2)

PRINT USR 0

Completely clears the memory. (New Basic) clears the 9000 FOR f=1 to LEN a\$:PRINT A\$(f)::BEEP .05,0:NEXT f:RETURN

Prints text newsflash style. It is meant to be used as a sub routine. To activate use LET a\$="message to be printed.", then set the printing variables e.g.

PRINT AT XV: and GOSUB 9000

I have noticed that the Spectrum has a facility to convert binary numbers to decimal but it doesn't have anything to convert decimal numbers to binary, so I have written a routine to serve this purpose. Poke the decimal number that you want to convert into location 16384, then run this routine:

1 LET a\$=" ":FOR f=0 to 7:LET a\$=a\$+STR\$(POINT(f,175):NEXT f:PRINT a\$:STOP

Neil Braganza, Nailsea, Avon.

DISMON

IN THE June issue of Your Computer you published a program and accompanying article about my Dismon machine code monitor. Unfortunately, you accidentally left out quite a large section, describing the 'E', 'F' and 'G' commands.

E ssss: Allows you to Enter Ascii (continued on page 21)



THOUGHTS & CROSSES

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You can get messages to us in two ways. Either use the Prestel Telex Link to 892084 BISPRES G or you can use our very own modem, day or night on 01-661 8978. The modem is V21, 300 baud, even parity, 10 bits per character. You simply transmit in upper case "YRC" - our address code, and wait for the acceptance code "+++ STF GO". Then off you go. Don't forget to tell us who it's for. Sign off with "NNNN" - again in upper case.

(continued from page 19)

text into memory from ssss onwards. Ascii text and control characters are entered from the keyboard - delete removes the last character, replacing it with a zero byte. This mode is terminated by pressing Stop in which case it displays the address of the next character that would have been entered, for use when appending.

F ssss eeee bb bb : This finds all occurences of the one to seven bytes specified, within the given address range. Any byte can be ignored by typing ** in place of the byte value. The bytes may also be specified as the Ascii value of a character by preceding the character with an apostrophe.

F ssss eeee bb bb bb - bb bb: This form of the Find command allows you to search for the given sequence of bytes and replace every occurence with the second sequence. As in the first form, a byte specified as ** will leave the original contents of the memory intact.

Note - The address of all matches found is printed out. If there are many occurences then the find can be prematurely terminated by the Stop key. For example:

F 1000 17FF A9 'N 20 ** 18 -

This finds all occurences of loading the accumulator with the Ascii of N followed by a JSR to the \$18th page and replaces them with JMP's to the same relative position in the \$19th page.

G ssss: Start executing machine code at location ssss.

G: Start executing m/c at location specified by the program counter.

On entry, by any method, to Dismon it saves the IRQ vector, NMI vector, Progam counter, Stack pointer,

Accumulator, X register, Y register and Status register. When Going to m/c it replaces all the above registers and starts execution at the specified location. Dismon automatically redirects the NMIV to point to itself allowing you to break out of a program and re-enter Dismon by pressing Restore. If desired, this break function can be disabled by

GN ssss and GN: Both having the same function as above. On encountering a BRK instruction during execution of a machine code program, the computer returns control to Dismon therefore BRK instructions may be inserted within a routine you are checking to help with debugging.

John Twiddy, Wallsend, Tyne and Wear.

ENTERPRISING

AT THE BEGINNING of March I took delivery of an Enterprise. It had taken only 10 days from the date I sent the cheque, to the day it arrived by Securicor which I don't consider to be bad going.

Before I ordered it from Zappo Computers. I had read your review of the machine which said the keyboard was poor. I had used a QL a few times and thought that the Enterprise's keyboard would be similar. It seems I was wrong, and I find it much better than the offering from Sinclair.

The graphics are superb - 640 x 512 - and although there are "only" pre-defined colours, one can define thousands using the RGB command which mixes the three primary colours.

The Basic is really outstanding, with no need to use the Poke statement. Many systems variables can be altered by using their names. For example the delay before any auto-repeat can be changed with the following.

SET KEY DELAY X - where x is the delay

The arithmetic is very accurate, with 10 digits accuracy. Try this small program on any machine.

10 LET C = 9.8

20 LET C = C + 0.00001 30 PRINT C

40 IF C = 10 THEN GOTO 60

50 GOTO 20 60 END

> Richard Hudson, Keighley, West Yorkshire.

TO THE TOP

THE SPECTRUM To The Top program published in the July issue of Your Computer will work on any Spectrum, not just the 48k Spectrum as stated.

The game should work as listed, but readers may obtain a copy of the program on cassette by sending a cheque/postal order for £2.50 to: Mr J.R.E. Wood 22 Denver Hill, Downham Market, Norfolk PE38 9BE.

BITS 'N' BOBS

K.R. Laslett's Amstrad Backup only handles programs with a Basic header. To extend its range to cope with machine code only files change line 170 to read:

170 DATA &A8, &22, &F3, &03, &2A, &EC, &03, &ED

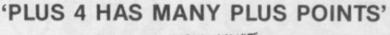
Although the Backboogie article in the July issue claims that listing 2 automatically saves the code in listing 3 once it is entered, in fact it does not do so. When you have finished entering the hex code from listing 3 you must save it yourself with: SAVE "BOOGIE" CODE 60148,150

The Load and Save commands for Spectrum Multi-Font in the June issue need to be changed before the program will work. After running listing 2 save the code it creates with:

SAVE "M.F.T. Code" CODE 60928,2355

Now to load it back change the second statement in line 10, listing 1, to read

LOAD "" CODE 30464





AFTER READING the review of the C128 in the June issue, I would like to make some comments about the Plus 4:

If the Plus 4 is not selling well the press is at least partly responsible. It has a good Basic which is a considerable improvement over Basic 2.0, yet straight Basic 2.0 programs will run quite happily, (with a few minor changes for colour etc.) I have run programs written for the Vic on a Plus 4, with a Screen Window to suit the Vic display.

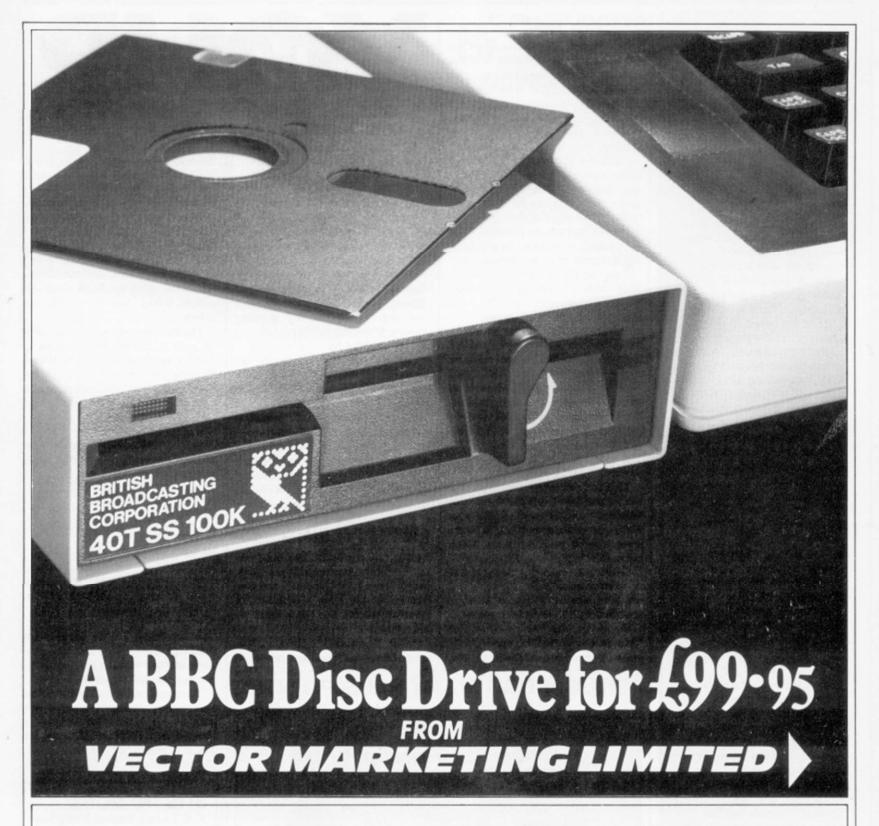
Basic programs for the C64 run with no problems. The 1541 drive works satisfactorily with the Plus 4, transfering software is no trouble. The built-in software is adequate for many applications.

The sound and graphics commands are simple. The Plus 4 has a lot of potential for many users, including small businesses. Obviously the C128 will be an improvement but why knock the Plus 4, it's a good machine and available now.

D.E.F. Rolfe,

Byfleet,

Surrey.



Why continue to use slow cassette Tape Storage when you can buy a highly reliable Disc Drive for the remarkable low price of

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Cheque enclosed for £ Barclaycard A/c	or charge my Access/
Signed	, '
Expiry date of credit card	Tick if VAT invoice
required Offers not applic Company Reg. No. 1632455	

ADD-ON HAR

Modem £143.75 Interlekt Elec A multi rate, multi standard modem, 1200/75 300 and 1200 answer or originate modes. Connects via a standard 25 pin RS232 connector. Five LEDs on the front show when the modem is powered up, on line, receiving or transmitting data. It has a loop back test mode.

Speech Synthesizer

Commodore £24.95 Cheetah Difficult as it may be to think of anything more irritating than a computer announcing in a loud voice that you've got it wrong, the Cheetah Sweet Talker plugs into the user port and a din plug goes into the video output socket. It has a vocabulary of 63 allaphones (speech building blocks) and various pause lengths.

Centronics interface

Commodore \$42.50 Zero Electronics Yet another Centronics interface for the range of Commodore computers. A bit pricey, but it does plug into the serial port, and have its software in Rom, so it should be compatible with all Commodore software. Versions for most printers, screen dump software, optional 16k buffer at £14.95. Tel 0493 842023.

Control interface

Various Bowthorpe Microsystems Do you feel inadequate whenever people say "very clever old boy, but what can you actually do with it".? Well now you can satisfy your craving to control the central heating, the burglar alarm and the cat flap all at once with this controller.

The board gives you 12 digital and eight analogue ins and 16 digital outs.

Pace modem

■ BBC ■ Pace Electronics

BUYING A MODEM is always a tricky task. You have to be confident that what you buy is going to be flexible enough to allow you to keep up in the ever-changing world of micro communications. Prestel, Bulletin Boards and of course Telsoft.

Pace might just have a product here which is just what you are looking for. The modem itself fits under the phone, which plugs into the back of the modem, and the modem is plugged in via a modular style BT socket. Two push buttons on the front select either 1200/75 or 300 baud originate or receive modes. An RS-423 lead plugs into the back of the Beeb and there are two indicator lights. One doubles as power indicator and data, the other shows line hold.

So far so good, not much to get excited about here. But the real strength of this package lies in the software. Commstar comes on Rom and is one of the best terminal packages around. It has two separate modes, a spooling dumb terminal mode, suitable for Bulletin boards and a page orientated mode for Prestel.

Using the terminal mode, the first thing to do is initialise the system to conform to the board's protocols you are trying to access.

You can also decide whether you want characters echoed to the screen, spooled to a buffer - memory or disc

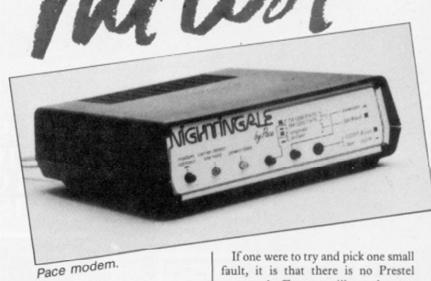
- output to the printer. If you are using a printer, it may be necessary to use XON/XOFF protocols to prevent jamming as the printer gets busy. There is a buffer output mode so that messages can be prepared off line.

The Prestel mode is a little more limited. There is no printer driver included, you can use various off the shelf printer drivers. To help cope with Prestel, you can tag as many pages as you want, and then retrieve them in the order you tagged them. All the usual options such as previous page, repeat page and download program are available from the function

fault, it is that there is no Prestel message buffer, so mailboxes have to be typed in on line. Short phrases, such as password and ID can be programmed into the function keys, but this isn't really adequate for messages.

Apart from its reliability, it hasn't crashed on me yet, its very user friendly. From the menu page, you can enter any 'star' command you like, so you can mess around with disc files and printer format, and then return to Commstar. You can even stay on line while you do it!

Further enhancements to the Modem include an auto-answer board which should be available by now, and a bulletin board disc, using the SBBS format.



Voice Master

■ CBM-64

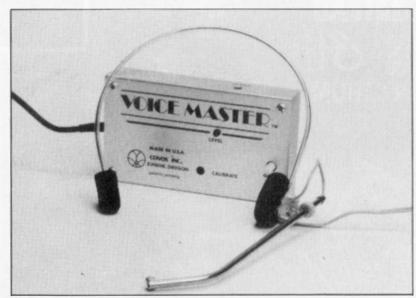
Anirog

£59.95

THE VOICEMASTER is a rather insubstantial lump of aluminium which converts your dulcet tones into a pattern of frequency against time. This it stores away inside the Commodore's memory. The box simply plugs into the joystick port. You can record a vocabulary of words which you can then incorporate into your programs.

You can train your Commodore to recognise a vocabulary of 32 words, or, if you hum it, the Voicemaster will play it, even correcting it if your singing is, shall we say, less than perfect. The quality of speech depends on the sampling rate. The faster the rate, the better the quality, but the greater the memory required.

Generally, the words will be recognisable, but from the Donald Duck school of diction. The speed of playback can be varied, and the Voicemaster need not be connected during playback, it uses the SID chip. After a couple of training sessions, the recognition program will achieve a hit rate around



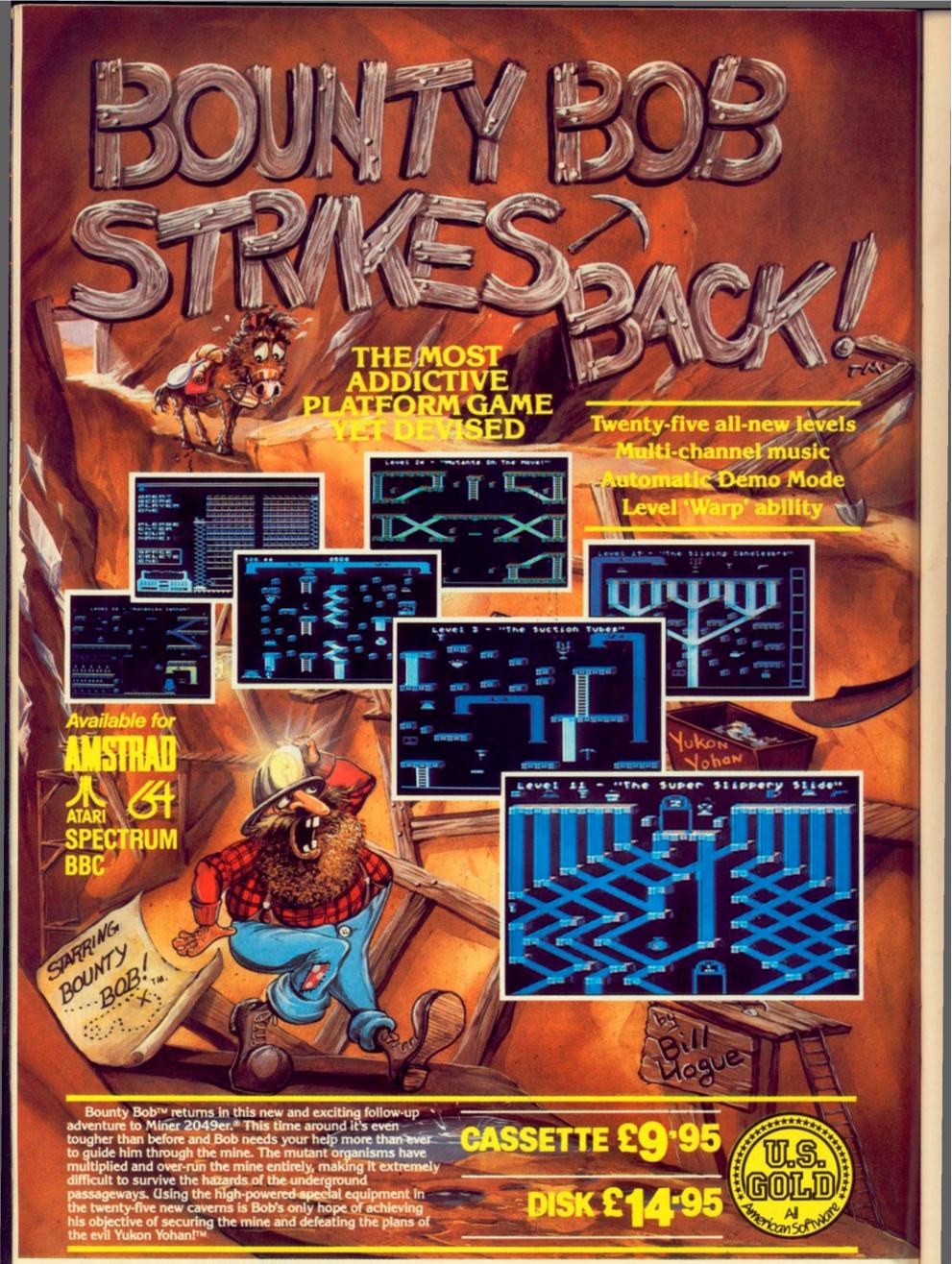
Anirog voice master.

80 per cent, once you're used to it. Voice control of games might be tricky, as trying to retain measured tones in a crisis might be difficult, but it might make computers more accessible to the

The hum-along program is amusing. It records a single melody line which you hum into the mike. This is displayed on a musical stave which can then be easily edited, printed out, saved and played back in any of the 10 preset voices available. It is a pity only one melody line can be recorded.

This is a fascinating add-on which will give hours of fun. A serious use for it might be harder to come by. It is a cheap method of incorporating speech into games. For someone interested in computer music, a true digital sampler with more specialist software is necessary.

That said, it brings into the province of the home user a field of interest formerly reserved to those with a few thousand pounds to play with.



THE PRINTING DOLLARD DOD CAN SEDICITED DAMAGE VOLLE SANITVI

Stark SOF

- * * * Best of its type Very good
- Good Average Below par

Bobby Charlton Soccer

BBC DACC Football simulation £11.95

It's a great idea - matchaction graphics teamed up with football strategy. Unfortunately, the graphics in the DACC game aren't as good as Commodore International Soccer's or Ocean's Match Day's, and the strategy aspect isn't as compulsive as Football Manager.

First you pick the team formation and then distribute 99 skill, accuracy and stamina points to the players. You can also hand out instructions on positional play to individual team members.

Tim Love's Cricket

CBM-64 Peaksoft Cricket Simulation £8.95

Every winter cricket fans cluster around radios like Ovaltine kids, listening to crackly broadcasts from the furthest corners of the Empire ... sorry, Commonwealth. England are nearly always in dire trouble, and prayers are offered to the great umpire in the sky, for a great summer of revenge back in the old country. Summer comes and with it rain. Still not to worry, now you can play cricket in the comfort of your living room.

Tim Love's Cricket may become to cricket buffs what Football Manager is to soccer fans. It takes about as long to play, and has many similar elements. However, where Football Manager is primarily a strategic "think'em-up", this is more an arcade game.

"Flawed but fun" sums up this game perfectly.

Way of the Exploding Fist

- **CBM 64**
- Melbourne House
- Arcade
- £9.95

THUCK! A high punch renders my opponent senseless. GRUNCH! Just as I square back up to him his roundhouse kick catches me unawares sending me sprawling. Melbourne House's Fist is the most realistic and enjoyable computer combat game yet. Even the tired and cynical hacks of the Your Computer office were queuing up to play it.

You have a choice of 18 different blows, jumps, blocks and kicks all controlled from the joystick - it sounds complicated yet the movements seem surprisingly natural and easily learnt. Against the computer-controlled karate kid waiting for it to strike then pulling its legs away with a forward sweep will take you a long way. But the game really comes into its own played between two human players.

There you need the full range of punches and kicks. A perfectly executed flying kick will bring you 1,000 points signalled by a Yin and Yang symbol awarded by the fan-toting judge but leaves you vulnerable to a whole range of counters. The sweeps along the ground which prove so effective against the computer can be smashed with a well-timed short jab kick.

Each blow that strikes home is signalled with a grunt of pain breaking in to the tinkling oriental music sound track as the victim doubles up. As you improve you need to use the forward and back somersaults to keep out of trouble and take your opponent by surprise. Each fight is played out in front of four background screens, a pagoda, lake and mountains, in a

Way of the Exploding Fist. gymnasium and in front of a Buddha. Against the computer you have to twice defeat a novice at the pagoda, a 1st Dan at the lake and mountains, and progressively more difficult opponennts at each location.

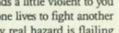
Between the 3rd and 4th, and 7th and High punch Low punch





Jab kick





If this all sounds a little violent to you - at least everyone lives to fight another day and the only real hazard is flailing elbows as you and your opponent wrestle with the joysticks.

8th Dans the program springs a surprise

on you, which you can deal with by

remembering the name of the game.

Forward

Fly kick









. BEHIND THE SCREENS . . . BEHIND THE SCREENS . . .

KARATE was the "only arcade game I played that I thought would be ideal on a home computer" says programmer Gregg Barnett. He put the idea to Melbourne House chief Fred Milgrom this January and "Fred jumped at the idea". Together with two other programmers and musician Greg Holland, Gregg Barnett has been slaving away in the software house's Melbourne bunker ever since. First he designed graphics handling routines to control the tall 72-pixel high figures on screen. Each player is made up of nine sprites which allowing for all the different shapes generated by 18 different moves makes a memorysapping sprite count of 740. Fist was developed on BBCs with fast disc access linked to Commodore 64s. On the

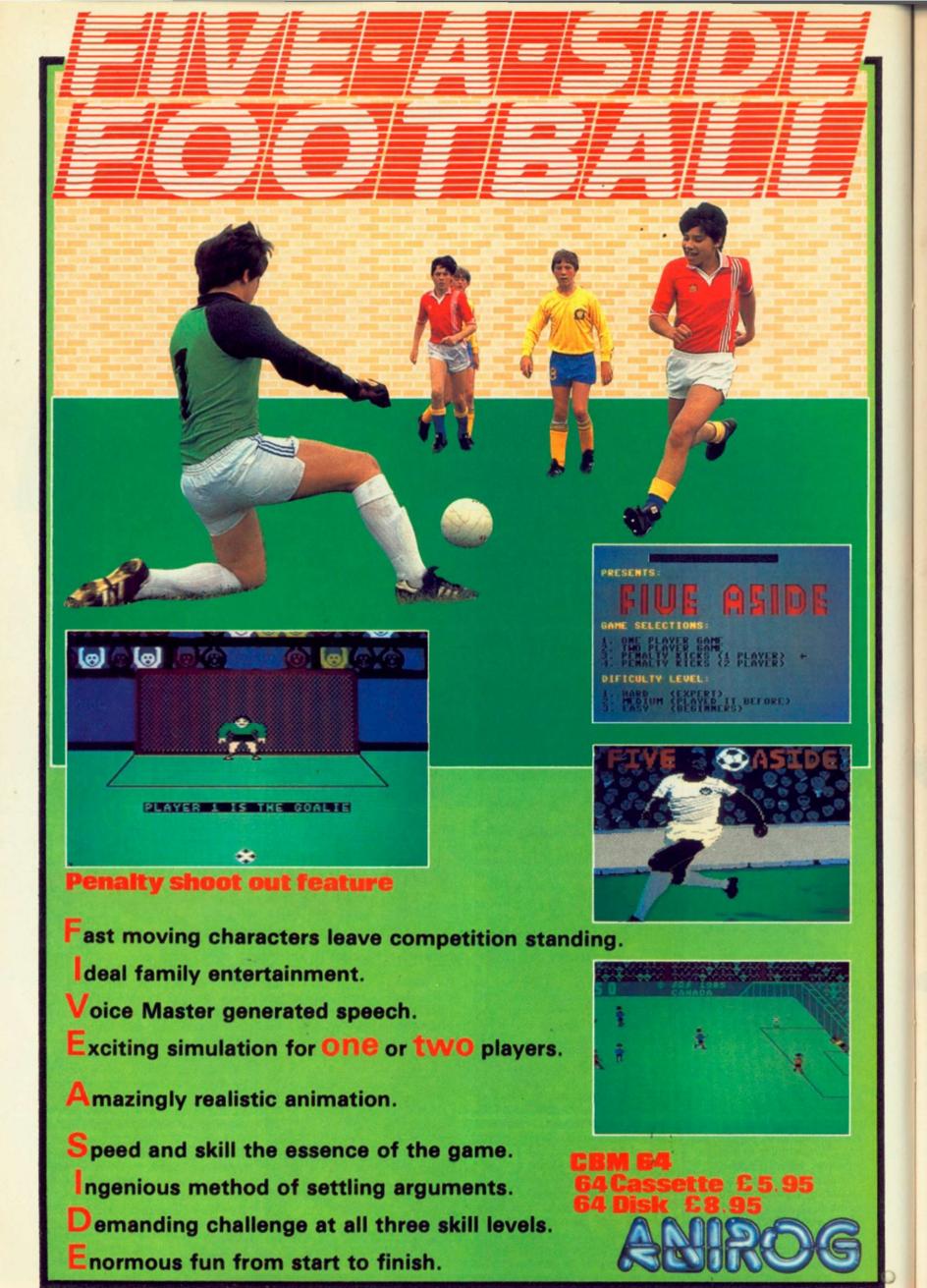
Commodore says Gregg "it can take up to three hours assembly time if you make a mistake compared with five minutes on the BBC." "Making the computer play an intelligent game" was the most difficult part of Gregg's job so he had to look for volunteers to take



Fist writer Gregg Barnett.

it on. "But this time there were too many takers. That's when we knew it was going to work." With sound and backgrounds as well cramming everything into the 64's memory was difficult. Holland's music alone took up 3K and the interrupt-driven sound effects - grunts, shouts, moans and a primal scream based on digitised real sounds, extracted at who knows what price from the Melbourne House staff another 3K. Gregg worked on Commodore versions of Horace, The Hobbit and Sherlock Holmes so he knows how development teams can become bored with a program. "Normally when the game's out everyone's sick of it" but this time they carried on playing Fist.

Meirion Jones



Star* chart

Dork's Dilemma

C-16 Gremlin Graphics Maze game £6.95

* * *

Slightly unusual in that the aliens try to trap you rather than kill you, though if you bump into them at any speed you've had your chips.

The graphics are all you would expect of the C-16 and the game is tactically interesting as you plant a time bomb and must be able to escape. Once you've killed all the aliens a piece of your craft is transferred out of the force field in the screen centre.

Saimazoom

QL and Spectrum Silversoft Maze game £7.95

* * *

Ultimate Play The Game have really spoilt software reviewers. I might have raved about this game once. As it is, it goes down as competent and enjoyable.

You steer your figure,
Indiana Smith, around the
jungle collecting items
which permit you to ford
rivers, shoot hostiles and
carve through rockpiles and
you must collect water
bottles.

Pipeline

Spectrum Viper Archetypal £7.95

* * * *

The ideal game for paranoid DIY plumbers in an excellent implementation by Simon Ffinch — with acknowledgements to Taskset.

The pipes in this game have a good solid Victorian quality about them, and the plumber and his mate have a tough time fighting off the saboteur and the aggressive ladybirds.

Eight screens and you can choose your own keys, or use a variety of joysticks. And with another game — SOS — on the flipside, it's really good value for money.

(continued from page 25)

Kennedy Approach

- CBM-64
- US Gold
- Simulator
- £14.95

* * * *

"AMERICAN ZERO zero five, turn left to bearing two seven zero, descend to two thousand feet", a crackle of static, and then "Roger" as the pilot acknowledges the order. No, this isn't the script from another turgid airport drama, but instead the new air traffic control simulator from Microprose. This game is not headed for disaster.

The speech, which is clear and understandable even down to the midwestern accent and the crackle of the radio, is all from the Commodore's own hardware. Just try that on a Sinclair!

Putting the voice synthesis to one side for the moment, how does the game play? Previous efforts at this sort of thing have suffered from a lack of playability. But, here, all the information is easy to get at and entering instructions to the pilot is simplicity itself. You move a cursor over the plane to be controlled, press the fire button and then give orders on direction and height. If you forget the orders you gave a plane, ask the pilot.

The graphics are rather primitive, showing blobs on sticks moving around a grid. But it gets the information across, which is the main thing. Five

Jump Jet

- CBM-64
- Anirog
- Flight Emulator
- £9.95

* * *

YOUR CHANCE to slip the surly bonds of earth with a V/STOL Sea Harrier—you don't need a ramp to get off because this program's plane has been specially modified to carry only 5,000 lbs of fuel and four missiles. Little details like this add credence to the program, if being written by ex-jump-jet pilot Vaughan Dow didn't already give it enough. (Some killjoys usually take this opportunity to point out that some really bad flight simulators have been written by pilots.)

With speech synthesis and introductory music this program has enough of the polish needed for it to be able to hold its head up in today's software market. But I don't think flight simulator afficionadoes and purists will rave about it — it's more of an advanced shoot'em-up than a pure simulator. Nevertheless, the instruments are visible throughout the program action, faithfully reproducing what's going on.

On the first screen, the top half shows an overhead view of the aircraft carrier with the instrument panel shown in the bottom half.

To take off you must hit the F key to select flaps down, switch on the vertical thrust — key 3 — and increase the power to maximum by pressing the

locations are available, from sleepy Atlanta to hectic Kennedy. There are three different aircraft types, Cessnas, jets and Concordes, which all go at different speeds, important when working out where various planes are going to be in a few minutes time.

During a really busy shift, you have



Jump Jet.

+ key. By selecting thrust at 45 degrees the aircraft can be boosted to normal flying speed. Don't forget to raise the undercarriage and flaps before exceeding 300 knots otherwise the computer will get panicky and shout at you. If the jump-jet is flown higher than 200 feet or out of range of the split screen display, the display shows the sea and the sky and the relative positions of the carrier and enemy aircraft are shown on the radar.

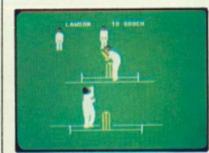
You achieve promotion by keeping the number of warnings down to the minimum permitted for your rank. So a Group Captain can only get away with three computer admonishments, whereas a Flight Lieutenant is allowed nine. A reverse example of what is meant by rank having its privileges. When the enemy aircraft attack you select M to activate the aiming sight and arm the missiles.

The higher you fly, the more difficult it gets — as you progress through the ranks, variable and deteriorating weather conditions make life more difficult.

Paul Bond.

to keep an eye on more than a dozen planes at once, landing, taking off and flying to various destinations. If this still sounds too easy, then the computer will throw a few storms and emergencies your way as well.

After your fifth mid-air collision over New York in the rush hour, you'll be glad you weren't flying in to America shortly after Reagan did the big shift change with his Air Traffic Controllers. Lee Paddon.



Graham Gooch's Test Cricket.

Graham Gooch's Test Cricket

- CBM-64
- Audiogenic
- Simulation
- £9.95

* *

REMEMBER the Great Egg Race, all that hype and in the end all you did was sit back and look at it? Well, here we go again. Once the game has loaded, apart from changing the bowlers every now and then, you are free to get on with those other important tasks in life like making coffee and putting the cat

The screen gives a Ritchie Benaud eye view of the crease, as the bowler moves up to the wicket and bowls. The ball moves as realistically as the chunky graphics will allow, and the batsman takes a swipe at it. If he connects, you switch to another graphics screen of a (continued on page 29)



Star* chart

Ancient Quests

QL and Spectrum Mirrorsoft Maze game £7.95

* *

Two games for the price of one is the growing trend for sensibly-priced good value software. I'm not wild about this example from the normally sound Mirrorsoft label, however.

The games run perilously close to passing off arcade games as educational software, in my opinion.

In King Tut you wander round a sub-Ultimate maze matching shapes with names and so on until you find the hidden treasure.

The other game, The Count, is set in a Dracula scenario and deals surprisingly enough with counting.

EVA

QL Westway Arcade adventure £10.95

* * *

EVA, far from being the new au pair, stands for Extra-Vehicular Activity as any child of the space age will tell you. Game has overtones of Jet-Pac, and consists of 26 different screens.

You must construct a teleport device to change screen. Naturally you are under relentless attack from aliens.

Anyone bringing out software, let alone games software, for the QL should be applauded, but when all's said and done, there are games just as good on the Spectrum.

Buggy Blast

Spectrum Firebird Shoot'em-up £5.95

* * *

Graphically pleasing little number from the BT software house, which has inexplicably missed being reviewed in Your Computer. Fly down corridors shooting at assorted robots, orbs and flying saucers.

(continued from page 27)

few fielders running about. If you feel like getting involved, there are two ways. In simulation mode, the bowler can attack off middle or leg and the batsman can decide to play more or less aggressively.

One or two players are catered for. Arcade mode is a solo effort, the bowler is controlled decathalon style, and you have to hit the batsman's fire button when you want him to play. Before loading the main game, you can define your own teams. You enter their names, bowling and batting averages, and bowler type.

For this sort of game to succeed, it must either appeal to the cricketing buff or be just another arcade game. It lacks the sort of detail the buff would want to see, and for the arcade addict, it's just too dull.

Lee Paddon.

Dun Darach

- Spectrum
- Gargoyle Games
- Graphic Adventure
- £9.95

++++

JUST WHEN you think that it would be impossible to squeeze any more out of the Spectrum, along comes a game which makes you wonder where it will all end. Gargoyle Games produce graphic adventures. But that is only half the tale, because Gargoyle graphic adventures are one of the jewels in the crown of British software.

Unlike most computer adventures, which are Tolkienesque or Gothic, Dun Darach, like the earlier Tir Na Nog, is Celtic. From the unpronounceable names, to the unspeakable horrors, Dun Darach is poetically atmospheric. In our dreams we've all been to Dun Darach.

The graphics and action are exceptional. Especially wonderful is the movement of the characters. Like a number of other graphic adventures, this one uses the movie camera approach. That is you do not see out of the eyes of puppet in the computer world. Instead you view him through a camera. He can be made to walk, grab, drop, fight and offer objects to others through the keyboard — the same medium is used to control the direction which the camera is pointing in.

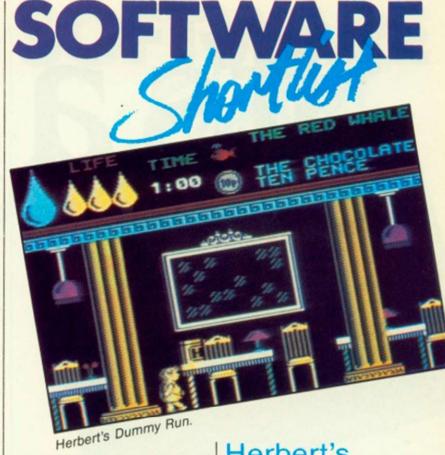
Cuchulainn is the name of the hero of the game. Tir Na Noggers will remember him, and his task is to free his pal, Loeg the charioteer, from the city of Dun Darach. He and the other inhabitants of the city look like rock musicians, with long flowing hair, bare arms and boots — the girls have longer hair and mini-skirts.

The city is realised wonderfully in this computer game, it is easy to get the impression that you are actually there. Taking the time to draw a map can be dangerous as the inhabitants are a bunch of thieves and pickpockets, but if you do you will be impressed by the size of it, and the attention to detail.

As graphic adventures go, Dun Darach is not easy. But it is highly original, superbly crafted and will give pleasure for hour after hour.

Bill Bennett.

Peter Connor.





Dun Darach.

Nodes of Yesod

- Spectrum 48K
- Odin Computer Graphics
- Arcade adventure
- £9.95

* * * *

THIS EVOCATIVELY named game features a home computer breakthrough — the first-ever Spectrum speech with Liverpudlian accent. But don't worry, it's only the introduction.

It bears certain similarities to Ultimate's Underwurlde, not least in the quality of production. You play a spaceman who must descend into the depths of the moon, collect eight alchiems — coloured shapes — and then get to the Monolith. All this to save the universe from some horrendous evil.

One of the game's nicest touches is that you're not alone in your quest. Before you disappear down a lunar pothole you need to catch a mole from its hole. When needed, the little crittur can be activated to chew through walls to new caverns, or to destroy the many creepy crawlies in the moon's depths.

The subterranean playing area has many platforms which you hop around on. Progress is made in a series of athletic somersaults which will often land you at the very bottom of a cave — minus a life.

Herbert's Dummy Run

- Spectrum
- Mikro-Gen
- Arcade Adventure
- £9.95

MIKRO-GEN'S ARCADE adventures are witty in an Ealing comedy way, as opposed to the Raiders of the Lost Ark fun of Ultimate's games. Both software ranges use impressive graphics, undisclosed maps, and take time to master. Both software ranges are more expensive than the average Spectrum fodder, but as Rolls Royce will tell you nobody begrudges paying extra for quality providing they have the money.

Herbert's Dummy Run is a compendium computer game. A number of the rooms within the arcade adventure are mini arcade games in their own right. So for your money you get a lot of different games — a kind of Star Wars On 45. You have to find items that let you do things, like the tennis racquet which is used to hit the bouncing tennis ball. In this respect the game is adventuresque, but go-north, eat-food, bangheaders will turn their noses up at Herbert's babyish actions.

In fact, Herbert is a baby. Just to prove it, the game loads and starts playing "Baby Face" — if you can amplify your Spectrum's sound output it is worth doing so. He comes from a good family, being the child of Wilma and Wally Week, who you may remember from the previous Mikro-Gen games. Wally looks like a Tetley Tea man, but reminds me of Norman Wisdom.

The game is set in a department store; somehow Herbert has been separated from his mum and dad. His adventures on the way to the lost and found department are like a surreallist's nightmare, maybe he just drank too much gripe water.

Bill Bennett.

It's a snip.

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YOUR COMPUTER

Star* chart

Five-a-side Football

CBM-64 Anirog Soccer game £5.95 - disc £8.95

If this indoor football game has much of the excitment of ice hockey - and many of the same rules - you shouldn't be surprised. It was co-produced by Advantage, the same Canadian software house that brought Anirog's Slap Shot ice hockey game to the small screen. Not only do the players glide around the pitch as if they were on skates, they can also bodycheck each other with impunity on or off the ball. This escalation of soccer violence to the computer's screen adds a new and unexpectedly enjoyable dimension to the game. Your view of the action moves smoothly from end to end following the play, and the crowd gives a squelchy under-water roar as the ball hits the back of the net. The play switches to a penalty sequence whenever you cannon one player too many into a wall. Playing options include three levels against the computer, a penalty game

Timeslip

English Software Triple Scramble

* * *

The game gives you three Scramble-type games for the price of one featuring a screen split horizontally three ways. At the top of the screen you fly a rocket over the landscape, in the centre you control a little man with a jet pack and on the bottom screen it's a submarine.

plus the normal two-player.

What are you trying to destroy, apart from the usual clutter of tanks, fuel dumps and civilian housing that tend to clutter up these sort of games? Well, there are 36 time orbs placed within the three time zones. Your job is to destroy all the orbs and synchronise time in the three zones to zero hours.

Sky Fox

■ CBM-64

Ariolasoft

■ Shoot'em-up

■ £9.95 — disc £12.95

NOT SO MUCH a flight simulator as a combat simulator, Skyfox features both air and ground attack, plus a variety of scenarios. The three-dimensional graphics are very impressive, especially in the airborne scenario. But the hordes of tanks rolling across the green terrain of the charted colony are just as deadly.

You have to defend your home base and installations against attacks launched from a vast alien mothership. You can develop your skills through various training levels through to small invasions, full invasions, or would a massive onslaught be more to your taste, sir? Likewise you get promoted through five ranks from cadet to ace of the base. It is possible to start high (against planes) or low (against tanks), in a combined scenario.

The screen display shows the view from Skyfox's cockpit. There is a central radar display as well as the actual view from the cockpit and by pressing fl you can choose an overhead or a forward view. If there is no activity in your area, you can just hit A and the autopilot will take you where the action is. As Ariolasoft's Clive Brown put it: "You don't want to be hunting all of the time there are plenty of other programs that do that".

But, you can hunt if you want to. Alternatively you can call up your onboard computer which gives an overhead display of alien incursions and by moving your cursor on the map and pressing A you can go to the most strategicaly important area, rather than just the nearest.

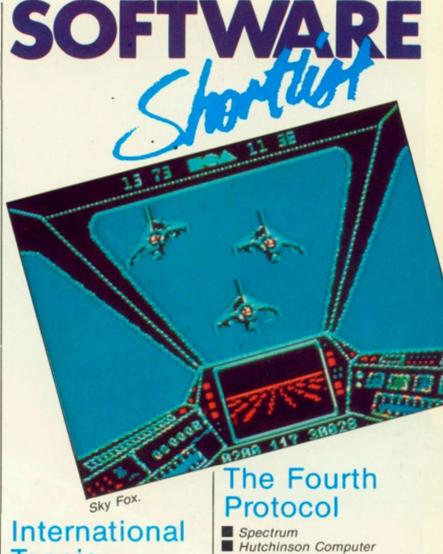
The prices certainly make Ariolasoft competitive with other quality US imports and this is a new game released within two months of its American debut. "My hope is that we will get prices down to the same level as cassette prices", says managing director Frank Brunger.

Other nice features in the game include afterburners - hit the space bar to blast yourself out of a sticky situation or to zoom in on the enemy. You can select a limited number of guided or heat-seeking missiles which wipe out your target as long as you keep it in the middle sector of your cockpit window. You can land at home base to refuel, which you'll need to do if you use the afterburners much.

There is also a set of five multiple mothership invasion scenarios, Halo, Alamo, Advancing Wall, Chess and Cornered which necessitate different kinds of threat analysis on your part. Paul Bond.



International Tennis



International Tennis

■ CBM-64

Commodore

Tennis simulation.

* * * Soggy strawberries, and tennis tantrums; such are the dubious pleasures of another washed out English summer, and one of its great institutions, Wimbledon. Thanks to Commodore, the sight of the rain tipping down on the centre court need no longer be a signal for tennis fans to despair, just plug-in your trusty Commodore, and get stuck in to this latest offering in Commodore's "International" series.

You get an umpire's eye view of the court, with a token bunch of blobs in the background "representing" the crowd. One or two player options are available, and four levels of computer opponent are provided. Control is via joysticks, moving the player around the court and playing the stroke.

The way you move the joystick as you hit the ball determines the sort of shot played in a fairly logical manner, i.e., pushing the joystick in the direction of your opponent plays a long straight ball, pulling the joystick toward you will produce a moderate length cross court ball.

Most shots are there - ground strokes, vollies, baseline play - but smashes and lobs are out.

Playing the game takes some getting used to. The side-on view is harder to judge than the more usual down-thecourt style.

Looking at other offerings, there seems little to recommend this game over Activision's On Court Tennis. Lee Paddon.

So you made it at last, Johnny. Congratulations, Bertie. This is the first phone call you take when as John Preston you take up your post as the new head of section CI(A), part of MI5 responsible for the security of government buildings. But you'd better not rest on your laurels too long.

Publishing

Adventure

£12.95

A burglar steals some diamonds from a flat somewhere in England, but posts back to the MOD some NATO documents that he lifts by accident at the same time. Where's the leak? You'd better find out fast, or you'll end up being posted to the Falklands. Worse, a nuclear bomb may go off somewhere in the UK.

The game is divided into three sections: The Nato Documents, the Bomb and the SAS assault. You must solve the first part to get the password for the second part and so on. The game is a high resolution, predominantly monochrome icon-driven adventure. On the first screen you have representations of three VDUs, a filing cabinet, a VCR camera, a cassette (this is for utilities related to saving the game for continuation at a further date), a graph, and a date pad which can be used to advance time in the game.

You just move a pointing hand around the screen to select what you want to do. If you go through the VDU displaying memos a subset of icons is overlayed on the screen enabling you to read, file or bin documents. A dustbin icon is used for the latter function, as on the Macintosh computer. Paul Bond.



OF THE MAKING of many joysticks there is no end. A few years ago you took what you could get; now you're faced with a bewildering number of conflicting designs. Somehow you have to solve a complex equation involving such variables as strength, comfort, responsiveness, manufacturers' claims and, finally, the price. One of the factors affecting the last variable - price seems to be the use of leaf switches or micro switches, the latter being more expensive as well as more responsive. Kempston's latest joysticks exemplify this difference.

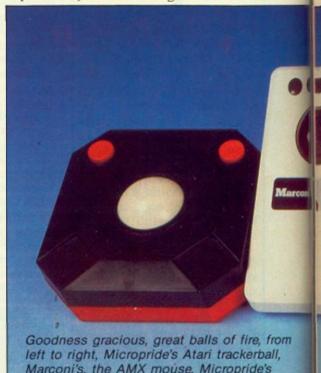
In keeping with their new image as sponsors of motor sport, Kempston's sticks are now called the Formula 1 and 2. They've changed the previous black for a vibrant light blue. I think it's a disgusting colour, but de gustibus . . .

The Formula 2 is the cheaper stick. It has two fire-buttons on the base - presumably to avoid accusations of right-handedism - and one on top of the shaft, which is quite tall and comfortably grasped. The trouble with this stick to get the response you want. It could cost lives.

More expensive is the Formula 1, doubtless because it's micro switched. This makes it much more sensitive. The construction also seems to be more solid. But I found it rather uncomfortable to use. It has a very short shaft with a bulbous end. The two fire-buttons are both on the base. If you don't want to put the stick on a surface, it means wrapping your hand around the base and firing with the same hand. This caused me considerable pain in the region of the

Another company with a selection of sticks is Wico. The Boss is a pretty nifty stick, with a solid plastic base into which the shaft fits snugly. The single fire-button is at the top of the shaft, a location which can lead to a certain amount of fatigue. The Boss is, otherwise, very comfortable and also very responsive. Perhaps just a little too much so; at times there doesn't seem to be enough resistance and you go much further than you wanted to.

Wico's Command Control is a very superior joystick; solid, smooth and attractive. There's a snazzy red and black base with a steel shaft. The grip is smooth, but this didn't cause any problems. This is a very responsive joystick and should last a long time. But it's also pretty base and top of the shaft. It gives a quick enough response and, while not being the sturdiest stick



Marconi's, the AMX mouse, Micropride's BBC trackerball, and Voltmace's data input around, seems pretty durable. At the lower end of the price range it's a good buy.

The Champion is another lower-priced stick but it has an auto-fire option as well as buttons on shaft and base. The black plastic grip is comfortable and you get a reasonable response from it. The whole thing is very light - perhaps too light for those who like to bash their sticks around. More restrained players should have no

The Arcade Turbo disturbed me by the noisy clicking as I moved the handle. But it didn't seem to affect performance, which was tolerably responsive. The Turbo has buttons on base and shaft and is very solid; it should stand up to quite a lot of punishment.

But not quite as much as the Super Champ, which is a fearsomely large construction of heavy black plastic. The long and thick handle with fire buttons on top and in trigger position is secured in the massive circular base by means of a plastic collar that gives strength and the right amount of resistance without sacrificing sensitivity.

The Super Champ's cable rewinds into the base, and provides the occasion for some of the strangest instructions I've seen in a long time: "Rewinding the cable should be always clockwise. If sometimes reverse the direction which may cause extangled to the cable". So now you know.

The Nidd Valley brings a welcome change of atmosphere from all these brutal, boasting, macho names. It's like those old Dragon or BBC joysticks, built to be held in one hand and controlled by the other. Unfortunately, the stick you twiddle is rather too small - you can't really get more than two fingers round it. I suspect most people aren't satisfied with a joystick unless they can grab it in a fist and wrench it around.

If you can manage without chunky handles, then the Nidd Valley will do you very nicely. It's micro switched, and so pretty accurate and sensitive. It's also one of the cheaper sticks on the market.

The Joy Card, from Hudson Soft, is a funny little thing and is definitely not for the histrionic games player. It's a small, slim rectangular "card" with four direction pads and two fire buttons.



for all games, and you won't like it if you don't want to use four fingers at the same time, but

it's worth having a look at.

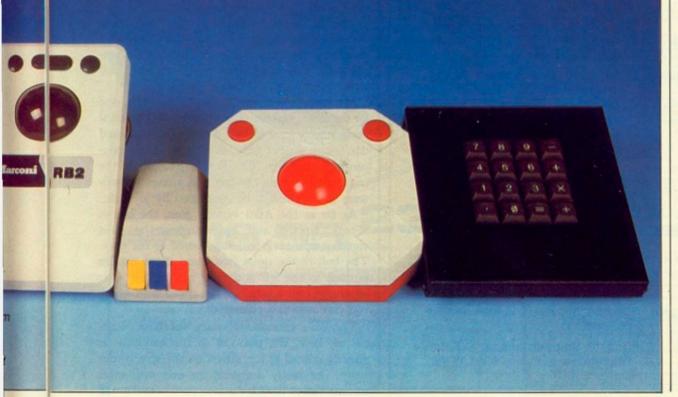
The Stick is almost as strange. It looks pretty much like a joystick except ... Great Scott! What's this? . . . The base is missing!

It doesn't need one. It works by means of "eight-point mercury switches". You get the movement you want by tilting the stick in the required direction. Obviously, this takes some practice since there's no resistance to movement. The Stick, though, proves to be very sensitive and less tiring to use than conventional joysticks.

Of course, it won't do for every game. The distributors say "it is particularly good with race games and flight simulators", and I would endorse that; it performed well on Pole Position but didn't do much for my chance in the Karate game Way of the Exploding Fist. At £12.99 it can't be considered expensive, so it may be worth investigating.

BBC owners used to have a rough time when it came to finding a joystick other than the official Acorn ones which were widely acknowledged to be unsatisfactory, to say the least.

But times have changed. If they want a stick that looks much like everybody else's the PCA is just the ticket. It plugs into the analogue port (continued on next page)



(continued from previous page)

at the back of the Beeb and is made of that old black plastic again, with the red buttons we all know and love. The shaft has depressions to fit your fingers ever so snugly, and is set to one side of the base. Fire-buttons are on top of the stick and on the base.

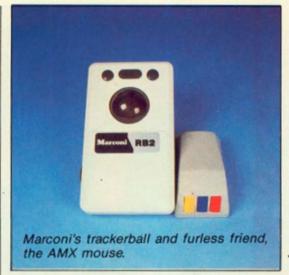
Control is pretty good with the PCA. My only reservation is that the thing is so light I wonder how much of a bashing it can take.

Voltmace's Delta for the BBC is another analogue joystick. It looks like a TV remote controller, with the small stick set in it at the top. Below that are three buttons; so you must have two hands to use it.

It's a self-centring stick with control that matches others. But the same reservations apply to this as to the Nidd Valley. There's not a lot to grip, and if you get over-excited I wouldn't like to be responsible for the Delta's safety.

Looking a little farther afield, Micropride import a range of joysticks from Taiwan. At the lowest end of the range comes the Quickstick, which bears more than a passing resemblance to the Amstrad joystick, without the extra socket. It is small, and rather frail looking, but the grip fits snugly in the hand, and there are three fire buttons, on the top and front of the grip, and on the base. The action seems rather loose, but positive, and seems good value for money.

The Computek Atari-style stick gets the award for sheer bulk. In traditional black and red, it dwarfs a standard joystick, standing nearly 20cm. high. Made for the avid decathalete, or



someone who likes to put everything they've got into a game, this one looks as though it would last for ever, certainly long after your Spectrum is an exhibit in the Science Museum.

The Computek stick for BBC computers is of similarly good construction. It is self-centring, with two fire buttons on its large base, and a metal shaft with a bulbous knob on top. It is quite sensitive, and has just the right amount of spring to centre the joystick without making accurate positioning difficult.

I think it was Snaglepuss who used to say "I hate those meeces to pieces", but he'd probably change his mind if he had a BBC and got hold of the AMX Mouse.

The AMX Mouse is so impressive because it comes with an excellent drawing program, ART.

As with the Macintosh MacPaint program, on which it is modelled, this allows you to pull down icons with your mouse instead of having to type in text or otherwise enter commands.

Available options are arranged around three sides of the screen. Move your mouse over the desk until the pointer is on the required option, press one of the buttons and, hey presto!, you're ready to go. For instance, you might want to start with a little graffiti. So you just select the Spray Can icon and off you go. Instant subway art.

It doesn't take long before you're able to do quite sophisticated drawings. Mistakes don't matter because all you do is pull down the eraser and rub them out. Although the program is monochrome there is a choice of 32 different patterns so a wide variety of effects can be obtained.

Other software available for use with the AMX Mouse includes a Utilities disc with icon designer and Desk, a program containing diary, memo pad, etc.

The first thing you have to do with Connexions' Magic Mouse for the Commodore 64 is assemble it — ball and carriage are separately packed for safety. The software includes a Hi-Res Graphic Designer — in other words, a drawing program. It's similar to the AMX one, with the major difference that the menu of icons is not constantly displayed.

You have a choice of nine brushes giving a good variety of width and stroke. As with the AMX you can draw circles and boxes, fill in backgrounds and dump to a printer. This mouse, though, seemed a little inaccurate; it circles came out rather less perfectly than one might have expected.

Also included in the Connexions package are a Sprite Designer, an Icon Designer and a Mouse Controller which enables you to write your own software for the wee creature.

It's been said that a mouse is really just an inverted tracker ball. But it would be a foolish man who tried to use Marconi's Tracker Ball for the BBC upside down. It's a hefty piece of peripheral, with a large brown ball set in the solid base. Marconi supply some software with it, including a painting program. This is not as sophisticated as AMX Art, but it does show just how accurate and sensitive the tracker ball can be.

The Tracker Ball can also be used with some — but by no means all — joystick-compatible programs. But how many games, Missile Command apart, would you want to use a tracker ball with? Not many, I'll wager.

Micropride also import two trackerballs, one for the BBC, and the other Atari style. The usual problems apply, at £19.95, they are expensive and don't seem to offer great advantages over the conventional joystick. This is not the fault of the trackerball, merely the fact that almost all software is designed to be controlled by joystick.

As far as the Atari version goes, the box is 15cms. square, and even during the most vigorous spinning will stay rooted to the spot. The ball moves quite freely and there are fire buttons to the left and right of the ball. One advantage over joysticks is the speed with which you can stop and change direction.

The BBC version obviously has more potential as, here, the position of the ball can be directly related to a position on the screen, but again, not really designed for use with most commercial software.

Name	Price	Company	Address
Formula 1	£16.95	Kempston	Unit 30, Singer Way, Woburn Road Industrial Estate, Kempston, Bedford. 0234-856633.
Formula 2	£11.95	Kempston	
The Boss	£15.99	Computer Games	CGL House, Goldings Hill, Loughton, Essex IG10 2RR. 01-508 5600.
The Champion	£11.99	Computer Games	
Bat Handle	£27.99	Computer Games	
3 Way	£32.99	Computer Games	
Gunshot 1	£8.95	Vulcan Electronics	200 Brent Street, Hendon, London. 01-203 6366.
Arcade Turbo	£22.95	New Horizon	1 Goodall Street, Walsall WS1 1QG. 0922-24821.
Joy Card	£8.95	New Horizon or Orpheus Ltd.	The Smithy, Unit 1, Church Farm Estate, Hately St George, Nr Sandy, Beds. 0767-51481.
The Stick	£12.95	Lightwave Leisure	2 Maldwyn Road, Liscard, Wirral, Merseyside L44 1AL. 051-639 5050.
Delta 3b	£12.00	Voltmace Ltd.	Park Drive, Baldock, Herts SG7 6EW. 0462-894410.
Datapad	£34.95	Voltmace Ltd.	
Delta 14b	£29.95	Voltmace Ltd.	
Delta 3d	£10.00	Voltmace Ltd.	
Delta 3s	£10.00	Voltmace Ltd.	
AMX Mouse	£89.95	Advanced Memory Systems	Woodside Technology Centre, Green Lane, Appleton, Warrington. 0925-62907.
Magic Mouse	£59.95	SMC Supplies	11 Western Parade, Great North Road, Barnet, Herts. EN5 1AD. 01-441 1282.
Trackerball	260.00	Marconi Electronic Devices	Doddington Road, Lincoln. 0522-688121.
Quick-stick Computek	£7.50 £9.95	Micropride Ltd	Unit 16, Shipyard Industrial Estate, Brightlingsea, Essex. 0206-364957.

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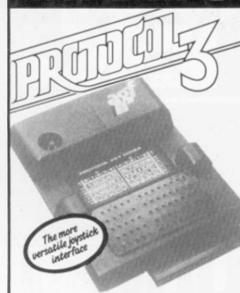
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ects to your Spectrum or Spectrum+ and lets you

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The one thing that all software has in common - past, present or future — is a keyboard control facility and Protocol 3 can turn joystick movements into any simulated key action you choose providing a simple and effective method of complete game control.

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Called CustomCards, and about the size of a credit card, they can Canea customs aros, and about the size of a create care, they can be programmed as often as you like and will stay programmed until you change them. They simply slot into place and can even be re-programmed while a game is in progress to get exactly the responses you want. You only ever need one CustomCard for your entire software collection although you may prefer to buy more later to fully appreciate the flexibility of this unique system.

Protocol 3 also has a Reset facility to clear the computer memory between games without interrupting the power, the safest way of recovering from program or microdrive crashes. Being 'hardware programmed' Protocol 3 cannot generate conflict with other peripherals and a full width rear expansion slot duplicates the tions for printers, light pens, disk drives etc



In addition to all the Protocol 3 features and in order to take advantage of games that do have joystick options as well as the obligatory keyboard controls, an extra circuit inside Protocol 4 offers immediate compatibility with the KEMP-STON standard at the Bick of a switch. AGF, PROTEK. CURSOR and SINCLAIR are all catered for by preset CustomCards supplied as these are in fact set key combinations.

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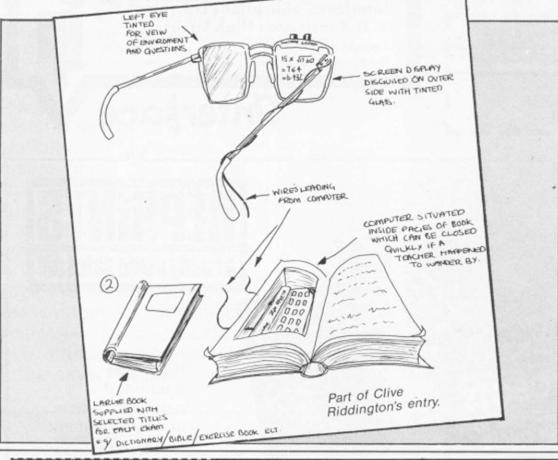
IN MAY'S COMPETITION to win an Enterprise 128 plus a printer you were asked to come up with an idea either for cheating in an exam, or for pulling off a computer scam. To our surprise this sparked off a minor scandal.

Teachers and headmasters accused us of trying to subvert the exam system: copies of *Your Computer* were withdrawn from school libraries, school kids protested, and questions were asked in the House. In our defence we protest that the competition was intended as a light-hearted jape; and to our detractors we reply: Come off it Chalky! Where's your sense of humour?

Needless to say most of the entries took the competition less seriously. C. Holland suggested a way of using the ZX-81 to hack open the computer-controlled security door of a bank: place the ZX-81 near the security lock then, using its advanced wedge shape design, hit it with a mallet

J. Andeh's idea was to program a computer to control a robot arms on wheels. During the exam the robot is to approach the supervisor and yank down his trousers. In the ensuing confusion you can take out a pre-prepared crib sheet and start cheating. This entry was nicely illustrated by a cartoon in the style of the Beano's Bash Street kids

H. Kay revealed his three-part plan for making sure that he won the competition. First, break into the computer-held record of competition entries and delete all other entries. Second, hold Your Computer's memory banks to ransom. Third, alter BPI's records "to show that I am editor of Your Computer, whose decision is final". Just as well that the entries are not stored on a computer but in a cardboard box.



RESULTS

As you might expect many people hit on the idea of using hidden radio transmitters to communicate with computers during an exam. Seiko wrist micros were also popular, as was the technique of projecting answers on to spectacle lenses.

The best entries along these would-be practical lines were from R. Buckley with his comprehensive Cheat-O-Matic system, and C. Riddington with The Perfect Exam Cheat Implement.

All those mentioned above receive the runnersup prize — copies of the Hackers Handbook and Computer Crimes and Capers.

We awarded the first prize to one of the most entertaining entries submitted in a long time, which came from Manolo Abd-El-Baki, 21 Rue Daniele Casanova, 91330 Yerres, France. This amounted to a definitive study of cheating, or cheatology as the author calls it.

Cheating philosophy

At the start Abd-El-Baki discusses the philosophy of cheating. He argues that "cheating is a basic need for virtually all students" and cites the Greek philosopher Aesopius, who said "cheating is the mother of all wisdom".

Following this he takes a look at the history of cheating and makes the bold claim that "the search for the perfect method of cheating has been man's greatest preoccupation since the dawn of civilisation".

Finally he gives the specifications of his new model, the SOGE — Standard Operational Cheating Equipment — accompanying them with diagrams and formulae. A team of *Your Computer* scientists is now carrying out a feasibility study on the system, and its full details cannot be disclosed here. Suffice it to say that SOGE involves a pair of glasses, a contact lens, and a strip of microfilm.



THE Computer Game...

Datasoft



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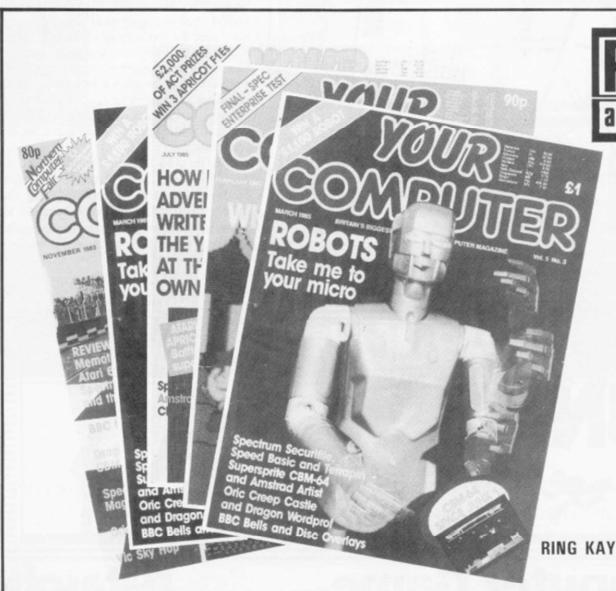
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50 STICKS MUST BE WON RULES The winner of the competition will be the person who, in the view of £600 / Ongetition

■ The winner of the competition will be the person who, in the view of the editor, puts the joystick features in the right order and comes up with the most interesting idea.

The name of the winner will be printed in the November issue of Your Computer.

■ All entries must arrive at the Your Computer offices by the last working day in August 1985.

Each person may enter the competition only once.

Entries to the competition cannot be acknowledged.

No employees of Business Press International or their relatives may enter the competition.

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FIRST FIST, THE

FIRST FIST – THEN, Mordon's Quest, Terrormolinas, and Lord of the Rings plus conversions of Starion and Fist for other machines — not to

Knuckle wrestler Geoff Heath, Melbourne's new U.K. chief, still plans to go ahead with the launch of Terrormolinas — a holiday disaster spoof adventure by the team who wrote Hampstead — despite the trail of real life disasters facing tourists this summer, from hijackings and bombings in mid air and on Spanish beaches to alerts in British resorts.

mention future projects like a Whitbread Round the World Yacht Race game and enhanced versions of current hits for new machines like the Commodore 128.

Everything seems to be coming up roses for Melbourne House since Geoff Heath became British boss a few months back but he would be the first to admit that the seeds of success had already been sown. The current wave of strong software was all under development long before Geoff took control, but when he arrived the company had faded out of the public view with Starion waiting to be launched.

Although Fred Milgrom, the international head of Melbourne House, admitted to Your Computer that the likes of Ultimate were producing arcade games that "were technically far superior to what we were coming up with" and promised to do something about it, that was over a year ago and there was still no sign of action. Melbourne was a leading adventure house but had no chance of catching up with the arcade specialists.

Geoff decided to scrap the expensive videostyle packaging planned for Starion and go for a simple cassette case in the belief that a good Spectrum shoot'em-up just needed to be seen on as many shelves as possible.

Timing was also important — with thousands of Spectrum owners looking for something like Elite to come out on their machine. But when Starion hit the shelves the quality of David Webb's vector graphics on screen and the idea that Melbourne House could produce a successful program that was neither an adventure nor written by an Australian were both major surprises.

But if Starion was a cracking good variation on an old theme, Way of the Exploding Fist was something else — one of those programs which sets standards by which others will be judged. Timing again was nice — out in good time for the World Games at Crystal Palace on July 27 where non-Olympic sports like Karate will have their world championships.

Jeoff Thompson, World Heavyweight Karate Champion from 1982-84 and Team Champion now, who is competing there, believes that Fist has enough of the feel of the real thing to attract computer gamers into abandoning the screens and taking up Karate. Jeoff urges caution though "I want to see the sport develop — and safely. If they wish to take it up go to a local karate club but be careful". If anyone plays the game then wants advice on taking up the sport they can write to him for advice at Pursuit of Excellence, PO Box 699, Fulham, London SW6.

Jeoff first tried Fist at the Commodore show "it looked very authentic, movements, drop sweeps — the mood, music and atmosphere" but he couldn't take it seriously — until he had suffered the indignity of being repeatedly laid out by kids of half his age, "I got really competitive". With three hours a day training for the championships — "it's a combat form of chess, you never really master it" — Jeoff has not had



much time to improve his game on screen but he uses it as a break from training. He'd like to see a sport version where you take on teams from other countries.

After Starion and Fist, which were the May and June blows in Melbourne's Summer offensive, July drops into lower gear with Mordon's Quest. Geoff Heath was born in Morden, and if my supposedly efficient Croydon-based hire-purchase company claims to operate from Croyden on its headed notepaper, I suppose these Aussies can get away with a mis-spelt tribute to the head of the British office.

But no, Mordon's Quest turns out to be just the next text only stage in the Classic Adventure. Mordon is apparently the most important person in the history of the universe so I suppose he need not worry about being mistaken for a grey south London suburb stranded between

Like karate champ Jeoff Thompson, Melbourne House is exploding into action. Meirion Jones asks what next after the Fist?

Mitcham and Cheam.

About the only significant feature of the Quest is that it will be ready simultaneously in Spectrum, CBM-64 and Amstrad versions whereas Starion and Fist will gradually migrate to other machines over the next couple of months.

Summer migrants to Spain are the targets of Terrormolinas, an adventure aimed at people who do not usually buy adventures by the team who wrote the snobby social climbing computer game Hampstead — Peter Jones and Trevor Lever. Peter works in public relations and he says that Hampstead went down well although "Your Computer were fairly scathing about it. It was tongue in cheek which perhaps you didn't realise". At least that well known micro mag The Listener made it their computer game of the year.

This time Peter and Trevor are taking more

LORD OF THE RINGS



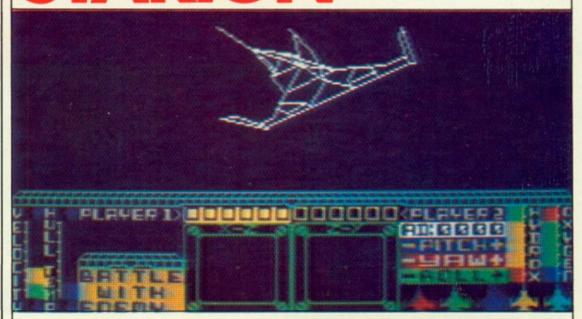
Good news for Frodo fanciers. Fellowship of the Ring, first part of Tolkien's Ring and eagerly awaited sequel to the program which established Melbourne's reputation — The Hobbit — will appear in late September. Philip Mitchell, left, who programmed The Hobbit and Sherlock Holmes is team leader for Lord of the Rings and is seen here back at base with Lyn and Russel Comte and Fred Milgrom, right, who is the international head of Melbourne House.

of a chance. Terror is based on the idea of collecting snapshots — unlike its predecessor this game has graphics — during a Spanish holiday in which everything that could go wrong does go wrong — from tummy bugs to bombs. Despite the risk of accusations of bad taste if tourists are hurt on the Costa Brava this year, Peter says it's "less risky than actually going to Spain". He's also not worried that the Spanish government may be offended — "we haven't written it for the Spanish tourist industry. I hope it does offend some people".

No wonder Fred Milgrom asked them to "be nicer to the Spaniards" when he saw an early version. Fred's other contribution was the name Terrormolinas which he suggested as an alternative to the working title which was Holiday in the Sun — after the Sex Pistols song.

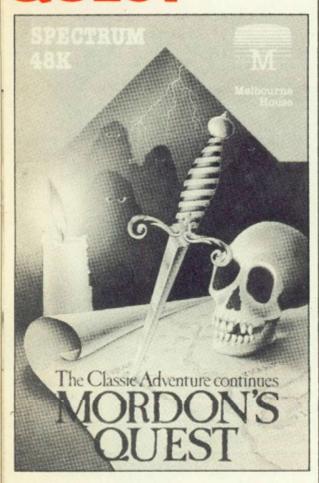
A global conspiracy game is what Trev and (continued on next page)

STARION



Commodore 64 and Amstrad versions of Starion are on the launch pad now that the Spectrum shoot'em-up is hurtling up the charts to prove that Melbourne House can produce arcade games as well as adventures.

MORDEN'S QUEST



Mordon's Quest takes up where Classic Adventure left off. It's a 150 location text adventure and Mordon is the ancient one who asks you to find all the components of his immortality machine—if you fail the universe will be destroyed.

(continued from previous page)

Pete are working on next — sounds a little closer to the "plain of Tharg and the misty mountains of Blimp" which are the traditional settings for adventures and which they find "almost incredibly narrow".

Lord of the Rings

Meanwhile back at the Victoria branch of the Melbourne House global conspiracy Philip Mitchell is leading the team working in the ultimate misty mountains adventure - The Lord of the Rings. After the Hobbit - which was also programmed by Philip - expectations are high so there will be no attempt to cram the whole thing into one game. He and his team, which includes "Fred's creche" - a bunch of University of Melbourne computing students moonlighting in the vacations - are putting together The Fellowship of the Ring, the first part of the Tolkien Ring trilogy which again like the Hobbit will be a book plus game set to be released in late September. Then the other parts - the Two Towers and the Return of the King will be released at six month intervals. Before the Two Towers appears the Whitbread Round the World Yacht Race, which will run from this September to next March, should have made it to Australia and back again. Appropriately Milgrom plans a simulator game based on the race where you have to use radar and satellite navigation as well as fighting off the hazards of the sea.

Now that Melbourne House has a British boss

— below Fred but at least every decision does
not have to make the passage to Australia and
back — the company seems to find it easier to
hold to its intended course over here.

Geoff Heath does not think that the problems of Acorn, Sinclair and the like are a real threat to the software industry. "Even if Sinclair is having problems right now I don't believe the consumer is worried by that. People have still got money to spend". Piracy is not such a problem either "if you produce a good product at a good price" and the "new copyright act will help".

He believes that most of the small software houses that have folded were bound to go anyhow. "The days of starting up in a garage and running off a few hundred are over. The big software houses — under 10 companies count — are run as businesses. Soon there will be six or seven companies with others under their wings".

Looking forward to more Ram

New machines mean it takes more programming time to create games that will take advantage of increased Ram — which again favours companies with big resources, but programs like Fist use every last byte of the 64's memory and Melbourne's teams are already looking forward to the luxury of 128K Ram and beyond. "More memory has never been enough for the programmers" as Geoff points out. At first they will produce enhanced versions of existing games for machines like the CBM-128.

Melbourne will still carry on producing books, for people who have just bought a micro "to tell them there are other buttons on it than shift and run" or who want to go on to machine code — "the helicopter head stuff".

Before joining the Milgrom organisation Geoff was Mr Activision in this country so he's seen it all but he is still enthusiastic about computer games. After all "there's no other business where you can go home at night and be a karate expert".

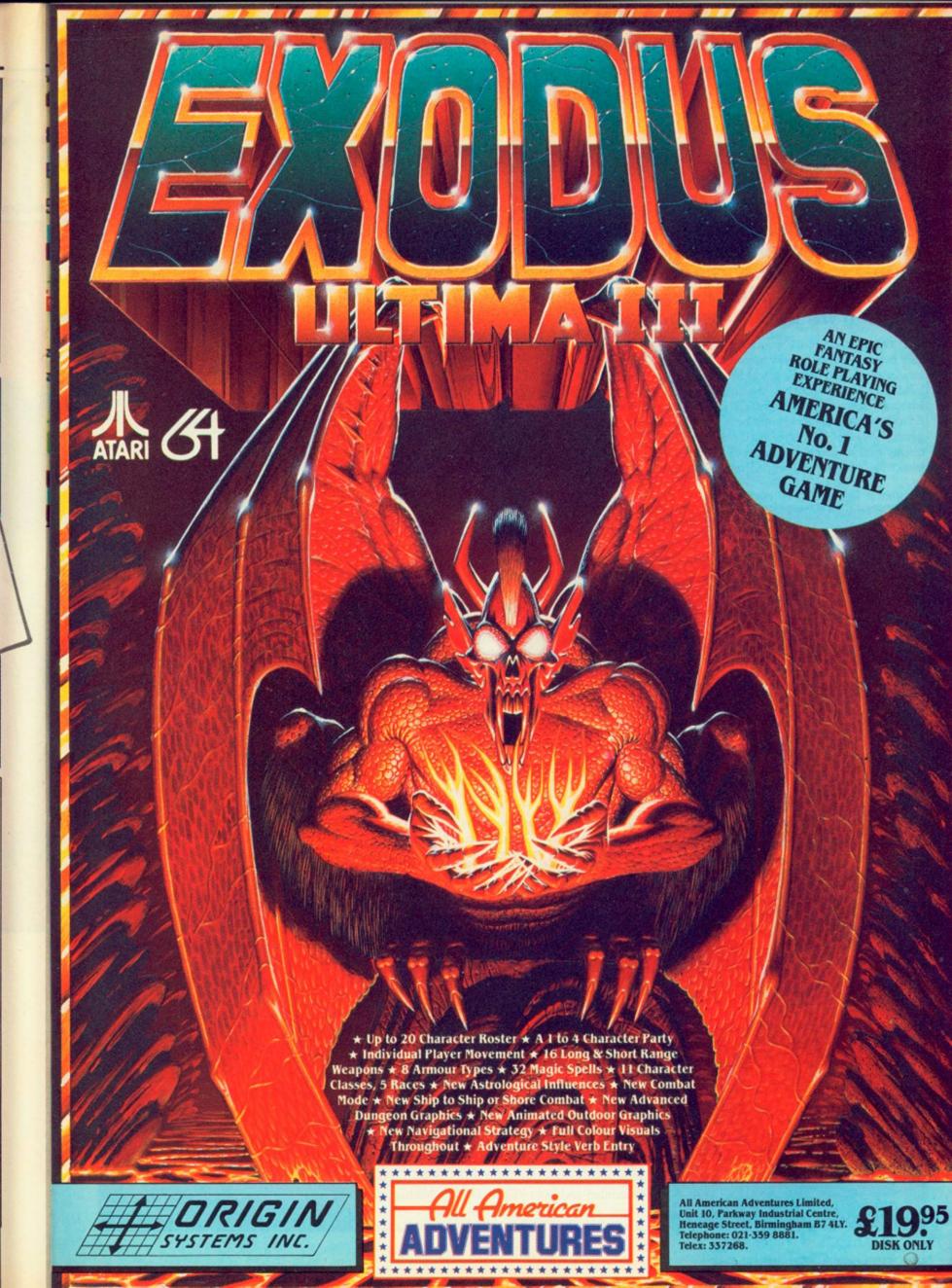




EXPLODING FIST



Gregg Barnett, who converted the Hobbit and Sherlock to the Commodore before making his mark with Way of the Exploding Fist, is now converting Fist to the Amstrad and Spectrum and — memory permitting — the BBC, in other words if the Plus ever takes off.



NAME YOUR

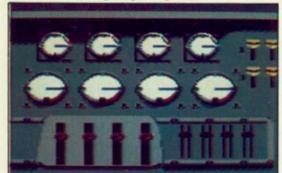
Just name your top 10 games and win a Commodore 64, a CPM machine and 128K of Ram all rolled into one — in other words the Commodore 128. Sounds easy — but as Ellie Dee, Elsie's elder sister, finds out you can be spoilt for choice.

ALTHOUGH PURISTS tell you there's no difference between the early jerky monochrome space invader clones and today's games like Skyfox and Raid Over Moscow, or that adventures have not advanced since Crowther and Woods Classic Adventure, the qualitative jump between chasing white blobs around the screen and playing arcade quality games in your own home came with the launch of popular colour computers — the

Gridrunner - the Vic-20 classic.



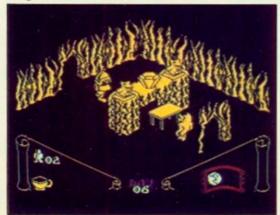
Dambusters - going for gold.



Tir Na Nog — real graphic venture.



Knight Lore - 3D arcade venture.



Vic-20 in Summer '81 and Spectrum in Spring '82.

Games like Jeff Minter's Gridrunner made good droid-zapping use of the Vic with enough colour and buzz-saw sound to keep you mesmerized. It had that magic addictive ingredient which puts it in my all time top ten — unlike Minter's later efforts which were technically more proficient, colourful, tuneful and complex but less fun to play.

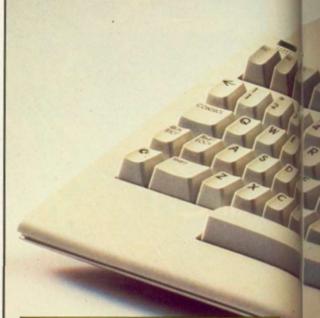
Meanwhile in America Atari waded in with a whole series of cartridge games that were to set the standard for the home arcade. Missile Command, Defender, Star Raiders and Pole Position all used the Atari 400 and 800's superior graphics and sound capabilities while the quirky Oric went another way, even if the price of machines and software kept them out of the hands of all but a few British Atari fanatics.

Pole Position was unchallenged as a racetrack game until the likes of Talladega on the Commodore 64 and Revs on the BBC. Star Raiders was only upstaged by the slower and more thoughtful Elite this year. Buck Rogers-type games passed me by although Zaxxon still has its champions. Frogger spawned hundreds of copies, elaborations and even simplifications like Jumpin' Jack which has a charm of its own; snake games slithered out of all the software houses and every self-respecting micro had to have its own version of Galaxians.

But nothing compared with the Pac-Man madness that swept two continents and slides into my 10 toppers. If Pac-Man had arrived a couple of years later it would probably have been called Ghostbusters. Pity it didn't play as good as it sounded on the 64.

In Britain in 1983 Manic Miner singlehandedly raised expectations of what the humble Spectrum might achieve and platform games became the rage. At the same time strategy struggles like Eastern Front, or on a less serious level Football Manager, developed. The Commodore 64 allowed more realistic sports games on screen — like International Soccer which set new standards for realism.

The bigger memory of machines like the 48K Spectrum 64 allowed adventure writers to go for epics like the Hobbit. Tir Na Nog might make my ten. Knight Lore definitely does — I love the 3D crossword style of arcade adventures with those Filmation graphics. You need little reminding of the outstanding programs of the last year, some of the strongest yet. From Fighter Pilot and Boulderdash to Daley Thompson's Decathlon and Solo Flight, David's Midnight Magic and Lords of Midnight or the current wave of block busters — Dambusters and co.



RULES

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Ghostbusters - what a tune.





COMPUTER COMPUTER	CBM-128 COMPETITION
1	Don't forget to enclose this coupon, or a photocopy of it, when you send in your idea, which can be written or drawn or both, for a new screen, room or feature in your favourite game plus a list of your Top 10 commercial games to <i>Your Computer</i> , Room L221, Quadrant House, The Quadrant, Sutton, Surrey SM2 5AS.
5 6 7	NameAddress
8	Written or drawn idea for new addition to an existing game — use extra paper if necessary.

THE SINCLAIR QL



In the wake of Clive Sinclair's financial trouble John Dawson reassesses potentially his biggest money-spinner — the QL.

THE LAUNCH of the Spectrum's successor, the 16 bit QL with its 68008 central processor unit, exceeded anything that had gone before in terms of advance publicity. It was unfortunate that, once again, the manufacturer's marketing advisers took precedence over wiser judgment that the QL machine wasn't ready either in terms of the quality of the software or the factory's capacity to deliver.

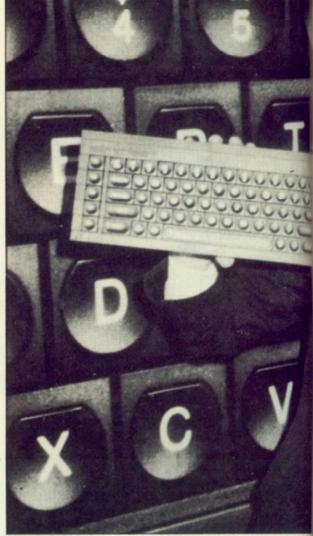
The operating system software and Basic interpreter contained numerous errors and a series of new Roms have been issued in the course of the first year. That's a depressingly familiar story but it occurs across the board in microcomputerland; remember the early Eproms in the BBC Micro and the problems with the Oric. Writing original software is very difficult, particularly at the low level of an operating system. The new Apple software for the Lisa — a comparatively unsuccessful launch, but for different reasons — and the Macintosh, took more than 100 man-years to write at the cost of a king's ransom.

But, admire Sir Clive Sinclair's entrepreneurial spirit as you may, if you take delivery, several months after placing your order, of a machine which doesn't work properly, you are likely to discount your role in the British computer industry's success story and demand a better product.

Now leave all these aside, for if you buy a Sinclair QL microcomputer today they are past history, how good is the QL as a general purpose microcomputer now, and what sort of value does the machine represent for the money you are spending?

Hardware is less important than software at the level of complexity represented by the Sinclair QL. Nevertheless, it is the hardware that provided the basis for the name "QL". A quantum is the smallest quantity of some physical property, such as energy, that a system can possess according to the Quantum Theory.

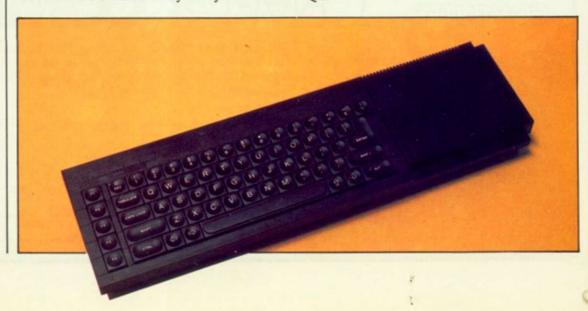
The QL is 48 cms — 19in. — long, 14 cms — 5in. — deep, 5.5 cms — 2in. — high and weighs 1.5 kilograms. In that space is the main printed circuit board, two Microdrive tape units and the keyboard. Compare these measurements with the BBC Micro's 16 by 14 by 2.5in. and



you will appreciate that the QL is comparatively portable.

Unlike the BBC Micro, the QL has a separate power supply which weighs about one kilogram; but the BBC requires a separate tape recorder or floppy disc drive for mass storage of programs or data.

Communication with peripheral devices is an important part of the design of a successful microcomputer. Compatibility and standardisation are effected at several levels, from the design of the plugs and sockets at the lowest level, through to software protocols that will control the transmission and interpretation of information at the highest. There are 11 sockets on the OL:



-ISITMATURING?



- 1 64 pin bus from the 68008 CPU
- 2 Rom cartridge socket for plug in software cartridges
- 3 Two control socket for joysticks
- 4 Two non-standard RS-232 sockets leading to one RS-232 interface
- 5 UHF output providing modulated RF for a TV
- 6 Video outputs
 - RGB + synchronisation
 - Monochrome + composite synchronisation
 - Composite PAL video
- 7 Power Power supply unit delivers 5 volts at 1.8 amps and 15 volts AC at 0.2 amps
- 8 Two 3.5 mm sockets for linking up to 63 QL computers into a type of Local Area Network

There is no parallel port which would be compatible with a Centronics interface on a printer. The control sockets for games joysticks are inputs which are switched on or off rather than the accurate, if slow, analogue to digital converters on the BBC computer.

On the other hand, the inputs in each QL control socket have been arranged to correspond to two different, and very useful, sets of keys on the keyboard. If you wanted to write a program, for example, that would allow a disabled person to use a wordprocessor program, this arrangement would give you a good start. By most standards the QL is resonably well equipped in terms of the input/output hardware.

The QL keyboard consists of two plastic membranes which have opposed metallised pads underneath the hard plastic keys. When a key is depressed the two pads are squeezed together and an electrical contact is made. The keys travel a reasonable distance down and up when they are pressed but there is no definite point at which you can be sure that an entry has been accepted by the machine.

Visual display unit manufacturers like Televideo make computer terminals that will stand up to continuous use for many hours each day and they use orthodox keyboards which feel like an electric typewriter.

One of the best keyboards that I have come across was on the original Nascom. That used semiconductor Hall effect switches which operated when a tiny magnet was moved by the operator's finger pressing on the key. There were no mechanical contacts in the Nascom keyboard and no "bounce" or multiple character entry.

After the Nascom there was a steady tendency to downgrade the quality of the keyboard in new machines, presumably because the economics of competition have intruded more and more into domestic microcomputer design.

However, the QL keyboard feels much better than the Spectrum or the first Oric and the improvement is probably due to the influence of the BBC microcomputer keyboard which is acceptable to both secretaries and scientists.

Two Microdrive cartridges provide built-in mass storage of programs and data on the QL. Each cartridge will hold a maximum of 100 Kbytes and the continuous loop of tape com-

pletes one traverse in seven seconds. The BBC machine requires either an external tape recorder or floppy disc drives before it will store anything.

Data transfer using cassette tape is comparatively slow — 120 characters per second — but the BBC interface is robust, if primitive. Like other aspects of the computer, the QL design is theoretically attractive; the hard questions are to do with practical reliability and the Microdrive's cost effectiveness.

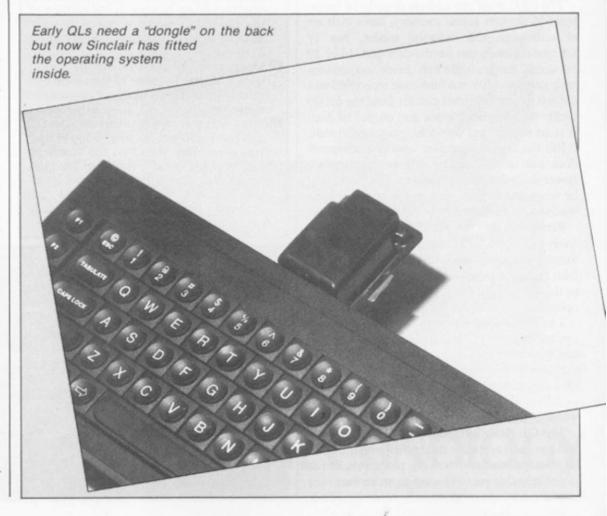
I think I would still hesitate to trust information that affected my livelihood to the QL Microdrives without the most careful backup procedures. Floppy disc manufacturers quote the expected error rates for storage and retrieval of information and the uncorrected false read/write data rates are better than one bit in 10 gigabits and the floppy and hard disc interfaces now on the market for the Sinclair QL will make the computer more attractive.

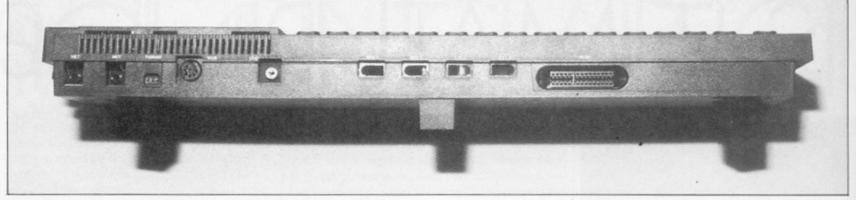
However, the additional cost will bring the QL close to the Apricot F1 purchase price and starts to whittle away at the BBC price differential.

The QL screen display on a monochrome monitor is very good. The image is stable and lower case letters such as q, y, g and j have descenders which are two rows deep — the BBC characters are one row deep — and are easy to read. The spacing between lines is good. The operating system adjusts the screen format between 80 and 64 characters for display on a monitor or a television.

The graphics resolution may be set to either 255 by 255 pixels with eight colours, or 512 by

(continued on next page)





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255 pixels and four colours. However, it is possible to produce stippled or mixed colours which increase the complexity of the graphics effects considerably.

The QL is lighter than the BBC Micro and this can be attributed, in part, to the use of more recent, and more sophisticated integrated circuits. The memory chips in the QL are 4164 ICs — 64 Kilobits — set against the 4816 ICs — 16 Kilobits — in the BBC. Similarly, the QL uses two microprocessors and a number of ULAs — Uncommitted Logic Arrays.

The weight of the chips themselves is immaterial; it is the clustering of more functions into a single chip that matters. Reducing the "chip count", with consequent effects on the size of the printed circuit board, the number of associated components, and the smaller case, is the factor that contributes to the lighter, but more powerful, machine.

"More powerful" is a statement that needs careful examination. The Motorola 68000 central processor unit is an extremely powerful integrated circuit that is used now in some very expensive commercial computers. UNIX, the suite of programs that looks to have a good chance of becoming the next standard commercial operating system, runs happily on the 68000 series of microprocessors.

The CPU itself can address directly 16 megabytes of random access memory, has a rich set of addressing and indexing modes, has 17 internal registers, can handle data as 8, 16 or 32 bit words, has multiply and divide instructions built into the chip's machine-code repertoires and can use cheap integrated circuits from the 68000 family for peripheral input and output of data. It is an elegant and powerful integrated circuit.

But the central processor unit of a computer does not determine the effective computing power delivered by the machine. The CPU may be strangled by poor design of the rest of the machine or smothered by badly written software.

Remember that the BBC Micro uses the relatively old 6502 CPU and yet BBC Basic performs calculations faster than almost any other 8 bit microcomputer. The BBC's success is owed to the stunningly clever design of the machine operating system and the Basic interpreter.

The Basic interpreter in the QL does not operate as quickly as the BBC Micro despite the raw power locked up in the 68008 CPU. It is the software that you buy or write for a computer that unleashes the power. Without instructions to follow, the most powerful computer in the world is a useless, dead thing.

The QL Basic interpreter is well thought out and has good syntax or structure for helping you to solve problems by writing programs. But it is unlikely that you will want to write your own communications program, adventure or arcade style games, home accounts programs and so on. The range of software for the QL is still quite sparse and this, I think, is the most serious criticism of the computer taken as a whole.

Four programs are supplied with the QL. The first versions operated slowly but these have been replaced with a new issue 2.0. Sinclair has operated an exchange scheme for the earlier programs

Quill is a powerful wordprocessor with very sophisticated on-screen formatting, good file handling and good control over the printer. Its search and replace facility is fairly basic but overall Quill is an effective and friendly piece of software. Two other programs — Abacus, a spreadsheet and Archive, a database — complete the three most used pieces of software in office work.

Abacus has all the usual facilities that are regarded as essential in a good spreadsheet program and, in addition, you can use labels to identify rows, columns or single cells. It is far easier to build a model when you can refer to "December.Materials" or "Temperature.5 Gal-

CONCLUSIONS

- or entertaining a microcomputer will be for you. I am never impressed by the fuss and bother that surrounds 16 bit micros. Software for eight bit machines is still only beginning to scratch the surface of the profitable and/or socially valuable uses to which microcomputers can be not
- Most computer systems mature during their lifetimes in terms of the range and quality of software that will run on the machine.
- has been markedly improved and is now very good. That will cover the business needs of the great majority of the QL's users. But there is a virgin market for all the fun programs that helped the Spectrum to take off, provided that they can be delivered quickly.

lons/hour" rather than to "A24" or "V17".

Archive is a form of database programming language with which you can create procedures to enter, manipulate and print information according to your requirements. The manual says that it is possible to build relational files as well as the simpler card indexes. Archive is similar to dBase II in terms of the commands — there are 65 instructions — and although it is not possible to create a number of indexes to a database, Archive has a large potential.

Easel, the fourth program from Psion, is a clever business graphics package which will take data and present it in different ways. You can display pie charts, bar and line graphs on the screen and the program will dump the screen image to one of several printers included in the printer driver.

All the Psion programs have an excellent "Help" facility which loads detailed information from the program cartridge about any of the functions in the program. Data can be exported from any of the programs to any of the others. These two features, assistance on screen and integration of the data used by all the software, would make the Psion software outstandingly good value if you had to buy it. Given away with the machine, it is clearly the main reason why many people buy the QL.

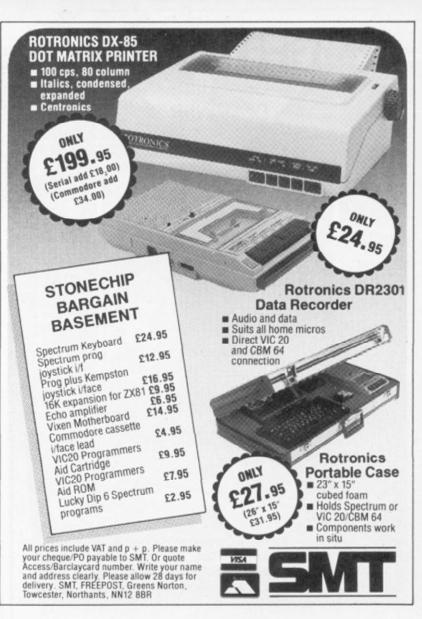
But if you want to play games or demonstrate some scientific theory such as the reflection of sound waves from a concave surface, it's a different story. It is almost impossible to buy programs for the QL from W H Smiths and similar high street chain stores and even the pages of specialist magazines offer very little apart from a terrific chess program.

While the QL is well supplied with languages — APL, BCPL, Forth, Assembler, C, Lisp, Pascal, Fortran are all available from one company or another — it has not attracted the huge programming effort that went into its predecessor.

Below: The QL keyboard — "better than the Spectrum".







Ace down the line.

Punch data down the line with Miracle Technology's Modem WS2000.

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the ability to create stunning graphics and complete illustrations at your fingertips.

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Commodore of ABBC From

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nachine code and its many applications.

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184 Spectrum

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The crystal ball

Radar Games of Dudley have released Confidential, a graphics and text adventure where you step into the world of a private investigator. Available now for the Spectrum and soon for the 64 and Amstrad, Confidential will be reviewed next issue.

A helping hand

Keith Foreman of Rugby has almost completed Colossal Cave but wants answers to the following:-1. What should I do with the magazine "Spelunker Today"? SUNO BARO FDNES TTIW TATI EVAE L 2. Where is the Pirate's chest? a) NMUL OCEG NARO RAEN SEGA SSAP "EMA S" OF EZAM NI b) UOYB ORET ARIP EHTT ELTS RIFU OYLI TNUT IDNI FT'N OWUO Y 3. Are the carpet and curtains in the Soft Room significant? TIGN IKAE RBTU OHTI WNOE SAVE HTGN IPPO RDRO FYLN O For the first time in any

here's some hints for owners of Infocom's new and utterly brilliant Hitch Hiker's Guide to the Galaxy:-Robot grabbing the Babel Fish? LENA PFOT NORF NILE **HCTA STUP Bugblatter Beast spotting** you? LEWO TEHT HTIW DAEH **RUOY REVO C** Problems with the Vogon Captain's poetry recital? YRTE OPYO HNE: NOIT AICE RPPA RUOY WOHS TSUM UOY Yours in dungeons and

danger.

Hugo North.

home computer magazine,

The agent says softly, Your ship

ring at the dock." You quick

Our man with the brass lamp and the key to a thousand mysteries sheds light on new adventure programs. Lost? Never fear, Hugo North is here.

Tracer Sanction

Commodore 64 Activision £9.95 Disc only

YOU'RE THE highest ranking agent of the Stellar Intelligence Agency (SIA) and have been assigned to capture the Wing, the most notorious criminal in the galaxy.

You begin in SIA HQ on the planet Mongo facing a sinister gent in sunglasses. Trying to take his shades away only results in getting slapped. And that's one of the good things about this adventure - you can examine and experiment with many of the objects and still get a sensible response.

Your spaceship is nearby - you'll need to buy fuel and a map of the galaxy. On the planet Sonex, a long line of people waiting at the Tourist Information Centre might snooker you. Waiting politely in line gets you nowhere fast - the queue moves slowly and people keep barging in.

Puzzles abound. A bartender is in a daze and having trouble remembering anything - a clear-cut case of amnesia. A ragged hermit gets hot under the collar if he catches you swiping a solar battery from his shack. Stalactites are none too secure - one false move and you're in danger of becoming a kebab.

Further into the galaxy, a neat "sword in the stone" puzzle may baffle you and an unsociable chap will try to shake you off a suspension bridge.

In a park, an old gentleman feeding the pigeons tells you to "Get off my turf, crumb." Old age pensioners aren't what they used to be. If you're not careful, he'll whip out a magnum .45 and say "Go ahead - make my day." Of all the pensioners in the parks

in all the galaxy, you have to pick on Dirty Harry's grandad!

The graphics are particularly good, a hi-res picture for every location. Some are animated — the rolling eyes of an angry hermit, a soaring fountThe Tracer Sanction

ain, and a flowing river for example. There's a wide vocabulary and response time is fast.

The Tracer Sanction is an enjoyable, medium-complexity adventure with several original wrinkles.

Bored of the Rings

Spectrum

Delta 4

£4.95 cassette, £6.95 Microdrive

A MITE WEARY of Middle Earth lookalike adventures? Browned off with Baggins dopplegangers? Then this large (three-part Quilled game's the perfect antidote; it blows a gust of irreverent air right through the Shires.

Bored of the Rings is a delicious send-up of you-know-what. The author, Fergus McNeil, has done a superb job. Text is presented in an impressive character set, using green, blue, grey and white to splendid effect. There are some graphics but it's in the prose where the adventure excels.

Fag End, your uncle Bimbo Faggins house, bears a startling resemblance to a certain location in another adventure does a round green door ring a bell? As you enter, you'll hear Grandalf in conversation with Bimbo: ". . . and so we'll need to get some dense lemming to take it and dump it where old eyeball can't get it." "But what stupid" individual can we get for a suicidal folly such as this . . ."

As Fordo, a boggit, it won't be long before you're joined by a large company. Do these names sound vaguely familiar: Spam, Pimply, Murky, Legoland, Aragont, Borrower and Giblet? Later, there's a delightful sideswipe at the famous vending machine that appears in the classic Crowther and Woods adventure.

ACTIVISION

FOR THE COMMODORE

Eating some magic beans has a strange side effect: Fordo sees a squadron of pink elephants flying past, pursued by brightly glowing traffic "Coroner's verdict: wardens., overdose".

This is an extremely funny adventure. If you like a good laugh then get this at once. It's only available by mail order (048 93 5800) and deserves to be a massive success. Excellent.

Assassin

BBC B

Robico Software

■ £9.95 tape, £11.95 disc

JUST ROOM for a brief mention of Assassin, a machine code text adventure. It has a fairly sophisticated command parser that allows input of a more complex nature than the usual verb plus noun.

Using text compression techniques, the game offers over 220 locations to explore, many characters to meet and a host of puzzles to solve. The game comes attractively packaged and includes an adventurer's notebook and card entitling you to help should you get stuck.

WELCOME TO Birdy, a challenging Spectrum machine-code game for anyone - though it's no longer than 6.5K, it runs on 48K models

You are the humble but brave little Birdy a Birdy being a rare breed of penguin, very fond of ice, but you won't find him being friends with an Uglie.

Birdy likes adventure. And that's the reason why you'll find him collecting diamonds on the frozen wastes of the Jupiterian Southpole.

There is only one slight problem: the extremely high gravitation on this planet. Normally it would be impossible for Birdy to take the enormous diamonds with him, but the gravitation is eliminated by a levitation power that arises from a combination of three of these precious stones in a row.

That's why he must push the diamonds over the icefields in order to join three of them.

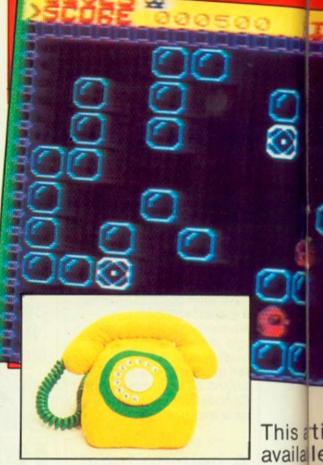
This would be simple if there weren't any Uglies in the neighbourhood . . . These nasty tomato-like creatures don't like Birdy taking away their diamonds, so beware those fellows!! Lucky for our hero, they are not too intelligent.

To help the Uglies to The Other World Birdy can squeeze them with one of the numerous blocks of ice lying around in the screens.

Sometimes Birdy can, for a while, make an Uglie dizzy by activating the electric fence that means punching it - when such a nasty creature is wobbling along it.

If an iceblock is pressed by Birdy but it can't move, then it will fall to dust. Note that an Uglie cannot be killed by a sliding diamond.

Points are scored for squeezing the Uglies and



This aticl availale c

420 IF NOT K THEN GO SUB 120: G



Listing 2. 10 GO TO 540 20 INK 7: PAPER 1: BORDER 3: C LS : SAVE "BIRDY-CODE"CODE 49536 30 PRINT "** VERIFY (YES/NO)?" 40 IF INKEY\$="N" THEN RETURN 50 IF INKEY\$<>"Y" THEN GO TO 4 " FLASH 1; "** PLEASE AM PRINT PLAY THE TAPE" 70 VERIFY "BIRDY-CODE"CODE 495 36,6528: PRINT ""VERY WELL!!": PAUSE 25: RETURN 80 INK 4: PAPER 0: BORDER 1: C 90 PRINT ': FLASH 1: "** START YOUR RECORDER.. 100 LOAD "BIRDY-CODE"CODE 49536 110 PRINT "*** GOOD OLD QUALIT : PAUSE 25: RETURN 120 INK 0: PAPER 7: BORDER 4: C 130 LET a=10: LET b=11: LET c=1
2: LET d=13: LET e=14: LET f=15
140 PRINT "** Type number of FI RST block to enter ";: INPUT b eg: PRINT beg: IF beg<>INT beg 0 R beg<0 OR beg>101 THEN GO TO 14 150 PRINT "** Enter number of LAST block to enter ":: INPUT end: PRINT end: IF end<>INT end OR end
beg OR end>101 THEN GO TO 160 PRINT "You want to enter b lock ";beg;: IF beg<end THEN PRI NT " to ";end 170 PAUSE 50: CLS 180 RESTORE : FOR n=1 TO beg: R

190 FOR n=beg TO end: READ sum 200 PRINT "TYPE IN: BLOCK ";n: PRINT 210 INPUT LINE b# 220 PRINT b# 230 IF b\$="QUIT" THEN RETURN 240 IF LEN b\$=128 THEN GO TO 26 250 PRINT : PRINT FLASH 1: "* YO U MADE A MISTAKE, TRY AGAIN!" :: GO TO 200 260 FOR g=1 TO 128: LET k=CODE b\$(g): IF ((k>=48) AND (k<=57)) OR ((k>=65) AND (k<=70)) THEN NE XT g: GO TO 280 270 GO TO 250 280 BEEP .1,12: BEEP .1,-12: LE +=0 290 FOR G=0 TO 63 300 LET v=16*VAL b\$ (2*a+1)+VAL b\$(2*g+2): POKE 49536+n*64+a,v 310 LET t=t+v 320 NEXT g 330 IF t<>sum THEN PRINT ' FLAS H 1;"* CHECKSUM ERROR, TRY AGAIN
!!!": PRINT : GO TO 200
340 PRINT "O.K. "'"-----350 NEXT n 360 RETURN 370 INK 0: PAPER 6: BORDER 2: C 380 PRINT AT 3.11; "* MENU *"
390 PRINT AT 8,3; "1 - ENTE
HEX-CODE"; AT 10,3; "2 - SAVE ENTER SAVE B YTES"; AT 12,3; "3 LOAD BYTES

400 PRINT AT 20.2: FLASH 1: BRI 1; INK 4; PAPER 7: "* PLEASE

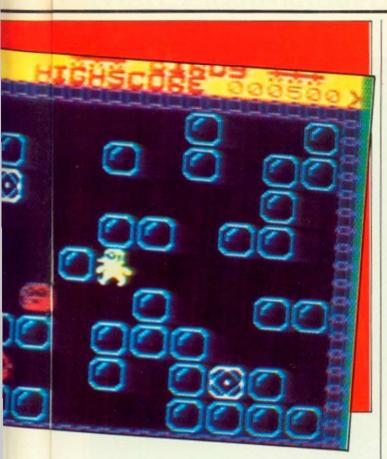
MAKE YOUR CHOICE *"

410 LET K=CODE INKEY\$-49

0 370 470 LET T=0 480 RESTORE

O TO 370 430 IF K=1 THEN GO SUB 20: GO T 440 IF K=2 THEN GO SUB 80: GO T 450 GO TO 410 460 REM * DATALINES'-CHECK * 490 FOR N=0 TO 101 500 READ D: LET T=T+D 510 NEXT N 520 IF T=621249 THEN RETURN 530 BEEP .7,24: BEEP .7,0: BEEP 1.5,-48: PRINT FLASH 1; BRIGHT 1; INK 4; PAPER 0; "* ERROR IN DA TALINES. AAARG!!": STOP 540 CLEAR 49535: POKE 23658,8: GO SUB 460: GO TO 370 550 DATA 2509,2526,5528,3573,73 51,5984,5935,1947,7339,7193 560 DATA 7634,6688,5529,6769,69 09,8803,8058,7959,7481,7880 570 DATA 7171,6493,7114,6137,72 92,7783,8658,7779,7341,7759 580 DATA 6018,6977,5997,5910,75 26,7706,6708,7023,5986,7426 590 DATA 7113,8351,7609,8180,82 33,5474,6377,9340,7924,7699 600 DATA 8183,7802,5787,5561,75 79,6809,7375,7380,7423,7116 610 DATA 7191,6743,7454,6950,68 23,6976,7089,6405,8721,7477 620 DATA 5615,5692,5032,5491,59 56,2785,549,2722,3068,2643 630 DATA 1324,3320,3673,3742,36 71,2434,3318,3491,4198,4049 640 DATA 1394,584,6161,4344,411 9,6814,7896,7325,7115,6672 650 DATA 5938,6571

EAD sum: NEXT n



is article is ailable on Telsoft.

E Verlind and A and R Revesz with a challenging game for the Spectrum.

for placing the three diamonds in a row. The latter will give you the greatest number of points. Reaching 5000 points will be rewarded with a bonus-Birdy.

You can control your Birdy with a Kempston joystick or with cursor-keys. For playing the game only the four directions are used: pressing zero - or fire - will cause a break that enables a player to return to Basic. Please note that we can't guarantee the machine code won't crash if restarted after a return to Basic!

Take two blank tapes: one for the program itself and another for the saving of the hexloader and the bytes as far as typed in.

Enter listing 1 - the loader program that draws a loading message on the screen - and then loads the entire machine code block. Save this one to tape 1 after having entered it.

Now type in the hexloader - listing 2. It's safe to save this one to the other tape before starting to work with it. After this is successful, the nicest part of the job has to be done: typing in the hexdump.

First Run the hexloader, you will see a menu now: select the input-option. As you have probably seen already, the code is divided into 102 blocks of 64 bytes (= 128 characters = 4 lines), numbered 0 to 101. If you are at this point for the first time, type 0 for the number of the first block to enter.

Have a little patience

If you know what the last block you'll enter today is, type it when the Spectrum asks for it, otherwise simply enter 101. Then you have to do the real work.

Please have a little patience after having entered a block: the computer checks your input and that takes a little time.

We think that you won't type all in in one go: if you want to stop entering code type Quit when your machine asks for the bytes of a block: you will see the menu again.

Choose save to save the code to a tape and please remember the number of the last block you entered. Next time, Run the hexloader again, choose the load option and continue entering until you've finished it all. Save the complete code after the loader - listing 1. The game is now ready to be played!

We really hope you like this game and we think you will, but we can also imagine that you don't want to enter 6.5K of code. If so, you can send a letter to us Dutchies and we'll send you a copy on cassette. Please send £3 with your letter. For that you'll receive a Birdy copy with

20 REM **** BIRDY! **** 30 REM ***** BY ***** 40 REM ** E. VERLIND ** 50 REM ** A. REVESZ ** 60 REM ** R. REVESZ ** 70 REM ** MAY 1985 ** 80 REM ********** 90 INK 7: PAPER 0: BORDER 0: C LEAR 49535: GO SUB 210 100 PRINT #0: 1985 VERLIND & RE WESZ BROTHERS" 110 INK 0: PRINT AT 0,0: LOAD "BIRDY-CODE"CODE 49536,6528: POK E 23606,128: POKE 23607,192: POK E 52983,128: POKE 52984,2: POKE 53012,65: RANDOMIZE USR 50048 120 READ D\$: LET L=0 130 PRINT AT Y+L,X;

140 PRINT CHR\$ (CODE D\$(1)+63); LET D\$=D\$(2 TO): IF D\$(1)="#" THEN RETURN 150 IF D\$(1)="*" THEN LET L=L+1 LET D\$=D\$(2 TO): 60 TO 130

160 GO TO 140 170 LET Y=3: LET X=2: INK 6: 60 SUB 120

180 LET Y=9: LET X=12: INK 5: G SUB 120

190 LET Y=16: LET X=2: INK 4: F LASH 1: GO SUB 120: FLASH 0 200 RETURN

ET P\$(32)="*": FOR Y=3 TO 20: PR INT P#: NEXT Y

220 BRIGHT 0: GO SUB 170: PLOT 15,48: DRAW 225,0: DRAW 0,-32: D RAW -225,0: DRAW 0,32: RETURN 230 DATA "AAAAMMMAEMMIMMAMMIAI

AEIAAAA*AHLAFMNCAFKAPAFKPAHIHMLA AHLA*BHLCPAFKAFKAPDPAPANCAPAABHL C*ADDADDDABDDCDABCDDCAADAAADDA#" 240 DATA "EMMIEMMA*AFKAHMMA*AFK AMAFK*BDDCBDDA#"

250 DATA "MAAAEMMAEMMAMMIAEMMIM AEIEMMA*PAAAPAFKPAFKPAHIAFKAPOFK PABC*PAAAPAFKPDHKPANCAFKAPBPKPBH +DDDCBDDADABCDDCABDDCDABCBDDA#" 260 REM * U-CASE LETTERS!

a beautiful loading-screen drawn by Alex and we also pay the postage overseas for sending the tape. Our address is: "Birdy", E. Verlind and A. + R. Revesz, Waalstraat 3, 7333 JR Apeldoorn, The Netherlands.

Hexdump.

BLOCK &

382838103B647E3B0E0E1C000000000000

060E18181818180E0E30380C0C0C0C3830 266618FFFF186664000C1C7F7F7F1C18 000000000000000E0E1C0000003F7F7E0000 000000000000C1C180103070E1C387060

3F7F676B73637F7E3C7C6C0C0C0C7F7E 3F7F431F7C607F7E3F7F431E1F437F7E 26666666667F7F063F7F607F7F037F7E 3F7F607F7F637F7E3F7F070E0C0C1C18

BLOCK 3 3F7F637F7F637F7E3F7F637F7F**8**37F7E 0C1C1C00001C1C180C1C1C001C1C3C38 030E1C38381C0E02003F7FFF007F7FF 181C0E07070E1C303F7F63660C000C08

BLUCK 4 9FB1EØCED89C989E3F7F63637F7F6362 3E7F637E62637F7E3F7F636Ø6Ø637F7E 3E7F676363637F7E3F7F6Ø7C7C6Ø7F7E 3F7F6Ø7C7C6Ø6Ø4Ø3F7F636Ø6F637F7E

1F3F030363637F7E23666C7078786C6662 30707070707077F7E377F7F686B636362 236373786F6763623F7F63636363637F7E

BLOCK 6 3F7F63637F7E60603F7F63636B677F7E 3F7F63637C7F67663F7F607F1F437F7E 3F7F7F1C1C1C1C18236363636363637F7E 236363636363673E1C23636363687F7762

001038541010100000000000000000000000

ED7382D43E01327ED43E02CD0116CD47 D13E033256D4AF3280D4FB3E01D3FECD 32D30E46CD4FD33E4808CD8CD23ECDCD @1D3FD365546@131@@1154D6CD3C2@3E

F7DBFEF6FC2FFEØØ28F53D327FD43EØ1 3267D4AF3257D4329ED5329FD532A0D5 181CFE0020AB2157D47EFE0428033418 0D36003A67D4FE0928043C3267D421AC

D411ADD40109003A10EDB02100D7227B D43E04CD9B22AF3270D4326FD4CDC7C9 CD83CA2158D4360F23360D215AD43601 233600CD11CBCDBECBFBCDBBD0CD77CC

1FFE103045E60FFE0028DFFE01200177 200236FF23FE0420023601FE0B20 2C36FF18283EF7DBFECB67200236FF3E

BLOCK 12 EFDBFECB572002360123CB5F200236FF EF0923601084720035BCF147E2BAE FE012804FEFF2092110C003E018E2002 1E0423BE20021E083EFFBE20021E0021

BCD419116@D47E124723137E1223137E 124F23137E123ASBD4B15F3AS9D4B@CD E6D33264D4@B215BD43A63D4865F233A 61D486CDE6D33265D447Ø88ØFE4Ø28Ø5

CD22C5181A2158D45E237ECD84D32158 D4115AD41AB67713231AB677CD11CBC3 3AC43A5AD4FE002005CD11CB100D2177 65FE012003216F67CD60CB3A64D4FE36

BLOCK 15 CADØC8FE5Ø38Ø5FE64DAØCCE3A65D4FE 5Ø38Ø5FE64DAØCCE2158D43A5AD48786 325ED45F233A5BD48786325FD4CDE6D3 FE42CAC6C7FE46C@AF3266D4215ED43A

BLOCK 16 62D4865F233A6ØD486CDE6D3FE2Ø2Ø3C 215ED43A63D4865F233A61D486CDE6D3 FE2Ø2Ø28Ø1ØØFAØ378B12ØFB2A5ED4CB

8677CD7DCR3E013266D418R0FF643004 FE4F30623A66D4FE01C908CDEDC50100 F00378B120FB3A5FD4CDB4D3C93A5ED4 4F3A5FD42E3ECD85D33A5FD43C2E3CCD

BLOCK 18 85D308FE002018010A1921FF00110A00 CSDSESCDBSØ3E1D1C17D916F10F2FB3A SED44F3ASFD42E3ACD8SD33ASFD43C2E 38CD8SD3S9C92ASAD4226DD421SED43A

DD4878A32A8D4Ø8233AAED4878A32AC D406F218DD4DD21A1D40423DD235FAF DD8E007820F4BE20F1E821F6FF1908BE 280408EB18E4783269D42A68D43A62D4

855F3A6@D484CDE6D3FE2@2@32@1@@FA 03788120F83A5ED45F3A5FD4CD84D301 68D4115ED4216DD40A86021A86120313 230A86021A8612CD7DCBCD44CC18BBFE

643017FE4C3813ED4B6BD42A69D4EB21 84D41971110A001970C92A69D4EB21A2 D41936403A91D4FE0020113A67D42100 00110001193D20FCEBCD41D03A5ED45F

3A5FD4CDB4D3215ED43A6DD48677233A 6ED48677CD7DCB215FD43A6ED4FE0028 333A60D486326CD4216BD44E2E4DCD85 D3216BD45E236E165826002929292929

0000000010FBD3FE772C772D3D 1785ECD68D32155D42B3A62D4863254D4 11785ECD68D32155D4341E7@CD68D33A 55D43D6F3A54D45F165826@829292929

(continued on page 56)

• THE NEW AMSTRAD CPC 664 WITH BUILT-IN DISC DRIVE



THE LOW COST COMPUTER FOR HOME AND BUSINESS ·

If you know anything about computers you'll know that disc drives are up to fifty times faster than cassette when you're loading and saving programs. In fact, a disc drive makes computing faster, more reliable, more efficient and more

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BUSINESS OR - · PLEASURE · -

Although a disc drive will make games more fun (and there are loads of them to choose from) it also makes the CPC 664 a serious proposition for the business user.

There are accounting,



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business more efficient and effective by providing access to the famous range of CP/M* software.



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AN EXPANDING

· SYSTEM · -

There is a complete range of peripherals avail-

able to CPC 664 users which plug directly into the built-in interfaces.

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THE HOME OMPUTE HAT MEANS **BUSINESS**

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The one thing you won't need a computer to work out is that the

Amstrad CPC 664 represents outstanding value for money.

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There are hundreds of programs for business or pleasure available on disc (and cassette) to CPC 664 users. Many from Amsoft, others from other

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CD44CCC9216BD4@E42CD16D43A6DD4FE 00260587C65918063A6ED487C6616FD6 02673A6BD44F3A6CD4E5CD85D33A6CD4 3CE16CCD85D3C9AF3269D4216FD4BE28

CDE6D3C1FE2020D83A59D490FEFB3810 FE06300C3A58D491FEFB3804FE0638C0 2A69D41184D41971110A0001970ED436B D4CD2ED4216DD436013E80BA380236FF

106282184D4772310FC3269D4CDE0 CB3A67D4473A69D4BBDØ3C3269D41BEE CD2ED47AE61FF6Ø1FE1E3ØF44FCD2ED4 7AE61FF6Ø1FEØ33BE7FE143ØE347C559

@E45CD16D43ASED44F3ASFD42E46CD85 D33ASFD43C2E44CD85D3C9010E0011FD D5FD365571CD3C203A56D4FE00C80E06 2E7F08AFCD85D30C0C083D20F3C9AF32

696718242E777987C67167181B3A5DQ4 CFC602325DD44F3A5BD4FE012E7F2803 CD85D33A59D43CF16CCD85D3C9215ED4

73D2@FC@6@611B6D47E1223131@FA 092158D40E40CD16D47A5AD4FE002E 473A5CD4FE0220093EFF325CD40E01 053C325CD44F78FE0128092E6F7987

D11821FE02201D4169D50E47CD19D4D1 4879C5C52E424BCD85D3E17D3C2E4@CD 85D359C11C1C7BFE1F38BØDD23@C@C79 FE1538A4218ØD53A57D4FEØØ28Ø711Ø6

BLDC7. 36 3883C9DD21CCD43A57D4FE0028081124 00DD193D20FB0E031E017BE607FE0720 09DD7E00E603DD23180DED44C60747DD 7E000F10FDE603FE002008D579CDB4D3

DD3600001190D8CD68D3DD36001F11B0 DBCD68D3DD34Ø1C11@E5CD9BCB11@@@@ CD41D@@E@13E@32E46F5CD85D32E44F1 CF5CD85D3F13CFE1538EC@C@C79FE1F

BLOCK 34 @@DD771FDD191@F6FD365572@13F@@11 C2D5CD3C2@214@4@DD21A@5@@E2@11B@ D@E5CD7CD311B@D@DDE5E1CD7CD3E12C DD23@D2@E9DD2154D4DD36@1@3@612C5

BL OCK BØAE772C1@FCC9CD32D1@E45CD4FD33E 04D3FE21C05A3E20772C20FC21065801 710B712C10FC2E4011A05A3E43062077 122C1C10FA112000DD2160590612DD77

BLOCK 32 083C2E51CD05D3DD361401C1DD2310B9 CD99C93E40326FD4C921405B3A70D4FE 033013FE0120022E5F11200006143E00 AE771910FCC9FE03200321A05A06203E

67D446042170D44EC5AFDDBE1E203B FE03300E3A71D4DDBE00202E5FDD56 100C3A72D4DDBE0A202057DD5E00D5 0EC4CD19D4D14B7A007A2E53CD05D3

BLOCK 30 CCC1DD2310DD3A5AD4FE012810FEFF20 043E0218083A5BD42FCB2FC604DD2184 D43270D4FE03300DFE013E0120023E1D 3271D4180BFE033E0320023E133272D4

EI DCI 4E2E42CD8SD33ASFD43C2E4@CD85D3C4 3A7@D4FE@@282FCD99C92167D446@4DD 2184D4C5AFDDBE1E2017DDBE142812DD 7714DD7E00326BD4DD7E0A326CD4CD44

BLOCF 28 78099D4602DD7702DD7000DD7E01DDEE 023009DD4602DD7702DD7001DD7E02DD 7600FE04C0110020CD41D0E1CD0ED1AF C3E2C3215ED40E47CD16D4215FD47E2B

1B9D4DD7E@@DDBE@12@@BDDBE@22@@6 D21860418130D218604D7E@@DD8E@1 C@DD8E@2C@DD2189D4DD7E@@DD8E@138 @9DD46@1DD77@1DD7@@@DD7E@@DD8E@2

A61D486CDE6D3FE20201D2A5ED45D 7CCDB4D32A5ED4EB2A5AD47CB2677DB3 6F22SED4CDB3CB1BBBDD21B6D4ED5B73 D4DD193A5ED4DD77@83A5ED4DD77@3DD

@E1AFC3E2C3@6@@2A5ED4DD21B6D47D DDBE0020067CDDBE032B0504DD2310EF 21730470215ED43A62D4865F233A60D4 86CDE6D3FE202031215ED43A63D4865F

2919ESDDE1AF060000000010FBD3FEDD 7700DD77203D20EE3E04D3FE3A5ED45F 7A5FD4CD84D3216DD4115ED41A861223 31A8612CD7DCB2168D4343A67D43CBE

(continued from page 53)

BLOCK 64 B210A0C225ED4CDB3CBDD360110CDB3 CBDD369112CDB3CBFD3655D7118CD601 1300CD3C2021805A364F11815A017F00 EDB0FD36554F119FD6011500CD3C20F6

BLOUP 63 @D2@F6152@EEC93E@6CD9B22CD32D3@E 46CD4FD3FD3655CC1185D6@1@7@@CD3C 2@3E@13281D421@A@A225ED4DD215ED4 CD7DCBDD36000CCD7DCBDD36001ECD7D

BLOCK 62 08AF327DD4DD227BD4CDB503FBC9DD21 86D7DD66007CFEFF2002FBC9DD6E01DD 5E@216@@DDE5CDB5@3DDE1@1@3@@DD@9 18E016082100400E18CB3E2CC239D124

BLOCK 61
DBFEE61FFE1F280134CB462812DD2A7B
D4DD6600DD23DD6E00DD237DB4200F01
002A0B78B120FB2100D7227BD4C91600
DD5E00DD233A7DD4FE003E01327DD428

BE003806DD2310F41810DD219ED50603 DD7E00DD7703DD2310F6DD2154D4DD36 0101DD360007219ED5DD2154D4CD1DD0 21A1D5DD360019CD1DD0C9217ED43EFD

DD219ED57BDD86@227DD77@23@@114 C4DD214ED578DD868227DD7782588114 7ADD868127F5FE5838133A8804FE88028 8C3E8132880421560434CD98CBF1DD77 81DD7E88CE6827DD77888683DD7E83DD

BE00:813C03A9FD5DDBE01380AC034 D5DDBE022801D0DD1910E137C906067E CB40280823E60F8787871803E6F00FC6 805F163DE5C5CD68D3C1E1DD340010DF

BI OCK BLOCK: 57 CD1DDØE1C10478FE063008DD3401DD34 0118B6010000008F78B120FB3A7FD4FE00 20093EEFDBFEC64720F8C9AFDB1FFE10 38F9C9110300DD21A4D506053A9ED5DD

BLOCK 56 54D4DD36010721B3D5DD36000578C5E5 878787C68Ø5F163DCD68D3DD36ØØØBE1 0603E5C57E07260F6F2929EBCD68D3C1 E123DD340010EBE5DD36001411EEFF19

BLOCK: 55 2810F00D20EB21A0D5117AD406037EDD 77001ADD770F2B1BDD2B10F2CD32D30E 4FCD4F033E4708CD8CD23EF0CD01D301 13001141D6FD3655F2CD3C200601DD21

BLOCK 54 ØC282CE2178D4ED5876D4193A75D477 21A607111400CDB503FB2176D47EFE02 0434C37DCEDD21B2D5F1FE0238174F 0D0603DD7EFDDD7700DD7E0CDD770FDD

BLOCK 53 FE0029FBFE38200406011806FE35202F 06FF3A75D480FE2120043E411812FE1F 20043E5A180AFE5B2804FE4020023E20 3275D4215000114F00CDB503FB1883FE

BLOCK 5D43A76D4C6@E3254D43A75D4@726@ 6F2929EBCD68D33A7FD4FE00281CDB1F E613FE0120043E38181AFE0220043E35 1812FE1020FB3E30180A210B5C36007E

BLUCK 51 CD4ECE3EØ1C3E2C3CD11CBC33AC4CD32 D1CDF3CFDA5FCFC5ØE32CD4FD3FD3655 9FØ136ØØ11ØBD6CD3C2Ø2155D436ØE21 DØØ711BCØØCDB5Ø3FBAF3276D43E4132

BLOCK 50 D4FE00C0CD99C9AF3270D4C9E121353 CD68CB21ACD411ADD43620010900EDB0 0E802158D4CD16D406007980D3FE10FA @EF2156D4E535CD9PCBE1AFBE38@8

6BD45F3A6CD4CDB4D3216BD4116DD41A 8786774F13231A8786772A69D4E82184 D41971218ED41977CD44CC2169D43A67 D48E280434C382CC3A70D4FE00C83A6F

04.007 49 4028063E63B8DAØCCEB9DAØCCE185C21 6BD43A6DD4865F233A6ED48657D53A62 D4835F3A6@D482CDE6D3D1FE2@2@3C3A 63D4835F3A61D482CDE6D3FE20202C3A

7AFE4@D2EBCD2AADD4ED5B6BD47C8782 225F04708783325E04C0E0C53A5F04C0 44D3C0444CCC3E8C02168043A63D4865F 233A610486C0E6D33265D447488F88FE

RLOU 46 08:EFFBE70021E0021BCD4191160D47E 124723137E1223137E124F23137E123A 6BD4815F3A6CD480CDE6D33264D4FE36 28A2470878FE47302FFE43382BCD2ED4

BLOCE 45 D35600CD44CC180C21ACD419AFBE2804 55C3ERCDCD2ED4216DD47AE603FE0230 08873D77233600180736002387D60577 28110C003E018E20021E04238E20021E

F 6FF 1977C2EBCDCDE@CB2168D435C3EB CD2184D4197E326BD421BED4197E326F D42198D419AFBE28ØF3A6FD4FEØØC2EB

> 20554740494553161508323016020126 20504C414345204449414D4F4E445316 15073230C390EA00000000000000000000

> BLOC: 84 5053544F4E16000E44454D4F16020142 52454148494E4720544845204943451 150055434F524553A202020303020504F 494E545316020153504C415420544845 BL OCK

> C160208544F44415927532047524541 5445535416060542495244592047414D 452053454C454354494F4E160D0A3120 484559424F41524416@F@A322@484540

> BLOCK 82 2020202020202020202020201602045553 45204C4546542C20524947405420414E 44205A45524F1603043E544F20454E54 455220594F555220494E495449414C53 BLOCK 83

BLOCH 81 5959160000204C495645531600112A2A

BLOCK 80 07190F0509110D0519070F1107110307 0F130313190B0B110305190309090000 ᲛᲓᲨᲢᲓᲔᲛᲓᲔᲛᲓᲔᲛᲓᲔᲛᲓᲔᲛᲓᲔᲛᲓᲔᲛᲓᲔᲛᲓᲔᲛᲓᲔᲛᲓᲔᲛᲓᲔᲛ Ტ**Დ**ᲛᲓ**Ე**

BLOCH 44140044445054446454244444155044

BLOC: 76 41404000455405145005150014401190 00550154450410004014555056540554 15155510155041100511444411118444 05114144655555545550001445015504

00010202020200010001FFFF00054004 16455554054414405505149051551450 51001050011151401516414414014504 01440104110451141118501050045450

000000000000000000000000000FFF0001

BLOCK PEBDD19EB292929EBDD19DDE5D11BED

BLOCF: 74 0A142310FBE1D13E8091C9E111080019 D10D20E5AFC95E236E16582600292929 292919712C71112000319712D71C9DD21 0000ED58765C13DD19E829EBDD19E829

9545D1CAFØ6Ø8771224141ØFA112ØFF 7DFEE@3@@3112@F819545D1CAF@6@877 241410FAC957E618677A940F0F0F6F 164019EB2100DB0E60D5E506081ABE20

13241@FAC92DCB25260029291100DB15 19EB47E6186778940F0F0F6F2C064009 E5060B1A77132410FAE12D060B1A7713 2410FAC957E618677A940F0F0F6F1640

0050771 1020C23CD30414247CFE58C23BD3C921 00587111015801FF02ED80C9CB252600 29291100D81519EB3A55D447E6186778 940F0F0F6F06403A54D44F0906081A77

E1C9010040110048210050AF0212770C BLOCK 71

BELOF 76 C99DE521005811015877011F00EDB021 E05A11E15A77011F00EDB00616DD2120 58112000DD7700DD771FDD190520F5DD

BLOCK 54D4086F08CD5CD3F1F56F261722 54D4086F00CD5CD3F13CFE2038DFAFF5 72E002254D4086F08CD5CD3F1F5672E 1F 2254D4@86F@8CD5CD3F13CFE1838D8

BLOCY 68 CDB4D3210A0E225ED4CDB3C8FB3E0606 S076D3FEEEFB10F9AF32B1D4C9DD215B D4CD11CB767676767676DD7E00FE08D0 SFDD7E01CDB4D3DD340018E5AFF56F26

06507610FD217765CD68CB3E0C325ED4 CD78C5FD3655F211CCD6@113@@CD3C2@ FD36554F11DFD6@1@5@@CD3C2@F@@63@ 761@FD21@@@1225AD4CD11CB1E@A3E@C

BLOC1 66 F40D:16BD4DD36001CDD360100CD44CC F876767676767676DD7E01FE0A300BDD34 01DD5E00CD04D310E411C7D6010500CD 3C20FD36554D11B4D6011300CD3C20FB

06507610FD3F01325AD4325CD4325DD4 2100003258D43E0032AED2C09DD2177 A5CD60C0AF00210A00325ED4CDEDC53E 0032AED25FCD04D3CD9DD2210001226D

104

BLOCK .103

BLOCK 102

9F8F8F8E82020701F1F1F1F17040E00 EØFØFØFØFØFØEØFØØ7ØCØ9ØEØBØFØ7ØF FBFBFBFBEB2Ø7ØØØ1F1F1F1F17Ø4Ø4ØE E0F0905090F060F0070F090A090F060

100 BLUCK: 100 FCEEF6F070341C183F77070F1E1C180C F079BCCCF06038B6060F1F1F1B030703 D0D0D050B0E088E0050506070F0F0F0101 E030D0903GFEF0F0070F0A0A0B0D0707

BLOCK 95 FCFEE6F8783818383F776F8F8E2C3818 68F8F8DBC6E6C00F1E3D338F866C1D A8A666E8F8F898883B88B8A8B8F878187 E8F85858D8B8E8E8878C8B891C7F8F8F

2000F0F89C6E2E9E00000F1F39767479 F1FFFEF0E0000000000000183B3F0F1B00 FØE@800080000018383FØF1800 DCFCFØD8808FFF7FØF07010001

BLOCK 98 FE7E7EFEFCF800005F5E5E6F3F1F0000

BLOCK 97 BF1CFCFCFCFBF0003E3F2F2F371F0F00 00C0E0F0FB1CECGF0003870F1F3F3E3E FEFEFEFEFCF000007F7F7F7F3F1F0000 0000F0FBFCFEFEFE00000F1933676F6F

BLOCK 96 17378FFF7F7FFFEEBECF1FFFEFFFFF 8008401000F88C3604001401001F316C 7CFCF4F4ECF8F000F1383F3F3F1F0F00 80C0E0F0F8FC7C7C0003870F1F3837F1

E7E7A7BFBFDF7E3C3C7EFFDBA5A5DBFF

001F3162444850610202020202060CF800 4840404060301F0000FB0C0602020202 001F3063464C48480F1E3C78F0E1C387

BLOCK 93 3126413410C5209500000000000044080AB 0000000000000000020015AAA6BE12864CF600 44544B486B381F0000F8BC76024E9202 001F326470535942860A122246BCF800 BLOCK: 6150484462311F0000F88C4622120A86

C4A4A52A23CRRRR1B2BRBRBRBBBBBBBBB

000408080808040000201010101010200 000014083E081400000000883E080 000000000000008811000000000003E000 0000000000018180000000020408102000

BLOCK 98 99999999999991919199991999 0024248080808080808024752424752488 000835283584358088862648818264688 00182818284438888888818888888888

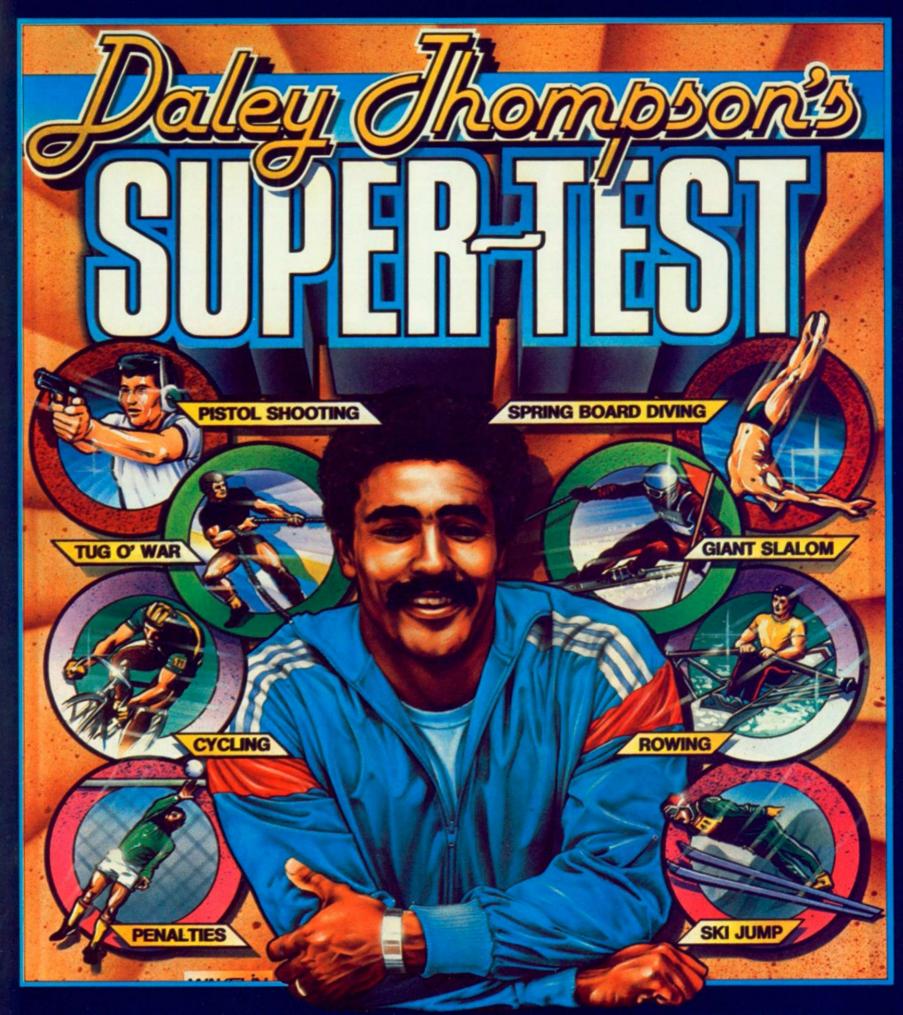
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2AT4888887C55A85CB5A85CB3985 25.4004926005CB5603D3AD04924400492 4804474D03D328044F26049224044F26 07D35605252005CB1C05252004922405

CATA03263403C420066A1A051120043E 2703C42B03BC2E03C42B043E27051120 043E2703573102CA3A02794102544502 794102CA3A035731032634032634038C

86.6A1A051120043E2703C42B03BC2E03 C42B043E27051120066A1A051120043E C703C42B03BC2E03C42B043E27051120 04C62203C42B03263402CA3A02A13E02

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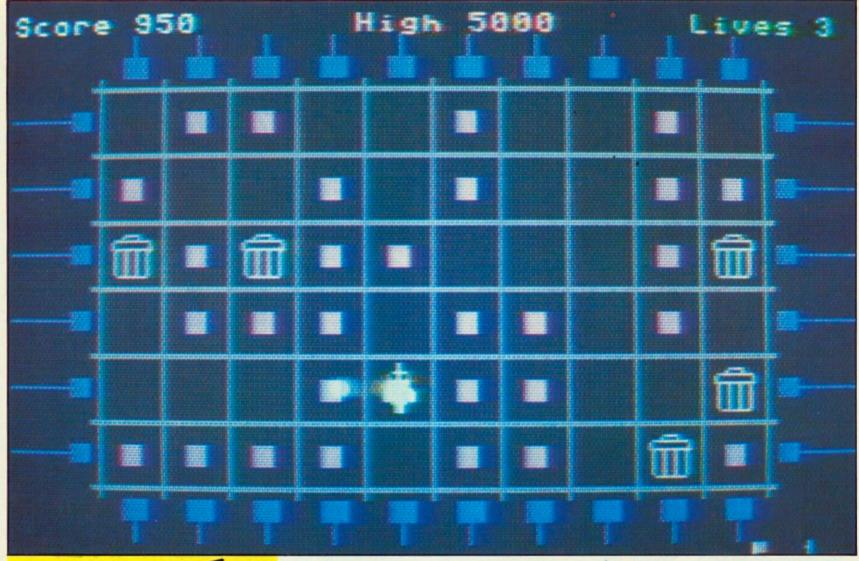
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MPULSE

Keith Suddick finds something fishy at the chip factory and gets his CBM-64 to help.

This program is available on Telsoft.

SOMETHING HAS gone very wrong down at the chip factory — silicon chips that is, not fish and . . . — All of the memory circuits have started forgetting the data that they are supposed to be remembering!

In a desperate attempt to find out what has gone wrong and hopefully put it right, Floyd the droid has been miniaturised and put onto the surface of one of the faulty chips. The problem soon becomes obvious as the circuit is invaded by program bugs and data locks which roam across the chip, both trying to turn any data they find into garbage. As if the bugs and locks weren't enough, worse still are the sparks which shoot across the chip from the contacts on either side.

Floyd can destroy bugs

Luckily Floyd can destroy the bugs and the locks by firing packets of random data at them but nothing has any effect on the sparks. Add to this the fact that if Floyd is caught by any of his adversaries then his own circuits will be scrambled, and you can see that he might need some help!

At the start of each screen Floyd will appear in the top left hand corner of the chip, a joystick in port number 2 will control his movements and the fire button will fire a packet of random data. The chip itself is organised as a 10 by 6 matrix of memory cells each able to hold a packet of data. The data is supplied to the chip from outside and is stored in any unused memory cell. Floyd will not harm the data in any way but if any of the other characters find any data then there is a good chance that they will interfere with it and turn it into useless garbage.

You start the game with three droids, scoring 50 points for each bug you destroy and 100 points for each lock, remembering that you cannot destroy sparks! Each screen is completed when the memory chip is full, including garbage, then you will score 10 points for every unharmed data packet retrieved from the chip.

Bonus of 100 points

Should you save 75 per cent or more of the data — 45 cells or more — then there is a bonus of 100 points per valid data packet. 10,000 points or more will earn you an extra droid.

On the first screen you will find only one bug to contend with but with each successive screen up to level 8 a different combination of enemies will appear. After level 8 the screens will cycle through the patterns for screens 5 to 8 but the degree of difficulty will be increased by speeding up the movement of the bugs. A small flag in the bottom right hand corner of the screen indicates the current level of play.

At its most difficult level the game uses all

eight of the 64's sprites thus Basic by itself would not be able to support the game so the program makes use of several machine-code routines to deal with the animation of the characters and some of the otherwise lengthy operations. Unfortunately this generates a lot of data statements and requires quite some time to read them — although this is only done once when the program is first run.

It is, as always, the case that Commodore control characters such as cursor movements and colour codes, do not lend themselves to dot matrix printers followed by photographic reduction and although anyone who has used Commodore machines for any length of time, will probably have gotten used to them, I have tried to make things easier by including details of

almost all the control characters used in the program in Remark statements directly after their use.

Don't type Rem statements

These remarks should not be typed — they will at best slow the program down slightly and at worst cause an out of memory error because I have placed the video chip data directly after the program area.

Table 1 describes the abbreviations I have used to explain the control codes. As usual, if you type the program then be sure to make a copy of it before you run it, if you would rather not type it then I can supply cassette copies for £2.50. Please write to: Keith Suddick, 6 Ravel Court, Jarrow, Tyne & Wear, NE32 3BW.

Program	breakdown.		Maluacia de Maria de Carrero de C
0-90	Initialisation for the pro- gram, game and screen res- pectively. Sets top of	6000-6080	values on the screen. Game over message, give options to play again or review the instructions.
100-210	memory, sets up video and sound chips ready for game. Main program loop, Fills	8000-8080	Initialise title string and displays "please wait
	screen with data packets, checks status of bugs etc. and either removes them or	8100-8120 8200-8270	message. Dimensioning of arrays. Initialise constants fo future use.
300-310	generates a new one as required.	8300-8320 8400-8490	Initialise strings. Read data into arrays and
300-310	Makes beep and hiss sounds respectively.		memory as required Cal
400-600	Generates details of new bugs, locks and sparks		machine code routine to reset the video bank and
700-790	respectively. Deals with the loss of a droid. Flashes Floyd sprite	8500-8550	access the character set. Calculate array elements for use in generating new
	and either begins the screen again or ends the game dep- ending on how many droids are left.	8900-8999	characters. Installs IRQ routine vector and calls instruction routine, then starts the
800-860	Plays fanfare at the completion of each level.	9000-9140	game. First screen of instructions
1000-1999	Draws the chip and the rest	9160-9290	Second screen of instructions.
	of the game screen, blank- ing the screen during	9700-9710	Sets up the video chip with requested data.
2000-2040	drawing. Generates at random the	9800-9820	Flashes sprites during instructions.
	positions on the chip that the data packets will fill. This is only done once at the	9900-9990	Prints instructions, waits for space bar then clears the screen.
	start of each screen to save time.	10000-10090	Video chip set up data
4000-4280	Called at the completion of each level to collect data	12000-11090	Animation data. Colour codes
	from the chip and award		Data for machine code initialisation routine.
	points and bonuses as required.	14000-14030	user defined character data
5000-5010	Adds points onto current	15000	Sound chip set up data
	score, updates high score if needed and prints new	16000-16470 17000-17410	Data for other machine code routines.

```
reverse on
                           reverse off
Table 1.
                  ron
  cursor down
                                    clr
                   rof
   cursor up
                                    hm
                   clr
    cursor left
CU
                                  G+1
                   hm
    cursor right
                                  G+2
                    org
blk ctrl + 1
                                   G+3
                    brn
 wht ctrl + 2
                                   G+4
                    It.red
 red ctrl + 3
                                   G+5
                    gray1
 cyn ctrl + 4
                     gray2
                                    G+6
 pur ctrl +5
                                    G+7
                     It.grn
  grn ctrl+6
                                    G+8
                     It.blu
  blu ctrl +7
                      gray3
       shift + the following character
   yel ctrl+8
       ctrl+ the following character
    = | G + the following character
    Numbers if present indicate the number of
     e.g. 4s/* means 4 shifted asterisks.
    repetitions:
         15cd means 15 cursor down.
```

Pokeic, Pokes 180	oke56.68 clr:run8888	needed and prints new	Data for other machine co routines.
Pokev2,ub:Pokev2,ub:Pokev2,ub+u:ford=1to400:next:Pokev2,ub:ford=1to300:next	<pre>pwg:tl=@:nf=3:sp=.85:ax=!*000**9oto760* pokelc,:vu=.9osub9700**9osub2000**9osub1000** dy=(lvandc3)=c4**(lv2c3) forx=0to15:Pokesc*16+x:i2(x):Pokesc+x.a%(dv,x):next forx=0to24:Pokesc*16+x:i2(x):Pokesc+x.a%(dv,x):next forx=0to24:Pokesi**x:n%(x):next sf=60**-c4**int((lv-c5)/c4):ifsf(32thensf=32 rd=60**-lv:ifrd(,thene da.*9p=.7 Pokeaf.sf:Pokesc**u!*Pokerc.u:Pokefk i=fre(0) Printleft\$(vt\$,asc(y\$))tab(asc(x\$))da\$ x\$=mid\$(y\$,c2):y\$=mid\$(y\$,c2):di=c4+rnd(.)*du:ifx\$=**then4000 di=di=u:ifdi(,then100 forx=2to7:iffsek(sc+x)=.thensyss0,x:xd=sd+x:9osub100 next:ifrnd(.)*pthensyss9 iffsek(fx)then700 9oto130 iffsek(xd)= 4thenPokexd,15:qs=50*(u-(x)c3)):9osub310:9oto5000 xc=sc+x:ifPsek(xd)thenPokexd,:Pokexc,c5+rnd(.)**rd!return onx9osub0.400.400.500.500.600.600 Pokerc,ifPsek(xd)thenPokexd,:Pokexc,nc:ff=9f*(xoru)*c2:9oto300 Poker2,ff:Pokev2,ub1*Pokev2,ub+u:return Pokev3,um:Pokev3,un+u:return P=int(rnd(.)*dr):sx=dx(P):sy=dy(P):nd=hd(P):nc=ht:Pokenc+x,hh:return P=int(rnd(.)*dr):sx=dx(P):sy=dy(P):nd=hd(P):nc=ht:Pokenc+x,hh:return P=int(rnd(.)*dr):sx=dx(P):sy=dy(P):nd=hd(P):nc=ht:Pokenc+x,dd:return P=int(rnd(.)*dr):sx=dx(P):sy=dy(P):nd=hd(P):nc=t-Pokenc+x,dd:return P=int(rnd(.)*dr):sx=dx(P):sy=dy(P):nd=hd(P):nc=t-Pokenc+x,dd:ret</pre>	761 ren 1 clr 2cd	u 11s/* lu 11s/* Pokesi+13,247:Pokesi+6,247 to9 ""; next:Print" "" next -) cd 4cl s/+ 2s/- s/+ 3cu cl Lives" nf f 9rn Col"; next d 2cl ron =/k =/n rof cu 2cr 35)" ""

```
(continued from previous page)
              6000 Printtab(S) "EMPress the fire button to Play
6000 Printtab(S) "Printtab(G)" or return for instructions.
6000 Object (Printtab(S) Printtab(G) Fire 6000
6000 Object (Printtab(S) Printtab(S) Printtab(S)
6000 Object (Printtab(S) Printtab(S)
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6000 Object
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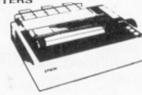
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CHARLIE CHAN IMAGINE THE situation, there you are with FACTOR your hot steaming rice in lotus leaf ready to tuck into your favourite meal of the day when you realise that there are no woks to cook your repas

in and what's more, number one son is no where in sight so it looks like you'll have to get those woks yourself.

Untold nasties lurking

The only way you can get a wok at such short notice is to go to the old wok factory once owned by Mr Woo. However, this is not as easy as it seems because there are untold nasties lurking in the shadows of each of the factory's rooms. In all there are 15 screens and 15 woks to collect, but if you find any screen too hard simply press the Return key and you will go onto the next screen. Of course, you will gain no points for your efforts if you do this.

There are five different nasties - listed in the instructions - all of which are animated and all of which you have to avoid because the

Brian Lewis with an oriental orgy of violence on the BBC.

slightest touch can kill, and you can also die from falling too far.

Each of the listings should be typed in and checked and then saved one after the other on the same tape, but make sure you have a copy of listings 2 and 3 before you run them as they contain machine code and a mistake could cause a bad program ruining all your hard work typing in the game. If the listings appear quite long remember that the game has to store data for 15 screens which, even after massive compressing, is still quite lengthy.

As with all such games the controls are a

simple left, right and jump type which may take a small amount of time to get used to because the longer a directional key is pressed the farther the jump goes in the appointed direction. This technique must be mastered to clear certain sheets.

If BBC users wish to type in and play Charlie Chan Visits the Wok Factory they merely have to increase the values of the X and Y registers in line 320 of the second listing, their exact value will have to be found through experiment. I would like to apologise here and now for the sequence that occurs after all the lives are lost.

Listing 2.

10ENVELDPE11.1.2.1.2.1.1.0.126.0.0.-126.126.126 20DATA40.20.40.10.40.10.52.10.48.10.40.10.48.20.32. 10,20,40 30DATA88.10.88,20.88,20,88,10,88,10,100,10,96,10,88

10,96,20,80,10,68,30 40DATA40,20,40,10,40,10,52,10,48,10,40,10,48,20,32, 10,20,40,88,10,88,20,88,20,88,10,88,10,100,10,96,10,88, 10,96,20,80,10,68,30 50DATA52,40,48,40,40,15,32,20,32,10,52,40,48,40,40,

15.32.40

60DATA1,0,11,255,40,0,15.0 70RESTORE20:FORT=01097:READD:T7%4000=D:NEXT

80RESTORE60:FORT=0T07:READD:T784062=D:NEXT

9078950=20:78951=0 100FORT=0TO2STEP2:F%=&406A:[OPTT 110DEC%950:LDA&950:BNEnosound:.a LDA#21:LDX#5:JSR&FF

1201NC&951:INC&951:LDX&951:LDA&4000,X:STA&4066:LDA&4 001,X:STA&950:LDA#7:LDX#&62:LDY#&40:JSR&FFF1:LDA&951:C MP#96: BEDend

130.nosound RTS 140.end LDA#254:STA&951:JMPa 1500

150NEXT

170CHAIN""

Listing 1.

2REM IMPORTANT:: CHECK BEFORE RUNNING ! "10VDU23,128,254,254,254,0,239,239,239,0,23,129,0,0, 0,0,255,126,60,24

20VDU23,130,60,94,239,255,255,255,126,60,23,131,36, 36,36,165,102,0,0,0

30VDU23,132,60,126,255,0,72,149,106,165,23,133,0,126,255,126,0,255,126,60 40VDU23,134,36,60,36,60,36,126,195,90,23,135,90,195

,126,36,60,36,60,36 50VDU23,136,255,129,145,185,147,133,181,181,23,137,
181,181,133,147,185,145,129,255
60VDU23,138,16,56,124,120,124,120,124,120,23,139,12

4,60,24,126,255,255,66,231

70VDU23,145,60,94,239,255,255,126,60,23,146,36,66,129,129,231,0,0,0 80VDU23,147,0,0,0,60,126,255,72,149,23,148,106,165,

126,255,126,255,126,60

90VDU23,149,60,36,60,36,60,126,66,219,23,150,219,66

126,60,36,60,36,60 100VDU23,151,255,129,169,145,171,133,181,181,23,152, 181,181,133,171,145,169,129,255 110VDU23,153,4,14,31,30,31,30,31,30,23,154,31,15,6,1

0,17,51,51,240,112,64,48,17,255,255,119,224,192,80,14 5,17,221,255,255,0,0,0,136,136,136,136,0,51,51,51,16,0 ,0,0,0,51,51,3,3,3,35,34,102 150DATA136,136,8,8,8,136,204,0,0,0,0,0,0,0,0 160DATA0,0,0,0,0,0,0,0,0,17,51,119,255,112,80,96,136

51,51,3,3,3,35,102,0,153,153

170DATA25,24,8,136,136,204,136,136,136,0,0,0,0,0 180DATA&11,0,1,0,2,0,5,0,&11,0,2,0,9,0,1,0

190J%=%5200 200RESTORE140:FORT%=0TO207:READD:T%?J%=D:NEXT:sou=J% +192:s0u2=sou+8:M%=s0u2+8:F0RT=ØT02STEP2:P%=M%:[0PTT

210LDA#&90:STA&70:LDA#&73:STA&71:LDA#0:STA&72:STA&76 :STA&77:STA&79:STA&7C:STA&9C:LDA#2:STA&73:LDA#J% MOD25 6:STA&74:LDA#J% DIV256:STA&75:LDA#&80:STA&9D:LDA#&78:S

220JSRdis:.start LDA&7C:CMP#4:BMIi1:JMPnoleft:.il 23ØJSRCHri:CPX#&FF:BE0noright:LDA#&81:LDX#&BD:LDY#&F F: JSR&FFF4: CPY#&FF: BNEnoright: JSRdis: CLC: LDA&70: ADC#8: STA%70:LDA%71:ADC#0:STA%71:INC%72:JSRani:JSRdis:JSRSOU

240.noright JSRchLE:CPX#&FF:BEQnoleft:LDA#&81:LDX#&9 E:LDY#&FF:JSR&FFF4:CPY#&FF:BNEnoleft:JSRdis:SEC:LDA&70 : SBC#8: STA&70: LDA&71: SBC#0: STA&71: DEC&72: JSRani: JSRdis :JSRSOU2

250.noleft JSRcheck:CPX#&FF:BEOnojump:LDA&77:CMP#1:B EQnojump:LDA#&81:LDX#&FF:LDY#&FF:JSR&FFF4:CPY#&FF:BNEn ojump:JSRjump

260.nojump LDA&77:CMP#0:BEQnS:JSRJUMP

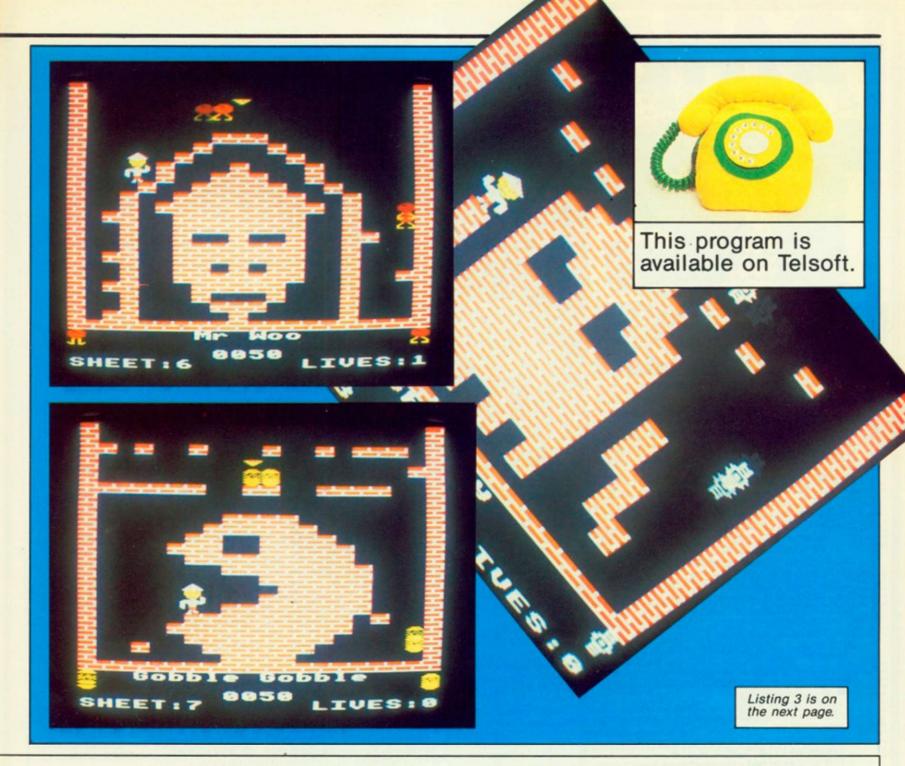
270.nS LDA#&81:LDY#&FF:LDX#&B6:JSR&FFF4:CPY#&FF:BNEH S:RTS:.HS JSRchecK:CPX#&FF:BNEe1:JSRHOLE

280.e1 LDA&72:CMP#34:BNEg1:JSRscore:JSRscore:JSRscor e:JSRscore:RTS:.g1 LDA&7C:CMP#&FF:BNEh1:LDA#10:STA&79: RTS:.h1 LDX#0:JSRenemy:CPX#&FF:BNEuU2:STX&79:RTS:.uU2 JSRdelay: JMPstart

290.dis LDY#0:.A LDA(&70),Y:EOR(&74),Y:STA(&70),Y:IN Y:CPY#32:BNEA:CLC:LDA&70:ADC#&20:STA&4D:LDA&71:ADC#1:S TA&4E:.B LDA(&4D),Y:EGR(&74),Y:STA(&4D),Y:INY:CPY#64:B NEB:CLC:LDA&4D:ADC#&20:STA&4D:LDA&4E:ADC#1:STA&4E:.C L DA(&4D), Y: EOR(&74), Y

300STA(&4D),Y:INY:CPY#96:BNEC:RTS 310.ani LDA&76:CMP#1:BEQsc:CLC:LDA&74:ADC#96:STA&74: LDA&75:ADC#0:STA&75:LDA#1:STA&76:RTS:.sc SEC:LDA8 C#96:STA&74:LDA&75:SBC#0:STA&75:LDA#0:STA&76:RTS

320.delay LDX#100:.D LDY#150:.E DEY:BNEE:DEX:BNED:RT



330.check LDX#0:LDA&77:CMP#1:BEQF:CLC:LDA&70:ADC#&C0 :STA&4D:LDA&71:ADC#3:STA&4E:LDY#8:.E LDA(&4D),Y:AND#15
:BEQH:INX:.H INY:CPY#24:BNEE:CPX#0:BEQdrop:.F LDX#0:LD A&7C:CMP#8:BMIi1:LDA#&FF:STA&7C:RTS:.i1 STX&7C:RTS

340.drop INC&7C:DEC&73:JSRdis:JSRani:CLC:LDA&70:ADC# &40:STA&70:LDA&71:ADC#1:STA&71:JSRdis:LDX#&FF:RTS

350.jump LDA#1:STA&77:LDA#0:STA&78:JMPSOU 360.JUMP LDA&73:CMP#23:BPLend:INC&78:LDA&78:CMP#5:BP Ldown: INC&73 37@JSRdis: SEC:LDA&7@:SBC#&4@:STA&7@:LDA&71:SBC#1:STA

%71:JMPdis

380.down LDA&78:CMP#6:BEQend:RTS:.end LDA#0:STA&77:R 390.50U LDA&953:CMP#&FF:BEQzZ2:LDA#7:LDX#sou MOD256:

LDY#sou DIV 256:JSR&FFF1:.zZ2 RTS 400.CHri CLC:LDA&70:ADC#32:STA&4D:LDA&71:ADC#0:STA&4

E:LDY#0:.a1 LDA(&4D),Y:AND#15:BNEhit:INY:CPY#8:BNEa1:L DX#0:RTS:.hit LDX#&FF:RTS 410.chLE SEC:LDA&70:SBC#8:STA&4D:LDA&71:SBC#0:STA&4E :LDY#0:.b1 LDA(&4D),Y:AND#15:BNEhit:INY:CPY#8:BNEb1:LD

X#Ø:RTS 420.SOU2 LDA&953:CMP#&FF:BEQzZ2:LDA#7:LDX#sOu2 MOD25 6:LDY#sOu2 DIV 256:JMP&FFF1

430.check LDA&70:STA&4D:LDA&71:STA&4E:LDY#0:.c1 LDA(&70), Y: EOR (&74), Y: BNEsee2:.d1 INY: CPY#24: BNEc1: LDX#0:R

440. see2 AND#15: BNEd1:LDX#&FF:RTS

450. HOLE LDY#21:.f1 LDA#31:JSR&FFEE:LDA#19:JSR&FFEE: TYA: JSR&FFEE: LDA#32: JSR&FFEE: INY: CPY#25: BNEf1: JSRdis: L DA#31:JSR&FFEE:LDA&7B:JSR&FFEE:LDA&7D:JSR&FFEE:LDA#32: JSR&FFEE: JSRdis: JMPscore

460.enemy LDY#0:.k1 LDA&D60,Y:STA&A60,Y:INY:CPY#7:BN Ek1:JSRENE:JSRDIS2:LDY#0:.l1 LDA&A60,Y:STA&D60,Y:INY:C PY#7: BNE11

470LDY#0:.m1 LDA&D70,Y:STA&A60,Y:INY:CPY#7:BNEm1:JSR ENE:JSRDIS2:LDY#0:.n1 LDA&A60,Y:STA&D70,Y:INY:CPY#7:BN En1:RTS

480. ENE JSRread

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78:5

C#B:

RSOU

X489

A&78

Rdis

#1:B

BNEn

BNEH

679:

Y: IN

#1:S

64: B

C L

74:

1:SB

DIRT

uU2

490LDY#0: TYA:.s1 STA(&4D), Y: INY: CPY#16: BNEs1: CLC: LDA

&4D:ADC#&40:STA&4D:LDA&4E:ADC#1:STA&4E:.t1 LDY#0:TYA:. ul STA(&4D), Y: INY: CPY#16: BNEu1

500LDA&A66: CMP#1: BEQ1ef: CMP#2: BEQrig: CMP#4: BEQup: CMP #8: BEQdow: RTS

510.lef DEC&A60:LDA&A60:CMP&A64:BEQrev:RTS:.rig INC& A60:LDA&A60:CMP&A62:BEQrev:RTS:.up DEC&A61:LDA&A61:CMP &A65: BEQrev: RTS: .dow INC&A61: LDA&A61: CMP&A63: BEQrev: RT

520.rev LDA&A66:CMP#1:BEQLEF:CMP#2:BEQRIG:CMP#4:BEQU P:CMP#8:BEQDOW:.LEF LDA#2:JMPDO:.RIG LDA#1:JMPDO:.UP L DA#8: JMPDO: . DOW LDA#4: . DO STA&A66: RTS

530.read LDA#0:STA&4D:LDA#&58:STA&4E:LDY&A60:.o1 CPY #0:BEQp1:CLC:LDA&4D:ADC#16:STA&4D:LDA&4E:ADC#0:STA&4E: DEY:JMPo1:.p1 LDY&A61:.q1 CPY#0:BEQr1:CLC:LDA&4D:ADC#& 40:STA&4D:LDA&4E:ADC#1:STA&4E:DEY:JMPq1:.r1 RTS

540.HIT LDX#%FF:RTS 550.DIS2 JSRread:LDY#0:.aa1 LDA(&4D),Y:BNEHIT:INY:CP #16: BNEaa1: CLC: LDA&4D: ADC#&40: STA&4D: LDA&4E: ADC#1: STA &4E:LDY#0:.bb1 LDA(&4D),Y:BNEHIT:INY:CPY#16:BNEbb1 56@SEC:LDA&4D:SBC#&4@:STA&4D:LDA&4E:SBC#1:STA&4E:LDY

#0:.cc1 LDA(&9D),Y:STA(&4D),Y:INY:CPY#16:BNEcc1:CLC:LD A&4D:ADC#&40:STA&4D::LDA&4E:ADC#1:STA&4E:CLC:LDA&9D:AD C#&40:STA&9D:LDA&9E:ADC#1:STA&9E::LDY#0:.dd1 LDA(&9D),

Y:STA(&4D),Y:INY:CPY#16 57@BNEdd1:SEC:LDA&9D:SBC#&4@:STA&9D:LDA&9E:SBC#1:STA &9E:INC&9C:LDA&9C:CMP#10:BNEx1:LDA#0:STA&9C:LDA&9D:CMP #&B0:BEQy1:LDA#&B0:STA&9D:LDA#&79:STA&9E:RTS:.y1 LDA#&

80:STA&9D:LDA#&78:STA&9E:.x1 RTS 571.score INC&B1:LDA&B1:CMP#10:BNEshow:LDA#0:STA&B1: INC&B2:LDA&B2:CMP#10:BNEshow:LDA#0:STA&B2:INC&B3:LDA&B 3: CMP#10: BNEshow: LDA#0: STA&B3: INC&B4: LDA&B4: CMP#10: BNE show: LDA#Ø: STA&B4: INC&B5

572.show LDA#31:JSR&FFEE:LDA#8:JSR&FFEE:LDA#28:JSR&F FEE:LDY#3:.zz2 CLC:LDA&B@,Y:ADC#48:JSR&FFEE:DEY:CPY#&F F: BNEzz2:RTS

5801: NEXT

581PRINTTAB(0,15); "Well you'll just have to do witho the title page won't you"
59@PRINT''':CHAIN""

```
350DEFPROCDEAD: FORT=0T0200STEP10: FORG=0T050: NEXT: VDU
 (continued from previous page)
                                                                                      19,0,1;0;:FORG=0T050:NEXT:VDU19,0,0;0::SOUND&11,1,255-
 Listing 3.
                                                                                      T,3:NEXT
      IVDU23,142,84,84,131,128,128,135,136,240,23,143,0,
                                                                                         3601ives%=lives%-1:ENDPROC
170023,142,84,84,131,128,135,136,240,23,143,0,

0,128,126,1,1,129,126,23,144,84,84,84,84,84,84,84,84,84

2ENVELOPE7,1,1,-1,-1,1,2,1,126,0,0,-126,126,126

10DATA192,0,240,0,48,0,0,0,0,0,2,192,0,48,0,12,0,

19,143,192,0,0,0,0,76,0,3,64,0,192,1,48,124,0,0,0,0,4,

200,0,48,0,76,0,3,0,209,1,52,64,13,16
                                                                                         370*FX15.1
                                                                                         371*FX13,4
                                                                                         372*FX21.5
                                                                                         379PROCRIPOFF .
                                                                                         38ØG0T021Ø
20DATA0,0,0,0,0,0,0,0,0,63,255,192,0,0,0,0,0,1,0,0,63,255,192,0,0,0,0,0,128,0,0,0,3,255,252,0,0,0,0,0,0,16,
                                                                                         390DEFFROCREAS: IF 787946 A=A+10: IF A=160 A=10
                                                                                         400RESTOREA: X%=1: Y%=1: FORT%=0T053: A%=128: READD: FORH%
                                                                                      =ØTO7:IF (D AND A%)=A% THEN PRINTTAB(X%,Y%);CHR#128;
41@X%=X%+1:IF X%=19 X%=1:Y%=Y%+1
 0,3,255,252,0,0,0,0,0,0,0,0,0,0
     30DATA0,0,0,0,0,0,0,0,255,255,0,0,64,0,0,0,0,0,0,0,122
 35,96,0,0,0,0,0,0,218,0,0,64,0,11,176,0,0,0,0,0,0,16,0
                                                                                         420A%=(A%/2):NEXT,:B=(A/10):COLOUR2:COLOUR128:RESTOR
                                                                                     E430: FORT=1TOB: READX, Y: NEXT: PRINTTAB(X,Y); CHR$129: 2878
 ,0,46,250,16,0,8,0,0,0,0,0,0,0
 40DATA0,0,0,0,0,0,3,0,0,28,62,0,0,0,0,0,4,0,0,0,0,0,0,0,0,127,12,64,64,16,16,12,6,1,1,0,96,64,48,20,4,4,1,65,32,192,64,16,17,4,132,1,1,1,66,64
                                                                                      =X: 787D=Y: ENDPROC
                                                                                        430DATAB, 3, 4, 1, 4, 1, 10, 22, 6, 1, 9, 2, 9, 4, 9, 3, 15, 11, 1, 7, 3
                                                                                         ,2,2,3,1,1.10,18,4
                                                                                        440DATA1,10,17,10,2,10,2.10,16,17,16,2,16,2
450DATA5,6,17,6,4,6,2,1,16,14,16,2,16,2
    50DATA0,0,0,0,0,0,0,0,0,29,238,192,0,0,0,4,0,0,0,0,
55,123,128,0,2,0,0,0,0,0,0,13,222,224,0,0,0,0,0,0,16,0,0,238,236,18,162,4,228,193,40,160,202,236
                                                                                        460DATA6,5,6,21,6,6,8,10,10,10.21,10.6,8
60DATA0,0,0,0,0,0,0,0,0,0,0,0,112,0,34,0,16,64,8,13
6,2,114,1,62,64,159,200,47,250,25,252,130,127,32,146,7
6,39,242,25,252,130,107,32,159,201,99,226,8,136,130,28
                                                                                        470DATA11,15,11,22,11,15,8,18,12,18,22,18,13,8
480DATA6,8,16,8,7,8,2,10,17,16,17,3,17,2
                                                                                        490DATA1,3,17,3,2,3,2,18,5,18,17,18,6,8
 ,33,130.8
                                                                                         500DATA1,5,16,5,2,5,2,18,9,18,22,18,10,8
 70DATA0,0,0,10,68,184,0,0,0,0,64,0,15,204,240,0,0,0,0,0,120,0,63,0,25,224,14,124,1,255,0,31,224,1,248,0,62,0,31,128,31,224,31,244,15,252,1,254,2,63,0,7,128
                                                                                        510DATA4,4,14,4,4,4,2,17,10,17,22,17,11,8
520DATA2,10,2,22,2,11,8,18,10,18,18,18,11,8
                                                                                         530DATA3,8,13,8,4,8,2,1,13,15,13,2,13,2
                                                                                        540DATA13,15,13,19,13,13,8,18,12,18,22,18,13,8
550DATA1,14,10,14,1,14,2,2,9,10,9,2,9,2
560DATA1,10,14,10,2,10,2,9,14,9,22,9,15,8
    BØDATAØ,0,0,0,0,0,0,0,0,64,1,0,0,1,73,64,7,0,3,224
1,248,0,127,0,22,192,4,144,1,36,1,127,64,95,208,23,244,13,253,130,127,32,159,200,39,243,17,84,68,85,0,0,0
                                                                                     570DATA1,11,14,11,2,11,2,3,15,14,15,4,15,2

580DATA1,71,14,11,2,11,2,3,15,14,15,4,15,2

580DATA7,7,7,15,7,8,8,4,23,16,23,5,23,2

590DEFPROCEN:B=(A/10):IF (B MOD 5)=1 E=1:F=2:AS=130:

BS=131 ELSE IF (B MOD 5)=2 E=2:F=2:AS=132:BS=133 ELSE

IF (B MOD 5)=3 E=3:F=3:AS=134:BS=135 ELSE IF (B MOD 5)
 90DATA0,0,0,0,0,0,0,0,128,10,32,7,248,0,170,0,2,128,0,128,7,255,1,132,64,80,144,18,20,4,67,129,8,64,97,16,20,39,4,133,1,16,192,66,16,31,252,193,4,0,65,0,56,224
   100DATA0,0,0,0,4,0,0,0,0,6,128,0,45,128,0,0,0,10,0,0
,0,0,13,202,104,0,0,0,0,0,0,16,0,0,255,252,31,254,3,25
5,0,127,128,15,195,195,240,0,0,2,0,0,0,0
110DATA0,16,0,4,0,1,0,192,64,0,16,0,4,0,1,0,224,64,6
                                                                                       4 E=3:F=3:AS=136:BS=137
                                                                                        6001F (B MOD 5)=0 E=1:F=1:AS=138:BS=139
                                                                                        610ENDPROC
,16,0,4,0,1,2,3,64,0,16,0,4,1,153,0,0,0,192,0,0,0,0,0,0,0,0,0,0,57,254,0,127,128,31,224,7,248
120DATA0,0,0,0,0,0,0,0,0,0,0,0,63,192,0,3,128,0,128,0,
                                                                                        620MODE4: VDU23, 1, 0; 0; 0; 0; : A$="CHARLIE CHAN": B$="VISI
                                                                                     TS":C$="THE WOCK FACTORY":DIMB$(5):RESTORE790:FORT=1TO
                                                                                     5: B$(T)=".....": READG$: B$(T)=B$(T)+G$: NEXT
32,32,8,0,2,112,255,128,0,32,64,8,0,2,0,1,134,0,32,0,9
                                                                                        63@FORT%=1TOLENA$:G=ASC(MID$(A$,T%,1)):PROCDBL(G):PR
 ,143,242,0,0,128,0,32,0,14,8,2,0,0,128
130DATA0,0,0,0,0,0,0,0,63,255,192,0,0,0,0,0,0,224,
                                                                                      INTTAB (T%+13,10); CHR$140TAB (T%+13,11); CHR$141: NEXT
                                                                                      640FORT%=1TOLENB$:G=ASC(MID$(B$,T%,1)):PROCDBL(G):PR
INTTAB(T%+16,13);CHR$140TAB(T%+16,14);CHR$141:NEXT
   64,0,16,0,0,0,0,3,254,0,0,0,0,0,64,0,0,0,0,0,4,0,32,
128,16,16,8,4,2,0,129,0,63,192
140DATA127,255,159,255,231,255,248,255,252,31,254,3,
                                                                                     65ØFORT%=1TOLENC$:G=ASC(MID$(C$,T%,1)):PROCDBL(G):PR
INTTAB(T%+11,16);CHR$14ØTAB(T%+11,17);CHR$141:NEXT
66@VDU19,0,1;0;:FORG=ØTO500:NEXT:VDU19,1,0;0;:FORT%=
 255,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,63,255,144,0,0,0,1
,0,0,0,0,0,0,0,255,255,0,0,8,0,0,0,0,0,0
150DATA0,0,29,221,133,84,65,84,152,85,20,21,221,128,
0,0,0,1,0,0,192,0,240,0,124,0,63,0,31,192,15,240,7,252
                                                                                     ØTO8:FRINTTAB(19,31):SOUND&11,2,T%*25,4:FORG=ØTO3Ø:NEX
T.:PRINTTAB(0,10):ST&ING*(40,"_")
                                                                                        670PRINTTAB(12,13); "Do Battle With:-"
                                                                                     680PRINTTAB(1,15); CHR$130TAB(1,16); CHR$131TAB(1,18); CHR$132TAB(1,19) CHR$133TAB(1,21); CHR$134TAB(1,22); CHR$
  3,255,3,255,193,255,240,255,156,127,195,0,0,16,0,0,0,
   160DATAEntrance, The Steps!, Mess, The Safe, His Name, Mr
                                                                                      135TAB(1,24); CHR$136TAB(1,25); CHR$137TAB(1,27); CHR$138
Woo,Gobble Gobble,Ghosty,Sales Rooms,THE GREAT WOCK,Divide,Blob,Empty Wock,The Press,ROUISE 170DATA&11,0,1,0,10,0,10,0
                                                                                     TAB(1,28); CHR$139
                                                                                        690GG%=1:FORT%=16TO28STEP3:FORG%=1TOLENB$(GG%):PRINT
                                                                                     TAB(G%+3,T%):MID*(B$(GG%),G%,1);:PROCsound:FORG=@TO60:
   180DATA%11,0,2,0,2,0,1,0
190MODE4:DIMA*(15):RESTORE160:FORT%=1T015:READA*(T%)
                                                                                     NEXT,: GG%=GG%+1: FORG=ØT0100: NEXT
                                                                                        700FORG=0T05000:NEXT:VDU17.129.28.0.31.39.11.12.26.1
 :NEXT:CLS:PRINT'''SPC(2); "WOULD YOU LIKE INSTRUCTIONS
 (Y/N)?
                                                                                        710PRINTTAB(0,12); "You (Charlie Chan) must go around
   191A$=GET$: IF A$<>"Y" AND A$<>"N" THEN 191 ELSE IF A
                                                                                     the deserted wock factorying to collect somewocks to cook your tea with. However the prementioned nasties
                                                                                     hinder you progressas much as they can."
720PRINT''"On each of the 15 screens there will be a wock to collect and the exit will not be opened until
   200DEFPROCWALL: COLOUR131: COLOUR1: FORT%=1T024: PRINTTA
B(0,T%);CHR$128;TAB(19,T%);CHR$128;:NEXT:PRINTTAB(0,T%);STRING$(20,CHR$128);:ENDPROC
                                                                                       you have collected it. You have three lives and loos
one if you drop too far or get hit."
730PRINT''THE KEYS ARE:-"'Z - LEFT
   210FORT=0T05: T7&B0=0:NEXT: A=0:lives%=3:7&79=A:MODE5:
                                                                                     e one if
VDU23,1,0:0:0:0:0:
   230*FX15,1
                                                                                              X - RIGHT"
   240PROCWALL: COLOUR128: COLOUR3: PRINTTAB(0,30) "PRESS S
PACE TO START":
                                                                                        740PRINT"
                                                                                                                          shift - JUMP
   250A$=GET$: IF A$<>" " THEN 250
                                                                                        750FORG=0T015000:NEXT:VDU19,0,0;0;19,1,6;0;:PRINTTAB
                                                                                     (4,30); "BE VELY PLEASED IF HONORABLE SIR"; TAB(12,31); PLESS SPACE BAR!";
   2517&953=0:PRINTTAB(2,26) "KRAFTWERK (Y/N)?": A$=GET$:
IF A$<>"N" AND A$<>"Y" THEN 251 ELSE IF A$="N" THEN 25
                                                                                        760A$=GET$: IF A$<>" " THEN 760
                                                                                         770CLS:60T0210
   2527&953=&FF: 7&950=20: 7&951=0: 7&220=&6A: 7&221=&40: SO
UND1,-15,40,15
253*FX14,4
                                                                                        78ØDEFPROCDBL(G): ?&7Ø=G: A%=1Ø: X%=&7Ø: Y%=Ø: CALL&FFF1:
                                                                                     VDU23,140,7&71,7&71,7&72,7&72,7&73,7&73,7&74,7&74,23,1
41,7&75,7&75,7&76,7&76,7&77,7&77,7&78,7&78:ENDPROC
790DATACONAN THE BALL BEARING, Hammy Burger, WALLY WAT
   254PRINTTAB(2,26); SPC(16)
   26@PRINTTAB(@,3@);SPC(2@);:COLOUR1:COLOUR131:PROCREA
                                                                                     CH. Henry Head Cleaner, KEVIN QUICKSHOT
                                                                                     800DEFPROCRIPOFF:FORT=1T03:VDU19,T,0;0;:NEXT:CLS:COL
OUR131:COLOUR1:FORT%=20T030:PRINTTAB(8,T%)CHR$128;CHR$
   270PROCEN: COLOURE: PRINTTAB (0,26); CHR$ (AS) TAB (19,26);
CHR$ (AS+15): COLOURF: PRINTTAB (0,27); CHR$ (BS) TAB (19,27);
CHR$ (BS+15):
                                                                                     128; CHR$128; CHR$128; NEXT
   280B=(A/10):COLOUR128:COLOUR3:PRINTTAB(0,29); "SHEET:
                                                                                        810FORT%=0TO2:FORG%=0TO31:G%?(&6DD0+(T%*320))=G%?(J%
 ;B; TAB((20-(LENA$(B)))/2,26); A$(B); TAB(13,29); "LIVES:
                                                                                       (32*T%)): NEXT
";lives%
                                                                                        820COLOUR128:COLOUR3:A$=" "+CHR$144+" "+CHR$8+CHR$8+
   300B=430+A: RESTOREB: FORT=0TO6: READD: T?&D60=D: NEXT: FO
                                                                                     CHR$8+CHR$10+" "+CHR$142+CHR$143+"
                                                                                        821VDU19,1,1;0;19,2,3;0;19,3,7;0;
830FORT%=0T018:PRINTTAB(8,T%);A$;
RT=ØTO6: READD: T?&D7Ø=D: NEXT
   310COLOUR128: CALLM%: PRINTTAB(0,26): SPC(20) TAB(0,27):
SPC (20)
                                                                                        840SOUND&11,7,255-(T%*14),2:FORG=0TO60:NEXT,
   320IF ?&79>8 THEN PROCDEAD
                                                                                        870FORG=0T01000:NEXT:CLS:ENDPROC
   330IF lives%=-1 THEN 370
                                                                                        999END
   340COLOUR131:COLOUR1:FORT%=21T024:PRINTTAB(19,T%);CH
                                                                                       1020DEFPROCSOUND: SOUND&11,1,T*25,1:FORG=0T050:NEXT:EN
R$128;:NEXT:VDU28,1,24,18,1,17,128:FORT%=1T025:PRINTTA
B(0,0); CHR$11;: NEXT: VDU26
                                                                                       1080DEFPROCsound: SOUND&11.1.255.1: ENDPROC
   34160T0260
```



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COMMUNICATIONS

SOFTWARE

	APPLE	APRICOT	ATARI
FEATURES OF BASIC SYSTEM	MACINTOSH	F10	0208T
Price Includes B/W Monitor	YES	NO - extra £200	YES
Keyboard size mm (LxDxH)	330×147×50	450×167×28	470x240x60
Keyboard size ins (LxDxH)	13x5\\x2	1715×615×1	1815×916×216
3½" D/Drive (Unformatted)	500K	500K	500K
31/2" D/Drive (Formatted)	399K	315K	349K
WIMP (Window, Icon, Mouse)	Apple	ACT - Activity	GEM
Real-time Clock	YES	YES	YES
Polyphonic Sound Generator	YES	NO	YES
RS232 Serial Port	YES	YES	YES
Centronics Parallel Printer Port	NO	YES	YES
Dedicated Floppy Disk Controller	NO	YES	YES
Hard Disk DMA Interface	NO	YES	YES
Full stroke keyboard	YES	YES	YES
Number of keys on keyboard	59	92	95
Numeric Keypad	NO	YES (16 Keys)	YES (18 keys)
Cursor Control Keypad	NO	YES	YES
Function keys	NO	10	10
16-bit processor	68000	Intel 8056	68000
Processor running speed	BMHz	4.77MHz	BMHz
RAM size	512K	256K	512K
Number of graphics modes	1	4	3
Number of colours	Monochrome	16	512
Max Screen Resolution (pixels)	512 x 342	640 x 256	640 x 400
Mouse included	Single Button	NO - extra £95	Two Button
Replaceable External Power Pack	NO	NO	YES
Cartridge Socket	NO	NO	YES
Joystick Ports	NO	NO	YES (two)
MIDI Synthesiser Interface	NO	NO	YES
Monitor Size	9.	9" - extra £200	12"
RGB Video Output	NO	YES	YES

System Cost with: Mouse - Monochrome Monitor - 512K RAM - 500K Disk Drive						
Price of basic system (exc VAT)	£2595+VAT	£595+VAT	£652-YAT			
* Mouse	Included	£95+VAT	Included			
Monochrome Monitor	Included	£200+VAT	Included			
+ Expansion to 512K RAM	Included	£295+VAT	Included			
Price of complete system (exc VAT)	£2595+VAT	£1185+VAT	£652+VAT			

PRICE rounded down £2.984 £1.362 £749

THE NEW ATARI 520ST

HE NEW ATAMI SZUS

Ider the new leadership of Jack Tramiel (former boss and founder of siness Machines). Atari Corporation have marked their entry into siness/personal computers with a machine which leaves the competition ameli's slogan 'Power Without the Price' has been implemented in the the new 512K Atari 520ST colour computer which offers the uper am iformance at an incredibly low price. Launched as a work-station, this corporates seven software packages as well as the 520ST computer with ouse controller, high resolution monochrome monitor (640x400), 95 is ith 18 key numeric keypad), MIDI Interface, GEM and a 500K 3½ inch in the package price of only £651.30 (*VAT * £749). Dubbed the Map to ackintosh' (after Atari's Chief, Jack Tramiel), Atari's new machine has impaired with the Apple Macintosh RRP £2595 (*VAT * £298) which is a much higher price. Favourably reviews

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ON THE NEW ATARI 520ST COMPUTER

Mr/Mrs/Ms:	Initials:	Sumame:

	*	
Address:	***************************************	



Listing 1.

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Listing 1.

10 MEMORY 29223

20 CLS PRINT*PLEASE WAIT. LORDING BYTES!"

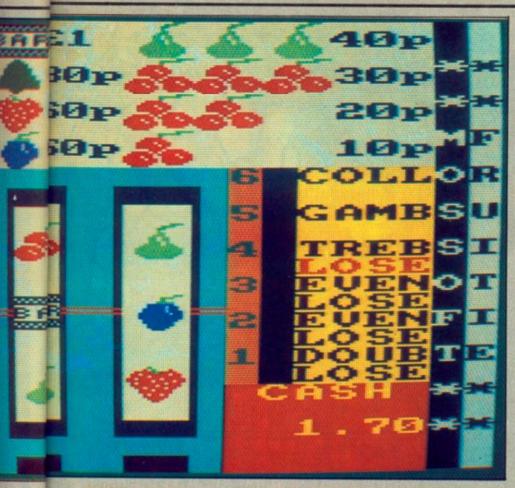
30 LORD*!"

50 RM*DOMIZE TIME

60 ON ERROR GOTO 1600

70 ELW 1.1.15.1.14-1.5.5.0.1

80 LIM GRO : GGR (3) "TREB" (GR (2) = "LOSE" (GR (3) = "EVEN" (GR (4) = GR (2) ) GR (5) = GR (3) \ GR (6) \ GR (2) \ GR (7) = DOUB* (GR (8) = GR (2) = "LOSE" (GR (3) = "EVEN" (GR (4) = GR (2) ) GR (5) = GR (3) \ GR (6) \ GR (2) \ GR (7) = DOUB* (GR (8) = GR (2) = "LOSE" (GR (3) = "EVEN" (GR (4) = GR (2) ) GR (5) = GR (3) \ GR (6) \ GR (2) \ GR (7) = DOUB* (GR (8) = GR (2) = "LOSE" (GR (3) = "EVEN" (GR (4) = GR (2) ) GR (6) \ GR (2) \ GR (7) = DOUB* (GR (4) = GR (2) ) GR (10) \ GR (10) = ZB = "CPS, PECKPE (143) + CHRR (1
270 HAMBO
280 IF RND)0.7 AND POF=0 THEN GOSUB 620
290 IF RND)0.3 THEN HHHI SOUND 1.30.0.0.1
300 GOTO 160
310 "***** PPYOUT *****
320 LOCATE 1.1
330 POS=****
320 LOCATE 1.1
330 POS=****
320 LOCATE 1.1
340 IF POS=****
250 LOCATE 1.1
340 IF POS=****
250 LOCATE 1.1
340 IF POS=****
250 LOCATE 1.1
340 IF POS=***
250 IF POS=**
250 IF POS=*
          640 PRINTMS." NUDGE NON";
650 WHILE NUVO AND POP=0
660 WHILE NUXO AND POP=0
660 WHILE INKEY(%)-" HEND
670 IF INKEY(65)-" THEN A=1 B=0 C=0:GOTO 710
680 IF INKEY(65)-1 THEN A=0:B=1:C=0:GOTO 710
690 IF INKEY(65)-1 THEN A=0:B=1 C=0:GOTO 710
700 GOTO 660
710 SOUND 1,30.5:GOSUB 900
720 IF NUVO THEN LOCATE#4.1,13-(NUM2):PRINT#4,1
          690 IF INKEY(57)()-1 THEN A=0:8=0:C=1:GOTO 710
700 GOTO 660
710 SOUND 1,30.5:GOSUB 900
720 IF NU:0 THEN LOCATEM4,1,13-(NU#2):PRINT#4,USING*#":NU)
730 NU=NU-1
740 NU=NU-1
740 NU=NU-1
750 LOCATEM4,1,1:PENM4,7:PRINT#4,"6 5 4 3 2 1 ")
760 CLS#5
770 RETURN
780 ""***** HOLLD ******
790 FOR V=1 TO 3:PENM4,3:PAPER#4,15:CLS#V:NEXT
800 LOCATE 1,9:PEN 3:PAPER 1:PRINT" HOLD ")
```





M K Mostowyj and his Amstrad turn you into a slavering degenerate gambler with a colourful print machine simulation.

Table 1.

Keys

These are used to control holds and nudges for the three reels. When used for holds the keys work on a toggle on/off basis, so if you accidentally hold the wrong reel, press the same key and it will be released.

Space This starts the reels spinning assuming you still have money. C:G Used to choose either Collect or

Gamble when you have a winning line.

Large If gamble is chosen this key is used to stop the flashing symbols on either Even, Doub, Treb or Lose. Your winnings are then adjusted accordingly.

FRUITIE IS A simulation of a penny arcade fruit machine. It includes all the usual features such as hold, nudge, gamble etc. The program is in two parts. Listing 1 is the Basic program that controls the above features plus pay-outs etc. Listing 2 is slightly over 2K in length but in fact pokes over 10K of data into memory. This data includes 9.9K for the reel graphics - 3.3K for each reel - and 353 bytes of machine code that are used to spin the reels and print the payout lines at the top of the screen.

Although listing 2 is discarded once it has poked the relevant data, it would be wise to save it on a separate tape in case of any mistakes you may make when entering the data lines. To get the program running is very simple, first of all enter listing 1 and save it to tape.

Do not run it at this stage as the machine code

calls within it may cause the computer to crash. Secondly, enter listing 2 and, after saving it on a separate tape in case of mistakes, run it. If all is well, after a short delay the reel symbols should start appearing one by one in the top left corner of the screen.

After 39 of these have appeared and have been poked into memory, the data for the machine code is poked in, the screen will then clear and the save message will appear. The two sections of memory that are about to be saved should be saved directly after listing 1, so make sure the tape is wound to the correct position before inserting it and proceeding to save the bytes.

Once this is completed reset the computer, rewind the tape and run it. If all is well listing I should auto load the other two parts.

10 SYMBOL AFTER 224-DIM a(8) FOR v=224 TO 253 FOR u=1 TO 8
20 REPD x8 a(u)=VPL("%"*ovs) NEXT
20 SYMBOL v.a(1),a(2),a(3),a(4),a(5),a(6),a(7),a(8) NEXT
20 SYMBOL v.a(1),a(2),a(3),a(4),a(5),a(6),a(7),a(8) NEXT
20 SYMBOL v.a(1),a(2),a(3),a(4),a(5),a(6),a(6),a(7),a(8) NEXT
20 SYMBOL v.a(1),a(2),a(3),a(4),a(5),a(6),a(6),a(8),NEXT
20 FOR v=1 TO 39 REPD a ON a GOSUB 120,140,160,180,200,220 NEXT
20 FOR v=1 TO 39 REPD a ON a GOSUB 120,140,160,180,200,220 NEXT

E 1 PEN 1 a=40000 TO 40352 PERO 55 POKE a.VAL("%"+55) NEXT E "CODE", b.29232,9904 SRVE "'CODE1", b.40000,353

END | 2=LC0000 | x=z | FOR | a=1 | TO | 4 | FOR | b=1 | TO | 8 | FOR | c=1 | TO | 8 | |
3 | POKE | des. | PEEK(|z|) | z=z+1 | des=des+1 | NEXT | z=z+2040 | MEXT | z=x+80 | x=z | NEXT | RETURN |
3 | CLS | PEN | 9 | LOCATE | 1,2 | PRINT | CHR\$(226) | CHR\$(227) | CHR\$(228) | CHR\$(229) |
6 | GOSUB | 100 | RETURN | 2 | PRINT | CHR\$(230) | CHR\$(231) | CHR\$(232) | CHR\$(233) | LOCATE | 2 | PEN | 3 | LOCATE | 1,2 | PRINT | CHR\$(235) | CHR\$(236) | CHR\$(237) | CHR\$(238) |
6 | GOSUB | 100 | RETURN | 2 | PRINT | CHR\$(235) | CHR\$(236) | CHR\$(237) | CHR\$(238) |

PEN 12 PRINT CHR#(234))
GOSUB 100 RETURN
CLS:PEN 5 LOCATE
1,2 PRINT CHR#(235);CHR#(236);CHR#(237);CHR#(238))
GOSUB 100 RETURN
CLS:PEN 3 LOCATE
1,2 PRINT CHR#(239);CHR#(240);CHR#(241);CHR#(242):PEN 12:L
GOSUB 100 RETURN
3 CLS:PEN 6 LOCATE
1,2 PRINT CHR#(225))
GOSUB 100 RETURN
3 CLS:PEN 6 LOCATE
1,2 PRINT CHR#(244);CHR#(245);CHR#(246);CHR#(247);PEN 12:L
GOSUB 100 RETURN
0 CLS:PEN 13:LOCATE
1,2 PRINT CHR#(249);CHR#(250);CHR#(251);CHR#(252);PEN 12:L
GOSUB 100 RETURN
0 CLS:PEN 13:LOCATE
1,2 PRINT CHR#(249);CHR#(250);CHR#(251);CHR#(252);:PEN 12:CHR#(250);C

288 CATA FF,55,AA,FF,00,E1,92,E3,FF,55,AA,FF,00,8E,49,CE,92,E2,00,FF,55,AA,FF,00 290 DATA 49,49,00,FF,55,AA,FF,00,00,04,1E,37,30,6F,7E,2F,00,10,78,EC,FC,BE,F6,DC 22.68.90.06.10.05.01 DRTR 08.00.28.66.90.ED.58.68.9D.D5.ED.B0.22.66.90.E1.01.00.08.09.30.04.01.50 09.22.68.90.01.10.DE.09

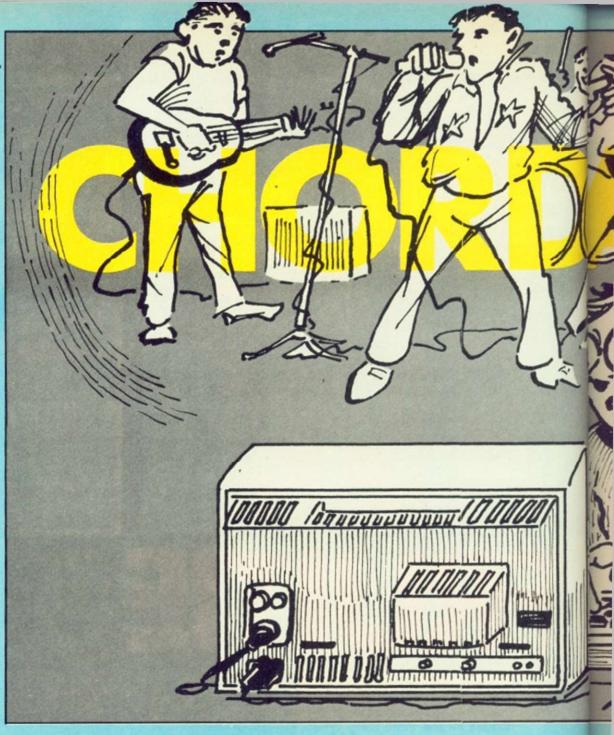
THE CHORD symbol system, along with the rest of music notation, has archaic origins, and has evolved to its present day state. The result is a system that, although reasonably consistent, is cluttered, widely misinterpreted and full of conventions, i.e., rules having little logical basis and so only learnable by experience.

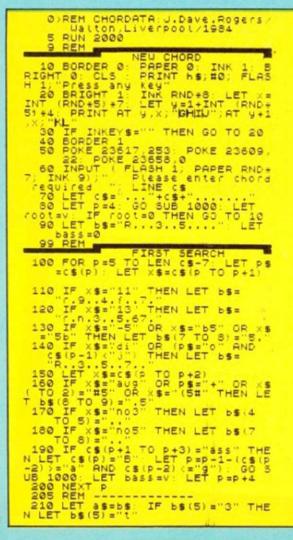
However, like the English language — and Basic? — at least it has the advantage of having settled down into an established standard, agreed on by almost all; even a 1930's jazz musician could follow most of what's printed on a modern Casiotones chord buttons! This program boils chord structure for guitarists down into a very easy to use expert system.

It accepts any chord name typed in simply as read from sheet music, and takes into account all recognised variants by which chords are known — but if you type in rubbish don't blame me for the results! Unlike chord books or simple chord programs, which store a few standard chord shapes, Chordata scratch builds each chord you ask it.

This makes it extremely flexible and able to work out virtually any chord, of any type, whether old, contemporary or yet to be fashionable, in any key, at any fret position, and also for any tuning of any stringed instrument; a total of many thousands of chords. Although it works from theory it also weeds out what experience tells me are impractical combinations of notes e.g., an eleventh chord technically includes a third as well as a fourth, but the third is omitted in practice.

Eventually — well, six seconds — you are given a simple display of the guitar neck, showing finger positions as you would see them if playing your guitar in front of a mirror. Some people prefer the more conventional — but illogical — view with treble strings uppermost, so I have included a control to flip between





```
410 IF a$(10 TO 11) = "67" THEN L
ET a$(10 TO 11) = "65": LET b$(10 TO 11) = "57" LET b$(110 TO 11) = "57" LET b$(110 TO 11) = "70" LET b$(110 TO 110 TO 11
```



Find that chord with the push of a button. J. Dave Rogers and a ZX-81 explain how to fret without worrying.

either view. Keys Z and X let you scan up and down the neck to see different frets. The neck display is held in an array - GS - using one character string per guitar 'string'. Several UDG's are used for the frets and thick/thin strings. For beginners, a simplifier can be selected which shows chords as small, easy-tograsp shapes to play.

For more advanced players the simplifier can be switched off so that a greater length of the fretboard can be seen at one time. This mode shows not only all the notes usable for a given chord but also their scale relationships e.g. root, third, ninth, etc, which is useful for learning about harmony and the anatomy of chords, or as an aid to composing solo runs - or bass guitar runs - to fit in with a given chord sequence.

As far as fingering the chords is concerned, an obvious shape will usually suggest itself. The more complex types of chords however can have several alternative ways of being played. There may even be two notes indicated on the same string within a few frets of each other and they obviously can't both be played, even though they are all legitimate notes for that chord.

So, to help sort out which to choose I have made 'top priority' notes appear in capitals, with less important or optional notes in lower case letters. Although all the 'standard' chord shapes can be seen, the program can also throw up, if you'll pardon the expression, less common ways of playing chords.

Don't be conservative, try them all, see which you prefer - you've nothing to lose but your fingernails - and remember that each inversion may be just what's needed to suit a particular piece of music rather than the others.

Also, carefully chosen parts of a chord residues - can sound just as strong as a huge six-string-five-fret-wrist-wrecker, especially when playing in combination with other instruments - or a good echo-chorus unit!

There now follows a potted chord theory: A chord symbol such as E means the basic chord of E major, which consists of the first - root, third and fifth steps of the rising major scale of, in this case, E - and their octaves. Minor, sus 4, augmented and flattened fifth chords are formed by altering - raising or lowering - the third or the fifth.

Added notes can then include the sixth, various sevenths, ninths, and so on, in any combination. The added notes generally sound better if confined to the higher-pitched strings, so the program indicates this automatically. In fact, if a seventh or other added note is required as a bass note than it can be written not as a seventh but as 'chord over bass note' e.g. D/C, and this notation is allowed for in the program.

It became more common as the main system failed to conveniently describe some contemporary chords, e.g. if the chord A/D had to be named with D as its root - but still as exactly the same notes - it would be called D maj 7/9/no 3rd. The newer notation is more descriptively accurate, yet short to write and quick to understand (like good computer language should be!).

If typing errors are made when entering games programs then something obvious will usually happen - or at least fail to happen but with a utility/educational program, such as this one, errors may give you an apparently (continued on next page)

```
780 PRINT AT 9,21," and M";TAB
20; "main finger";TAB 20; "positi
ns";TAB 21;"( = coot) ";AT 14,19;
N Play if no";TAB 20; "alternati
e";AT 17,19; "Do not play";TAB 1
; "open strings";TAB 19; "unless=
"; AT 20,0;"

810 LET x=6 AND simp: LET a=
fr+31-(14 AND simp=2)
820 PRINT PAPER 8; AT 21,6;"
; FLASH 1; AT 21,6; (fr+2)/4
830 PRINT AT 8,0
840 FOR s=1 TO 5: IF view THEN
FOR s=6 TO 2 STEP -1
850 PRINT 9$(s+x,fr TO a): PRIN
e$(fr TO a)
860 NEXT s
870 PRINT 9$(s+x,fr TO a)
890 REM
870 PRINT 9$(s+x, (r TO a))
890 REM

USER CONTROLS
900 IF play THEN FOR n=1 TO pa:
BEEP .02+simp/8,p(n): IF INKEY$
="" THEN NEXT n: GO TO 900
910 LET k$=INKEY$
915 POKE 22539+RND*7,8*INT (PEE
(22539/8)+1+RND*5
920 IF k$="" THEN GO TO 910
930 IF k$="" THEN LET play=NOT
play
940 IF k$="" THEN LET play=NOT
play
940 IF k$-"0" RND k$<="9" THEN
LET col=CODE k$-48: GO TO 700
950 IF k$="n" THEN GO TO 10
960 IF k$-"a" AND K$(="9" THEN
970 IF K$="v" THEN LET view=NOT
view
  980 IF ks="s" THEN LET simp=UAL "201"(1+simp): GO TO 750
```

```
"990 LET fr=fr+(4 AND ks="x" AND fr>4)
fr (45)-(4 AND ks="z" AND fr>4)
991 IF ksx>"t" THEN GO TO 800
992 REM ---OPTIONAL-RETUNER---
993 CLS: PRINT , " Enter tunin g required for six strings, bass string first, using this exact form:e.g.", " id:a:e:a:b:e:", "
(example is Jdr's D6/9 tuning)"
,"OR:Enter n to return to norm
          994 INPUT LINE T$: CLS : IF LEN
T$>12 THEN 30 TO 4020
995 IF T$=""" THEN RUN
995 GO TO 992
000 REM
2000 REM

2010 PRINT "Please wait"
2020 LET f=0: LET s=0: DIM g$(12): DIM n(6,20): DIM a$(12): DIM b$(12): DIM j$(12): LET fr=2: LET x$="": LET col=6: LET simp 2030 LET v$="" DDDE"
2030 LET v$=" DDDE"
2040 LET v$=" DDDE"
2050 LET v$=" DDDE"
2050 LET v$=" DDDE"
2070 LET v$=" DDDE"
2070 LET v$=v$+"DDDF"
2090 LET v$=v$+"DDDF"
2090 LET c$=c$+"
2100: NEXT n
2110 LET c$(52) =":"
2120 LET h$=h$+h$: IF LEN h$
```

```
2150 IF LEN (as+bs+js+xs+9s(12)+
Us+Vs+es+hs)(>1076 THEN PRINT "E
RROR in lines 2000 to 2150",,,jdr
  3030 DATA 24,60,110,235,215,118,60,24,0,0,16,84,255,84,16,0,74,4 6,68,97,118,101,46,82,111,103,10 1,114,115 3040 FOR n=USR "a" TO USR "p"
1,114,115
3040 FOR n=USR "a" TO USR "P"
3050 READ f: POKE n,f: LET s=s+f
3060 NEXT n
3070 IF s+n<>76042 THEN PRINT "e
cror in data",jdr
from in data", jdr

4000 REM --TUNE-UP-NOTES-ARRAY--
4010 LET t$="':e:a:d:g:b:e:"
4020 LET c$=t$: LET p=2
4030 FOR s=1 TO 6
4040 GO SUB 1000
4050 FOR f=1 TO 20: LET n(s,f)=
v: LET v=(v AND v(12)+1: NEXT f
4060 LET p=p+2
4070 NEXT s
4080 PRINT AT 20.0; "test chord"
LET c$="dmaj7/9/f#bass": LET
simp=2: GO TO 70
4090 GO TO 10
9996: REM
POKE UDG'S TO LETTERS
UITH A "STRIPE" FOR LISTING
9997/LET ad=15880: FOR n=USR "a"
TO USR "P": POKE n, PEEK ad+128:
LET ad=ad+1: NEXT n
9998 REM Thanks to:Els+Les(tea+
typing)
999 POKE 23693,56: CLS: BORDER
7: PRINT "instant normality": L
IST 363
```

Table	1.		dimensioned even when already	3070	Checksum for UDG data.
Spec	trum-specified Pokes etc.	500/52	set up. 20 The first or the second of the	9997	Reads character bit-patterns from the Rom and Pokes them into the
0	A zero line is obtained by the direct command: Poke 23756,0.		characters in quotes is sliced out depending on whether b\$(n) is an		UDG's, but by adding 128 a 'stripe' is added down one side to high-
10	h\$ is a screen-sized string used as a 'backdrop'.	-4	upper-case or lower-case character.		light the UDGs in the listing. Adding 129 would give a stripe on
50	The first Poke changes the Input- cursor character, the second Poke	710	Border colours are sliced directly out of a string using 'Val'.		the other side as well.
	makes the Spectrum's key-beep more audible and the third Poke switches Caps-shift off.	720	Using one big string takes less memory and prints faster than if using lots of separate 'Print At's.		B r Root note of chord B Bass (if altered root) 3 t Third (minor or major)
60	'Line' allows string input without the quotes being shown.	840	If 'view' equals one then the second version of the For-Next		5 f Fifth (flattened, perfect or augmented)
395	Performs a CLS on the bottom two lines only, #0 Prints to the bottom of the screen.		loop is set up and the one that was first set up is ignored. Not recommended on non-Sinclair		7 s Seventh (diminished, dominant or major) 6 s Sixth
450	use of boolean logic with b\$ allows a 'complete algorithm within a line'. Use of 'lf's would have caused the rest of the line to	915	machines! Pokes the attributes file to flash random INK colours only. The bits that are significant for Paper/		 9 n Ninth (flattened, dominant or sharpened) 4 u Fourth (suspended or eleventh)
	be ignored if a condition was false.		Flash/Bright are masked off by the function 8* INT (Peek/8).	If a main	If an optional
560	Sinclair arrays can be re-	2150	Checksum for strings.	note.	note.

(continued from previous page)

working program but one that spouts a load of misleading rubbish. I made up the (rather unlikely) 'test chord' in line 4080 to test as many parts of the search algorithm as possible.

If you do not get exactly what's shown in figure 1 then there is an error somewhere. When a Run gives the correct result you can erase line 4080, then make final copies using Save "chordata" line 1.

User-definable characters - to be entered in Graphics mode - are highlighted in the listing as capital letters with a stripe. To return them to this form, for checking, you must Run 9000 - this copies character bit-patterns from the Rom. It is also most important to notice where capital or small letters are used in the listing, because this is used as a note-priority marker.

For this reason check all lines in the search loops even more carefully than usual. Note that some lines in the listing have been padded out with spaces to clarify their appearance. Lines 540, 780 and 2050 use graphic shifted eight (not inverse video space).

In use, the 'sharp' sign can be found on key 3. For flats, as on all music, a small b is used. If you come across a natural sign - - then type maj instead. It is not necessary to put capitals or spaces when typing in a chord, these will be inserted later by the program itself where needed for clarity e.g. Type in abbbbass and see how the four b's get sorted out into Ab/Bb Bass.

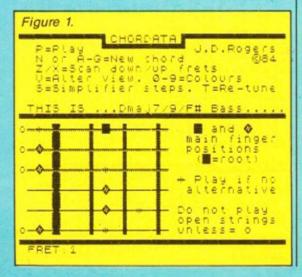


Table	1- 0	A A - I -	1/	2-6-1	1
I ani	0 /	Main	var	Iani	88

C\$	Chord name, inputted by user.	
B\$	'Allowed notes' for given chord	
1	(separate sets for	
A\$	bass/treble strings).	
X\$	Extracted items from C\$	
P	Pointer for search through C\$	
V	Value returned from note-to-	
	number subroutine.	
root	Root note of chord.	
bass	New root note if 'altered bass'	
i\$/j\$	Simplified versions of b\$/a\$.	

For 9th chords you are prompted to choose jazz or added, the former includes a seventh, the latter doesn't and sounds more contemporary - used extensively by The Police. Any chord +7 means augmented fifth and dominant seventh, not a sharpened seventh. A 13th chord includes the sixth and seventh, usually an octave apart, sometimes the ninth, optionally the fourth and theorectically the root, third and

If the program is typed in error-free (!) then at least 99.9 per cent of chords typed-in off sheet music will be worked out correctly. Don't believe those who tell you "that's not how I play" whatever, many guitarists have their own somewhat loose idea of chord names.

Even sheet music is not infallible and can contain chord shapes or names that are unsuitable or just plain wrong e.g. G eleventh (G11) is used sometimes to mean F/G but sometimes to indicate G7 sus 4.

Structure-wise (horribobble word) the program flows straight through from line 10 to 900. The main variables to try and follow are a\$, b\$, c\$, p and x\$. Both searches through the inputted chord name (c\$) use a pointer (p) to keep track of everything. P is incremented for example to accommodate "sharps and flats" in the routine at 1000. Allowed notes for the chord in question are built up in a\$ - for the three treble strings - and in b\$ - for the three bass strings. B\$ gets started off containing a major triad in line 60.

The filling of the actual guitar-strings array (G\$) is all done in line 660 as follows: For each guitar-string/fret position (S, F) the fixed reference array N is sliced to find the note-value at that S, F. The resulting number - range 1 to

Guitar 'strings', literally.

a\$(s) Empty string, used to keep the guitar strings spaced-out.

N(s,f)Notes reference array (string,

fet) Colour/options for display col

Tuning for open guitar strings

Simp Simplifier, on/off 'flags', 0 = off view

View, up/down Play notes, on/off play

Shf Sharps and flats Play-array p (pa)

Table 3. Some chords to try, from simple to complex, showing just some of the types that may be found on sheet music.

E7	D	Dm7	Fmin	Am
Am(maj	7)	Am7	Bb6	C7-9
F F	6/4	Esus	Eaug	D/E
C(Bb	Am/F	B7-1	O E	m(add 9)
Cm7/9		A7(b9)		Abmaj7
B9	A6	4/GBass		Dmajg
Bbm7		C11		F/#dim
F/+ m7/4	561	G	A13	D/9)

12 - is used to slice out a character from a\$/b\$ - allowed notes data - which is then put into G\$ at the current string/fret.

This character could be a symbol or just a bit of guitar string - to fill the gap - depending on whether the note was an allowed one for the current chord or not.

Since the Spectrum Beep is monophonic not to mention barely audible - the only way to give at least an impression of a chord is to play the notes of the chord rapidly in succession. This is done by storing the notes of the chord into a play array, P - sound better through a proper amp.

Note that throughout this program I use 1 to represent C, 2 for C sharp, 3 for D and so on. The Spectrum's Beep uses the same system but one lower (0=C) hence the need for 'n-1' in liné 580.

I can supply a ready-taped version of Chordata which includes extra text screens. Send £2.50 to 11 Carnarvon Road, Walton, Liverpool, L9 1EB. Note that I refuse to have anything to do with fans of Wham!



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J G Fountain gives your Amstrad a schizoid screen.

THE PROGRAM Split uses the built in interrupt facilities on the Amstrad to split the display into separate areas and provide them with separate colour pallettes, thus allowing the machine to have more colours on screen than normal. The program actually splits the screen into two sections, the upper retaining the normal screen pallette and hence responding to the normal Basic commands for controlling the ink colours.

The lower area however is given a completely new pallette and hence new commands have to be provided to control the inks though the 4 RSX commands are provided:-

colours available are the same 27 hardware

The new commands are provided using Resident System Extensions, which have been well described in various publications and are fully documented in the Complete CPC 464 Operating System Firmware Specification Soft 158. Basically an RSX command is a user defined extensions to the Basic language and provides a method for calling machine code routines by name rather than address.

For the control of the lower area of the screen

:SPLIT,p,n, - splits the screen at position p where p is in the range of 0 to 4, 0 being the bottom of the screen and 4 being the top, n inks are associated with the new pallette ie. if n=0 none of the inks are changed in the lower area of the screen, if n=16 then all of them are changed the border always being split.

:SPLITOFF — returns the display area to its normal format.

:LOINK,i,c - sets ink i to colour c in the lower area of the screen.

:LOBORDER,c - sets the border to colour c in the lower area of the screen.

These RSX's have to be initialised by the Basic instruction

CALL 34000

though this address can be changed by changing the two ORG definitions in the assembly pro-

```
RSX INITIALISATION ROUTINE
                                                                                                                                                                                                                                                                                                                                                                                               ! Address of Fast Ticker Event block
! Class of interrupt. Asynchronous Express Event
! with a routine in RAM
! Rom number. Not applicable
! Address of routine
! KL NEW FAST TICKER
! Return to Basic
This routine is called from basic and initialises the RSX commands.
                                                                                                                                                                                                                                                                                                                           LD C, MFF
LD DE,FTRTN
CALL MBCEO
RET
                                                                              i Address of command table
i Address of work space
i ML LOG EXT
i Return to basic
                                                                                                                                                                                                                                                                                                                                                                                      FAST TICKER ROUTINE
                                                                              SPLIT SCREEN COMMAND ROUTINE
                                                                                                                                                                                                                                                                                                         This routine is called every 3.33 mS. It checks where the screen scan has got to and if this matches the split position then the ink colours are changed.
 This routine is called when the RSX command SPLIT, n, m is found by the Basi
Interpreter. It splits the screen at position 'n', poviding a new palette
for the first 'm' Inks. If there are no parameters it defaults to SPLIT.I
If there are too many parameters it exits via the Error routine.
                                                                                                                                                                                                                                                                                                                           LD A, (PCOUNT)
LD HL, POSTN
CP (HL)
JR NC, FTPASS
                                                                                                                                                                                                                                                                                                                                                                                                i det the frame position counter
i det position at which to split the screen
i Check if they are equal
i if they are not the same, do not change the
paiette
                  CP 0
JR NZ,SPRAH
LD A,4
LD (POSTN),A
LD A,46
LD (DELAY),A
JR SPIN
CP 1
JP Z,SP2
CP 2
JP NZ,PCERR
                                                                                        I Check for parameters
I If at least one jump to handle it
I Else default to SPLIT, I
                                                                                                                                                                                                                                                                                                                            LOAD IN THE NEW PALETTE
                                                                                                                                                                                                                                                                                                                                                                                             I Get delay time length:

I Move it into B

Delay loop to get change of

colours at character line boundry

Load date array address into B

since B is put on the upper 8 Bits of the
I Address Bus During the OUT (C) instructions

Check No. of inks to be changed

If A < 2 change colours the slow way

Else do the border and the

i first two inks as fast as possible

Save limit of inks to be changed

Load the spare registers with the

i ink numbers and colours of the first

two inks to be changed and the border

which is also changed at this point
                                                                                                                                                                                                                                                                                                   LD A, (DELAY)
LD B, A
FTLGOP: DJNZ FTLGOP
                                                                                                                                                                                                                                                                                                                             LD A, (LIMIK)
CP 2
                                                                                                                                                                                                                                                                                                                           LD A, (LIMIK)
CP 2
JR C,FTFEW
LD ML, INKTAB
PUSH AF
LD D, L
LD E, INL!
LD A, (BDRCOL)
LD C, &10
INC ML
PUSH ML
LD M, (ML)
OUT (C), D
OUT (C), C
OUT (C), C
OUT (C), C
OUT (C), A
OUT (C), H
POP ML
INC ML
INC ML
POP AF
JR Z,FTPASS
JR FTOUT
                                   SET NO OF INKS TO BE CHANGED
                   LD A.(IX)
CP 17
JR C.SP4
LD A.16
LD (LIMIK), A
INC IX
INC IX
                                                                                      Get in byte of P2
Limit the parameter
to between 0 and 16
                                                                                                                                                                                                                                                                                                                                                                                                       Save ink table pointer
                                                                                                                                                                                                                                                                                                                                                                                                      Dutput the ink Nos. and colours
                                SET SPLIT POSITION
                     SET SPLIT

D A, (IX)

ADD A,3

AND 7

LD E,A

SUB A,3

LD BC,LOOPTAB

ADD A,C

LD C,A

INC B

LD (ABC)

LD (BC,AY),A

LD A,E

LD (POSTN),A
                                                                                       I Get parameter
I Limit the parameter value
I to between 3 and 7
I Save the split position parameter for later
I Bring back to range 0 to 4
I Get the loop table start address
I Add offset ( ADD BC,A )
                                                                                                                                                                                                                                                                                                                                                                                                    Get the ink table pointer
Increment it to 2
Get the limit of links
If there were exactly 2 inks to change
Else continue outputing inks
                                                                                                                                                                                                                                                                                                                                                                                                     1 or no inks to change
Set Date address
                                                                                       ; Get the loop driver value from table ; Load loop driver temp. store ; Get the split position parameter again ; Set split position variable
                                                                                                                                                                                                                                                                                                                           IE L, &10
OUT (C), L
LD A, (BORCOL)
OUT (C), A
LD HL, INNTAB
LD A, (LIMIK)
CP 0
JR I,FTPASS
DEC A
                                                                                                                                                                                                                                                                                                                                                                                                INITIALISE FRAME FLYBACK
                                                                                      Address of Frame Flyback Event block
| Class of interrupt. Asynchronous Event
| with a routine in RAM
| Rom number. Not applicable
| Address of routine
| KL NUM FRAME FLY
                                                                                                                                                                                                                                                                                                                           OUT (C),L
OUTI
INC B
```



tion

inks =0 area are

a to

the

lour

ging program, the latter of these two must however be of the form &XXOO.

The mechanism by which the screen is split uses two of the interrupt queues, the Frame Flyback Queue and the Fast Ticker Queue. These interrupt queues are again described in the-Firmware Specification Soft 158. Again briefly these allow the user to write machine code routines which are called not from basic in the normal manner but periodically in a similar manner to the way the Basic Instruction Every works and hence operate without the User needing to be concerned with driving them.

The Frame Flyback interrupts occur as the name suggests every Frame Flyback i.e., 50 Hz in the UK, 60 Hz in various other countries. The Fast Ticker interrupts occur at 300 Hz and so 6 - or 5 if Flyback is at 60 Hz - of these will happen during the period between frame

flybacks, unfortunately only three of these happen during the actual display period. The Fast Ticker is used to set the position at which the screen is split and the Frame Flyback used to synchronise the split position with the display.

To use the interrupt queues each routine to be called has to have an event block which is an area of memory reserved by the user which is kicked by the interrupt and in turn calls the routine. These blocks are initialised, put on the queues, deleted from the queues, etc using various jump blocks.

```
Basic loader.

1 SEM SETSION 1.1

10 REM Beasic loader for SPLIT.

20 REM beep the line numbers as listed

20 REM and them when you make a mistake

40 REM and them when you make a mistake

40 REM in the data statements the

50 PEM orderam will tell you what line

40 REM it is in.

50 PEMINT "To load the code from 34000 onwards":FRINT "

61 Order when the INPUT prompts appear"

70 INPUT'Start of Machine code program":starto

80 If starto = 0 HEM starto = 34000

90 If starto = 0 HEM starto = 34000

100 IF startd < 0 THEN starto = 34320

110 IF startd < 0 THEN startd = 34320

110 IF startd < 0 THEN startd = 34320

110 IF startd < 10 THEN startd = 34320

110 IF startd < 10 THEN startd = 34320

110 IF startd < 10 THEN startd = 34320

110 IF startd < 10 THEN startd = 34320

110 IF startd < 10 THEN startd = 84400 HEM MEM THEN MEMORY STARTON IN THE STARTON 
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1320 DATA 221,126,0,254,28,210,4,134,503D1
1330 DATA 17,25,134,131,95,48,1,20,801D7
1340 DATA 26,119,201,254,1,194,251,133,50498
1350 DATA 123,254,22,214,154,17,25,1031B
1360 DATA 123,254,22,214,154,17,25,1031B
1360 DATA 124,151,95,48,1,20,26,50,801F9
1370 DATA 14,151,95,48,1,20,26,50,801F9
1370 DATA 16,135,101,35,134,134,540347
1270 DATA 205,13,134,201,33,113,134,6,50347
1270 DATA 205,13,134,201,33,113,134,6,50347
1270 DATA 205,13,134,201,33,113,134,6,50347
1270 DATA 205,13,134,201,33,113,134,6,5037
1410 DATA 201,0,0,0,0,0,0,0,0,0,0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             618 FDRE address, value-INT: value/256 > * 256 628 FDRE address * 1. INT: value/256 > * 256 6ETURN 980 RETURN 980 FEM read data subroutine 818 startaddrs = address 820 chect = 0
                       Basic loader.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ### STO FOR mark TO T

### REAT virone addressmout

### SECOND Check Store

### SECOND Check Store

### STO Check Store

### SECOND CHECK STORE

### S
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         B30 FOR n= 0 TO "
240 REAT v:FORE address=n.v
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  TWO GOSUB 600
TWO NEXT
TWO FIRST
TWO FEAD address : FEAD value
TWO address = address - &6619 - startd : value = value
Two address = address - &6619 - startd : value = value
Two address = address - &6619 - startd : value = value
Two address = address - &6619 - startd : value = v
                   408 GOSUF -000
410 NEXT
470 CALU-starto
470 SFLIT.1
440 STOP
180 REM Doke in new address values
```

```
CP L 5 Check if this is the last ink to be set JP NC.FTOUT 1 14 not continue outputing
                                                                                                                                                                                                                     LOEND: RET
                                                                                                                                                                                                                                                                                    I Load into ink table
I Return to basic
FTPASS: LD A, (PCOUNT)
DEC A
JR NZ, FTNST
LD A,6
FTNST: LD (PCOUNT), A
                                                              ; Get the position counter; And decrement it; If it decrements to zero; Reset it to 6; And store it egain
                                                                                                                                                                                                                                                                                BORDER COLOUR COMMAND ROUTINE
                                                                                                                                                                                                                          This routine is called when the RSX command LOBORDER,m is found. It changes the colour of the lower border area to colour 'm'. It requires one parameter, and if more or less than one parameter is past then it exits via the Error routine.
                                                       LD A,O
LD (FTBLK+4),A
RET
                                                                                                                                                                                                                                      CP 1
JP NZ,PCERR
LD A,E
CP 20
JP NC,PRERR
LD DE,COLTABL
ADD A,E
LD E,A
JR NC,BO1
1NC D
LD A, IDE!
LD E,ORCOL1,A
RET
                                                                                                                                                                                                                                                                                       I Check there is only one Parameter
; If not jump to error
; Get the Low Byte of the parameter
; Check that the colour is in range
                                                       FRAME FLYBACK ROUTINE
    This routine is called every 20 mS. It Synchronises the Split position with the Frame Flyback. It also resets the pallette at the frame top
FFRIN: CALL ABCOB
CALL ABCOB
LD A.6
LD (PCOUNT), A
LD A.0
LD (FFBLK+4), A
RET
                                                     i Get border colour
i Set border colour
i Reset position counter
                                                                                                                                                                                                                                                                                      Get Hardware colour number from the table Load into ink colour into varible Return to Basic
                                                                | Reset the Frame FlyBack block counter
                                                               I Return to besic
                                                                                                                                                                                                                                                                                PARAMETER COUNT ERROR ROUTINE
                                                         SPLITOFF COMMAND ROUTINE
                                                                                                                                                                                                                        This routine is entered if the parameter count was incorrect.
   This routine is called when the RSX command SPLITOFF is found. It resets the screen to the normal format. The Fast Ticker and Frame Flyback Blocks are removed from their respective queues.
                                                                                                                                                                                                                       PCERR: LD HL, PCMES
LD B, 28
CALL PRINTHES
RET
                                                                                                                                                                                                                                                                               i Point HL at the start of message i Load B with its length i Cail message printing routine i (uses the current window)
                                                               Remove fast ticker block
KL DEL FAST TICKER
Remove Frame Flyback block
KL DEL FRAME FLY
Return to basic
                                                                                                                                                                                                                                                                               PARAMETER RANGE ERROR ROUTINE
                                                                                                                                                                                                                         This routine is entered if the parameter was out of range.
                                                         LOINK COMMAND ROUTINE
                                                                                                                                                                                                                      PRERR: LD HL, PRMES
LD B. 29
CALL PRINTMES
                                                                                                                                                                                                                                                                               i Point HL at the start of message
i Load B with its length
i Call message printing routine
i ( uses the current window )
   This routine is called when the RSX command LOINK, n, m is found. It changes the colour associated with ink number 'n' to colour 'n'. It requires two parameters, and if the correct number of parameters are not passed then it exits via the error routine.
                                                                                                                                                                                                                                                                                    i Return to besic
                                                                                                                                                                                                                                                                                PRINT MESSAGE, SUBROUTINE
                                                                | Get the Ink number
                 LD A, (IX+2)

LD ML, INKTAB

CP 16

JR NC, PRERR

LD B, O

LD C, A

ADD HL, BC

LD A, (IX)

CP 28

JP NC, PRERR

LD DE, COLTABL

ADD A, E

LD E, A

JR NC, LOI

INC D

LD A, (IDE)
                                                                    Get the Ink table start
Check that the ink number is
in range 0 - 15
                                                                                                                                                                                                                         This routine should be entered with the address of the start of the string in HL and the Length of it in B. It prints the string, printing not obeying control codes in the current window.
                                                                                                                                                                                                                      PRINTMES:

LD A, (HL)

INC ML

PUSH BC

PUSH HC

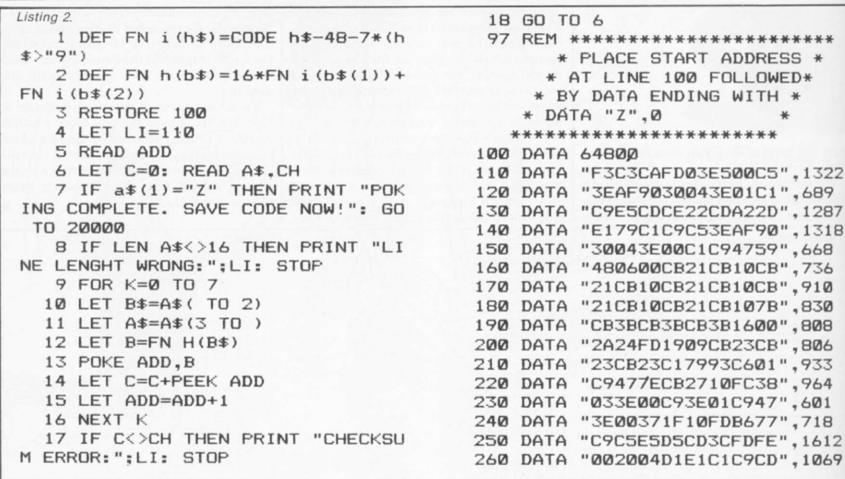
CALL &BSSD

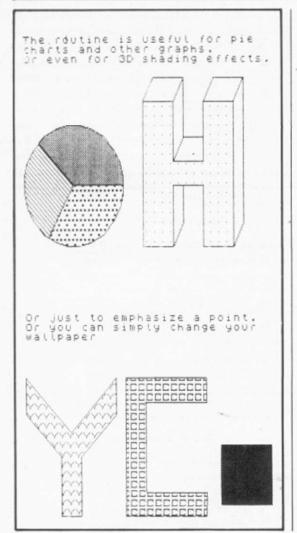
POP HL

POP BC

DINZ PRINTMES

RET
                                                                   Add offset in table
Get the Ink colour
Check if it is in range
                                                                                                                                                                                                                                                                                     Get a character
Point at the next
Save counter
This ave counter
This ave counter
This was chara
Recover pointer
Recover counter
Are there any more to print
                                                                  Get Hardware colour number
```





THESE TWO machine-code routines provide your 48K Spectrum with a way of filling in the screen without all the problems of attributes, i.e. colours overlapping. This is achieved by filling in the required area with a set pixel pattern, set up by the user in the first user-defined graphic.

The main dollop of machine code is in fact a common garden fill routine, this particular one by N. Dore - Your Computer October 1983. The program first fills in the required area in the usual way, then hatches it.

To type in the machine code, first type in listing 1. Type Run and the computer will check the data for any errors. After correcting any of these errors, save the program to tape or Microdrive with:

SAVE "HATCH DATA"

SAVE *"m";1;"HATCH DATA" Now save the code with

SAVE "HATCH" CODE 58000,70

SAVE *"m";1;"HATCH" CODE 58000,70

It is probably best to save the code on a different tape from the data programs. Next comes the fill routine. Type

CLEAR 57999

then type in listing 2 and Run it, correcting any errors. Then save it with

SAVE "FILL DATA"

SAVE *"m";1;"FILL DATA"

The reason for saving the data programs as well as the code is that checksums do not detect all

errors. Now save the actual code using SAVE "FILL" CODE 64800,500

SAVE *"m";1;"FILL" CODE 64800,500

Now the code is ready to run. Listing 3 demonstrates some of the possibilities of this routine. How to use this routine is probably best learned by studying this program but here is an example of step by step hatching.

- 1. Create shape to be filled on screen, making sure there are no gaps along the edges.
- 2. Define the first UDG (see listing 4 or manual).
- 3. Choose any point inside the shape and type PLOT INVERSE 1;x,y

where x,y is the chosen point.

4. Type

RANDOMIZE USR 64800

and the area will fill with ink.

5. Type

RANDOMIZE USR 58000

and the area filled will become hatched.

6. If you don't like the pattern, then type RANDOMIZE USR 58000

redefine the UDG and retype RANDOMIZE USR 58000

- 1 DEF FN i (h\$) = CODE h\$-48-7*(h
- 2 DEF FN h(b\$)=16*FN i(b\$(1))+
- FN i(b\$(2))
- FN 1 (b*(2))
 3 RESTORE 100
 4 LET LI=110
 5 READ ADD
 6 LET C=0: READ A*.CH
 7 IF a*(1)="Z" THEN PRINT "POK
 ING COMPLETE. SAVE CODE NOW!": GO
 TO 200000
 8 IF LEN A*<>14 THEN PRINT ".
- 8 IF LEN A\$<>16 THEN PRINT "LI NE LENGHT WRONG: ";LI: STOP
- * PLACE START ADDRESS * * AT LINE 100 FOLLOWED*
- * BY DATA ENDING WITH * * DATA "Z",0 100 DATA 58000 110 DATA "06AF1103E52A7B5C",687 120 DATA "78E607EE07C54F86",684 7130 DATA "0009C1CDABE210ED",1054 140 DATA "0009C1CDABE210ED",1054 150 DATA "0804CDB5E21379C6",964 150 DATA "0804F30F6C9D5E5C5",1221 160 DATA "ESCDAA221A46ABE1",1127 170 DATA "4F7E471AA0B157C1",919 180 DATA "C5CDAA2272C1E1D1",1347 190 DATA "C900000000000000",201 200 DATA "Z",0 100 DATA 58000

```
270 DATA "79FDD1E1C1C9C5E5",1628
280 DATA "D5CD3CFDFE002004",1021
290 DATA "D1E1C1C9CD87FDD1",1630
300 DATA "E1C1C9C5F53EAF90",1442
310 DATA "3805E5CDDF22E1F1",1218
320 DATA "C1C92A24FD010016",748
330 DATA "3600230B78B1FE00",651
340 DATA "20F62A7D5CE5444D",911
350 DATA "0CCD27FDFE00200A",805
360 DATA "CDBBFDCDA6FD18F0",1533
370 DATA "0000E1444D0DCD27",627
380 DATA "FDFE002008CDBBFD",1192
390 DATA "CDA6FD18F03E0032",1000
.400 DATA "815C2A24FD0100AF",728
410 DATA "7EFE00C479FE2379",1107
420 DATA "C608FE002001054F",577
430 DATA "3EFFB8287A18E9CD",1125
440 DATA "91FDFE00C804CD27",1100
450 DATA "FDFE00CC8DFE050C",1123
460 DATA "CD27FDFE00CC8DFE",1350
470 DATA "0D05CD27FDFE00CC",973
480 DATA "8DFE040DCD27FDFE",1163
490 DATA "00CC8DFE0CC9E511",1058
500 DATA "2000237ECB7FE1C8",948
```

22

9

37

18

2

9

510 DATA "E52B7ECB47E1C8E5",1326 520 DATA "197EFEFFE1C0E5A7",1473 530 DATA "ED527EFEFFE1C0D1",1580 540 DATA "C9CD56FEC51E00D5",1186 550 DATA "CD27FED10C1C3E08",817 DATA "BB20F4C1C9CD91FD",1460 560 570 DATA "FE01CBCDA6FDCDBB",1471 580 DATA "FD3E0132815CC93A",846 590 DATA "815CFE00CAECFE3E",1229 600 DATA "0032815C2A24FD11",619 610 DATA "FF151901FF007EFE", 937 620 DATA "00C4CDFE2B79D608",1041 630 DATA "FEFF2001044F3EB0",863 640 DATA "B8281618E9CD56FE",1048 650 DATA "C51E00D5CD27FED1",1147 660 DATA "0D1C3E08BB20F4C1",767 670 DATA "C93A815CFE00CAEC",1172 680 DATA "FEC305FE2A24FD11",1056 690 DATA "00000100167EC506",352 700 DATA "08CB2730011310F9",583 710 DATA "C10B2378B1FE0020",822 720 DATA "EC424BFBC9000000",829 730 DATA "0000000000000000000",0 740 DATA "Z",0

A J Renton makes it easy to fill the Spectrum screen with patterns.

7. If you wish to remove all of the filled area, using

RANDOMIZE USR 58000

revert the hatch pattern to its original all filled in position, define the UDG as totally blank and

RANDOMIZE USR 58000

Hey presto! the filled area disappears.

A final warning: before loading the fill routine, always type

CLEAR 57999

or the computer is likely to crash.

Listing 4. 10 REM UDG data poke program 20 30 RESTORE 100 40 FOR k=USR "a" TO USR "a"+7 50 READ byte 60 POKE k, byte

70 NEXT k

80 PRINT "A": REM Gr aphics A 100 DATA BIN 10001000 101 DATA BIN 01000100 102 DATA BIN 00100010 103 DATA BIN 00010001 104 DATA BIN 10001000 105 DATA BIN 01000100 106 DATA BIN 00100010 107 DATA BIN 00010001

Listing 3. 10 REM Hatch demo 20 REM by A.Renton 1985 30 LET poke=9000 40 LET fill=64800 50 LET hatch=58000 60 PAPER 7: INK 0: BRIGHT 0: FLASH 0: OVER 0: INVERSE 0: CLS 140 DATA 170,85,170,85,170,85,170,85: G O SUB poke 150 RANDOMIZE USR hatch 160 PLOT INVERSE 1:40,40: RANDOMIZE USR 170 DATA BIN 10001000.BIN 1000100.BIN 1 00010,BIN 10001,BIN 10001000,BIN 1000100 ,BIN 100010,BIN 10001: GO SUB poke 180 RANDOMIZE USR hatch 190 PLOT INVERSE 1:60.40: RANDOMIZE USR fill 200 DATA BIN 0.BIN 01100110,BIN 0110011 0,BIN 0,BIN 0,BIN 11000,BIN 11000,BIN 0 210 GO SUB poke: RANDOMIZE USR hatch 220 PRINT "Or even for 3D shading effec

230 PLOT 150,0: DRAW 0,50: DRAW 30,0: D RAW 0,-50: DRAW 30,0: DRAW 0,120: DRAW -30,0: DRAW 0,-50: DRAW -30,0: DRAW 0,50: DRAW -30,0: DRAW 0,-120: DRAW 30,0 240 DRAW 10,20: DRAW 0,20: DRAW 0,10 250 PLOT 150,70: DRAW 10,20: DRAW 20,0: PLOT 160,90: DRAW 30,50: DRAW -30,0: DRA W -10,-20: DRAW 30,0: DRAW 10,20 260 PLOT 210,0: DRAW 10,20: DRAW 0,120: DRAW -10,-20: DRAW -30,0: DRAW 10,20: D DRAW -10,-20: DRAW -30,0: DRAW 10,20: D RAW 30.0 270 PLOT INVERSE 1;131,1: RANDOMIZE USR 280 DATA 0,0,0,16,0,0,0,0: GO SUB poke: RANDOMIZE USR hatch 290 PLOT INVERSE 1;130,122: RANDOMIZE U DATA 0,255,0,255,0,255,0,255 310 GO SUB poke: RANDOMIZE USR hatch 320 PLOT INVERSE 1:190,122: RANDOMIZE U SR fill: RANDOMIZE USR hatch 325 PLOT INVERSE 1:160,80: RANDOMIZE US R fill: RANDOMIZE USR hatch 330 PLOT INVERSE 1;152,20: RANDOMIZE US R fill 340 DATA BIN 11011101.BIN 11101110.BIN 340 DATA BIN 11011101.BIN 11101110.BIN 1110111.BIN 10111011.BIN 10111011.BIN 11011101.BIN 11 101110.BIN 11 350 GO SUB poke: RANDOMIZE USR hatch 360 PLOT INVERSE 1,212,20: RANDOMIZE USR fill: RANDOMIZE USR hatch 370 PLOT INVERSE 1:152,90: RANDOMIZE USR fill: RANDOMIZE USR hatch 380 PAUSE 20: PAPER 0: INK 6: BRIGHT 1: CLS

230 PLOT 150,0: DRAW 0,50: DRAW 30,0: D

390 PRINT "Or just to emphasize a point

400 PLOT 35,0: DRAW 0,50: DRAW -35,35: DRAW 0,30: DRAW 45,-45: DRAW 45,45: DRAW 0,-30: DRAW -35,-35: DRAW 0,-50: DRAW -20,0 410 PLOT INVERSE 1:40.1: RANDOMIZE USR 420 DATA 0.BIN 1000001,BIN 100010,BIN 1 420 DATA 0,BIN 1000001,BIN 100010,BIN 1 0100,BIN 1000,BIN 1000,0,0 430 GO SUB poke: RANDOMIZE USR hatch 440 PLOT 100,0: DRAW 0,115: DRAW 00,0: DRAW 0,-20: DRAW -60,0: DRAW 0,-75: DRAW 60,0: DRAW 0,-20: DRAW -80,0 450 PLOT 179,1: INK 4: RANDOMIZE USR fi 60 DATA 0,126,66,64,64,66,126,0 470 GO SUB poke: RANDOMIZE USR hatch 480 PRINT "Or you can simply change you 480 PRINT "Or you can simply change you r wallpaper"
490 PLOT 195,10: DRAW 50,0: DRAW 0,50: DRAW -50,0: DRAW 0,50: DRAW -50,0: DRAW 0,-50
500 PLOT INVERSE 1:220,20: PAPER 5: INK 0: BRIGHT,1: RANDOMIZE USR fill 510 POKE 23676,62: FOR a=1 TO 26: POKE 23675,a*8: RANDOMIZE USR hatch: PAUSE 1: RANDOMIZE USR hatch: DRUSE 1: RANDOMIZE USR hatch: IF CODE INKEY* THE N GO TO 520 NANDOMIZE USR hatch: IF CODE INKEY* THE N GO TO 520 515 NEXT a: GO TO 510 520 POKE 23676,255: POKE 23675,88 8999 STOP 9000 FOR k=USR "a" TO USR "a"+7: READ a: POKE k,a: NEXT k

Nalin Sharma with a routine for special effects.

RASTER INTERRUPTS are one of the most important aspects of machine-code programming on the Commodore 64. They allow such things as smooth scrolling and split screen effects, both of which I have used in previous Your Computer programs.

However, one of the most striking illustrations of raster interrupts is to have more than eight sprites on the screen at once. This was hinted at in the programmers' reference guide, but there was no full explanation, and so here is a program which will display 64 sprites on your CBM-64.

The screen display of the CBM-64 is made up of 200 horizontal lines and is updated roughly every 1/60th of a second. The screen

Listing 1.

```
1 REM*******BASIC LOADER FOR 64 SPRITES********
2 REM*******COPYRIGHT 1985 NALIN SHARMA********
5 CM**44868:SM**5119:SUMCD**8:SPRCD**8
10 FORX**49158T049445
20 READBIPOKEK . BISUMCD - SUMCD + B
     NEXT
IF SUMCDOCMTHENPRINT*DATA ERROR*:STOP
50 FORM=8192T08384
      READA: POKEX, A: SPRCD=SPRCD+A
70 NEXT
80 IF SPRCD()SMTHENPRINT*DATA ERROR*:STOP
100 SYS49152
100 SYS49152
200 PRINT"#M"TAB(30)"#64 SPRITES"
210 PRINTTAB(30)"(C) NALIN"
220 PRINTTAB(30)" SHARMA#"
1000 DATA 169, 147, 32, 210, 255, 32
1010 DATA 199, 192, 32, 12, 192, 96
1020 DATA 120, 169, 58, 141, 20, 3
```

```
1030 DATA 169, 192, 141, 21, 3, 169
1040 DATA 0, 141, 64, 3, 169, 1
1050 DATA 141, 26, 208, 173, 17, 208
1060 DATA 41, 127, 141, 17, 208, 169
1070 DATA 49, 141, 18, 208, 169, 255
1080 DATA 141, 25, 200, 169, 0, 141
1090 DATA 14, 220, 88, 96, 174, 64
1100 DATA 3, 160, 1, 199, 1, 193
1110 DATA 153, 0, 208, 200, 200, 192
1120 DATA 17, 208, 247, 169, 129, 141
1130 DATA 25, 208, 173, 17, 208, 41
1140 DATA 127, 141, 17, 209, 238, 64
1150 DATA 208, 5, 162, 0, 142, 64
1170 DATA 3, 189, 9, 193, 141, 18
1130 DATA 208, 224, 0, 208, 80, 238
1190 DATA 65, 3, 173, 65, 3, 201
1200 DATA 7, 208, 49, 169, 0, 141
```

(continued on opposite page)

Listing 2.

```
10 *=#C000 IMULTIPLEXED SPRITES COPYRIGHT 1985 NALIN SHARMA
                      VIC+17
  51 HRAST
                       VIC+18
   52 RAST
                   = VIC+25
  53 IRST
  54 ERST
                      AIC+SS
 880 VB
                      830
                      VB+1
 890 HIND
                                                ISPRITE MOVEMENT INDEX
 900 RASNUM
905 SPD
                                               INTERRUPT NUMBER
                      VB+2
                       VB+3
 906 SPIND
907 SPRITESON
                       VB+4
                                                ISPRITE NUMBER INDEX
                      VIC+21
 908 MSBX
                      VIC+16
 910 BORDER
                       53280
  915 BACKGR
                       53281
1000
 1010
 1020
1070 START
                  LDA #147
                   JSR #FFD2 ~
                                                ICLEAR SCREEN
                   JSR SETSPRITES
 1085
                                                ISET UP VIC CHIP
                                                  SET NEW INTERRUPTS
                   JSR NEWINT
 1190
                   RTS
                                                IRETURN TO BASIC
1216 NEWINT
                   SEI
                   LDA #KSTINT
                                                LOW BYTE INTERRUPT POINTER
1230
                   STA #0314
                   LDA #>STINT
 1234
                   STA #0315
                   LDA HO
                                                INUMBER OF INTERRUPT
 1260
                   STA RASNUM
 1565
                  LDA #1
                                                IALLOW INTERRUPTS TO BE CAUSED BY R
ASTER
1263
                   STA ERST
                   LDA HRAST
                                                IHIGH BIT RASTER LINE
 1265
                   AND #127
                   STA HRAST
 1266
                   LDA #49
 1267
                                                !LOW BYTE RASTER LINE
 1268
                   STA RAST
                   LDA #255
 1278
                   STA IRST
                                                ICLEAR RASTER LATCH
 1272
                   LDA #0
 1274
                   STA 56334
                                                ICBM INTERRUPTS OFF
 1277
                   CLI
                                                IREADY TO BEGIN
```



```
1210 DATA 65, 3, 238, 66, 3, 173
1220 DATA 66, 3, 41, 3, 141, 66
1230 DATA 66, 3, 41, 3, 141, 66
1230 DATA 3, 174, 66, 3, 109, 33
1240 DATA 193, 141, 248, 7, 141, 249
1250 DATA 7, 141, 250, 7, 141, 253
1270 DATA 7, 141, 252, 7, 141, 253
1270 DATA 7, 141, 254, 7, 141, 255
1280 DATA 7, 141, 254, 7, 141, 255
1280 DATA 7, 32, 175, 192, 76, 49
1290 DATA 234, 162, 0, 222, 0, 208
1310 DATA 232, 0, 208, 222, 0, 208
1310 DATA 232, 232, 224, 16, 208, 241
1320 DATA 63, 104, 168, 104, 170, 104
1330 DATA 64, 169, 255, 141, 21, 208
1340 DATA 169, 0, 141, 63, 3, 141
1350 DATA 66, 3, 141, 65, 3, 141
1350 DATA 66, 3, 141, 65, 3, 141
1350 DATA 16, 208, 162, 0, 160, 0
1370 DATA 189, 17, 193, 153, 0, 208
1380 DATA 169, 128, 157, 248, 7, 189
1390 DATA 25, 193, 157, 39, 208, 206
1400 DATA 200, 232, 224, 8, 208, 232
1410 DATA 169, 1, 141, 33, 208, 162
1420 DATA 66, 141, 32, 208, 96, 51
1430 DATA 75, 191, 215, 30, 60, 90
1460 DATA 126, 150, 180, 210, 240, 0
1470 DATA 2, 4, 5, 6, 11, 9
1490 DATA 2, 4, 5, 6, 11, 9
1490 DATA 2, 4, 5, 6, 11, 9
1490 DATA 2, 4, 0, 60, 0
          1490 DATA 14, 130, 129, 128, 129, 4000 DATA 0, 24, 0, 0, 60, 0, 4010 DATA 0, 60, 0, 0, 24, 0, 4020 DATA 2, 15, 128, 3, 31, 224, 4030 DATA 1, 190, 48, 0, 254, 96, 4040 DATA 0, 14, 64, 0, 14, 0, 4050 DATA 0, 14, 0, 0, 29, 0
             4060 DATA 0,
4070 DATA 0,
4080 DATA 0,
                                                                                                                                                                                                              59, 128, 0, 97,
96, 192, 0, 192,
192, 4, 0, 64, 0
                                                                                                                                                                                                              64, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
             4090 DATA 0,
4100 DATA 0,
4110 DATA 0,
          4110 DATA 0, 0, 50, 0, 0, 6
4120 DATA 0, 0, 24, 0, 0, 1
4130 DATA 0, 0, 31, 0, 0, 3
4140 DATA 128, 0, 62, 128,
4150 DATA 128, 0, 207, 0, 0
4160 DATA 0, 0, 30, 0, 0, 3
                                                                                                                                                                                                                                                                                                                                                                         0, 12
                                                                                                                                                                                                                                                                                                                                                                      0, 0, 0, 0, 30
          4170 DATA 0, 0, 30, 0, 4180 DATA 0, 0, 49, 192 4190 DATA 32, 0, 16, 96 4200 DATA 0, 0, 32, 0, 4210 DATA 0, 0, 0, 24, 4220 DATA 60, 0, 0, 60, 4230 DATA 24, 0, 0, 12, 4240 DATA 26, 0, 0, 26, 4250 DATA 26, 4
                                                                                                                                                                                                                                                                                                                             192,
                                                                                                                                                                                                                                                                                                                                                                                                           0, 48
0, 16
                                                                                                                                                                                                                                                                                                                               12.
                                                                                                                                                                                                                                                                                                                               26.
                  4270 DATA 22,
4280 DATA 30,
                                                                                                                                                                                                                                                                                                                             14,
               4290 DATA 12, 0, 0, 12, 0,
4300 DATA 12, 0, 0, 28, 0,
4310 DATA 12, 0, 0, 28, 0,
4320 DATA 0, 24, 0, 0, 60,
```



is updated by an "invisible" horizontal line called a raster which runs from top to bottom of the video display.

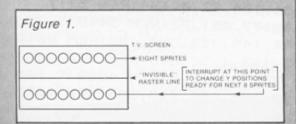
So say, for example, you had all eight sprites at the top of the screen, you could interrupt the raster once it had drawn all eight sprites. Then you could change the Y position of all eight sprites to the bottom of the screen, so that when the raster reaches the bottom part of the screen it will draw all eight sprites again, thinking it hasn't drawn any sprites yet — see figure 1.

The process I have just described can be tightened up to interrupt at eight different parts of the screen, each time changing the Y position of the sprites — thereby giving 64 sprites.

Listing 1 is the Basic loader for the machine code program which shows 64 men running from right to left. Make sure you save the program before running it.

Listing 2 is the fully assembly listing of the program which is actually quite short. The complete program takes up less than 500 bytes, and that includes data for three sprites. Also, it shouldn't take much trouble to extend the program to a very simple Space Invaders program which shouldn't take up more than about 2K.

One last point is that since the program operates under interrupt control you have all the features of Basic at your disposal. It does make a very strange spectacle watching your program list upwards while 64 men are running across the screen.



```
(listing 2 continued from opposite page)
                    RTS
 1310
 1500 STINT
                    LDX RASNUM
                                                  ISTART INTERRUPTS
 1510
                    LDY #1
                    LDA SPRITEVERT,X
                                                  ISPRITE-Y-POSITION
 1530 PLACEY
                    STA VIC,Y
 1532
 1534
                    INY
 1540
                    CPY #17
 1550
                    BNE PLACEY
 1600
                    LDA #129
                    STA IRST
                                                   ICLEAR LATCH
 1620
                    LDA HRAST
 1630
                    AND #127
 1640
                    STA HRAST
 1641
                    INC RASNUM
                                                  ISET UP FOR NEXT INTERRUPT
 1642
                    LDX RASNUM
 1644
                    CPX #8
                    BNE NKLN
 1647
                    LDX #0
                                                  IRESET EVERY EIGTH INTERRUPT
 1648
                    STX RASNUM
 1650 NKLN
                    LDA RASLINE,X
                                                   INEXT RASTER LINE
 1660
                    STA RAST
 1664
                    CPX #0
                    BNE RETEROMINT
 1670
                                                   100 ANIMATION OF ALL 64 MEN
 1680
                    INC SPD
                    LDA SPD
 1682
                    CMP #7
 1684
                    BNE GOBACK
 1690
                   LDA #0
                    STA SPD
 1692
 1700
                    INC SPIND
                   LDA SPIND
 1704
                   AND #3
STA SPIND
 1708
                    LDX SPIND
 1740
                   LDA SPRPT,X
 1750
                    STA 2040
 1760
                    STA 2041
 1770
                   STA 2042
                    STA 2043
 1790
                    STA 2044
                    STA 2045
 1810
                    STA 2046
                    STA 2047
 1820
 1822
                    JSR LEFT
 1830 GOBACK
                                                  SERVICE CBM INTERRUPTS EVERY EIGTH
                    JMP $EA31
 INTERRUPT
                   LDX #0
                    DEC VIC,X
 1872 LOOPLEFT
 1873
                    DEC VIC.X
                    DEC VIC,X
 1874
 1876
                    INK
                    1000
 1877
 1878
                    CPX #16
 1879
                    BNE LOOPLEFT
 1880
2070 RETFROMINT
THER 7 INTERRUPTS
                   PLA
                                                  IPROCEDURE FOR RETURNING FROM THE O
2080
                    TAY
2090
                    PLA
 2100
                    TAX
2110
                    PLA
 2150
 3000
 3010
 5000 SETSPRITES
                   LDA #255
 5010
                    STA SPRITESON
 5020
                    LDA #0
                    STA HIND
 5022
                    STA SPIND
                                                   PRESET SPEED & SPRITE INDEX OF MAN
 5024
 5026
                    STA SPD
                    STA MSRX
 5030
 5040
                    LDX #0
                    LDY #0
LDA SPRITEHORZ,X
 5045
                    LDY
 5050 PLACEX
                    STA VIC,Y
                                                   SPRITE-X-POSITION
 5060
 5062
                                                   ISPRITE POINTERS
 5864
                    STA 2040.X
 5066
                        SPRITECOL,X
 5868
                    STA 53287,X
                                                   ISPRITE COLOURS
 5070
                    INY
 5080
                    INY
 5090
                    INK
 5110
                    BNE PLACEX
                    LDA #1
 5200
 5210
                    STA BACKGR
                                                   WHITE SCREEN
 5220
                    LDA #6
 5230
                    STA BORDER
 5500
 9000 SPRITEVERT
                    BYT 51,75,99,123,147,171,195,219
                   BYT 40,71,95,119,143,167,191,215
BYT 30,60,90,120,150,180,210,240
 9010 RASLINE
 9020 SPRITEHORZ
 9030 SPRITECOL
 9090 SPRPT
                    BYT 130,129,128,129
```

ONE OF THE features that most people miss when programming in machine code is strings. This program provides the machine-code programmer with a number of subroutines to manipulate strings. It will then be possible to write educational programs, quizzes, etc. in machine-code with very little difficulty.

Up to 64 strings are available, numbered in hex from 00 to 3F. These are stored in the area of memory under the Basic Rom — \$A000-\$BFFF. The sub-routines are situated in memory between \$C000 & \$C300. They are in a form very similar to the kernal sub-routines and are used in the way way.

The new sub-routines are:

INPUT. Address \$C1FA: This sub-routine receives information from the keyboard and stores it in the string specified by the accumulator. For example,

LDA #\$09 JSR \$C1FA

The information will be stored in string number 9.

PRINT. Address \$C1FD: This sub-routine will display on the screen, at the current cursor position, the contents of the string specified by the accumulator. For example,

LDA #\$05 JSR \$C1FD

This will print string number 5.

CLEAR. Address \$C200: This sub-routine will clear all characters from the string specified by the accumulator. For example, LDA #\$20
JSR \$C200

This will clear string 32 (Hex 20).

CLEARALL. Address \$C203: This clears all 64 strings and requires no registers to be set. This sub-routine should be called before using the strings to make sure that they are ready for use. For example,

JSR \$C203

MEM→STRING. Address \$C206: This subroutine transfers information from the address specified in the X and Y registers to the string specified by the accumulator. The X register contains the least significant byte and the Y register the most significant byte. For example,

LDA # \$01 LDX # \$50

LDY # \$80 JSR \$C206

The above example transfers information from the address \$8050 to string number 1. The first 125 bytes of information are transferred unless a 0 (Zero) is encountered which indicates the end of a string.

STRING—MEM. Address \$C209: This performs the exact opposite function of the previous routine. This transfers the information in the string indicated by the accumulator to the address specified by the X and Y registers. The X register contains the LSB and the Y register the MSB. For example,

LDA # \$01 LDX # \$50 LDY # \$80

JSR \$C209

This, transfers the information in string number 1 to address S8050.

SWAP. Address \$C20C: This sub-routine

MACHINE



REM ****************

23

23

23

23

23

23

23

23

23

24

2

2

2

2

2

2

2

2

2

2

6

REM *RUN TO TRANSFER SUB'S TO MEM* 1 REM * RUN50000 TO CHECK DATA 3 REM * 4 REM **************** 10 AD=49152 20 READA: IFA = - 1 THENEND 30 POKEAD, A: AD=AD+1: GOTO20 . 200 DATA72,169,0,133,251,169,160,133,252:REM 7663 201 DATA104,168,192,0,240,17,24,165,251:REM 6065 202 DATA105,128,133,251,165,252,105,0,133:REM 6033 203 DATA252,136,76,11,192,96,32,227,193:REM 6109 204 DATA32,0,192,160,0,32,207,255,201:REM 6738 205 DATA13,240,6,145,251,200,76,41,192:REM 6134 206 DATA169,0,145,251,169,13,32,210,255:REM 6730 207 DATA32,240,193,96,32,227,193,32,0:REM 4604 208 DATA192,169,54,133,1,160,0,177,251:REM 5864 209 DATA32,210,255,200,201,0,208,246,169:REM 7967 210 DATA55,133,1,32,240,193,96,32,227:REM 5781 211 DATA193,32,0,192,160,0,169,0,145:REM 4313 212 DATA251,200,192,127,208,249,32,240,193:REM 8150 213 DATA96,32,227,193,169,0,72,32,97:REM 4091 214 DATA192,104,168,200,152,201,64,208,244:REM 7978 215 DATA32,240,193,96,32,227,193,134,253:REM 7697 216 DATA132,254,32,0,192,160,0,177,253:REM 6349 217 DATA145,251,201,0,240,5,200,192,127:REM 6559 218 DATA208,243,32,240,193,96,32,227,193:REM 7068 219 DATA134,253,132,254,32,0,192,160,0:REM 4836 220 DATA169,54,133,1,177,251,145,253,201:REM 7919 221 DATA0,240,5,200,192,127,208,243,169:REM 7938 222 DATA55,133,1,32,240,193,96,32,227:REM 5781 223 DATA193,72,138,32,0,192,165,251,133:REM 6391 224 DATA253,165,252,133,254,104,32,0,192:REM 5717 225 DATA160,0,169,54,133,1,177,251,72:REM 5449 226 DATA177,253,145,251,104,145,253,200,192:REM 8611 227 DATA127,208,241,169,55,133,1,32,240:REM 5438 228 DATA193,96,32,227,193,72,138,32,0:REM 4008 229 DATA192,165,251,133,253,165,252,133,254:REM 9176

230 DATA104,32,0,192,169,54,133,1,160:REM 4484

Graham Barbour helps you to write educational and quiz programs.

swaps two strings around. The first string is specified by the accumulator and the second by the register. For example,

LDA # \$08 LDX #\$05 JSR \$C20C

String number 8 will now contain the information previous stored in string number 5 and vice versa.

COMPARE. Address \$C20F: This subroutine compares the string specified by the accumulator - we will call this A - with the string specified by the X register - we will call this B. The result of the comparison will be returned in the accumulator. The possible

\$FF this occurs if A is alphabetically less than B or if A and B are alphabetically the same but A is shorter than B.

than B or if A and B are alphabetically the same but A is longer than B.

\$01 this occurs if A is alphabetically more

\$00 this occurs if the two strings are ex-

```
231 DATAØ,177,251,209,253,240,22,144,10:REM 6044
232 DATA169,55,133,1,32,240,193,169,1:REM 4994
233 DATA96,169,55,133,1,32,240,193,169:REM 6073
234 DATA255,96,200,201,0,208,223,169,55:REM 6507
235 DATA133,1,32,240,193,169,0,96,0:REM 3938
236 DATA0,0,0,0,0,32,227,193,141:REM 4594
237 DATA67,193,142,68,193,169,0,141,72:REM 4906
238 DATA193,173,67,193,141,69,193,170,232:REM 7430
239 DATA32,254,192,201,1,240,13,174,69:REM 5469
240 DATA193,232,138,205,68,193,208,234,76:REM 7401
241 DATA131,193,173,69,193,170,232,32,205:REM 7022
242 DATA192,169,1,141,72,193,76,102,193:REM 5700
243 DATA173,72,193,201,1,240,200,32,240:REM 6961
244 DATA193,96,32,227,193,141,69,193,169:REM 6748
245 DATA54,133,1,232,142,71,193,152,170:REM 6484
246 DATA169,1,160,1,32,186,255,173,71:REM 5739
247 DATA193,32,0,192,165,251,141,67,193:REM 6616
248 DATA165,252,141,68,193,173,69,193,32:REM 5682
249 DATA0,192,169,251,174,67,193,172,68:REM 6506
250 DATA193,32,216,255,169,55,133,1,32:REM 4327
251 DATA240,193,96,32,227,193,152,170,169:REM 7280
252 DATA1,160,1,32,186,255,169,0,32:REM 4383
253 DATA213,255,32,240,193,96,141,237,193:REM 7940
254 DATA140,239,193,142,238,193,96,0,0:REM 4785
255 DATA0,173,237,193,172,239,193,174,238:REM 9008
256 DATA193,96,76,33,192,76,67,192,76:REM 4850
 257 DATA97,192,76,118,192,76,139,192,76:REM 5790
 258 DATA168,192,76,205,192,76,254,192,76:REM 7014
 259 DATA73,193,76,142,193,76,206,193,0:REM 5662
 260 DATA0,0,0,0,0,0,0,0,0:REM 0
 270 DATA-1
 50000 FL=200
 50010 CO=1:AV=0:FORI=0T08:READA:IFA=-1
       THENPRINT "DOK " : END
 50015 AV=AV+(CO*A):CO=CO+1:NEXT
 50020 PRINT" LINE" ; FL; " . . . "; AV
 50030 PRINT" PRESS"
 50040 GETA$: IFA$= " "THEN50040
 50060 FL=FL+1:G0T050010
```

actly the same. For example,

LDA # \$01

LDX # \$09

JSR \$C20F

This compares strings 1 and 9. The result may now be used for a branch.

SORT. Address \$C212: This sub-routine performs a bubble sort on all the strings from the string specified in the accumulator to the string specified by the X register. They are sorted into alphabetical order in a fraction of a second. For example,

LDA # \$05

LDX # \$3F

JSR \$C212

This will sort strings 5 to 63 (Hex 3F) into alphabetical order.

SETNAM. Address \$FFBD: This is a kernal sub-routine but is needed to define the file name for the next two routines which load and save strings. The accumulator must hold the length of the name. The X and Y registers must hold the address of where the name is stored in the usual way - the X register containing the least significant byte and the Y register the most significant byte. For example,

LDA # 05 LDX # 00

LDY # 80

JSR \$FFBD

This will set a five character file name starting at address \$8000.

SAVE. Address \$C215: This routine saves strings to tape or disc, and must be used in conjunction with the Setnam routine. It saves from the string indicated in the accumulator up to and including the string in the X register. The Y register must contain the device number i.e. 8 for disc and 1 for tape. For example,

LDA # 10

LDX # 20

LDY # 08

JSR \$C215

The above saves strings 16 to 32 — Hex 10 to 20 - onto disc.

LOAD. Address \$C218: This routine loads strings and is used in conjunction with the Setnam routine. The Y register must contain the device number. For example,

JSR \$C218

This will load the previously saved strings from tape.

When these routines are called, the registers are not destroyed except where a value is returned e.g. Compare.

Program 1 is merely the loader program which transfers the sub-routines from Data lines to memory. If you have a machine-code monitor, you can save the actual sub-routine by saving from \$C000 to \$C250. The resulting program will be much shorter than program 1.

To enter program 1, type it leaving out the Rem statements and the numbers following them. Then, to test that all has been correctly entered, Run line 50000. Line 200 will appear followed by a number. Check that this number is the same as the number following the Rem statement for the corresponding line. If correct, press any key and the next line will appear. If incorrect, press Run Stop, list the suspect line and check it. Then Run 50000

IF YOU typed in last month's music editor, you will have produced data files of your favourite tunes, waiting to install them into the operating system of your BBC. Once installed two entry points are available from calling programs. An activation address will cause the tune to start playing, a call to the deactivation address will stop the tune after the sound buffer has processed at most two notes.

The most obvious application for this is to accompany games. The routine is very well behaved. As it is interrupt driven the tune will proceed without interference from the game program written in Basic or machine code.

Any memory locations used outside its own defined area are preserved across the period of time the tune system is active. This allows machine code programmers not to be concerned with page zero locations reserved for this routine.

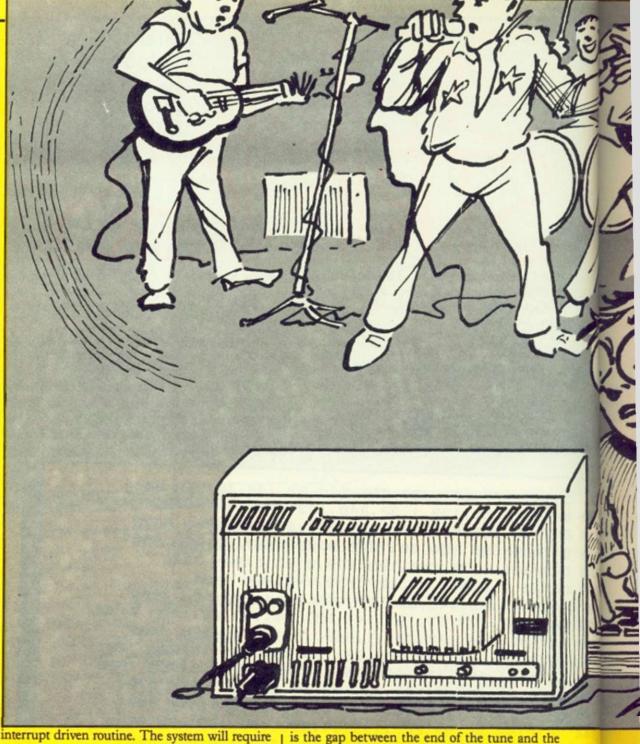
As is usual with machine-code routines an area of memory will have to be declared for it and the machine code itself assembled for this area. The amount of memory needed for the routine will depend on the length of the tune. In general, the routine itself will need in the order of 300 bytes and each note will add two bytes to the length of the code.

Once the file produced by this system has been loaded into the machine it has to be protected. Any interference with the event vector in page two has to be legitimate. The int'tune system uses this vector correctly, finishing with a jump to the original destination after the routine has completed.

Any other routines chained onto the vectors should do the same else the int'tune system will be bypassed. Likewise, the contents of the registers should be preserved over any other use of the vector. In Basic and other systems the value of Page or other system variables should be moved to protect the code once it has been installed.

For example, with disc users where Page normally resides at address Hex 1900 and the tune system is two pages long, Page should be moved to Hex 1B00 before the tune is loaded and the code assembled from 1900 onwards.

Having decided on the address where the routine is to be installed and the data file is available, the program can be run to produce the



you to input the assembly address and the data file name. This is then followed by the sound and envelope number which the tune is to use.

The users' programs should avoid using the selected sound channel. The last input requested is the gap between the end of the tune and the restart of the tune. This is in intervals of 1/25th of a second, and should be in the range 1 to 255.

After these values have been confirmed the code will be assembled. This will require the data file to be read in, tape users should watch the

```
10 REM INT'TUME2
20 REM FINTAN CULUIN
30 REM APRIL 1984
90 MODE 7
100 PROC_inputs
110 FOR opt = 0 TO 2 STEP 2
120 PS = location
130 FROC_interupt
140 PROC_interupt
140 PROC_checks
150 PROC_delay
160 PROC_SHOULD
180 PROC_SHOULD
180 PROC_SHOULD
180 PROC_SHOULD
180 PROC_SHOULD
180 PROC_SHOULD
180 PROC_HOULD

                                             400 UNTIL envelope > 1 AND envelope < 17
410 MEPRAT
410 MEPRAT
420 PRINTTAB:(21,12) pC(15):
430 INPUT YAB:(21,12) channel
440 IF channel <1 OR Channel >3 THEN PROC_wally
450 UNTIL channel >0 AND channel <6
450 UNTIL TAB:(21,14) deltarget
470 PRINTTAB:(2,23) *CONPIRR (YYN)*!
470 PRINTTAB:(2,23) *CONPIRR (YYN)*!
470 CESSONSE = 0ET AND 223
500 UNTIL response = 78 OR response = 87
510 IF response = 78 THEN OK = FALSE
```

```
520 UNTIL OK
530 OSSTTE = %FFF4
540 OSWORD = %FFF1
550 DIM pitches(i), durations(?)
560 FOR pitch = 0 TO 11
570 READ pitches(pitch)
580 NEXT pitch
670 FOR duration = 0 TO 7
600 READ duration(duration)
610 NEXT duration
620 ENGRMCC
700 DEEF PROC_Gone
710 PRINTTAB(2,16) "Activation address" | TAB(24,16) | Tativate
   (vate 720 PRINTTAB(2,18) "Deact(vation address";TAB(24,18);
 PACTIVATE 730 PRINTTAB(2,20) "Highest location "ITAB(24,20); "to
740 PRINTTAB(0,23)SPC(181'TAB(0,22)
750 CALL activate
760 ENDPROC
960 DEF PROC_Mally
910 VDU7
720 *FX 15,0
930 PRINTTAB(0,22)CHR*(136)1"OUT OF RANGE !!"
940 PRINT YAB(0,22)*PRESS ANY KEY."
940 PRINTTAB(2,22) SPC(20)'SPC(22)1
970 ENDPROC
 930 PRINTTAB(0, 22) PR
940 PRINT TAB(9, 23) PR
950 response=GET
960 PRINTTAB(2, 22) SPC
970 ENDPROC
1000 DEF PROC_interupt
 \ delay not active
```

```
1190RTS
1190.deactivate
1200LDA revec
1210STA &220
1220LDA revec+1
1220STA &221
1240RTS
1250 3
1280 3
1240 ENDPROC
1500 DEF PROC_main
1510 ( OPT opt
1520 .main
1530 3
1540 PROC_checks
1550 PROC_delay
1560 PROC_delay
1560 PROC_delity
1570 PROC_delity
1580 PROC_delity
1580 PROC_delity
1590 PROC_delity
1590 PROC_delity
1590 PROC_delity
1590 PROC_checks
2010 10PT opt
2020578 bbuff-4
2030PHA
20205TA sbuf = 4
2030PHA
2030PHA
2030PHA
2030PHA
2030LDA &70
2090LDA &70
2100LDA &71
2110PHA
2120LDA Sbuf + 4
2140ENE exit
upt #4
2150LDA flag
2150LDA flag
2150LDA flag
2160BNE no_delay
2170JNP delay
2190LDA &880
2290LDX #1251 - 4
2210JSR 058PTE
                                                                                                            A preserve A register
                                                                                                            \ stack registers
                                                                                                             \ stack page zero locations
                                                                                                              . examine chosen sound buffe
                                                                                                             1 branch if sounds being pro
```



"cassette motor" led on the keyboard and start the tape with the data file when it lights up. When the code has been assembled it will demonstrate itself, and provide its activation, deactivation and high water addresses. A copy of the file can be saved with the command:

BEEBSK Fintan Culwin with the second part of his music program for the Beeb.

*SAVE filename assembly address highest point (activation address) <RETURN>

If the activation address is included in the command then the routine will self activate when it is loaded.

The routine uses the screen refresh event to time the system. When screen interrupts have been enabled, every 1/25th of a second the operating system jumps to the address contained in &220/1 with the accumulator containing the event code 4.

In order to install this system the contents of the vector have to be preserved and the address of the main part of the routine installed into the vector and screen refresh interrupts enabled. This is accomplished within the listing within PROC_install labelled activate.

In addition the envelope is defined with a call to a routine labelled envdef and the pointers set to the start of the tune with reset. The deactivation routine within the same procedure removes the sound driver by restoring the original vector. A tidier deactivation can be accomplished by disabling the interrupts with a

*FX 13,4

This may be a bad idea as other routines could be using these interrupts. Additionally the sound channel buffer could be cleared by using a

command.

The routine labelled main is pointed to by the new vector. It consists of three major parts.

Setting up for interrupt, testing certain conditions and leaving the interrupt in an orderly manner. To set up for interrupt the A register is first preserved in Ram, then it, all other registers and two page zero locations are stacked.

The exit routine has to tidy the stack, restoring all values to the correct locations, and passing control to the address of the original vector. This is the only exit point from the routine.

The middle part first tests the Ram copy of the A register to determine if the interrupt was a screen refresh; with a fast exit if it isn't. A branch to the delay routine takes place if the delay is currently active, this is signalled by a flag. The state of the sound channel is then sampled.

If there are less than two notes waiting to be processed the program jumps to the soundit routine to place another note in the buffer else the program exits.

In order to enter a note into the sound buffer the routine has to have some way of knowing which is the next note to be played. This is provided by a 16 bit location called counter. The contents of this location are transferred to page zero. The two values pointed to by this are then put into the sound buffer definition area, and a sound osword command executed.

The counter is then incremented by two and a check made to see if the end of tune has been reached. When the end of tune is met the counter is reset and the delay flag enabled.

```
Cessed

2240JPP soundit

2250_exit

2250FLA

2270STA &71

2270FLA

2270STA &70

1 restore page zero locatio

As

2310TAY

2310TAY

2310TAY

2310TAY

2310TAY

2310TAY

2310TAY

2310TAY

2310TAY

2310 CPT expect

2300 DEF PROC_delay

2310 ( OPT opt

2300 STA delcount

2300 STA files

2370 LDA Melcount

2300 STA files

2370 LDA Mest

2400 JUNG

2410 JMP exit

2410 JM
```

```
3130 LDA #7
3140 LDX #(sbue MOD 256)
3150 LDY #(sbue DIV 256)
3160 JBY #(sbue DIV 256)
3170 CLC
3180 LDA 670
3190 ADC #2
3200 STA counter
3210 LDA 671
3220 ABC #0
3230 STA counter=1
3240 CMF #(top DIV 256)
3280 BME notdun
1 tune
3290 JBR notdun
3290 JBR reset
3300 LDA #0
3310 STA flag
3320 STA flag
3320 STA delcount
3330 .notdun
3330 .notdun
3330 JBP exit
3350 JBR #Sbuttom MOD 256)
3500 DEF PROC_utility
3510 ( OFT opt
3520 .reset
3530 LDA #Sbuttom MOD 256)
3540 STA counter=1
3550 LDA #Sbuttom MOD 256)
3560 STA counter=1
3570 LDA #Sbuttom MOD 256)
3600 LDX #(servour MOD 256)
3610 LDX #(servour MOD 256)
3620 JBR (BWORD
3630 RTS

Add JA60 JDX #(servour MOD 256)
3610 LDX #(servour MOD 256)
3620 JBR (BWORD
3630 RTS

Add JA60 JDY #(servour MOD 256)
3630 LDX #(servour MOD 256)
3640 JBY #(servour MOD 256)
3640 JBY #(servour MOD 256)
3650 SENDPROC
4000 DEF PROC_data
4010 IF opt ) 2 TMEN ENDPROC
```

```
4020 ( DPT opt
4030 .revec NOP : NOP
4040 .felse NOP : NOP
4050 .delcount NOP
4050 .delcount NOP
4060 .flag NOP
4070 .envbud
4080 3
4090 PX = PX:14
4100 i OPT opt
4110 .sbud
4120 1
4130 !sbud = 0
4140 'isbud = 0
4140 'isbud = 0
4141 REM clear sound budfer
4150 sbud > 0 channel
4160 chan = OPENIN(#) lenamed
4170 PX-PX-0 i bottom = PX
4171 REM bottom points to start of tune
4180 chan = OPENIN(#) lenamed
4190 FOR paramater = 1 TO 13
4210 envbud > BOET Schan
4220 envbud > PX envelope
4200 FOR paramater = value
4230 NEXT paramater = value
4230 NEXT paramater = value
4230 NEXT paramater
4240 SEPRAT
4250 pitch = BOET Schan
4270 PXTO = pitchesipitch-1
4280 PXTO = pitchesipitch-1
4280 PXTO = pitchesipitch-1
4280 PXTO = pitchesipitch-1
4290 INTEL EDF Schan
4210 CNTIL EDF Schan
4210 CNTIL EDF Schan
4210 CNTIL EDF Schan
4210 ENDPPOC
10000 BATA 101.109.117.121.129.137,145,149.157.165.169
1011 REM Suration values
10010 DATA 5,7,10.15,20,30,40,e0
10011 REM Suration values
```



International Micro Software Division



by Superior Software

The object is to retrieve diamonds from an underground cave system, using maps and passwords. But look out! Ferocious reptiles are lurking just around the corner. (Yuk!) BBC Electron.



by Virgin

The player, alias Rockin' Rodney delivers demos to his record company. But first he must test their danceability by blasting the people of Funky Town to their feet. Stupendously fab soundtrack includes Baker Street and Electric Avenue. Commodore 64

£8.95

mystery makes his own m review...

QUACKSHI

by Creative Sparks

A mad survival chase game, with the player as night watchman in a toy factory, pursued by crazed clockwork ducks. (I know the feeling).

Spectrum 48K

£2.50

DESERT BURNER

by Creative Sparks

Desert Burner is a powerful road bike capable of megasonic speeds. The rider has to deliver crucial weapon plans, but there are enemies attacking and traps to evade. Skilful, huh?

Spectrum 48K

£2.50

AVIEWTO A KILL

by Domark

The name is Bond, James Bond. The game is to tear through the 3D streets of Paris, escape from a raging inferno, then save the world from a ghastly time bomb (and the Duran Duran soundtrack!)

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£10.99

MAD DOCTOR

by Creative Sparks

As Mad Doctor, in this blood-curdlingly evil game, the player must create new life out of freshly killed body parts. If he arouses the villagers' suspicions, they'll kill him. A light touch on the scalpel is required. £8.95

Commodore 64

SHADOW FIRE

The player has a 100 minutes of real time to rescue Ambassador Kryxix held captive by the horrible General Zoff. All commands are issued through picture symbols to enable the game to be played at a truly intergalactic pace. Commodore 64 Spectrum 48K

THE ADVENTURE by Tynesoft

A whacky chase game based on the popular TV pensioner. Put on your kilt and your lavender water, wave your walking stick and zap the evil Scunner Campbell before he blams the world to bits.

Commodore 64 Commodore 16 Spectrum 48K

£9.95



by Gargoyle

Cuchulainn, the hero, is trying to free a companion imprisoned in the corrupt city of Dun Darach. But first he must take part in hundreds of minor adventures. A game for brilliant warped minds.

Spectrum 48K

£9.95

by Ocean

A perilous journey to the centre of the pleasuredome with those whacky Frankie boys. Plus a unique live recording of Relax.

Commodore 64 Spectrum 48K

£9.95

Something for zappers everywhere:



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YC1

All games featured above are available from Laskys, WH Smith and other good software stores.

Address.

COMMODORE 64, BBC AND SPECTRUM

Figure 1. CBM-64.

HEX LOADER FOR CBM 64 FIG. 1 5 REM HEX LOADER FOR CBM 64 FIG.1
6 REM
10 FOR I=680 TO 727:READA:POKEI,A:T=T+A
20 NEXT:IF T=6716 THEN GOTO 100
30 PRINT"ERROR IN DATA ".T-6716:END
40 DATA 169,1,133,186,169,1,133,184
50 DATA 133,187,169,8,133,183,169,208
60 DATA 133,187,169,2,133,188,169,56
70 DATA 133,251,169,199,133,252,169,251
80 DATA 162,231,160,206,32,216,255,96
90 DATA 68,79,87,78,76,79,65,68
100 SA=51000:LA=52855
110 INPUT"START ADDRESS";A
120 IF (ACSA) OR (ADLA) THEN GOTO 140
130 IF A/8=INT(A/8) THEN GOTO 150
140 PRINT:PRINT"ADDRESS ERROR":GOTO 110
150 T=(A-32768)AND255:PRINTA;:INPUTD*
150 IF D*="END" THEN GOTO 900
170 IF LEN(D*)=20 THEN GOTO 150
190 FOR B=0 TO 7:B*=MID*(D*),2*B+1,2)
200 GOSUB 300:IF E=1 THEN GOTO 280

210 POKE A+B,D:T=T+D:NEXT
220 B\$=MID\$(D\$,18,3):GOSUB 300
230 IF E=1 THEN GOTO 280
240 IF T=D THEN GOTO 260
250 PRINT"CHECKSUM ERROR":GOTO 150
260 A = A+B:IF ACLA THEN GOTO 150
270 GOTO 800
280 PRINT TAB(8+2*B+D)C\$"??"
290 B=8:NEXT:GOTO 150 PRINT TAB(8+2*B+1))C*"??"
B=8:NEXT:GOTO 150
E=9:D=0:FOR N=1 TO LEN(B\$)
C\$=MID\$(B\$,N,1):GOSUB 400
IF E=1 THEN D=N:N=4:NEXT:RETURN
D=D*16+X:NEXT:RETURN
X=ASC(C\$)-48:IF X(0 THEN E=1:RETURN
IF X(10 THEN RETURN)
X=X-7:IF X(10 THEN E=1:RETURN)
RETURN
RETURN 430 IF X>15 THEN E=1
440 RETURN
500 H\$="0123456789ABCDEF"
510 FOR A=SA TO LA STEP 8
520 PRINT A;"? "; T=(A-32768)AND255
530 FOR B=0 TO 7:X=PEEK(A+B):GOSUB 600
540 T=T+X:NEXT:PRINT"=";
560 Y=INT(T/256):PRINT MID\$(H\$,Y+1,1);
570 X=255 AND T:GOSUB 600:PRINT
580 NEXT:GOTO 900
600 PRINT MID\$(H\$,INT(X/16)+1,1);
610 PRINT MID\$(H\$,1+(XAND15),1); RETURN THE PROGRAMS given here will enable Spectrum, BBC, and CBM-64 owners to download via Your Computer's Telsoft service. Each month for each machine we transmit at least one - and usually two - of the main programs appearing in the current issue. Also available is the full user to user communications program, Dialsoft.

So far OE LTD's Telemod 2 and the VTX 5000 modems have been tested with the BBC and Spectrum but the service also works with

800 SYS 680:C#=CHR*(34)
810 PRINT:PRINT" TO RELOAD CODE:"
815 PRINT:PRINT" LOAD"C#"DOWNLOAD";
820 PRINTC#",1,1 (RETURN)"
825 PRINT:PRINT" THEN TYPE NEW";
830 PRINT: (RETURN)"
835 PRINT:PRINT"TO RUN THE PROGRAM";
840 PRINT" SYS 51000 (RETURN)"
900 PRINT:PRINT:PRINT"I ENTER DATA"
910 PRINT:PRINT:2 PRINT DATA"
920 PRINT:PRINT"3 SAVE DATA"
930 INPUT 2:0N Z GOTO 100,500,800

Figure 2. CBM-64.

A9068I21I08I20I0=3E2 A90F8I8602A90E20=2E4 I2FFA9008I15I0A9=4III FF8I8A02BA8E92CE=510 20CAC920C7CB20F8=4I5 CARISOCEC931F023=532 C935F8I4C936I006=43F FF8D8H02BH8E92CE=510
20CRC920C7CB20F8=4D5
CRADB80CEC931F023=532
C935F014C936D0066=43F
20BEC74C5BC7R916=410
20D2FF202FCBD0DB=52E
203FC8H92020D2FF=461
4C93C94C4RC82063=411
CC3C92CDA95B85FD=4F1
R9C85FE2028CDR0=547
002095CC202FCBC9=404
44F00BC954D0ED20=4E1
D2FFR901B007R944=4EF
20D2FFR901B007R944=4EF
20D2FFR901B007R944=4ER
25CDA98820ABCCR9=4R3
BDSFDA9CD85FEA0=6R0
002095CC2025CD20=383
95CC9848R0048C83=4CC
CE20B8C968R82025=4C4
CD2095CC9848R906=4C5
8D83CE20B8C9ADR7=5E3
CE85FBADR8CE85FC=6ER
68R82060CBR90185=38A
B885B998R293R0CE=539
20BDFFRER9CEACAR=567
CEEBD01C82025CD=479
A9FB20B8FF20F1CB=597
6020B9CC990D00B=3FE
A90085C7R92020D2=380
FFA90D20D2FF60R9=4E7
0D2029C8R90D20D2=306
FF692063CCR000R9=43F
FF9993CEC8D0FR20=5FB
D2CB90FB20D2CBB0=5ED
FBBD72CER0008C7C=4D0
CE8C7DCE202ECCRD=4D4
CE8C7DCE202ECCRD=4D4
CE8C7DCE202ECCRD=4D4
CE8C7DCE202ECCRD=4D8
CE8C7DCE202ECCRD=4D8
20D2CBB0DA9973CE=599 51080 51104 FB8D72CEA0008C7C=4D0
CE8C7DCE202ECCAD=4D4
72CE29F0C980D0E4=5C6
20D2CBB0DA9973CE=599
C8202ECC0009D0F0=4EB
A000AD76CE2980D0=492
0FR52B85FB18A52C=3D8
6D75CE85FC4CAAC8=587
AD78CE85FBAD79CE=607
85FC20D2CBB0A820=55E
D9CC20D2FFC820D9=607
CC202ECCC010D0EA=528
A9202D2FFAD75CE=56A
202ECD20D2CBB087=4D7
CD7CCEF00BA95820=503
D2FF2030C84C57C8=52C
20D2CBB0F8CD7DCE=65D
D0EBAD75CEA8B993=687
CED00E2030C8A991=4EE
20D2FF4C7EC94C57=51F 408

C880008C7CCE8C7D=447
CE20D2CBB0F091FB=5BF
202ECCC8CC77CED0=4D3
F020D2CBB0E00D7C=59E
CEF008R95820D2FF=4D8
4C57C820D2CBB0E0E=4CE
CD7DCEF0034C23C9=473
20RCCB2030C8RD75=409
CER089009993CERD=506
84CEC902D02520BC=436
CBR9C820F3CBR955=568
2016CDR95020F3CB=432
20C7CBRC73CEC888=54F
B993CED02398D0F7=5D4
4C5BC7R9552016CD=3DF
20F1CB4C63C9RC77=4EF
CE20D2CB8BD0FR20=57D
D2CB20D2CB4C47C9=53E
4C5CC8R52B85FBR5=4F5
2C85FCR000B1FB99=52R 51464 51472 4C5CC8A52B85FBA5=4F5 2C85FCA000B1FB99=52A 2200C8B1FB8523F0=4CE 0BA52285FBA52385=447 FC4C9BC918A5FB69=57D 02852B852F8531A5=37B FC6900852E853085=412 32602063CCA9028D=3E1 84CFR90BRD02DF60=483 51608 51624 51632 02852D852F853H85-412
FC6900852E853085=412
32602063CCA9928D=3E1
84CEA90B8D02DE60=4A3
8E81CE8C82CEA200=533
A9098DCDCE202FCB=4D4
C914F016C90DF051=4E2
C924D01920D2FF8D=544
C3CE84CE5C926000=64B
D0E3E000F0DF20D2=554
FFCA4CE5C9269000=64B
D0E3E000F0DF20D2=554
FFCA4CE5C92093090=554
D4C93A901548ADC3=444
CEC924F004684CE5=460
C968C94190BFC947=4BA
B0BB20D2FF38E930=4D5
C90R9002E907E005=36A
F0RB9DC3CE844CE5=61A
C9E000F0A0E001D0=52A
07ADC3CEC924F095=4FF
A92020D2FFA9FF9D=54F
C3CEA2008ECFCE8E=544
D0C8ED11CE8ED2CE=659
ADC3CEC924D06A9=512
0F8DCDCEE8BDC3CE=5DD
C9FFF01D20CBCAB0=5B2
3418BDC3CE6DCFCE=524
8BCFCER9006DD0CE=566
8DD0CEB020E84C75=534
CARDCFCEAC83CE99=642
A3CEC8ADD0CE99R3=660
CEC8188C83CEAC82=561
CEAE81CE602025CD=4ED
R200BD41CEC921F0=500
0720D2FFE84CBACR=570
4CDEC9ADCDCE8DCE=65E 51664 51672 51680 51688 51736 51744 51752 51760 51848 51856

CEADCFCE8DD1CEAD=6C1
D0CE8DD2CE18ADD1=639
CE6DCFCE8DCFCEAD=68F
D2CE6DD0CE8DD0CE=6BE
B005CECECED0E660=625
2063CCA90F8D8602=414
A95185FDA9CD85FE=575
A000209DCC2025CD=343
209DCC209DCC209D=3DF
CC2022CD20A9CC20=3A8
95CC2022CD20A9CC20=411 51929 51968 51968 51976 52000 52008 52120 52128 52136 52144 52152 52160 52168 52176 52184 52192 52200 52248 ABCC20D8C9604D7D=48A
CE8D7DCEA208AD7D=44AA
CE2A9010AD7DCE49=411
088D7DCEAD7CCE49=460
108D7CCE2E7CCE2E=3D5
7DCECAD0E160A000=516
A9009900D4C8C018=40E
D0F660A99320D2FF=5B3
6048A5A2290FD01F=37E
A5D448A5A22910F0=4A1
05A9A44C80CCA920=42B
20D2FFA90085D4A9=51C
9D20D2FF6885D468=53F
6020D2FFC8B1FDC9=620
21D0F6C8602025CD=4B9 52296 52304

21D0F6C8602025CD=4B9

52376

R90C20RBCC2095CC=46D 60R9058E81CERAR9=4E6 2020D2FFCRD0FRRE=603 81CE60C914F008C9=505 7FF00160R91460R9=456 7F6020E4FFC9C190=5C4 07C9DBD00338E960=4RF 60C941900EC95B90=494 08C9619006C97BB0=490 0849206048BR4808=2D5 20E1FFD0034C59CB=533 2868RR6860RD00DE=485 49016R9003R90060=250 RD01DE6048RD00DE=3C7 49026R6R686860200C=223 52392 52400 52408 52448 52456 52464 52480 52488 52528 52536 52544 52592 52600 52608 52656 52776 52784 52792 52800



A reminder of how to use the Telsoft service.

a number of other makes. For the CBM-64 it will initially only be available with the OEL Comms pack together with the Telemond 2 or similar modem; later we hope to adapt the service to work with Commodore's modem.

To enter the download program first type in the hexloader for your machine - figure 1 and then enter the machine code - figure 2. Once the program has been saved you can run it by entering CALL &6000 on the BBC, SYS 51000 on the CBM 64, RANDOMIZE USR

60000 on the Spectrum.

To find out what is available and how to receive software dial up Colchester (0206) 8068. This audio recorded information line will also advise you which telephone numbers to ring for the 300 and 1200 bit/s services.

When a program you want to download is on line, make sure your modem is set up and dial the number appropriate to its speed. As soon as you hear the modem tones switch the modem to line and replace the receiver. Select

Option 1 from the menu - Receive. After a block of data is received you will see "OK" printed if there are no errors, otherwise the program will wait for the blocks to come round again. When the "Program loaded OK" message appears return to the Telsoft menu and select Option 5. You can now save and run the program.

Note that CBM-64 owners will need to use Option 6 if machine code is to be saved.

```
250 A=A-B:GOTO 50
260 PRINT "TYPING ERROR !"
270 A=8*(A DIV 8):GOTO 50
280 *SAVE "DOWNLOAD" 6A00 6F87
                                                                                                                                                                                                                                                                                                                                                             168 B= EVAL("&"+MID#(B#,2*N+1,2))
178 'A=B:A=A+1:T=T+B
188 NEXT
                                                                                                                                                                                78 PRINT ~A" ";
88 INPUT ";" B$,C$
Figure 1. BBC.
                                                                                                                                                                                                                                                                                                                                                           198 FOR M = 1 TO LEN (C$)
288 X$=MID$(C$,M,1):GOSUB 388
218 IF E =1 THEN A=A-1: GOTO 268
220 NEXT
                                                                                                                                                                            98 IF LEN(8#) <>16 THEN 58
188 T=8
118 FOR N=8 TO 7
            REM BBC HEX CODE LOADER
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           290 END
300 E=0:IF ASC(X$)<48 THEN E=1:RETURN
310 IF ASC(X$)<50 THEN RETURN
320 IF ASC(X$)<65 THEN E=1:RETURN
330 IF ASC(X$)>71 THEN E=1
20 CLSI-PROFF

20 CLSI-PROFF

30 INPUT " START ADDRESS (Hex)"; A$

48 A=EVAL(""+A$)

50 IF A>66F87 THEN 280

68 IF A<62A80 OR A>66F87 THEN 28
                                                                                                                                                                           128 Xs= MIDs(Bs,2+N+1,1): GOSUB 388
138 IF E=1 THEN 268
148 Xs= MIDs(Bs,2+N+2,1): GOSUB 388
158 IF E=1 THEN 268
                                                                                                                                                                                                                                                                                                                                                           238 IF T= EVAL("&"+C#) THEN 58
248 PRINT "CHECKSUM ERROR !"
                                                                                                                                                                                                                                                                                           248 PRINT "CH

6C28 : 496CC68FD0823868,374
6C38 : 6580CC982D0862979,369
6C38 : 6680CC68AP91A281,447
6C48 : 2874FF98A47E80DF,55C
6C48 : 668AA2D2CAEBCAD8,5AA
6C58 : FBAA68A908B47EA8,458
6C58 : 28496C8BD6FAA47E,449
6C68 : 68APEBA08BA2FF28,452
6C68 : F4FFA908858AA90C,468
6C78 : 2828F28AB8DA984,3E4
6C78 : 2828F28AB8DA984,3E4
6C78 : 283866EA9998582A9,2F8
6C88 : 668C8EA9998582A9,2F8
6C88 : 668C8EA9998582A9,2F8
6C88 : 668CA988A28128F4,335
6C98 : 426811C943F8174C,3A2
6C98 : 616CA98BA28128F4,335
6C88 : 728E3FFAA7E28AB,458
6C88 : 728E3FFAA7E28AB,458
6C88 : 6DA98828086E28F8,2C4
6C8 : 6DA98828086E28F8,2C3
6C8 : 6DA988280886E28F8,2C3
6C8 : 6DA98828086E28F8,2C3
6C8 : 6D
                                                                                                                                                                       16CB0F2917620D56D,477
1CBC475D0F1200C6C,45A
1B0E3C57AF80BA958,4CE
120E3FF20E7FF4C67,45B
16A200C6CB0CFC57B,3C1
1F000B475B20C3FF4C,447
1676A20C76B20E7FF,429
1A573ABA90099056F,3F6
1A5BAC902D055Q2057,419
16BA9C020056CA955,3B8
                                                                                                                                                                                                                                                                                                                                                                                                                                             6D48 : A90C20E3FF20AB6D, 3EF
Figure 2. BBC.
                                                                                                                                                                                                                                                                                                                                                                                                                                             AD58 : 498720884EA99AB5,306

AD58 : 82894EB583A080820,361

AD60 : F8602084860209940,300

AD60 : 2899402099402088,317

AD70 : 608908200082076

AD70 : 608908200082076

AD70 : 60208860890008

AD70 : 62088608900

AD70 : 640908200862076

AD70 : 640908200862076,287
                        1 A9CBA8FEA28128F4,4C6

:FF28616C28486DC9.38A

:31F88BC934F8E9C9.4C8

:35F8864C8C6A4C47.288

:6AA99C28E3FFA9E8.4B2

:4088A2FF28F4FFA9.4FD

:83A28828F4FFA98.363

:428228F4FFA9C8A8.4C8

:FEA28828F4FFA9C8A8.4C8

:FEA28828F4FFA9C8A8.4C8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 6EBB
                                                                                                                                                                                                                                                                                                                                                                                                                                                6D98 :608498829886629F8.28F

4D88 :6029886089288860,33A

6D88 :20886020827FF20827,445

6D88 :64087380793A398318,1F1

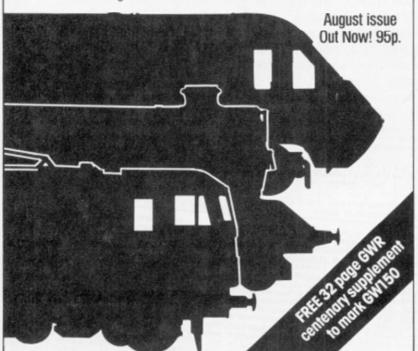
6DC8 :690720823FF68298F,312
                             0C20E3FF20F76BA9,439
15A20120F4FFA000,3EB
                            A915A28128F4FF28,394
                            8C6C90FB200C6CB0,348
                                                                                                                                                                            120006E20F86D20A8,2D8
16DA90520006EA988,2DA
                           FBA0000477847884,416
                              79847A847B857828,388
                           : D56DA57829F8C988,489
: D8E2288C6C88D899,468
                                                                                                                                                                            128386EA99628556C, 2DE
                                                                                                                                                                                                                                                                                                                                                                                                                                                  ADFR : CADREBARZBESFFCB, SAC
                              7188C828D56DC889,364
                                                                                                                                                                                                                                                                                                                                                                                                                                                  6DF8 :8182C98DD8F6C868,4F7
6E88 :867DAAA92828E3FF,478
                             DOF 8A888A5742988,422
                                                                                                                                                                           188D@FA2@@C6C2@@C,316
                                                                                                                                                                         16C4C486B4C6C6AA9,336
12828E3FFAY6F28E3,43D
1FFAY6B28E3FF68A9,51E
19CA888BA6BAE882D8,41E
                           : D008BA51C857618A5.354
                                                                                                                                                                                                                                                                                                                                                                                                                                               6E00 : CAD0FAA67D60C97F.55F
6E10 : D00BA90620F4FFE0,4FD
6E10 : 00F612A97FC920B0,3C3
6E20 : 00EC90AF00AC90DF0,3A1
6E20 : 00EC90AF00AC90D60,2D1
6E30 : 00EC90AF00A7EA991,440
6E30 : 00EC90AF0A7EA991,440
6E30 : A20120F4FFA903A2,404
6E40 : 00F4FFA99A200,403
6E40 : 20F4FF902902F0F4,4DA
6E50 : A47CA997A20920F4,4TF
6E50 : FFA903A20420F4FF,464
6E60 : A991A20020F4FFD0,49F
                                                                                                                                                                                                                                                                                                                                                                                                                                                  6E88 : CAD8FAA67D68C97F , 55F
                              1D65738577288C6C,289
888528E3FFC828D5,524
                            16DC818D9F8A57328,435
1826D288C6C88A8C5,3CC
                                                                                                                                                                           : 88A21328F4FFA212,387
: 28F4FF68A29723F4,4C8
       6ACB
                              17AF88BA95828E3FF,478
128E7FF4C676A288C,34F
    6AD8 : 20E7FF4C676A208C; 34F
6AD8 : 6CB08CC57BF00BA9, 48C
6AE8 : 5820E3FF20E7FF4C, 4AC
6AE8 : 676AA573A8B9856F, 43E
6AF8 : D00E20E7FFA9820, 3B8
6AF8 : E3FF4C836B4C676A, 469
6B00 : A000847A847B209C, 2C9
                                                                                                                                                                           1FFA29628F4FF68A9.553
                                                                                                                                                      6C08 :20F4FF6018A99685,44F
6C10 :8F847EA991A20020,38D
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   6F90 :4D454E550D202020,1A2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        240 PRINT "Checksum Erro
250 LET a=a-8: 80 TO 50
                                                                                                                                                                                                                                                                                                                                           158 IF e=1 THEN 80 TO 268
178 POKE a,y: LET a=a+1
188 LET t=t+y: NEXT n: LET y=8
 Figure 1. Spectrum.
```

```
08 INPUT " i"|b$
05 IF B$="END" THEN GO TO 200
98 IF LEN b$<>20 THEN GO TO 260
108 LET t=a-256*INT (a/256)
118 FOR n=0 TO 7
128 LET x*=b$(2*n+1 TO 2*n+1)
                                                                                                                                                                                                                                                                                         268 PRINT "Typing Error"
278 LET a-8-INT (a/8): 60 TO 58
280 SAVE "download"CODE 68888,1136
298 POKE 23658,8: STOP
  5 REM SPECTRUM 48k fig. 18 REM Hex Code Loader 15 CLEAR 59808 20 POKE 23658,8: CLS: PRINT 30 INPUT "Start Address"; a 50 IF a>61135 THEN GO TO 288 60 IF a<68080 THEN GO TO 28 78 PRINT a;
                                                                                                                                                                                  198 FOR m=1 TO 3
288 LET x==b$(17+m TO 17+m)
285 GO SUB 388: LET y=y=16+x
218 IF m=1 THEN LET a=a-1: GO TO 268
                                                                                             125 GO SUB 300: LET y=x
130 IF e=1 THEN GO TO 260
140 LET x$=b$(2*n+2 TO 2*n
                                                                                                                                                                                                                                                                                         300 LET e=8: LET x=CODE x$-48-7*(x$>"9"
310 IF x<0 OR x>15 THEN LET e=1
320 RETURN
                                                                                                                                                                                  228 NEXT # 238 IF tmy THEN PRINT ":"|b#: 80 TO 58
                                                                                              145 80 SUB 388: LET y=y+16+x
                                                                                                                                                                                                                                        60672 | EFEE10326FEF3721,3D5
                                                                                                                                                         68448 :31D3FF3E9F329F5C,385
68448 :328D5C32485C3E81,258
68456 :D3FE21915CC89EFB,568
68464 :CD59EDC366EACD15,52F
68472 :EECD66ED3E81D3FE,556
                                                                           68288 :E8EE12133E8812CD,348
Figure 2. Spectrum.
                                                                                                                                                                                                                                         60680 :6FEFCB1623CB160D,358
60680 :20E2C1E1C9110501,394
                                                                                                                                                                                                                                                                                                                                      1C9FE07201CFEC020,4F3
                                                                                           D7ECCDA6ECC3AAEA,681
CD1FEDDAAAEA2178,518
EFBE20E121E5EE3A,524
                                                                                                                                                                                                                                                                                                                                     :19FE@C2814FE@B28,386
                                                                           68224
                                                                                                                                                                                                                                         68696 1216A88CDB583C93E,32F
                                                                                                                                                                                                                                                                                                                      68928 118FE8D288CFE28FA, 367
40000 :CD15EDC307ECCD15,4C7
                                                                                                                                                                                                                                         68784 1963277EFCD47EDDA,529
                                                                                                                                                                                                                                                                                                                       60936 I OFFEFFE BOFALLEESE, 486
                                                                                           168EF856F3E888C67,3CC
13E888E288BCDD7EC,48F
13E2132885CC3FFEB,482
               EDCD36ECCD66EDCD,631
50EDCD47EE38FBCD,5AF
                                                                                                                                                                                                                                       60712 12EDF1C366EACDAC.5C8
60720 1ED7BE601F602D3FE.548
60728 1AF2177EF53200237.2FC
60736 1C9CD77ED30EBC9CD.5F0
60744 147EEDBFECBC037C9.5E6
60756 120043E3510023E37.107
60768 1D3FFDB7F1C9F53A.675
60776 161EFFE0020043E36.376
60704 1D3FFCD50EDF1C93E.644
60702 100DBFFE60037C0DB.59.640
60000 1FFE60237C0DBFFE6.626
60000 1302004DB7FA7C93A.3E0
60016 101EFFE0020043E37.390
                                                                                                                                                                                                                                         60712 12EEDF1C366EACDAC,500
                                                                                                                                                                                                                                                                                                                       68944 188C93E87C9CD6B8D
                                                                                                                                                                         : 2165EE3E08CD0FEC, 442
: CD04ECCDA3ECCDA6, 654
: EC23CD77ECCD77EC, 58F
                                                                                                                                                                                                                                                                                                                       60952 | 3E02CD01163E1832,1C4
               BBEDFE31CA99EAFE,69A
:35CA87EAC366EACD,5D@
                                                                                                                                                                                                                                                                                                                      68968 : 895CC93E121601CD,382
68968 : 1122C93E121600CD,257
68976 : 1122C9C5D5E53E02,3E8
68984 : CD0116CD47EE38F8,451
                                                                                            3E00326FEF3270EF, 3C7
            : 15ED3EFACD84EDCD.5FD
:15EDC9CD15EDC366.553
:EACD66ED11E5EE86.58C
:803EFF121310FCCD.458
:15EE11CDEE86173E.3D2
:28121310FCCD1FED.3DA
:30F80256EDCD1FED.5B8
:30F83265EF3E0832.3E9
:6CEF326FEF3270EF.544
:3A65EFCDE8EC3A65.5A1
:EFE6F0FE8020DE8E.627
:091165EFCD1FEDDA.501
:AAEA1312CDE9EC3D.552
:28F23A69EFE68028.51A
:80847892260EFE6.366
:80847892260EF8680.1DA
                15ED3EFACDB4EDCD, 5FD
                                                                           68272
                                                                                            EDSB6BEFBEBBCD1F,480
                                                                                                                                                                          :CDA@ECCD84ECCDA6,661
:EC233E@DCD8FECCD,4CF
                                                                                         EDDAAAEA3273EFCD,634
                                                                                                                                                           60520
                                                                                                                                                                          184EC23CDA3EC3E83,498
                                                                                                                                                                                                                                                                                                                      CDSCEEFIDICIC93A.5CD
                                                                                                                                                           60528
                                                                                                                                                                          :CDBFECCD84ECC9CD, 68B
                                                                                                                                                           68536
                                                                                                                                                                          : A3EC3EØ7CDBFECCD, 561
                                                                                                                                                                         :84EC23C97EFE00C8,520
:CD8BED23C384ECFE,651
                                                                                                                                                          68552 : CDBBED23C384ECFE,651
68568 : 9806F33E28CDBBED,528
68568 : F13DC38FECCDA8EC,65D
68576 : CDB3ECCDA6EC3E8D,5A6
68584 : CDBBED3FF328C5C,574
68592 : C9F513E6F8C81FCB,68C
68688 : 13FCB1FCB1FF8,68C
68640 : 15FCB1FCB1FF8,68C
68642 : D4ECC6871213,498
68646 : F1E68FF638FE3AFA,686
68624 : D4ECC6871213C921,46C
68632 : CDEEE5CD84ECE186,69C
68648 : 173E28772318FC3E,338
68656 : 77C58E887EAFCB17,449
68664 : 388D7EEE88773A6F,3C9
                                                                                                                                                                                                                                         A0016 101EFFE0020043E37,397
                                                                                                                                                                                                                                                        120FDF1C9CDACED3D,62A
120FAC9C5D5E3F5FE,70D
                                                                                                                                                                                                                                                        :7F2813CDF9EDFE0C,537
:280CFE0D20053E20,28A
68168 :11CDEECD1FED389A,47F
68176 :12138CCDEBEC79FE,45C
68184 :1828F83A68EFCDB1,447
                                                                                                                                                                                                                                          AB872
                                                                            68416 | 1FED38FBC38DEAF3,594
                                                                                                                                                                                                                                                         1D73E@DD7181@3E2@.34F
                                                                                                                                                                                                                                                         1 D73E88D73A885CFE, 4E8
68192 | ECCD1FEDDAAAEA21,574
68288 | 16FEFBE28133E5811,326
                                                                           $8424 :8683AFD3FF18FB3E,3DB
$8432 :48D3FF3EFFD3FF3E,56F
                                                                                                                                                                                                                                          68896 12128833E88D73E5F,2E6
```

RAIWAY STEAM-DIESEL-ELECTRIC

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Creating Arcade Games on the Commodore 64 by Robert Woolford (ISBN 0 907563 75 9) is £7.95, and is available at most book and computer stores, or directly from the publishers, post free:

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Interface

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FONT 464 is an easy-touse program enabling you to design, edit, and save your own characters and graphics for simple use in BASIC programs. There are 6 predesigned fonts and sophisticated printer-driving software which allows high-resolution screen dumps and letter writing on Epson compatibles or the DMP1. DEVPAC is a complete machine code development package. It is the second one that many people buy, because after the first one they know what to look for! The 'front panel' debugger is the only way to really see programs in action, and assembly from multiple source files is fast enough to satisfy its most

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Pascal is a valuable educational and development tool as well as running typically 40 times faster than a BASIC equivalent. Our compiler is an almost full implementation which compiles direct to machine code (no slow P-codes). Multiple file inclusion allows very large programs to be compiled.

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C combines high-level structuring with direct control over the machine, all at compiled speed. Our compiler is now available from good retailers, and has proved extremely popular. It supports all statement types (plus inline code) and over 40 operators; whilst char, int, unsigned and combinations using pointers, arrays, structures, unions, functions, and typedef are all allowed data types. External and static variables can have initializers, whilst auto variables support recursion. There are six preprocessor directives and over 60 library functions with a selective inclusion scheme.

MON QL is our latest product and our first on the QL; it was written by Andy Pennell, who has a great deal of experience on the QL. It is similar in style to the well-known MON 'front panel' in DEVPAC and includes additions like job control and multi-tasking support. It also catches system exceptions and includes fixes for QDOS.

Product Price Table

tar y	Pascal €	DEVPAC €	C	ULTRAKIT £	FONT 464
ZX Spectrum	25-00	14-00	25-00	9-45	
Amstrad CPC464	29-95	21-95			7-95
MSX	29-95	19-95			
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Sharp	39-95	25-00			
Sinclair QL		19-95 (MON QL)			

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could that

"Poor is the pupil who does not surpass his master" Leonardo da Vinci is supposed to have said. Taking this principle to heart, for this month's £15 competition we would like you to outdo John Ransley by improving on the demonstration program he gives elsewhere in First Bytes.

In other words we want you to write your own Snake program making it if possible — faster and more elaborate than John Ransley's, but not longer. It can be for any machine and can contain Peeks, Pokes, user defined graphics, print statements or whatever takes your fancy.

Despite the simplicity of the task we set for June's competition the response was disappointing. We were looking for an animation program based only on print statements and without any user-defined graphics.

From the few entries received we awarded the prize to Giorgio Berardi, Via Buonarroti 60, 47100 Forli, Italy. His program runs on the Spectrum but could easily be converted for other machines.

5 LET as="I COULD DO THAT" 18 LET x=18: LET v=(32-LEN as) 1 LET o=1 20 FOR n=38 TO y STEP == LET o=1
| FOR n=3@ TO y STEP =1
| PRINT AT x,n;a*(p)+" "
| MEXT n
| LET y=y+1: LET p=p+1
| IF p<(LEN a*+1) THEN GO TO 78 PAUSE 58: LET y= (32-LEN a#) PRINT AT x,y;a*;AT x-1,y;"
": REM Number of 40 NEXT n 150 PRINT AT n+1,y;" " 160 LET y=y+1: LET p=p+1 170 IF p<(LEN a*+1) THEN GO TO

Starting out in home computing? First Bytes is for you. Just write to Your Computer with any hardware or software problems, no matter how small or simple.

A bluffers' guide to micros

"TIS PLEASANT, through the loopholes of retreat, to peep at such a world; to see the stir of the great Babel, and not feel the crowd". Whatever William Cowper was writing about in his 18thcentury poem The Task, it might just as well have been computer languages, because this is something that micro users talk about a lot, but never actually do. It is thus an area wide open to bluffing.

Everybody uses Basic, which is supposed to stand for Basic All-purpose Symbolic Instruction Code. Worldlywise micro cynics always grin and maintain they have it on personal authority from John Kemeny that he invented what the acronym stood for a long time after he invented the acronym - probably during some after dinner game played by academics at Dartmouth College, USA, back in 1960. Basic programs are just long lists of lines made up of two things: a line number and a series of statements.

Six sorts of statement go into Basic programs: assignment statements which set up a variable or manipulate it in some way, input/output statements which deal with the peripherals, like the screen or the printer, control structures like the famous Goto If or Gosub statements, plus statements related to graphics and sound, error detection and, just in case I've forgotten something, miscellaneous. Languages which everybody talks about but never use include - Forth, Pascal, Lisp, Prolog, Logo. These are just the ones available in some form on microcomputers. More of this later, since the dedicated microbluffer must first be made aware of the dangers inherent in the break-out of a Basic skirmish, because this is the language everyone uses.

Just as God confounded the speech of men when they attempted to build the Tower of Babel to reach heaven, so Basic has been fractured into many dialects as a divine punishment for giving computing power to the little man instead of leaving it safely in the hands of big business, academic researchers and military intelligence.



Obedient to the principle of divide and rule, small knots of micro-hackers can be found arguing heatedly in their high-level human languages about the advantages of their Basic.

When Kemeny and Kurtz, the famous Dartmouth College double act, invented Basic routines, they revolutionised computer programming by doing away with having to assemble programs on punched cards, giving them to the machine and leaving it to extrapolate wildly from your initial error-strewn program until producing results of no use to anyone.

Now, instead of leaving the machine to single-handedly improvise from the original, or "batch program", you could join in and actually interfere with the program while it was going wrong. This is known as "real time" or "interactive" programming, and since the purpose of Basic was to allow non-programmers to program, you can imagine that the capacity for error must have been greatly enhanced.

There are several "standard" Basics. Computer languages spread rather like diseases, so that the dominant form is usually the most virulent, communicable or "portable" language, but not necessarily the most pleasant to experience. Microsoft Basic is thus generally regarded as a standard Basic because it is the most widely used, rather as engineers still end up using Fortran rather than Pascal, due to the company not wanting to spend any more money on systems development.

The American National Standards Institute spent 10 years developing a standard Basic, so it could carry out the natural function of such organisations, i.e., go around telling everyone that the standard universally adopted in the meantime was all wrong. It allows long

variable names and is very structured; like most extended Basics it starts to look like another language - in this case, Pascal, a very structured programming language developed by Swiss professor, Niklaus Wirth. About the only home computer you might encounter this admittedly powerful language on, is the Enterprise - its IS-Basic is closely related to the ANSI

Another Basic which owes a lot to Pascal is BBC Basic. BBC owners are quietly smug about the speed of their Basic. Detractors will point out that it is highly non-standard. The BBC owner will take this as a compliment. His language has powerful commands like Repeat-Until, which you don't find on your common or garden Spectrum. People who say that BBC Basic's VDU commands aren't very elegant had better make sure they aren't struggling with an overheated power pack, aerial and cassette leads, whilst frantically looking for a mains adaptor, when they say this. BBC owners are patrician, cool. Not for them the troglodyte scrabbling of the cheapskate Spectrum

The gruff, bluff Commodore 64 owner is liable to be a little spiky if the topic of Basic comes up. The strength of his machine is hardware; its language is Neanderthal. It uses the raw, ungraded old PET Basic of Commodore's early machines. The sprite graphics are a considerable improvement on the Vic-20, but a real micro-snob will remember to sneer at the fact you have to access them with Poke statements.

An Atari user would make mincemeat out of him. Both of their languages are descended from Microsoft, MBasic for (continued on page 89)

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(continued from page 87)

short. But until the C-16, graphics and sound commands were notably absent from Commodore Basic.

Having compared Basics, micro buffs can then bicker about the way they use

There is a fanatical hard core who insist that programs must be structured. Structuring a program is a way of making it less interesting. Instead of a fascinating tracery of Goto statements endlessly looping and recurring like smoke trails at an air-display, the idea is to construct the program out of 'modules'

This makes the program easy to edit and, worse, it makes it easily understandable to other programmers. If these people had their way, a bloody crusade would be waged against the Goto statement. They have misunderstood the true spirit of computing and are very dangerous men - not so much programmers as pogrommers. Paul Bond

disc maze Round the

SINGLE SIDED, double sided, double density, formatted, unformatted, 40 track, 80 track - these are just some of the terms used to describe discs and disc drives. Not surprisingly the newcomer often feels more than a little bewildered. So in this follow-up to May's introduction to discs we aim to set you straight on basic disc vocabulary. Most of the terms described here refer to 51/4in, discs, which are still the most popular size on home micros.

First, the drives themselves. Most of them can only handle a fixed number of disc tracks, so a 40 track drive cannot read an 80 track disc. They are also either single or double sided. Unlike the 3in. variety 51/4in. discs cannot be turned over but require a drive with two opposing read/write heads if both sides are to be used.

These considerations apart 51/4in. drives are generally not configured for specific disc operating systems and can often be interfaced to a variety of different machines. Thus Opus, Kempston and Cumana all supply interfaces which allow BBC drives to be run on the Spectrum. You can also add a 51/4in. drive to the Amstrad disc system as a second drive.

As for the discs, most are suitable for any disc system despite the information given on their labels. Manufacturers commonly produce all 51/4in. discs as double sided and double density. The only difference between those discs which are sold for 80 track double density operation and those for single density 40 track is that the latter are subjected to less rigorous quality

For example discs are described as 96 TPI - tracks per inch - or 48 TPI. Although the latter are usually formatted to give 40 tracks they can generally also be used as 80 track discs.

In single density mode data is interspersed on the disc with synchronisation bits which serve to keep the timing of the disc head up to the mark. By dispensing with synchronisation bits double density systems manage to store twice as much data as single density.



The quality of the disc itself and the sensitivity of the drive is therefore much more critical. But whether a disc system runs double or single density rests largely on the disc interface and not the drive mechanism.

Discs arrive from the manufacturer in a blank unformatted state. It is then up to the user to format the disc for a particular operating system. Formatting disc directory, and how many entries the directory can take.

The size of the directory limits the number of files — whether programs or data — that can be stored on the discs. Thus the BBC Disc Filing System gives 40 track discs a maximum of 32 files, while Commodore drives allow 144 files on 35 tracks.

Simon Beesley.

thonesque pokes — creating an arcade game

WHICHEVER MICRO you own and however much the makers may boast that its Basic runs faster than others, the fact is that you'll always be faced with something of a compromise when writing arcade-style games. Basic is a friendly language, but it's one that executes in a drawl.

Yet, as you can discover for yourself with a little experimentation, it is possible to shift individual characters and objects constructed from your micro's alphanumeric or graphic set around the screen with impressive speed - provided you use Print statements to do so.

Only problem is, games often require constant Peeking of different screen locations to suss out what's happening there, and combining active Print elements with frequent Peeks, and even the occasional Poke, can leave you with a program that runs slower than a Sinclair C5 on a dud torch battery.

Thankfully, though, there is a way of achieving acceptably fast screen movement using Pokes exclusively. It's just a matter of observing the golden rule of declaring as many fixed-value variables as you can right at the start of your program, so that subsequent sections of it can use this silicon shorthand as a short cut to faster execution.

If you'd like to refresh your memory as to the fundamentals of screen movement, animation and the use of Peek

and Poke, you'll find these explained in the June and July issues of Your Computer.

Rather than spend too much time theorising, let's get right down to keying in a program that makes good use of Peek and Poke: on the CBM-64 it's cloned from that arcade classic in which you control a centipede or snake which has to be moved around the screen gobbling objects while avoiding hazards

 not least, it's own body.
 10 PRINT"[CLR SCREEN]S"; :P=-1:L=0:D=5

20 IF SC>HI THEN HI=SC

30 SC=0

40 S0=1601:S1=SO+1:S2=S1+1: S3=S2+1:S4=S3+1

50 S5=S4+1:S6=S5+1:S7=S6+1: S8=S7+1:S9=S8+1 60 PRINT" HI-SCORE"HI: FOR

D=1 TO 1500:NEXT 70 POKE S0,56:POKE S1,37:POKE

\$2,37:POKE \$3,37:POKE \$4,37 80 POKE \$5,37:POKE \$6,37:POKE S7,37:POKE S8,37:POKE S9,37

90 100 REM MAIN LOOP

PRINT"[CLR SCREEN]" 110

L=0

130 D=D+5

FOR I=1 to D:X=INT(RND(1)) 140 *900)+41

IF PEEK(1103+X)<>32 THEN X = INT(RND(1)*900) + 41: **GOTO 150**

POKE 1103+X,90:NEXT

170 TI\$="000000":GOTO 280 180 J=PEEK(56320)

190 IF J=126 THEN P=-40

200 IF J=125 THEN P=40 210 IF J=123 THEN P=-1

220 IF J=119 THEN P=1

230 S9=S8:S8=S7:S7=S6:S6=S5: S5=S4:S4=S3:S3=S2:S2=S1: S1=S0:S0=S0+P

240 REM CHECK COLLISON

250 IF PEEK(S0)=90 THEN SC= SC+10:PRINT"SCORE"SC: L=L+1:IF L=D THEN 120

260 IF PEEK(S0) = 90 THEN **GOTO 280**

270 IF PEEK(S0)<>32 THEN GOTO 10

POKE S0,56:POKE S1,37: **POKE S9,32**

290 REM SCORE/TIME UPDATE 300 PRINT"SCORE[24 SPACES] TIME "TI\$

310 IF TI\$>"000060" THEN PRINT "[CSR HOME][8 SPACES] TIME EXPIRED! SCORED"SC:STOP 320 GOTO 180

This listing will work as it is on the Commodore 64, and on other micros with just one or two changes. In line 40, the value 1601 awarded to SO is the screen memory address that will place the snake's head - and the rest of his body will follow - near the centre of screen. The values 56 and 37 which crop up in lines 70 and 80 are the 64 screen codes for the figure 8 and percentage sign respectively.

In lines 140 and 150 you may use a different syntax to set the randomiser which peppers diamonds over the play-

Lines 180 and 190 make the snake move up, down, left or right under the control of a joystick; alter as necessary. On the 64, if you don't have a joystick you can

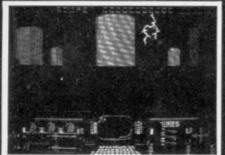
PEEK(197)

As you'll see when you play this simple demo, the "chaining" of Pokes in lines 70 and 80, and their updating in line 230, produces a surprisingly smooth - if not totally slinky - and automatically synchronised screen movement of no fewer than 10 different characters

The snake wraps round - moving up or down a line depending on direction - the edges of the screen, but take him off the top, or try to have him double back on his body, and the game resets.

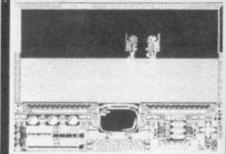
Line 310 gives you just 60 seconds to eat all the diamonds; beat the clock and the game resets with even more targets. The score feature gives you 10 points for every diamond taken and line 20 keeps a tally of your best effort.

This program has been kept to its bare essentials to make it easy for you to study its structure - especially the use of Peek and Poke. Once that's clear to you, you could add a few bells and whistles in the form of colour, sound effects, additional playfield obstacles, and perhaps user-defined characters to produce a more convincing snake! John Ransley.











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BREAKTHROUGH

During the production and testing of machine-code programs I have often accidentally caused my Spectrum to stick itself in an infinite loop, against which the Basic Break command will prove quite useless.

This program for either the 16k or 48k Spectrum solves this problem. By running the program before you test a machine-code subroutine or program, it will put the Spectrum into interrupt mode two (IM2). In this mode the machine will not only perform an RST566 instruction each time an

interrupt occurs, but will also execute the short machine code program which will check whether or not the Break key has been pressed. If the test should prove positive it will return the machine to interrupt mode one (IM1).

Once the program loader has been entered and run, it will automatically put the program above Ramtop and execute it. Once the Break key has been pressed however, the machine must be placed back into interrupt mode two by entering the line RANDOMIZE USR 32377. Edmund Ward.



SEARCHER

This is a simple machine code routine used to know what programs are loaded in a cassette, what kind of programs are, and the memory they employ. The routine runs on a CBM-64, and it's stored at C000 hex (49152 decimal). It uses some of the Rom and Kernel routines.

Once the program is typed, you must run it to store the data in memory.

When you want to know the content of a cassette, you must call this routine by typing SYS 49152. Manuel Garcia Alvarez.

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TOP* RESPON

STOP REPEAT

I have a friend who owns a Commodore 64. Unfortunately, he is quite severely disabled as he suffers from Freidrich's Ataxia, which affects his co-ordination. He was hoping to be able to use his computer as a word processor in place of his electronic typewriter. Unfortunately, he has found that when he attempts to use the computer in this way, the keyboard is too sensitive, and he gets multiple responses from the keys. I would be interested to learn if there is anyway he might overcome this problem.

Albert Hunt, Stafford.

I DO NOT know which word processing program you are using with the 64. However, if it allows you to do some modifications in Basic, it might be useful to put a small routine like the following at the point in the program which allows input from the keyboard. This routine simply ignores any duplicate key presses, so it will not give multiple responses.

If, however, more than one press of a similar key is needed at a time - as for double letters in words - a seldomused key - I've chosen the %, but you may have one which is more suitable - needs to be struck between the key presses needed for the double letter.

The letter which is 'passed on' to the word processor is in the variable Q\$, while the routine also uses P\$.

Ps=""
Q\$=INKEY\$
IF Q\$="" THEN 20
IF Q\$="%" THEN P\$="":GOTO 20
IF Q\$=P\$ THEN 20 REM NOW Q\$ IS USED TO 'HAND ON' REM KEY PRESS TO PROGRAM ITSELF

CLEAN SCREEN

I have written several games for the Spectrum, in which I load a complete picture (saved as Screen\$) into the computer, so it can sit there while the main program is loading. However, I don't want the loading message of the second program to obliterate part of the picture which is on the screen. I know I can overcome this, to some extent, by controlling the Ink and Paper colours of the loading message, but this puts some restriction on the original Screen\$ picture. Is there a better way? Arnold Thrimble,

STEVEN DEMPSTER of Littleworth, Stafford, has discovered a very good way of solving this problem. To stop the filename from obstructing your Screen\$, first Peek 23570. Note down the answer you get. Next, type in Poke 23570,16. After the Screen\$ has loaded, Poke 23570 with the original number.

Do you have a problem related to your micro? Tim Hartnell will do his best to help. Please include only one question per letter and mark it "Response Frame". Alternatively, perhaps you have an idea you'd like to pass on to others. Why not write to us with your top tips?

ZX PRINTER OK?

■ I own a Spectrum and am thinking of buying a new, or second hand, ZX Printer. Some of my mates say that Sinclair aren't making it any more. If it is not being sold any more, will I be able to get extra paper for it?

Paul Taylor, Sittingbourne, Kent.

THE ZX Printer has been discontinued, although independent suppliers are still producing paper for it. The Alphacom 32 has almost totally supplanted the ZX Printer, and most Sinclair stockists also handle the Alphacom.

This produces blue or black (depending on the paper you buy) printing, and is far more consistent in its output than the ZX Printer ever was.

BENCHMARKS

When looking through magazines with reviews in them, including Your Computer, I quite often see a section showing Benchmarks, 1 to 8'. Could you please tell me what these mean, and how they are timed?

D Macroe, Morpeth, Northumberland.

BENCHMARKS ARE a set of standard tests which try out a function or functions of the computer under test, producing a measurable result which can be compared, to some extent, with the results of running the same tests on another computer.

The 'standard' eight benchmarks were introduced back in 1977 by the American magazine Kilobaud, While they are not particularly rigorous, they do offer a quick and simple solution to the problems of checking out how well the computer performs particular arithmetic functions.

The first bench mark simply runs an empty For Next loop from 1 to 1000, and times it. In the second test, a variable is set to zero, then incremented by one over and over again until it reaches 1000.

In the third test, a small bit of I

arithmetic is added within the program, using variables. Test four does the same thing as test three, except numbers are substituted for the variables. A "dummy" subroutine call (that is a call just to the word Return) is added in test five

As you can see, each test demands a little more of the computer, and gives results which can be compared with the results obtained from running the tests on other machines.

DATA TRANSFER

I have recently changed from a ZX Spectrum to an Amstrad, and am having trouble transferring some of my programs. On the Spectrum, all the current variables and arrays are saved when the program is saved. This meant that, on reloading, it was possible to set off again from the same point, adding information to the array and variable data loaded in from the cassette. - provided, of course, Goto was used rather than run. This does not work on the Amstrad using the standard Save and Load commands. Is there a way of saving and loading current variables and array information on the Amstrad? Brian Paget,

UNFORTUNATELY, there is no way of doing this on the Amstrad which is as simple as that provided on the Spectrum. The best way to achieve this on the Amstrad is to open a cassette file, and save the date to that, load in the data from tape after the main program

has loaded in.

Aberdeenshire.

The command Openout "filename" opens an output file onto cassette for use with the current program in the computer's memory (see page 8-31 of the Amstrad manual). The program creates the first block of data, in the file with the given name. Each block consists of up to 2048 bytes of data.

A New command will abandon any open file buffered, and any data will be lost. The "opposite" command is Openin, which opens an input file from the cassette which contains information for use in the current program in your Amstrad's memory.





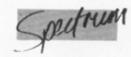
SOFTWAR

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Carrots from space

David Green, Wye Kent.



WHILE RECOVERING from the sheer boredom of typing in over 5K of machine code, I resolved to write a 48K Spectrum game that would be fast, fun to play, well-endowed with sound effects and that would contain less than 1.5K of machine code. Despite its unbelievably silly title, this is that program.

The game is based on the slightly improbable situation that entire battle fleets of alien telekinetic carrots, with world domination their intent, have been temporarily trapped in freak wormholes in the space/time continuum, and someone has to go in there to turn the evil vegetables into so much mangled cellulose. The only method known to science of destroying these extra-terrestrial tubers is that of skilfully placing time bombs in their path, but it is best to do this only when you are moving, as otherwise it is all too easy to blow yourself up.

Convincing your computer to take part in this wanton slaughter is relatively straightforward. The recommended procedure is as

Type in listing 1 and save it. This bit sets up the graphics, the title page, and various other things of dubious artistic value.

Type in the hexloader in listing 2 or load a

suitable one from tape. No self-respecting Spectrum user should be without one. Enter. **CLEAR 31999**

and then type in the machine code from listing 3 using the hexloader. Save it as:

SAVE "from" CODE 33000,1300

Type in the imaginatively-titled listing 4. This actually controls the game and plays the music. Save it when you've finished and then reload from the beginning when you want to play it.

The game should work first time, but if it doesn't, check the machine code in listing 3 and the Poke's and USR calls in listing 4.

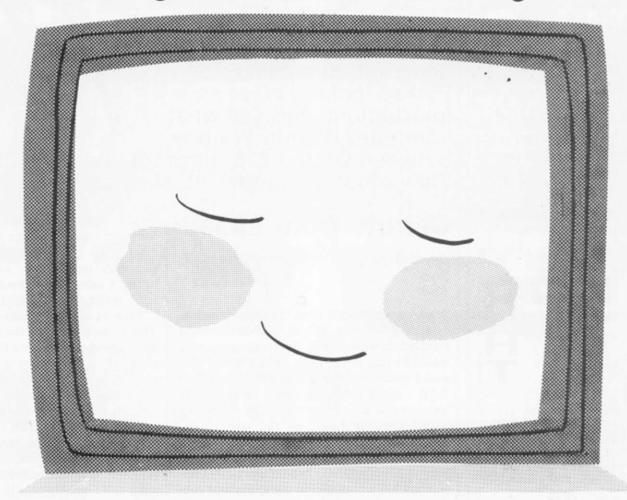
Full instructions on how to select any particular game configuration are given in the program. It would be quite easy to add a high score table by adding a few short routines to listing 4, including one at around line 320 that would use the Screen\$ function to find out what the score was after every game, but that is up to you. Anyone with a disassembler might like to know what the first 200 bytes of code do, since this is not very obvious, and this is in fact a collection of subroutines which handle printing to the screen etc.

If you don't like using the cursor keys, the part of the code which deals with the bombs is from 33520 onwards, and the section which controls movement is from 33630 onwards. These articles usually end with a heartfelt plea to send cheques or postal orders to the author, but as this program has been made as short as possible, this should not be necessary.

```
200 PRINT AT 15,9; "Start speed:
      ;sp;" "
210 BEEP .008,0: PAUSE 0
220 IF INKEY$="0" THEN GO TO 27
      230 LET sp=sp-2*(INKEY$="6" AND
sp>0)+2*(INKEY$="7" AND sp<50)
240 PRINT AT 13,dif*8+5; OVER 1
240 PRINT AT 13, dif+8+5; OUER 1
250 LET dif=dif+(INKEY$="8" AND
dif(>2)-(INKEY$="5" AND dif(>0)
260 GO TO 190
270 POKE 33309, (50-sp)+24: POKE
33384,16+(dif+1)-1
280 BORDER 2: INK 7: PAPER 0: C
LS: PRINT AT 21,0; PAPER 2;">SC
Ore:0000000 Wave:001 Lives:3<"
290 LET zz=USR 33221
300 GO SUB 630
310 BORDER 0: INK 7: PAPER 0: P
RINT AT 10,11; INVERSE 1; "GAME O
VER"
       ER"
320 FOR n=1 TO 200: NEXT n
330 IF INKEY$<>"" THEN GO TO 33
      340 IF INKEY$="" THEN GO TO 340
350 GO TO 140
360 REM tune © d.green
370 DATA 0,12,2,11,4,9,5,7
380 DATA 0,12,2,11,4,9,5,7
390 DATA 12,0,11,2,9,4,7,5
400 DATA 0,12,2,11,4,9,5,7
410 DATA 0,12,11,4,9,5,7
420 DATA 0,12,11,2,9,4,7,5
420 DATA 0,12,11,9,2,7,4,5
430 DATA 0,12,11,9,2,7,4,5
```

```
440 DATA 0,12,11,9,7,5,2,4
450 DATA 0,12,2,11,4,9,5,7
450 DATA 0,12,2,11,4,9,5,7
470 DATA 0,12,2,11,4,9,5,7
480 DATA 0,2,4,12,11,9,5,7
500 DATA 0,2,4,12,11,4,9,5,7
500 DATA 5,7,5,7,5,7,5,7
510 RESTORE 370: FOR n=1 TO 112
520 READ a
530 BEEP .1,a
540 BEEP .1,a-12
550 BEEP .1,a-12
550 BEEP .1,a-12
570 IF INKEY$<>"" THEN RETURN
580 NEXT n
590 BEEP 1,12
600 BEEP .2,0
610 PAUSE 0: RETURN
620 REM tune @ tom keir
630 DATA 19,14,19,21,14,21,22,1
4,21,19,14,19,18,14,18
640 RESTORE 630: FOR n=1 TO 15
650 READ a: BEEP .1,a-12: NEXT
650 BEEP .4,7: BEEP .05,7: BEEP
      .1.7
670 RETURN
680 REM
     690 REM
                                          SAVE "space" LINE Ø
                                                                       (continued on page 95)
```

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YOUR COMPUTER

Britain's biggest selling home computer magazine.

(continued from page 93) Listing 4. 33908	3384b 320850AF3A09803C = 608 33304 320A80210038220B = 318 33312 02100370A8811B = 742 33320 0200002220006811 = 742 33320 020000222000681 = 903 33320 020000222000681 = 903 33320 02000022200504 = 903 33320 02000022000004 = 903 33320 02000022000004 = 502 33320 0200002270221160 = 602 33344 6005261242121180 = 602 33360 2200002270221180 = 602 33360 220000227022118 = 502 33360 2200002270280280 = 500 33400 2707020280000000000000000000000000000	33632 SDSCED480080CD20 = 923 33640 S1FEFE78CA9884CC = 1368 33640 S1FEFE78CA9884CC = 1368 33640 S6720010C3EEFEE80 = 923 33654 C5720010C3EEFEE80 = 669 33660 FE61201CF21328E8 = 759 33680 FF601201CF21328E8 = 759 33680 FF601201CF21328E8 = 759 33704 OFC2007010C386 = 759 33702 S160326 C702087F203864 = 925 33712 C11601D1CC38600 = 776 33720 S6800 S7872807010 = 876 33720 S6800 S6800 S6800 = 876 33760 S6800 S6800 S6800 = 876 33760 S6800 S6800 S6800 S6800 = 876 33760 S6800 S6800 S6800 S6800 = 863 33776 S6800 S6800 S6800 S6800 = 863 33776 S6800 S6800 S6800 S6800 = 863 33776 S6800 S6800 S6800 S6800 S6800 = 863 33776 S6800 S6800 S6800 S6800 S6800 = 863 33780 S6800 S68	33965
33136: CSD5E52105807E3C = 991 33144: FE0A200316002B18 = 422 33152: F57706060E0C2105 = 440 33158: S03A805CF53E1732 = 799 33160: S03A805CF53E1732 = 799 33160: SD5C7EC630C50615 = 629 33164: F1328D5CE1D1C1C9 = 1352 33169: F1328D5CE1D1C1C9 = 7352 33169: F1328D5CE1D1C1C9 = 7352 331200: F1328D5CE1D1C1C9 = 7373 331200: F1328D5CE1D1C1C9 = 7373 331200: F1328D5CE1D1C1C9 = 7373 331216: F1328D5CE1D1C1C9 = 7373 331216: F1328D5CE1D1C9C1 = 7373 331240: F1328D5C1C1C9C1 = 7374 331240: F1328D5C1C1C9C1 = 7374 331240: F1328D5C1C1C1C9C1 = 7374 331240: F1328D5C1C1C1C1 = 7374 331240: F1328D5C1C1C1 = 7374 331240: F1328D5C1C1C1 = 7374 331240: F1328D5C1C1C1 = 7374 331280: F1328D5C1C1 = 7374 331280: F1328D5C1C1C1 = 7374 331280: F1328D5C1C1C1 = 7374 331280: F1328D5C1C1 =	33472 1501CD0881CB6720 = 863 33480 0216FFE5CD20817E = 1000 33480 E1B720FFCD7882CD = 1291 33490 3681712370237323 = 628 33504 7283E52132001132 = 528 33512 00CD8503E1C1082 = 985 33520 2114012214803811 = 311 33525 FECB47728E832264 = 1000 33544 00CD8503E1C1082 = 985 33545 0022140078205280 = 004 33554 0022140078E03280 = 965 33560 0022140078E03280 = 754 33560 0022140078E03280 = 752 33560 0026858108200 = 752 33576 5CF1CD3681182005 = 782 33576 5CF1CD3681182005 = 782 33576 5CF1CD3681182005 = 782 33592 20CD36810C1D20F7 = 740 33560 79D6054F041820ED = 753 33502 79D60528F041820ED = 558 33503 79D60528F041820ED = 558 33504 80FEFECC2F33AF32 = 1243	33808: 02060079834FFEFF = 845 33814: 0200021FFEE0002 = 399 33824: 020001FFEE004 = 764 33832: 20080101010103884 = 1144 33832: 20080101010103883 = 1144 33832: 80783091471320833 = 626 33855: 938F1800F13120832 = 626 33856: 938F1800F3120832 = 626 33872: 22171237027732372 = 784 33872: 22171237027732372 = 784 33872: 22171237027732372 = 784 33882: 0208101010100010101 = 1079 33996: 03001101000010501 = 408 33912: 225828702872 = 1142 33928: 02081381402820821 = 1879 33928: 0208138110802382 = 976 33928: 0208138110802382 = 976 33928: 02081381108023808 = 8972 33944: 3207328080289000 = 971 33958: 366002428280006825 = 664	34144 EE8681C12810F306 # 1097 34160 30EC5110100CDEE # 1057 34160 30EC5112310F311C8 # 1057 34160 30EC56761C110853E # 77 34176 17328053C31808033 # 569 34184 17328053C31808033 # 589 34184 17328053C31808033 # 589 34184 C538613380C80C602 # 982 34288 853C320R80F3C80F30 # 453 34288 08021640505CDEE # 504 34288 080265503C3278232 # 503 34288 080265503C3278232 # 503 34288 080265503C3278232 # 503

Double height

M K Mostowyj Bretton Estate, Peterborough.



THIS IS A utility program for the Amstrad CPC-464. It will give you access to a double height character set similar to that found on the BBC micro. The program provides Basic with two new commands by using the RSX capability of the Amstrad. The two new commands are Top and Bat. Anyone familiar with the BBC will know that to print in double height in Mode 7 two lines must be used, e.g.: 10 PRINTTAB(1,10);CHR\$(141), "This is an example"

20 PRINTTAB(1,11); CHR\$(141), "This is an example"

The second line is printed one line lower that

The second line is printed one line lower than the first and CHR\$(141) informs the BBC that double height is required. My version for the Amstrad works in a similar way. Any string that already exists in your Basic program can be printed in double height. The syntax is as follows.

1TOP,@a\$ (This prints the top line as in line 10 above)

1BOT,@a\$ (This prints the bottom line as in line 20)

The words Top and Bot must be preceded with the 1 symbol, this is the shifted @ key. Both words must then be followed directly by a comma and the @ symbol then the string to be printed, a\$ is used in the example but in fact any string can be used as long as it exists. Also the top and bottom halves of the double height characters can have different Pen and Paper colours, e.g.:

10 X\$ = "QWERTY" 20 LOCATE 1,10:PAPER 1:PEN 2: 1TOP,@X\$ 30 LOCATE 1,11:PAPER 2:PEN 3: 1BOT.@X\$

Any character from 32 to 126 can be printed using this utility and it can be used in any mode. The only restriction is that the string to

be printed must not exceed the screen width e.g. 80 characters in Mode 2, 40 in Mode 1 and 20 in Mode 0.

To enter the program simply type in listing 1 and run it. The data in line 250 is poked into memory first. This is not in fact part of the finished program but is a small machine code routine that transfers a copy of the original character set to a different part of memory thus saving you having to type in an extra 760 bits of data. Once this is completed the data containing the new character sets — one for the tops and one for the bottoms — and the machine code that supplies the two new commands is poked into memory. If all is well the new commands are logged on and a message is printed using the new facility.

To save the resulting code use

SAVE "D/H.BIN",B,38200,2371 To reload it either type as a direct command or as the first line of your own program

> SYMBOL AFTER 0:MEMORY &9537:LOAD"I":CALL &9E20

************ "BASIC LOADER FOR DOUBLE HEIGHT" BY M.K.MOSTOWYJ" MAY 1985" 30 80 MODE 1:PRINT"PLEASE WAIT!!" 90 FOR A=&7530 TO &753B 100 READ X\$: POKE A, VAL ("%"+X\$) 110 NEXT 120 CALL &7530 130 CH=0 140 FOR A=&9830 TO &9E7A 150 READ X\$:POKE A,VAL("&"+X\$) 160 CH=CH+VAL ("&"+X\$) 17Ø NEXT 180 IF CH<>96418 THEN CLS:PRINT"ERROR IN DATA": END 190 CALL &9E20 200 CLS 210 A\$="Routine now in memory and logg ed on." 220 !TOP,@A\$ 230 IBOT, @A\$ 240 END 250 DATA 21.00.A5.11.38.95.01.F8.02.ED 260 DATA 00,00,00,00,00,00,00,00,00,00 .18,18,18,18,18,18,00,00,66,66,66,66 270 DATA 00,00,00,00,36,36,7F,7F,36,36,00,00,00,00,00,71 280 DATA 53,76,0C,18,00,00,38,7C,6C,6C ,38,30,18,18,18,18,30,60,00,00,00,00,00 290 DATA 0C,18,30,30,60,60,00,00,30,18 ,0C,0C,06,06,00,00,00,00,00,66,24,18,7E 300 DATA 00,00,00,00,18,18,18,7E,00,00 ,00,00,00,00,00,00,00,00,00,00,00,00 DATA 00,7E,00,00,00,00,00,00,00,00 ,00,00,00,01,03,06,00,18,00,30,7E,66 320 DATA 66,66,6E,6E,00,18,38,78,18,18 ,18,18,00,3C,7E,66,66,06,06,0C,00,3C 330 DATA 7E,66,66,06,06,1C,00,0C,1C,1C 3C,3C,6C,6C,00,7E,7E,60,60,60,7C,7E

340 DATA 00,3C,7E,66,60,60,7C,7E,00,7E ,7E,06,06,06,0C,18,00,3C,7E,66,66,66 350 DATA 7E,3C,00,3C,7E,66,66,66,66,66 ,00,00,00,00,00,18,18,18,00,00,00,00 360 DATA 00,00,00,00,00,00,00,00,00,00 ,30,60,00,00,00,00,00,7E,7E,00,00,00 370 DATA 00,00,30,18,0C,06,00,3C,7E,66 ,66,66,0C,18,00,00,3C,7E,42,5E,5E,5E 380 DATA 00,3C,7E,66,66,66,66,7E,00,7C ,7E,66,66,66,7E,7C,00,3C,7E,66,66,60 390 DATA 60,60,00,78,7C,6E,66,66,66,66 ,00,7E,7E,60,60,60,60,7C,00,7E,7E,60 400 DATA 60,60,60,7C,00,3C,7E,66,66,60 ,60,60,00,66,66,66,66,66,66,7E,00,3C 410 DATA 3C,18,18,18,18,18,00,06,06,06 .06.06.06.06.00.66.66.66.66.6C.78.78 420 DATA 00,60,60,60,60,60,60,60,60,00,66 ,FF,DB,DB,DB,DB,DB,00,3C,7E,66,66,66 430 DATA 66,66,00,3C,7E,66,66,66,66,66 ,00,7C,7E,66,66,66,66,66,00,3C,7E,66 440 DATA 66,66,66,66,00,7C,7E,66,66,66 ,66,66,00,3C,7E,66,66,60,7C,3E,00,7E 450 DATA 7E,18,18,18,18,18,00,66,66,66 ,66,66,66,66,00,66,66,66,66,66,66 460 DATA 00,DB,DB,DB,DB,DB,DB,DB,00,66 ,66,66,66,66,7E,3C,00,66,66,66,66,66 470 DATA 7E,3C,00,7E,7E,06,06,0C,0C,18 ,00,3C,3C,30,30,30,30,00,00,00,00,80 480 DATA C0,60,30,18,00,3C,3C,0C,0C,0C ,0C,0C,00,18,3C,7E,5A,18,18,18,00,00 490 DATA 00,00,00,00,00,00,00,30,30,18 00,00,00,00,00,00,00,00,00,00,00,00,70 500 DATA 00,00,00,E0,E0,60,60,70,00,00 00,00,00,00,00,30,00,00,00,10,00 510 DATA 0C,7C,00,00,00,00,00,00,00,00,00,3C,00,00,00,1C,36,36,30,30,00,00,00,00,00 60,60,00,00,00,00,00,18,00,38,00,00 530 DATA 00,00,00,06,00,0E,00,00,00,E0,60,60,60,60,66,00,00,00,38,18,18,18,18 540 DATA 00,00,00,00,00,00,00,60,60,00 00,00,00,00,00,DC,00,00,00,00,00,00 550 DATA 00,3C,00,00,00,00,00,00,00,00,DC

,00,00,00,00,00,00,00,76,00,00,00,00 570 DATA 00,00,00,00,00,66,00,00,00,00 .00,00,00,66,00,00,00,00,00,00,00,00,00,C6 580 DATA 00,00,00,00,00,00,00,00,00,00 590 DATA 00,7E,00,0E,0E,18,18,18,18,70 ,00,18,18,18,18,18,18,18,00,70,70,18 610 DATA 18,18,00,18,18,00,00,00,00,00 ,00,00,00,00,30,36,36,76,76,36,36,00,00 620 DATA 7E,0A,7E,7E,0B,0B,00,00,30,6E ,CA,8E,00,00,00,00,7B,FF,CC,CC,FF,7B 630 DATA 00,00,00,00,00,00,00,00,00,00 ,60,60,30,30,18,00,06,00,06,06,06,00 640 DATA 18,30,60,00,18,24,66,00,00,00 ,00,00,7E,18,18,18,00,00,00,00,00,00,00 650 DATA 18,18,18,18,30,60,7E,00,00,00 ,00,00,00,00,00,00,18,18,18,18,00,00 660 DATA 30,60,00,80,00,00,00,00,00,76,76 ,66,66,66,7E,BC,00,18,18,18,18,18,3C 670 DATA 3C,00,18,30,60,60,60,7E,7E,00 ,1C,06,06,66,66,7E,3C,00,6C,6C,7E,7E 680 DATA 0C,0C,0C,00,06,06,06,66,66,7E ,3C,00,66,66,66,66,66,7E,3C,00,18,18 690 DATA 18,18,18,18,18,00,7E,66,66,66 ,66,7E,3C,00,7E,3E,06,06,66,7E,3C,00 700 DATA 00,00,00,18,18,18,18,00,18,00 ,18,18,18,18,30,60,60,30,18,0C,00,00 710 DATA 00,00,00,7E,7E,00,00,00,00,00 ,06,0C,18,30,00,00,00,00,18,18,18,18 720 DATA 00,18,18,00,4E,40,40,40,40,7E 3C,00,7E,66,66,66,66,66,66,00,66,66 730 DATA 66,66,66,7E,7C,00,60,60,60,66 ,66,7E,3C,00,66,66,66,66,6E,7C,7B,00 740 DATA 7C,60,60,60,60,7E,7E,00,7C,60 60,60,60,60,60,00,6E,6E,66,66,66,7E 18.18.18.18.18.30.30.00.06.06.06.66 760 DATA 66,7E,3C,00,7C,6E,66,66,66,66 (continued on next page)

(continued from previous page)

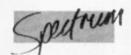
66,00,60,60,60,60,60,7E,7E,00,DB,DB 770 DATA DB,DB,DB,DB,DB,00,66,66,66,66 ,66,66,66,00,66,66,66,66,66,7E,3C,00 780 DATA 7E,7C,60,60,60,60,60,00,66,66 ,66,6E,6E,7E,3F,03,7C,7E,66,66,66,66 790 DATA 66,00,06,06,06,66,66,7E,3C,00 ,18,18,18,18,18,18,18,00,66,66,66,66 800 DATA 66,7E,3C,00,66,66,66,66,7E,3C 18,00,DB,DB,DB,DB,FF,FF,66,00,3C,7E 810 DATA 66,66,66,66,66,00,18,18,18,18,18,18,18,18,18,18,18,00,18,30,30,60,60,7E,7E,00 830 DATA 3C,00,18,18,18,18,18,18,18,00

,00,00,00,00,00,00,00,FF,00,00,00,00 840 DATA 00,00,00,00,00,7C,CC,CC,CC,CC 76,00,66,66,66,66,66,E6,BC,00,66,60 850 DATA 60,60,60,66,30,00,00,00,00,00 ,CC,CE,76,00,66,66,66,7E,60,60,3C,00 B60 DATA 78,30,30,30,30,78,00,66,66 ,66,66,3E,06,7C,76,66,66,66,66,66,66 B70 DATA E6,00,18,18,18,18,18,18,3C,00 ,06,06,06,06,06,66,66,3C,6C,6C,78,78 880 DATA 6C,6C,E6,00,18,18,18,18,18,18 3C,00,FE,D6,D6,D6,D6,D6,D6,00,66,66 900 DATA CC,CC,CC,CC,CC,TC,0C,1E,36,30,30,30,30,30,78,00,60,60,3C,06,06,06 910 DATA 7C,00,30,30,30,30,36,36,1C,00

,66,66,66,66,66,66,3E,00,66,66,66,66 920 DATA 66,3C,18,00,D6,D6,D6,D6,D6,FE,6C,00,6C,6C,38,38,6C,6C,C6,00,66,66 930 DATA 66,66,66,3E,06,7C,0C,0C,18,18 ,30,32,7E,00,70,18,18,18,18,0E,0E,00 940 DATA 18,18,18,18,18,18,18,00,0E,18 970 DATA 02,ED,B0,DD,6E,00,DD,66,01,7E,FE,00,28,17,47,23,5E,23,56,EB,7E,CD 980 DATA 5A,BB,23,10,F9,3E,0D,CD,5A,BB,3E,0A,CD,5A,BB,21,3B,95,11,00,A5,01 990 DATA FB,02,ED,B0,C9

Securdrive

Ansgar Zerpass, Lehrberg, West Germany.



THE SPECTRUM Microdrive manual tells you how to save a program or a code or data file in a way that the usual Cat command cannot register it: Save the program or file with a file name starting with CHR\$ 0.

This method will protect your programs on Microdrive cartridge from unauthorised access. On the other hand, you will have to learn the protected program names by heart - which will prove to be impossible - or you will have to keep a written list of the names along with your cartridges - which will make the whole protection senseless.

names of your protected programs and which allows you to get rid of a written list. Securdrive will be saved on Microdrive cartridge with the autorun facility (. . . Line 1) which makes it unable to break into Securdrive during the loading process or to merge it in order to get hold of the stored program names.

The first operation of Securdrive after loading is the input of a password. A wrong password will cause the system to crash. The right password will cause a list of all protected programs to be shown and will give you the opportunity to load any of these programs by pressing just

Spectrum users should be able to alter Securdrive to handle more than 10 protected file names or to handle protected data files from a commercial file program etc. without much difficulties.

You may use Securdirve with your existing Securdrive is a utility which will store the file | cartridges by saving all existing files and pro-

grams with a new, protected name (starting with CHR\$ 0) and saving Securdrive on the same cartridge. You will have to initialise Securdrive by entering the protected file names and a password of your choice every time a new protected program has been saved on the cartridge.

Type in listing 1 and save it on any cartridge

GO TO 9999

ENTER

Type in listing 2, the demo program, and enter GO TO 100

to save this program on the same cartridge with three different names. Then new your computer and load Securdrive. Initialise the program by entering Init as password and entering the three protected demo program file names - DEMO ONE, DEMO TWO, DEMO XXX. Enter any new password and save Securdrive on the cartridge using option two.

Listing 1. 9000 REM

SECURDRIVE } ENGLISH VERSION

SPECTRUM & M-DRIVE

0 04.05.1985 by

Ansgar Zerrass, Schlehenweg 10, Lehrberg 8802 Germany. West

CLEAR #: BORDER 1: PAPER 9010 1: CLS INK PAPER 5; INK © A.Zerfass Paper 6; Ink INK 0; " 6 SEC ss 1985" INK 0; "Enter PRINT 0: " { SEC 9020 URDRIVE INPUT 9030 password to access theprote the ams or enter INITto en list of protectedprogr enter INITto en cted programs ter a new ams and a new password NE IS I#="INIT" THEN GO TO 950 9040 9050 I\$ <> C\$ THEN PRINT USR Ø 9060 PRINT AT 4,6; "Choice of pro grams 9070 FOR F=1 TO 10: IF N\$(F)="
" THEN GO TO 9090
9080 PRINT TAB 9;"(";F-(10 AND F =10);") ";N\$(F): NEXT F 9090 PRINT AT 18,0;"Pres 18,0; "Press the co rresponding key am or press (C) (C) tocopy the scr printer!": BEEP .1,1 -1: LET Is=INKEYs: IF am or press (0)
een to your printer!": BEEP .1,1
9100 LET I=-1: LET I\$=INKEY\$: IF
I\$="" THEN GO TO 9100
9110 IF I\$<"9" AND I\$>="0" THEN
LET I=UAL I\$+(10 AND I\$="0")
9120 IF I>0 THEN IF N\$(I)="
" THEN LET I\$="": GO TO 9100
9130 IF I\$="C" OR I\$="c" THEN CO am or press LPRINT TO 9100 I == '' GO LET

IF I < 1 GO TO 9100 THEN 9140 9150 PRINT #0; AT 1,6; "Loading Ns(I) 9160 LOAD *"M";1;CHR\$ 0+N\$(I): R UN 9200 STOP 9500 CLEAR #: DIM N\$(10,9): FOR F=1 TO 10 "ENTER THE PROGRAM NA 9510 INPUT (Max. 9letters; enter END i ME haveentered all programs 400); LINE M\$: IF M OR LEN M\$>9 THEN GO TO 9510 9520 FOR G=1 TO F: IF N\$(F, EN M\$) =M\$ THEN GO TO 9510 M ==" M\$) =M\$ T 9530 NEXT IF M\$="END" LET N\$(F) =M! THEN GO TO 9560 9540 N\$(F)=M\$: NI)T "PASSWORD NEXT F 9550 INPUT 9560 \$: IF LEN C\$>20 THEN GO TO 9560 590 PRINT AT 3,0; "Press"/ "(1) to save SECURDRIVE on a Cs 9590 PRINT cartridge for the first time"''
"(2) to save SECURDRIVE on a
cartridge after a"'" mod
ification" 9600 IF INKEY\$="1" THEN GO TO 96 30 30
9610 IF INKEY\$="2" THEN ERASE "M
";1; "SECURDRIVE": GO TO 9630
9620 GO TO 9600
9630 SAUE *"M";1; "SECURDRIVE" LI
NE 1: UERIFY *"M";1; "SECURDRIVE"
: CLS #: PRINT "SECURDRIVE saved
and verified." "" "Password : "; C\$: PAUSE 0: PRINT USR 0
9999 CLEAR #:/LET C\$="INIT":
E *"M";1;"SECURDRIVE" LINE 1 Listing 2. The demo program.

DEMO PROGRAM FOR SECUR-DRIVE / PRINTS CHAR-SET

```
110 SAUE *"M"; 1; CHR$
     BORDER 0:
PRINT N$
                  PAPER Ø: INK 6: C
                                                                      0+N$ LINE
     FOR f=32 TO 255: PRINT CHR$
NEXT f
GO TO 9999
LS
                                                 NEXT
  20
                                            120
                                                 DATA
XXX"
                                            130
                                                        "DEMO ONE", "DEMO TWO",
  30
                                           "DEMO
     FOR F=1 TO
 100
                   3: READ NS
```

Fernando

David Cawthray. Leeds.

126

,ø

2,-1,100,0

0.-80,80,0 750ENDPROC 760DEFPROCKEY

0



dog when suddenly you leap into a human's hair by mistake. The hair is all tangled and you have to leap from strand to strand searching for some precious objects. There are four levels and it is loosely based around a platform game.

79ØRESTORE88Ø

Type in program 1, Run it and correct any mistakes. Save it then press Break, and enter program 2, Run it and correct any mistakes. Save it under "flea" then the two programs are ready. Rewind the cassette and chain program.

```
You are Fernando the Flea hopping around a
 Program 1.
      1100NERROR CLS: GOTO150
       120REMTITLEPAGE
        3@PROCINIT
      140MODE1: VDU23: 8202: 0:0:0:19.0.4:0:
      15ØCOLOUR1
      16@PROCCENTER("D.C.SOFT Presents",2)
17@COLOUR2
      IBOPROCCENTER ("FERNANDO THE", 5)
     180PROCCENTER("FERNANDO THE".5)
190PROCCENTER("FLEA",7)
200PRINTTAB(12,9) "By D.J.Cawthray"
210PRINTTAB(4,13) "Graphics"
220PRINTTAB(7,14) "By"
230PRINTTAB(3,15) "P.Cawthray"
240PRINTTAB(27,13) "Music"
250PRINTTAB(29,14) "By"
260PRINTTAB(26,15) "S.Addy"
270PROCKEY
     270PROCKEY
280PROCCENTER("FERNANDO THE FLEA",2)
290PRINTTAB(2,5)"You play the part of
  fernando flea'
      300PRINT" Who is trapped in somebody
 s hair."
310PRINT'"
                            Being a flea you can fall
But don't be too long on e
your BOUNUS will reach zer
will lose a life."
To get the gems you must g
monsters."
  any distance.
ach level or
 o and you
      320PRINT'"
 et past the
330PRINT'"
                             There are four levels each
different monster. You must
all the levels to get out
hair."
 has a different complete all the of the hair."

340FORI=1T01000:NEXT
      350PROCKEY
360ON ERROR CLS:GOTO370
370PROCCENTER("FERNANDO THE FLEA",2)
      38@PRINTTAB(2,5) "Use the following key
      39@PROCCENTER("Z....Left",7)
     400PROCCENTER("X.....Right",9)
410PROCCENTER("Shift....Jump",11)
420VDU28,10,22,30,20
      43ØONERRORGOTO44Ø
      440CHAIN"FLEA"
      45@END
     45@END

46@DEFPROCCENTER(A$,Y)

470X=20-(LEN(A$)/2)

48@PRINTTAB(X,Y)A$

49@PRINTTAB(X,Y+1);STRING$(LEN(A$),"~"
      510DEFPROCINIT
      520VDU23,255,255,255,255,126,126,42,20
     530VDU23,224,28,60,124,248,112,96,192,
      540VDU23.225,56,60,62,31,14.6,3.7
     550VDU23,226,42,85,16,16,28,16,24,60
560VDU23,227,42,85,8,8,56,8,24,60
570VDU23,228,24,60,126,255,255,126,60,
     4

580VDU23,229,0,29,17,29.5,29,0,0

590VDU23,230,0,209,11,209,17,29,0,0

600VDU23,231.0,220,72,200,72,72.0,0

610VDU23,232,0,0,0,24,24,0,0,0

620VDU23,232,0,0,0,36,0,0,36,0,0

630VDU23,233,0,66,0,0,36,0,0

640VDU23,235,129,0,0,0,0,0,129

650VDU23,236,66,126,60,24,24,24,126,21
      66@VDU23,237,62,126,254,62,62,62,12,28
67@VDU23,238,124,126,127,124,124,124,4
  8,56
      680VDU23,239,102,153,60,24,24,36,66,23
      69@VDU23,240,60,102,195,195,231,231,23
       700VDU23,241,24,24,24,126,126,102,126,
```

71@VDU23.242.0.255.231.195.195.231.255

720VDU23,243,255,66,255,255.126,60,24,

730ENVELOPE1.1,100,127,100,1,1,1,100,-

740ENVELOPE4,1,0,0,0,200,200,200,0,-1,

770PROCCENTER ("PRESS SPACE BAR", 28)

```
800FORI=0T039
B10READNO%, DU%
       82ØN0%=N0%-48
       840IF NO% =-48 THEN SOUND1.0.0.DU%: GOTO
BBB
       8501F INKEY (-99) THEN CLS: ENDPROC
       860SOUND1.4,NO%,DU%
       870SOUND1,0,0,0
880NEXT
       890UNTILFALSE
       900DATA101,1.121,1,109.1,121.1,117,1,1
      7,1,0,1
910DATA101.1.117.1,109.1.117.1,121.1.0
       920DATA101,1,121,1,109,1,121,1,117,1,1
17,1,0,1
930DATA101,1.117,1,109,1,117,1,121.1,0
       94@DATA137,1,121,1.149.1,121,1,157,1,1
17,1,117,1
950DATA157,1,117,1,149,1,117,1,137,1,1
Program 2
          10*FX15
           30PROCASS
           4ØPROCHALL
          50LEVX=1:SCX=0:LIX=3
60PROCINIT
           70VDU23:8202:0:0:0:
       800NERRORGOTO50
90VDU19,1,2;0;
100PROCHALLOFFAME
        110CLS
         20C0L0UR1
        130PROCINIT
        14@PROCSCREEN(LEV%)
         50PROCINIT
       16@COLOUR2
       170TIME=60
190TI%=300-INT(TIME/30)
190IF TI%<0 THEN PROCCAUGHT
       200PROCMOVE: PROCMON: GOTO180
210DEFFNCHAR (AX, BX)
       2207&71=A%: ?&72=B%
       23@CALLREC
24@C%=?&75
25@=C%
       260DEFPROCMOVE
       27@PRINTTAB(X%,Y%)" "
28@PROCKEYS
       2901FFNCHAR(X%,Y%)=130 OR FNCHAR(X%,Y%
)=131 THEN PROCCAUGHT
300PROCCHECK
       31@IFFNCHAR(X%,Y%+1)<>159 THEN Y%=Y%+1
 :FALL%=1:GOTO330
320FALL%=0
        33ØPRINTTAB(X%,Y%)CHR$(FLEA%)
       340PROCSCORE
350FORI%=1TO50
       360NEXTI%
       350MEXTIX
370ENDPROC
380DEFPROCJUMP
390IFINKEY(-98)THENPROCLEFT:ENDPROC
400IFINKEY(-67)THENPROCRIGHT:ENDPROC
410SOUND1,1,210,1
420YX=YX-2:ENDPROC
       43ØDEFPROCLEFT
       440E%=0
450FLEA%=225
       46@RESTORE59@
       470SOUND1,1,210,1
480REPEAT
       49ØE%=E%+1
       500 IF E% MOD2=0 THEN PROCMON
510PRINTTAB(X%,Y%)" "
       520READA%, B%
 5301FFNCHAR(XX+AX,YX+BX)=159THEN UNTIL
TRUE: ENDPROC
5401F XX+AX<0THENAX=0:UNTILTRUE:PROCCL:ENDPROC
       550XX=XX+AX: YX=YX+BX
      5-0PRINTTAB(X%,Y%)CHR*(FLEA%)
5-0PRIX=1TO50:NEXTIX
5-0PRIX=1TO50:NEXTIX
5-0PRIX=1TO50:NEXTIX
5-0PRIX=1TO50:NEXTIX
6-0PRIX=1TO50:NEXTIX
```

610E%=0 620FLEA%=224

```
63@RESTORE76@
    640SOUND1,1,210,1
650REPEAT
660E%=E%+1
    670 IF E% MOD2=0 THEN PROCMON
680PRINTTAB(%%,Y%)" "
690READA%,B%:IFA%=999 OR B%=999THEN750
    700IFFNCHAR(XX+AX,YX+BX)=159THEN UNTIL
TRUE: ENDPRIC
710IFXX+AX>39THENXX=39: PROCCL: UNTILTRU
E:ENDPROC
720X%=X%+A%:Y%=Y%+B%
730PRINTTAB(X%,Y%)CHR#(FLEA%)
740FORI%=1T050:NEXTI%
    75@UNTILA%=999 OR B%=999:PROCCL:ENDPRO
    76@DATA1,-1,1,-1,1,0,1,0,1,1,1,1,999,9
    77ØDEFPROCSCREEN (LLEV%)
    78ØCLS
    790C0L0UR1
BØØ1FLEVZ=1 PRINTTAB(Ø,3Ø)STRING$(4Ø,C
HR$255):ELSE PRINTTAB(Ø,31)STRING$(4Ø,CH
R$255):
B1@PROCOBJECT
    82ØCOLOUR1
    8300N LLEV% GOTO840,850,860,870
840RESTORE940:GOTO880
    85@RESTORE95@: GOTO88@
    860RESTORE960:GOTO880
870RESTORE970
    880F0RI%=1T025
    89@READX%,Y%,L%
9@@PRINTTAB(X%,Y%):STRING*(L%,CHR*255)
91@NEXTI%
    92ØCOLOUR2
    93ØENDPROC
94ØDATA31,3,7,37,5,1,5,7,21,29,7,4,37,
7,3,29,16,1,5,9,1,26,9,1,34,18,2,5,11,7,
14,11,2,17,12,7,26,14,1,10,16,18,29,18,2,19,20,1,28,20,3,21,21,6,19,22,1,10,23,4,19,24,1,10,25,1,14,25,3,18,26,2,7,27,6
95@DATA@,5,23,23,7,13,15,9,7,32,9,4,38
,11,2,38,13,2,33,14,3,38,15,2,38,17,2,16
,19,5,20,19,3,38,19,2,12,21,4,36,20,1,24
,22,4,34,22,5,14,23,5,30,24,5,20,25,4,5,
27,3,12,27,12,0,28,3,6,15,3,3,23,1,35,26
    96@DATA5,5,5,11,6,5,20,7,4,23,9,3,25,1
1,3,27,13,3,29,15,3,37,15,3,33,16,3,29,1
8,4,28,20,4,21,22,7,16,24,2,19,24,2,28,2
4,9,22,25,5,1,26,3,11,26,6,9,28,2,13,28,
2,16,28,5,10,16,1,16,16,1,35,3,1,30,28,1
    970DATA3,4,4,12,4,4,21,4,4,30,4,4,38,4
2,35,6,2,17,8,1,35,8,2,35,10,2,14,11,1,3,12,3,29,12,8,23,14,4,2,16,2,17,18,7,14,19,2,8,20,3,31,20,3,13,22,6,17,24,2,17,26,2,28,18,1,26,25,3,18,28,8,18,30,8 980DEFPROCCL:PRINTTAB(X%,Y%)" ":ENDPRO
C
    99ØDEFPROCMON
  1000PRINTTAB (MONX%, MONY%) " "
1010PRINTTAB (MON2%, MON2Y%) " "
  1020MONX%=MONX%+DIRX%
1030MON2XX=MON2XX+DIR2XX
1040IF MONXX>MMB% THEN DIRXX=-DIRXX:MON
C%=MONCAX
10501F MON2XX>MMB2% THEN DIR2XX=-DIR2XX:MONC2X=MONCAX
10601F MONXX<MMAX THEN DIRXX=-DIRXX:MON
C%=MONCB%
10701F MON2XX<MMA2% THEN DIR2X%=-DIR2X%:MONC2%=MONC8%
  1080IFFNCHAR (MONX%, MONY%) = 128 OR FNCHAR
10801FFNCHAR(HONXX, HONYX)=128 OR FNCHAR
(MONXX, MONYX)=129 THENPROCCAUGHT
10901FFNCHAR(MON2XX, MON2YX)=128 OR FNCH
AR(MON2XX, MON2YX)=129 THENPROCCAUGHT
1100PRINTTAB(MONXX, MONYX)CHR*(MONCX)
1110PRINTTAB(MON2XX, MON2YX)CHR*(MONC2X)
  1110PRINTTAB (MON2XX, MON2YX) CM

1120ENDPROC

1130DEFPROCINIT

1140IFLEVX=1 THEN RESTORE1190

1150IFLEVX=2 THEN RESTORE1210

1160IFLEVX=3 THEN RESTORE1210

1170IFLEVX=4 THEN RESTORE1220
  1180READX%, Y%, MONX%, MONY%, MMA%, MMB%, MON
2%%, MON2Y%, MMA2%, MMB2%, 01%, 01%%, 08%, MONC
A%, MONCB%
  119@DATA1,28,11,15,11,26,31,2,32,36,31
                                  (continued on next page)
```

97

231@SOUNDCH%,EN%.PC%,DU%
232@NEXT:FORI=1T04@@inEXT
233@ DATA&@201,-10,81,16,&@2@2,-10,65,3
5,&@2@3,-10,35,35,1,0,0,1,1,-10,81,12,1,
0,0,1,1,-10,81,4,1,0,0,1
234@DATA&@2@1,-10,81,16,&@2@2,-10,61,35,
&@2@3,-10,45,35,1,0,0,1,1,-10,93,12,1,0,0,1,1,-10,967,4,1,0,0,1
235@DATA&@2@1,-10,89,8,&@2@2,-10,81,36,
&@2@3,-10,65,36,1,0,0,1,1,-10,81,8,1,0,0,1,1,-10,81,12,1,0,0,1,1,-10,81,8,1,0,0,1,1,-10,81,12,1,0,0,1,1,-10,77,4,1,0,0,1
235@DATA&@2@1,-10,81,32,&@2@2,-10,61,32,&@2@3,-10,45,32
237@CLS
238@CQLOUR3
239@PRINTTAB(10,2) "FERNANDO THE FLEA"
24@@PRINTTAB(5,5) "YOU ARE DEAD BUT YOU
SCORED ":SC%;""
241@IFSC%>SCH%(10) THENPRINTTAB(1,7)"TH 1680ENDPROC 1690DEFPROCCAUGHT 1700*FX15 231@SOUNDCH%.EN%.PC%.DU% (continued from previous page) 1,228,227,226 1200DATA1,29,30,23,31,33,16,18,17,21.1, 710SOUND0.4.100.50 4,241,236,236 121@DATA18,0,22,21,22,26,11,5,12,14,2,2 173ØREPEAT 5,242,237,238 74@D%=D%+1 1220DATA7,25,3,3,1,38,29,11,30,35,0,7,2 75@FORIX=235 TO 232 STEP-1 1750FOR1.223 TO 232 STEP-1 1750PRINTTAB(X%,Y%)CHR\$(I%) 1770FORZ=1TO100:NEXTZ.I% 1780FORIX=232 TO 235 1790PRINTTAB(X%,Y%)CHR\$(I%) 123@DIRX%=1:DIR2X%=1:JUMP%=0:Q%=0:FALL% =0:FLEA%=224:MONC2%=MONCB%:MONC%=MONCB% 124@FALL%=0:FLEA%=224 1800FORZ=1T0100:NEXTZ,1% 1810UNTILD%=2 1820PRINTTAB(X%,Y%)CHR\$240 125ØENDPROC 12-00DEFPROCGOT 12-70REPEAT: TIX=TIX-10: SCX=SCX+10: SOUND1 4,TI%,1:PROCSCORE:UNTILTIX<=0
1280IF SC%>SCH%(1) THEN PROCENDGAME
1290TI%=1:PROCSCORE 1830COLOUR3 1840PRINTTAB(X%-1,Y%-1)CHR#229;CHR#230; 1300FORI%=1T02500:NEXTI% 1310PROCCAN_CAN 2410IFSC%>SCH%(10) THENPRINTTAB(1,7) "TH 1850FORI%=1T05000:NEXTI% IS SCORE PUTS YOU IN THE HIGH SCORE
TABLE. ":: PROCENTER 1860PRINTTAB(X%-1,Y%-1) 1870PRINTTAB(X%,Y%)" " 1320LEV%=LEV%+1: IF LEV%=5 THEN PROCENDG 242Ø*FX15 243@PRINTTAB(14,25) "PRESS ANY KEY" 244@A%=GET 1890TIME=60 1900COLOUR2:LI%=LI%-1:IF LI%<1 THEN PRO 134ØENDPROC 1350DEFPROCASS 1360DIMSPACE 90:P%=SPACE:OS=&FFEE 1370FORI%=0TO2STEP2 245@LIX=3:SCX=0:LEVX=1 CDEAD ELSE IF LEV%<>4 PROCSCREEN(LEV%):E 2460G0T0100 1910TIME=60 247ØENDPROC 1920ENDPROC 1930DEFPROCOBJECT 380COPTI% 248ØDEFPROCENTER 1390. REC 2490#FX15 2500INPUTTAB(1,9)"ENTER YOUR NAME (MAXI MUM OF 10 CHARS) ";NAM\$ 2510IF LEN(NAM\$)>10 THEN PRINTTAB(5,9)S PC(100):GOTO2500 194@COLOUR3 195@PRINTTAB(01%,01Y%)CHR\$(0B%) 1400LDA£31:JSR OS:LDA&71:JSR OS:LDA&72: 1410LDA£135:JSR&FFF4:STX&75:AND&75:LDA& 196ØCOLOUR3 75:STA&75DIV&100 1420LDA£31:JSR OS:LDA£POS:JSR OS:LDA£VP 197ØENDPROC 198ØDEFPROCCHECK 2520FORI%=1T010 2530FSC%>SCH%(I%) THEN P%=1%:I%=10 1990IF X%=01% AND Y%=01Y% THEN SC%=SC%+ OS: JSR OS 1430RTS: J: NEXT 1440ENDPROC 1450DEFPROCCAN_CAN 10: PROCSCORE: PROCGOT 2000ENDPROC 2010DEFPROCHALL 254@NEXTI% 2550FORR%=10 TO P%+1 STEP-1 2560SCH%(R%)=SCH%(R%-1):SC*(R%)=SC*(R%-1460RESTORE1610 1470CLS 1480*FX15 2020RESTORE2110 2030DIMSCH%(10),SC\$(10) 2040FORI%=1T010 1490*FX15 1500PRINTTAB(3,5)"WELL DONE! NOW ON TO 2050READ SCH%(I%) 2060NEXTI% 259@NAM#=1 2600ENDPROC 2610DEFPROCKEYS 2070FORI%=1T010 THE NEXT LEVEL": 2620IF INKEY(-98) AND JUMP%=0 AND FALL%
=0 AND XX>0 THEN XX=XX-1:FLEAX=225
2630IF INKEY(-67) AND JUMP%=0 AND FALL%
=0 AND XX<39 THEN XX=XX+1:FLEAX=224
2640IF INKEY(-1) AND JUMP%=0 AND FALL%
0 THEN PROCJUMP 1510COLOUR1 1520PRINTTAB(0,20)STRING*(40,CHR\$255) 2080READ SC#(1%) 2090NEXTI% 1530COLOUR2 1540X%=-1:Y%=19 1550PRINTTAB(X%,Y%)" " 2100ENDPROC 2110DATA1020,1000,900,800,700.600.500,4 00.300,200 156@READ NO%,DU% 157@IFNO%=999 OR DU%=999 THEN ENDPROC 158@IFDU%=10 THEN DU%=8 2120DATA David, Ian, Paul, Sharon, Alison, V ijay, Jason, Colin, Margaret, Banjan 265ØENDPROC 266ØDEFPROCSPACE 213ØDEFPROCHALLOFFAME 15801FDUX=10 THEN DUX=8 1590DUX=DUX-3 1600 X%=XX+1:PRINTTAB(X%,Y%)CHR\$(224):S OUND1,-10,NO%,DU%:SOUND2,-10,NO%,DU%:SOU ND3,-10,NO%,DU%:SOUND1,0.0,0:IF X%>40 TH EN ENDPROC ELSE GOTO1550 1610DATA101,10,109,5,121,5,117,5,109,5, 2670PRINTTAB(14,25)"PRESS SPACE" 2680IF INKEY(-99) THEN ENDPROC 2690GOTO2680 2140CLS 2150COLOUR2 2160PRINTTAB(13,5)"HALL OF FAME" 2170PRINTTAB(13.6)"-2700ENDPROC 2190COLOUR1 2190FORI%=1TO10 2710DEFPROCENDGAME 2720CLS 2730VDU19.0,4:0: 129,10,129,10,129,5,137,5,117,5,121,5,10 9,10,109,10,109,5,121,5,117,7,109,5,101, 5,149,5,145,5,137,5,129,5,121,5,117,5,10 2200COLOUR3 2750*D017.0.4:0; 2740PRINTTAB(2,5) "Well done you have compleated all the levels.";:IF SC%>SCH% (10) THEN PRINT; "Which means you are in the top ten."::PROCENTER 2750*FX15 2210PRINTTAB(10, 1%+9); 1% 2220COLOUR1 9,5,101,10,109,5,121,5,117,5,109,5,129,1 0,129,10 223@PRINTTAB(13, 1%+9):SC*(I%) 224@PRINTTAB(25, 1%+9); SCH%(1%) 1620DATA101,5,129,5,109,5,117,5,101,10, 225ØNEXT 999,999 163ØDEFPROCSCORE 226@PROCSPACE 227@COLOUR3 276@PRINTTAB(10,24) "PRESS SPACE" 277@REPEAT 1640PRINTTAB(0,0) "Score ":SC% 1650PRINTTAB(11.0) "Lives ":LI% 1660PRINTTAB(21.0) "Level ":LEV% 1670PRINTTAB(0.1) "Bonus ":TI%:" 228ØENDPROD 278ØKEY%=GET 2290DEFPROCDEAD 2290DESTORE2330:FORI%=1TO29:READCH%,EN% 2790UNTIL KEY%=32 2800SC%=0:VDU19,0,0;0; 281@GOTO5@

Gardener

R Williams, Deganwy, Gwynedd.



IN GARDENER you are the man at the bottom of the screen with a bucket on your head. To your left is a dripping tap and to your right a ladder which leads to four levels, each with a sunflower on it.

```
Program 1.

READY.

18 POKE36879,25:PRINTCHR$(14);CHR$(8)
29 PRINT"Jambid@blwETTING UP CHRRS.","MbbHND \.-.",,"MbbMTLERSE ORIT...."
39 POKE56,27:FORI=6913T07614:RERDJ:POKEI,J:NEXT:LORD"",1,1
40 DBTR32,110,29,160,0,132,253,132,10,165,0,133,254,165,1,133,255,165,197,201,12
,240,16
50 DBTR6201,36,240,52,201,20,240,100,201,21,208,3,76,176,27,96,32,50,29,162,44,32
,8,29
60 DBTR169,22,209,254,240,3,76,253,27,145,0,169,3,145,2,169,18,145,254,162,6,32,34,29
70 DBTR162,22,32,23,29,76,98,29,32,50,29,162,22,32,23,29
80 DBTR138,209,254,240,3,76,253,27,162,44,32,8,29,169,22,145,254,162,3,32,34,29,162,22

90 DBTR32,23,29,169,18,145,254,162,6,32,34,29,162,22,32,23,29,76,98,29
100 DBTR32,23,29,169,18,145,254,162,6,32,34,29,162,22,32,23,29,76,98,29
100 DBTR32,23,29,169,12,11,32,23,29,169,32,209,254,240,107,145,0,162,43
110 DBTR32,8,29,169,32,145,254,198,254,169,18,145,254,162,6,32,34,29,162,22,32,2
3,29,76
120 DBTR98,29,32,82,29,162,23,32,23,29,177,254,201,32,240,63
130 DBTR98,29,32,82,29,162,23,32,23,29,177,254,201,12,28,24,46,63
130 DBTR98,29,32,82,29,162,23,32,23,29,177,254,201,12,208,4,238,10,16,49,169,32,145,0,232,32,82,9,169,32
140 DBTR145,254,230,254,169,18,145,254,162,6,32,34,29,162,22,32,23,29,76,98,29
150 DBTR169,3,145,2,165,254,133,0,133,2,165,255,133,1,73,136,133,3,165,0,133,254,165,16
160 DBTR133,255,165,6,240,69,165,10,240,65,162,22,32,8,29,169,17,145,254,198,10,198
170 DBTR169,6,141,148,28,141,149,28,169,170,141,11,144
180 DBTR160,1,162,255,142,11,144,32,150,239,32,150,239,202,208,244,136
190 DBTR608,239,169,18,145,254,200,169,25,145,254,162,22,32,8,29,169,29,145,254,
```

The object of the game is to stop the flowers wilting, and therefore dying, by catching the water and pouring it on the flowers which will suddenly perk up. For each bucket of water poured on a flower you score five points. You start with three lives and there is a bonus life at 80 points. The keys to control the man are:

UP — Í DOWN — M LEFT — J RIGHT/POUR — L

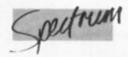
Written in 2 parts

The program is written in two parts so as to fit in 3.5K. The first part lowers the ramtop to decimal 6912 and loads in the machine code to move the man, and the user-defined graphic characters. Great care should be taken here as no error traps could be included due to memory limitations — so type with care!! The first part when saved, automatically loads the second part, when run. Below is a description of the second part of the program.

Lines 10-20: Waits for a keypress on first run then sets up the variables

Jon the Jany

N Billiland, Grangemouth, Stirlingshire.



Jon the Jany is a ladders and platform game. You play the part of Jon whose sole purpose in life is to switch off light bulbs. To do this you

must walk under them. Once you have switched off all the lights you get a different screen to complete and two extra lights to switch off. Sounds easy but as usual there are monsters that kill if they are touched.

Jon the Jany is written in Basic and machine code. The machine code controls the monsters and the rest is in Basic. The screens, bulbs and monsters are all printed up randomly and the cursors control Jon.

Lines 30-90: Sets up the screen — ladder, floors, flowers. Also

the man's starting position.

Lines 100-110: Picks the number of the flower to be wilted — if any.

If a flower has wilted too far then exit to line 200.

Line 120: Prints "score", "high", "lives"; calls the machine code to

move the man; delays depending on the score.

Line 130: If Peek (253) had been set during the machine code then five points are added

to the score and the high score checked for.

Line 140: If the score is 80, then a bonus life is given.

Lines 150-180: Moves the drop down the screen and "fills" the man's bucket if he catches it.

Lines 190-200: Makes a noise, takes a life away. If there are enough lives left then program

lives left then program goes to line 30. Lines 210-230: Asks if user wants another

go. If Yes then program moves to line 20. If No then SYS212, which resets the machine as if a RUN/STOP-RESTORE had been performed.

After typing in the second part it should be saved by typing

SAVE"",1,1

The first program will automatically run the second after it has loaded it.

 Do not break into the program when scrolling message appears at the bottom of the screen because

POKE 23659,0

is used to print the message on the 22nd line and the program will crash if attempting to do so. If you can't be be bothered to type in this great program send a sae and £1.50 to N. Billiland, 22 Garry Place, Grangemouth, Stirlingshire.

10 CLEAR 33199: BORDER 0: PAPE
R 0: OVER 0: INK 6: INK 8: CLS:
LET HI=0: GO SUB 5000: GO TO 45
00 30 GO SUB 1500
35 GO SUB 1500 GO SUB 2000: G

0 SUB 3500
100 REM MAIN ROUTINE
110 IF INKEYS()"" THEN BEEP .00
120 115 LET X1=X: LET Y1=Y: IF ATTR
(Y+2,X+1)=2 THEN GO TO 130
120 IF ATTR (Y+2,X)=7 THEN GO T

200 130 LET X=X+(INKEYS="8" AND X(3)
1)-(INKEYS="5" AND X)0
100 LET X=X+(INKEYS="6" AND ATT
R (Y+2,X)=7)-(INKEYS="6" AND ATT
R (Y+2,X)=7)-(INKEYS="6" AND ATT
R (Y+2,X)=7)-(INKEYS="7" AND ATT
R (Y+2,X)=7)-(INKEYS="6" AND ATT
R (Y+1,X)=40-ADA
ADO PRINT AT 0.6;5: IF T=N
THEN GO TO 3000
1000 PRINT AT 0.6;5: INK 7;"SCORE
1000 PRINT AT 0.6;5: I

0 TO 1110
1050 FOR G=1 TO 3
1060 LET C=INT (RND+30)+1: IF AT TR (F,C+1)=7 OR ATTR (F,C-1)=7 THEN GO TO 1060
1090 FOR H=-1 TO 3: PRINT AT F+H,C; INK 7: B": NEXT H: NEXT G: NEXT F
1110 IF ATTR (15,0)
(15,2)
(27 THEN FOR F=15 TO 19: PRINT AT F,1; INK 7; B": NEXT F: RETURN 1500 REM URRESED 1510 DIM A\$(3,2): LET A\$(1,1)="H": LET A\$(2,1)="E": LET A\$(2,1)="E": LET A\$(3,1)="H": LET A\$(3,1)="H": LET A\$(3,1)="C": LET A\$(3,2)="D": LET A\$(3,1)="H": LET A\$(3,1)="C": LET A\$(3,2)="D": LET A\$(3,1)="C": LET A\$(3,2)="D": LET A\$(3,1)="C": LET A\$(3,2)="D": LET A\$(3,1)="C": LET A\$(3,2)="D": LET A\$(3,1)="C": LET A\$(3,1)="H": LET A\$(3,1)="H": LET A\$(3,1)="H": LET A\$(3,1)="H": LET A\$(3,1)="H": LET A\$(3,1)="C": LET A\$(3,2)="D": LET A\$(3,1)="H": LET A\$(3,1)="H":

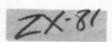
(continued from previous page) 4: INK 7: "YOUR FINAL SCORE WAS ".S: PRINT AT 9.3; FLASH 1; INK GO SUB 2500 4140 IF INKEY\$="Y" OR INKEY\$="Y" THEN CLS: GO TO 30 4150 IF INKEY\$="n" OR INKEY\$="N" THEN GO TO 4500 4500 FEM OPENING SCREEN 4510 LET B\$=" GUIDE "JON' AROUND TH FACTORY (USING 16E CURSORS) SU ITCHING OFF ALL THE LIGHTS BUT WATCH OUT FOR THE FUNNY BLOBS TWATCH OUT FOR THE FUNNY BLOBS PRINT AT 6,6; INK 5; BRIGHT 1;"J ON THE JANY" 4520 CLS: PRINT AT 6,6; INK 5; BRIGHT 1;"J ON THE JANY" 500 GO SUB 2500: FOR F=0 TO 30: BEEN O1,F: NEXT F: PAPER 7: CL S: PAPER 0: CLS: GO TO 30 SOUS FEM OFT TO USR 7: "PLEAS EWALT A MINUTE" 5010 RESTORE 5080: FOR F=USR "A" TO USR "J"+7: READ A: POKE F,A: NEXT F S020 RESTORE 9000: FOR F=33500 T

```
O 33829: READ A: POKE F,A: NEXT F: RETURN SOBO DATA 255,24,24,255,255,129,129,255  
5090 DATA 255,24,24,255,255,129,129,255  
5090 DATA 129,129,129,255,255,12 9,129,129,129  
5100 DATA 28,28,28,9,29,45,75,72  
72,20,148,84,82,34,2,3  
5110 DATA 28,28,28,6,28,42,42,42  
42,20,20,20,20,20,20,54  
5130 DATA 60,126,90,90,126,102,1  
02.60  
5130 DATA 56,56,56,144,184,180,2  
10,18,18,40,41,42,74,68,64,192  
5140 DATA 24,24,60,60,60,24,0,0  
5150 GO TO 4130  
9000 DATA 17,36,132,26,254,255,4  
0.5,205,241,130,24,246,19,26,254  
255,200,27,24  
9010 DATA 243,26,111,19,26,103,1  
9,205,143,131,205,108,131,19,229  
205,126,131,26,254  
9020 DATA 243,26,111,19,26,103,1  
9,205,143,131,205,108,131,19,229  
205,126,131,26,254  
9020 DATA 243,2,62,7,119,225,58  
35,132,167,40,2,19,201,213,27,2  
05,45,131  
9030 DATA 27,124,18,27,125,18,20  
9,229,205,126,131,126,18,54,4,22  
5,205,108,131,19  
9040 DATA 201,26,203,71,32,13,20  
3,79,32,11,203,87,32,9,203,95,32  
,26,201,43  
9050 DATA 201,35,201,213,125,230  
,224,40,8,167,17,32,0,237,82,209
```

201,17,32,7
9060 DATA 237,82,209,201,213,125
230,224,254,224,40,6,17,32,0,25
229,201,17,32
9070 DATA 7,25,209,201,229,213,1
7,136,255,6,8,78,26,169,119,36,1
9,16,246,209
9080 DATA 225,201,124,203,183,20
3,63,203,63,203,63,103,213,17,0,8
82,52,209,201,125
9090 DATA 230,31,254,31,32,6,62,0,203,198,180,201,167,32,6,62,0,2
03,207,18
9100 DATA 201,229,205,67,131,205
.126,131,126,254,6,225,32,17,229
205,88,131,205,126
9110 DATA 131,126,254,2,225,40,4
205,223,131,205,126
9110 DATA 131,126,254,2,225,40,4
205,223,131,205,126
9110 DATA 131,126,254,2,225,192
205,88,131,205,229,205,67,131,205
1120 DATA 17,132,230,3,40,249,25
4,1,32,23,62,0,203,223,18,201,20
5,17,132,230
9140 DATA 3,40,249,254,1,32,6,62,0,203,203
9150 DATA 19,18,201,62,0,203,20
7,16,201,229,42,33,132,35,126,71
230,63,103,34
9160 DATA 33,132,120,225,201,0,0

Outlaw

Chris Colley, Cambridge, Cambridgeshire.



THE IDEA is to get from your hideout at the bottom of the screen to the castle at the top, steal some gold and return with it to your hideout. In between, you have to negotiate the changing doorways in the outer walls and avoid the patrolling guard. You have to make the trip 12 times in all and each time the game gets slightly faster.

You may wait in a doorway for a passage to clear and in this time you may find the gap changes and a wall is built on top of you. You may use this to your advantage since, when you move, there will be two gaps in that wall until the next change. Be careful not to forget your position while you're hidden though.

To enter the program you will need a Rem of 1304 bytes.

Enter the code, delete the hexloader, enter the Basic from program 1 and run. And there it is. The machine code may be stopped at any time

by pressing shift with P, 0, Newline or Space. If the game is too fast, the speed may be changed by Poking 17480. This is initially set at 16 and the delay is caused by the computer counting up to

(PEEK 17480 - SCORE) x 256

Therefore, a number lower than 16 makes the game virtually unplayable in the later stage, while a number higher than about 30 makes it tediously slow in the early stages. If you require a challenge, cut your number of lives by Poking 17435 with the number of lives you require.

The hex dump.

```
The hex loader.

18REM HEXLOADER FOR OUTER.

10 PRINT "START ADDRESS"
20 INPUT S
30 PRINT "FINISH ADDRESS"
40 INPUT F
50 FOR N=S TO F STEP 8
60 LET T=0
70 PRINT N;" - ";
80 INPUT A$; " = ";
100 INPUT TOT
110 PRINT TOT
120 LET Z=0
130 FOR K=1 TO LEN A$ STEP 2
140 LET C=(CODE A$(K)-28)*16+CO
DE A$(K+1)-28
150 LET T=T+C
160 POKE N+Z,C
170 LET Z=Z+1
180 NEXT K
190 IF TOT=T THEN GOTO 220
200 PRINT "ERROR - PLEASE INPUT
AGAIN"
210 GOTO 60
220 NEXT N

The Basic program.

10 LET HI=0
5 FAST
10 CLS
20 POKE 16418,0
30 PRINT "
50 PRINT "
```

```
210 GOSUB 250
220 PRINT AT 10,11;"1: INFO";A

T 13,11;"2: KEY5";AT 16,11;"3:
PLAY";AT 19,11;"4: QUIT"
225 SLOW
230 GOTO 230+70*(INKEY$="1")+17
60+(INKEY$="2")+270*(INKEY$="3")+
60+(INKEY$="4")
240 GOTO 230
250 FOR A=9 TO 20
250 FOR A=9 TO 20
260 PRINT AT A,3;"

270 NEXT A
280 GOSUB 250
310 PRINT AT 10,4;";TAB 4;"5
TAB 4;"THE WOODS.THE PACKE HOUS
517AB 5;TAB 5;TAB 5;TAB 5;TAB 5;TAB 5;TAB 4;"THE WOODS
517AB 6;"TAB 7;TAB 5;TAB 6;"TAB 6
```

BBBBB B NE

NEXT A

The hex dump. 17018 - 8A8A8A8A8A8A8A8A8 = 1104 17026 - 8A8A8A8A8A8A8A8A8 = 1104 17034 - 8A8A8A8A8A8A8A8A8 = 1179 17042 - 050000000000000000000000000000000000	17282 - 81828383838383838383 = 1045 17290 - 83838383838383838383 = 1045 17290 - 838383838383838383838 = 1045 17290 - 838383838383838383838 = 1045 17306 - FFE9002E016D01AF = 817 17306 - FFE9002E016D01AF = 817 17314 - 01F1010A014C018E = 473 17322 - 01D0012A3240545 = 543 17332 - 292919229291922 = 289 17330 - 29291922929291922 = 289 17336 - 32407C09C0A043EE = 1019 17346 - 0EFE090C69B6F26 = 1019 17354 - 435E23552A0C4019 = 425 17354 - 435E23552A0C4019 = 425 17370 - CDAD43E61FFE1DF2 = 1231 17362 - E5061E368A2310FB = 759 17370 - CDAD43E61FFE1DF2 = 1231 17362 - E5061E368A2310FB = 759 17370 - 0A435F3E0057E119 = 779 17386 - 77090878B120FB09 = 1112 173650 - 44283A24040403805 = 502 17378 - 0A435F3E0057E119 = 779 17394 - 0182402A0C40230A = 358 17402 - FEFE2804770318F6 = 945 17402 - FEFE2804770318F6 = 945 17410 - 3E00232440323D40 = 411 17462 - 4011770219224040 = 389 17442 - 4011770219224040 = 389 17442 - 1143021922434036 = 330 17456 - 3CFECCORDARA A436F3E005 = 1019 17450 - 84284040A43A3406 = 781 17464 - 401770319224040 = 780 17474 - 403767447473E1090 = 542 17480 - 84284040A0443A3406 = 786 17450 - 84284040A0408060 = 886 17450 - 84284040A0408060 = 886 17450 - 84284040A080600 = 886 17450 - 84284040A080600 = 886 17450 - 84284040A08060 = 886 17450 - 84284060 = 886 17450 - 84284060 = 886 17460 - 30784060 = 886 17460 - 30784060 = 886 17470 - 00000000000000

Easy key

Vic 20

Andrew Breen, Paisley.

nd

THIS PROGRAM allows all the keys on the Vic-20's keyboard to be defined except the Shift, CBM logo key and the Restore keys. It gives a sort of one touch entry system as on such machines as the Electron and Spectrum.

Each key can be programmed with up to eight characters, which can be ordinary characters or can be control characters. The figure shows what the keys are currently programmed with: to change them, you will have to program them in order depending on what key by using the values on page 179 on the Programmer's Reference guide, or the table below.

The program takes up 768 bytes of memory and is totally relocatable, so it can be used on any Vic-20. You are asked to enter the Page number of the program. The program has been designed to fit from the start of one page right to the end of the third page. To work out the page number and divide it by 256 and take the whole number part to the result. Make sure that the area of memory is protected from the Basic program and variables by lowering the memory.

Value	Key	Valu-						
	е	Key	Valu-					
	е	Key	Valu-					
	e	Key						
0	1	16	none	32	Spa-			
	ce	48	Q					
1	3	17	Α	33	Z	49	E	
2	5	18	D	34	C	50	T	
3	7	19	G	35	В	51	U	
4	9	20	J	36	M	52	0	
5	+	21	L	37		53	@	

6	£	22	:	38	none	54	
7	DEL	23	÷	39	fl	55	f5
8	-	24	STO-				
	P	40	none	56	2		
99	W	25	none	41	S	57	4
10	R	26	X	42	F	58	6
11	Y	27	V	43	Н	59	8
12	1.	28	N	44	K	60	0
13	P	29	,	45	:	61	_
14	X	30	1	46	=	62	HO-
							ME
15	RET-						
	URN	31		47	f3	63	f7
No F	key giv	es 6	4.				

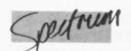
Start address is the page number multiplied by 256 plus 75. Therefore use:

Use SYS (page number)x256 + 75 In the data statements, use the left arrow character ('-') to represent return for direct commands, e.g List and Run.

```
READY.
                                             99 END
                                                                                          330 DATA RETURN+, "", PEEK, END+, NE
9 REM **********
                                             100 H=ASC(LEFT$(M$,1)):H1=(H-48)
1 REM
           CTRL KEY
                                             *16: IFH>57THENH1=(H-55) *16
                                                                                          340 DATA READ, SPC (, CHR$, INPUT#, R
            KEYWORD
  REM
                                             110 H=ASC(RIGHT$(M$,1)):H2=(H-48
                                                                                          UN←
3
  REM
              AND
                                                                                           350 DATA "", LIST, VERIFY+, STEP, ST
                                              IFH>57THENH2=(H-55)
           KEY BOARD
  REM
                                                                                          OP,PRINT,INPUT
360 DATA "",LIST+,LOAD,THEN,TO
370 DATA PRINT#,"",?TIME$+,"",SA
           EXPANSION
  REM
                                             130 RETURN
            ROUTINE
  REM
                                             200 DATA AD,8D,02,29,04,F0,28,A5
  REM *
              V.2
                                             ,C5,C5,FB,F0,22,C9,40
210 DATA F0,1E,85,FB,C9,20,10,1B
  REM
           (C) 1985
                                                                                           380 DATA FOR, DATA, TAB(, ASC, IF
9 REM *
          A.R.BREEN
                           10REM ****
                                             ,0A,0A,0A,AA,A0,00,BD
220 DATA 00,FF,C9,00,F0,09,99,77
,02,C8,E8,C0,08,D0,F0
                                                                                          390 DATA ?STATUS+, POKE, CLOSE, CLR
********
                                                                                           ←.REM
                                                                                          400 DATA GET,GOTO,WAIT,GET#,""
410 DATA "","","","","","","","","",CMD
10 PRINT"
                                            230 DATA 84,C6,4C,BF,EA,0A,0A,0A,AA,A0,00,BD,00.FF,C9
240 DATA 00,F0,EE,99,77,02,C8,E8,C0,08,D0,F0,18,90,E2
20 INPUT"OHAT TAGE"; P: D=P*256
30 FORT=01085 : READM$ : GOSUB100 : PO
KED+T.M: NEXTT
40 POKED+31,P+1:POKED+58,P+2:POK
                                                                                           421 REM *START ADD.=*
                                             250 DATA A9,00,8D,14,03,A9,FF,8D
                                                                                           422 REM *PAGE*256+75*
50 FORF=01063:READS$:R$=CHR$(0)
                                              15,03,60
                                                                                           423 REM
                                                                                                    *
                                                                                                        TO STOP
                                             300 DATA "","","","",""
S$=S$+R$+R$+R$+R$+R$+R$+R$
                                                                                           424 REM # RUN
                                                                                                             STOP
                                             310 DATA "B", "B", ?FRE(0) ←, SYS, OP
68 FORT=1T08: A=ASC(MID$(S$,T,1))
                                                                                                          AND
                                                                                           425 REM #
 IFA=95THENA=13
                                                                                                        RESTORE
                                                                                           426 REM *
                                             320 DATA "", RESTORE ←, RUN, GOSUB, C
                                                                                           427 REM ********
70 POKED+255+F*8+T,A
                                            0NT←
80 NEXTT,F
                                                                                           READY.
```

Screen Dump

L W Tomlin, New Southgate, London.



THE IMPLEMENTATION of RS-232 on Interface 1 is fairly good, for printers at least, but it can be quite a tricky business to transfer the screen to it. The machine-code routine here will do this by adding two new commands.

First of all type the numbers in the hex dump into the hex-loader provided, stopping with "*

Then save the code with

SAVE *"M";1;"copycode" CODE 32768,213 That done enter

OPEN# 3,"B":FORMAT "B",x where x is the correct baud rate for your printer. Now enter

RANDOMIZE USR 32768

and you have two new commands at your disposal.

The first one is Copy \$ which will send a compacted picture of the screen to the printer. The second Copy # gives a picture twice this size and is ideal for cassette covers, etc. The routine is fully relocatable so if you loaded the code to 40000 then type

(continued on next page)

(continued from previous page)

RANDOMIZE USR 40000

The routine works with any printer that uses Epson-type control codes such as the cheap to set up the new commands. The routine must | Brother range. Make sure that the "B" channel

not go into the printer buffer as it uses this itself. | has been opened before calling the code. It can take quite a while to print the screen at the lower baud rates but only takes about a minute at higher speeds.

```
The hex loader.
                                               Hex dump.
10 DEF FN h (h$) = 16 * (CODE h$(1)
-48-(7 AND h$(1) > "9")) + CODE h$(2)
)-48-(7 AND h$(2) > "9")
20 INPUT "Start ";s
                                                           21000009E5CF31E1
                                               32768:
                                                                                         764
                                                                                      =
                                                          22B75009FE3102FØ
                                               32776:
                                                                                         1247
                                                                                      =
       INPUT "Start
INPUT "Finish
                         1,5
                                                           013E4B32B05CD720
00FE23280AFE24C2
                                                                                          703
                                               32784
                                                                                      =
   30
                                               32792
                                                                                         823
                                                                                      =
       FOR n = S TO f STEP 8
LET tot = 0: PRINT n;
                               8
                                                          F0013E4C32B05CD7
2000CDB7053E03D7
                                               32800
                                                                                         912
                                                                                      =
   50
                                               32808
                                                                                         705
       INPUT hs: PRINT hs;
   60
                                                          01163E18D710003E
41D710003E04D710
003E0DD710003E0A
      LET X=0
FOR b=1 TO LEN hs STEP 2
   70
                                               32816:
                                                                                         405
   80
                                               32824:
                                                                                         593
                                                                                      =
       LET Z=FN h (hs): LET tot=tot
   90
                                                32832:
                                                                                           78
                                                                                      =
+7
                                                          D7100006000E00DD
                                                32840:
                                                                                         472
                                                                                      =
  100
      POKE n+x,z
                                                          21005879083F6F78
E6300F6778E60E07
                                               32848:
                                                                                         742
      LET h$=h$(3 TO ): LET x=x+1
NEXT b
                                                                                      =
  110
      PRINT
                                               32856:
                                                                                         767
  120
                                                                                      =
              " = ";: INPUT t: PRIN
                                                          070707856F78E601
070784F640670506
                                               32864:
  130
                                                                                      =
                                                                                         664
   †
                                               32872:
                                                                                         810
  140 IF tot<>t THEN PRINT "input
                                                           Ø8E516ØØ3EØ84E58
                                               32880:
                                                                                         495
                                                                                      =
  error - try again": GO TO 50
150 NEXT n
  error
                                                          CB391D20FBCB1224
3D20F37ADD7700DD
                                               32888:
                                                                                         829
                                                                                      =
                                               32896:
                                                                                      =
                                                                                         1019
  160 REM enter STOP to stop
                                                          23E110E5C10C0C79
FE4038BFC53E1BD7
                                               32904
                                                                                      =
                                                                                         843
                                               32912
Header program.
                                                                                      =
                                                                                         1066
                                                          10003AB05CD71000
AFD710003E01D710
                                               32920:
                                                                                         573
                                                                                      =
    5 OPEN #3, "b": FORMAT "b",960
                                               32928:
                                                                                         700
0
      CLEAR 32767
LOAD ""CODE 32768
                                               32936:
                                                           0021005B06007ED7
   10
                                                                                         471
   20
                                                           10002310F93E0DD7
                                               32944:
                                                                                         606
       RANDOMIZE USR 32768
                                               32952:
                                                           10003E0AD71000C1
                                                                                         512
                                                                                      =
   40
                                                          040478FE3038863E
18D710003E32D710
00C3C10500000000
 COPY # INT
                                               32960:
                                                                                      =
                                                                                         682
table"
                          'COPY $'
                                      and
                                               32968:
                                                                                         601
                           are now avai
                                               32976:
                                                                                         393
```

Key Helper

Colin Newcombe, Sudbury. Suffolk.



THIS PROGRAM defines most of the keys, A-Z, to print whole Basic keywords without affecting the numeric keypad. The program uses less than 1K of memory.

In the CPC-464 User Guide, there is a paragraph of key defining which tells you very briefly about the numeric keypad which can be used as function keys - this makes 12 function keys, key numbers from 128-139.

The other 20 function keys are not mentioned and are left out of the user guide. The program which I have written uses these 20 and leaves the numeric keypad alone so it can be used as normal because many people use the keypad for entering Data than using the normal top row number keys.

I have made it as easy as possible to remember which key prints which keyword. The keywords are called by pressing Control and a Key:

```
L = LOCATE
A = AFTER
B = BORDER
                      M = MODE
C = CHR$(
                      N = NEXT
                      P = PRINT
D = DATA
E = ELSE
                      R = RETURN
  = FOR
                      S = SYMBOL
                      T = THEN
G = GOSUB
                      U = UPPER$
H = HEX$(
  = INKEY$
                      V = VAL(
                      W = WHILE
```

As you can see, it is very easy to remember which keywords each key prints. If this sounds complicated then I suggest you sell your micro! I have tried to use the most commonly used

keywords. All of the keys can be reset to normal

CAL &BB00

Using this very short program you can speed up programming and make typing in listings

```
easier and much quicker.
100 REM ***********
110 REM *** Key Helper ***
120 REM * Colin Newcombe *
130 REM ***** 3-6-85 *****
140 REM * Software File. *
150 REM ***********
160 REM
170 REM - Loop to define KEYS -
190 FOR big.key%=140 TO 159
200
    READ message$,letter$,key.number%
     lower%=ASC(LOWER$(letter$))
210
     upper%=ASC(UPPER$(letter$))
220
230
     KEY DEF key.number%,1,lower%,upper%,big.key%
     KEY big.key%, message$
240
250 NEXT big.key%
260 REM
270 REM - DATA for key defining -
280 REM
290 DATA "AFTER ",A,69, "BORDER ",B,54
300 DATA "CHR$(",C,62,"DATA ",D,61
310 DATA "ELSE ",E,58, "FOR ",F,53
320 DATA "GDSUB ",G,52,"HEX$(",H,44
330 DATA "INKEY$",1,35
340 DATA "KEY ",K,37,"LOCATE ",L,36
350 DATA "MODE ",M,38,"NEXT",N,46
360 DATA "PRINT ",P,27
370 DATA "RETURN", R, 50, "SYMBOL ", S, 60
380 DATA "THEN", T, 51, "UPPER$", U, 42
390 DATA "VAL(", V, 55, "WHILE ", W, 59
```

ER 6613

Contact: Susan Platts

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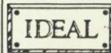
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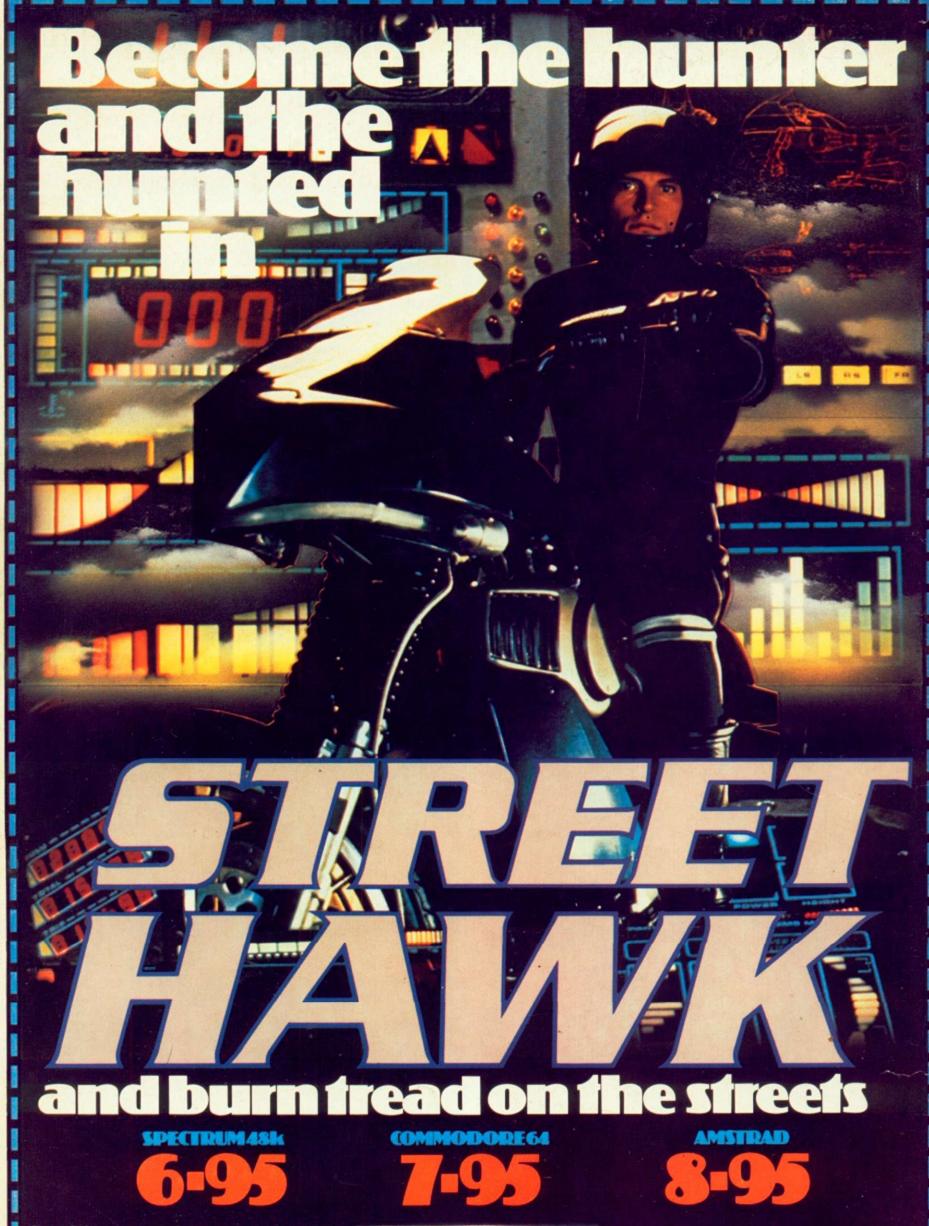
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