

Home Computing WEEKLY

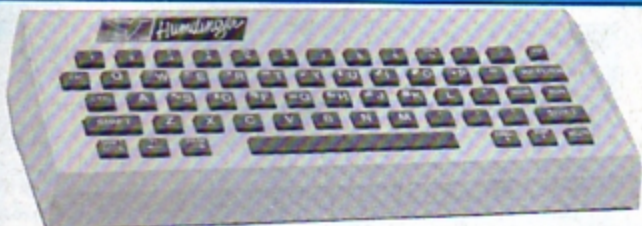
An Argus Specialist Publication

NEW

March 29-April 4, 1983

No. 4

35p



Humdinger on the way

San Francisco

A computer was shown at the West Coast Computer Faire which, when released in Britain, could prove to be a serious rival for Sinclair's Spectrum.

The Humdinger is the brain-child of a company called Venture Micro, which was formed to design, produce and market the

computer. It will sell in America for 129.95 dollars although it had been dropped to just 99 dollars as a special introduction at the show.

The Humdinger is based around the same Z80 processor as the Spectrum and, apart from a smaller standard memory, it of-

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COURT MOVE TO KILL TAPE BUY-BACK SHOP

Software companies have acted to try to halt a program buy-back scheme - days after it started.

Quicksilva has served a writ and Imagine has demanded its tapes back from the Software Centre, trading as Buy 'n Try in London's Wigmore Street.

They are among 36 well-known software houses given as suppliers of hundreds of programs listed in four-page magazine advertisements.

Quicksilva's writ of summons alleges infringement of copyright or assisting or conspiring to help such infringement.

But Bill Cannings, Software Centre's managing director, said: "It's ludicrous to suggest that we are infringing copyright. Obviously we will be defending the action."

A letter from Imagine's solicitors asks for its cassettes to be returned in seven days and says: "We do not trade with such companies or firms which offer our tapes for hire or on a discount buy-back basis or resale to dealers who offer tapes similarly."

Mr Cannings agreed that he bought Imagine's products through another of his companies, Computer Aided Systems. However, he said: "I buy through my major company and sell through subsidiaries. This is what the big distributors do."

"It's not to deceive people, it is just more convenient for us."

Buy 'n Try officially opened for business 17 days ago - and the shop was packed.

A customer can buy a program at the usual retail price, use it for up to six months and then ex-

change it for 80 per cent off the price of another program.

The aim of the scheme is to operate mainly by post and phone, but Mr Cannings is offering dealerships.

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Spectrum,
Atari, BBC
Articles on
ZX81
add-ons,
TI99/4A

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PAINTER — BBC, SPECTRUM, ATOM

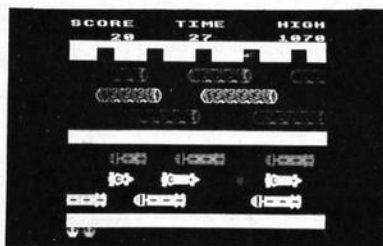
Completely machine coded Arcade game. 6 levels. 16 different screens. Runs in colour on the Atom without F.P. BBC cassette **£8**. Disk **£11.50** Atom cassette **£6.90**

Spectrum cassette **£5.75p**

PLANES — BBC 32K

Spectacularly fast arcade style game. Options for different speed of game — even the slowest is fast! Many different screens and bonus scores. Graphics are really superb.

Cassette **£8.00** Disc **£11.50**



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BBC cassette **£8.00** Disc **£11.50**

Spectrum cassette **£5.75**

ORIC Two adventure games for the ORIC available NOW, **Death Satellite** and **Zodiac**. Both will run on the 16K machine. Cassettes at **£6.90** per game.

DRAGON Dead wood Monopolise a western town — (1-4 players), set your own time limit. Cassette **£6.90**. **Buccaneers** A piratical game again for 1-4 players. Cassette **£6.90**

ATOM Space Panic **£6.90**, Death Satellite **£6.90**, Zodiac **£6.90**, Cyclon Attack **£6.90**. Atom Utilikits still available from stock at **£18.50**

SPECTRUM Crazy Balloons, an excellent game for the 16K machine at **£5.75**. **Specfile** stock control/data management system for the 48K machine **£10.00**

BBC Pharaoh's Tomb, an interactive graphic adventure game for the Model B. Cassette **£8.00** Disc **£11.50**

Tower of Alos Another graphic adventure game — this will run on the A or B machine. Cassette **£6.90** Disc **£11.50**

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Continued from front page

Software Centre's spokesman Gareth Williams emphasised: "Buy 'n Try is not a software library, nor a program hire business.

"It is a straightforward system of buying and selling.

"It has not been created to benefit software pirates... indeed, under the Buy 'n Try system all sales are registered, all software indexed and logged and all customer names recorded.

"As a result, unauthorised program copiers can be identified and traced to source. Customers are being advised that it is an infringement of copyright laws for them to reproduce programs."

Quicksilva originally applied for an ex parte injunction - granted without the plaintiff being present - but was turned down by a High Court judge.

Now the writ had been served, solicitor Robert Wood said he hoped for an early hearing. The notice of motion application was to get an injunction over more issues than copyright infringement.

After the injunction had been decided, he hoped for a full hearing within weeks.

Dave Lawson, a partner in Liverpool-based Imagine, said: "We are giving them seven days to return our products. Then we will go to court.

"There's no underestimating the strength of feeling among the software houses - we are all fuming about it. I would not like to be in their shoes."

Mr Cannings, who was 42 on Wednesday, said before the writ was served: "Perhaps I'll get a birthday present."

Later he said: "So far the response has been incredible.

"I don't agree with the sort of statements that have been made. They have misunderstood. It's a fair concept. Bear in mind we are selling, we are not renting the stuff.

"It may well be that I'll be happy to take them off my list because we are being inundated with people who want to be placed on our list.

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BUY THIS SPACE

**To advertise your latest products!
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"If I'm stopped I'll stop. But I think they are wrong.

"I've been in computer software for a long time and the problem is that people want to try the software, often the advertising is misleading and, thirdly, it may not be what he wants."

He said customers were told it was illegal to copy tapes and this was repeated on a sign in the shop. He had taken advice from a bar-rister before launching the scheme.

Ian Sinclair, whose IJK Software is also on Buy 'n Try's list, said: "I think it's an absolute disgrace. It's splitting hairs to describe it as sale or return. To all intents and purposes they are a library. They are going to cut off the hand that feeds them."

Tony Baden, partner in Bug Byte, said his solicitor was in touch with Quicksilva's. He said: "It has got to be stamped out quickly or the software market will collapse. Having said that, I can't see how they can make money out of it."

Commodore, however, sees the scheme differently. A spokesman said: "It's an interesting initiative and we will watch his progress with interest. I think that anything that sells our software and anything that spreads the use of computer software is a good thing.

The issue was being discussed at a meeting of the Computer Trades Association in Watford today.

LATE NEWS

High Court hearing held on Thursday, attended by Software Centre MD Bill Cannings and Quicksilva

July date for Electron

Acorn's Electron - a stripped-down version of the BBC micro - is now due in July.

For £150-£200, it will have 32K of RAM, 16 colours and a typewriter-style keyboard. *Acorn Computers, Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN*

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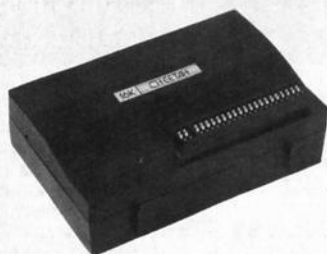
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HCW 4

ARCAIDIA

ASTEROIDS, INVADERS, ASTRO SLED & SPACE FIGHTER.

ASTEROIDS

A classic version of the classic game. Feature packed with thrust, hyperspace, rotate, multiple bolts, etc. This exciting program is written in m/c and employs hi-res graphics and double size screen techniques for maximum effect.



ASTRO SLED

Pilot your high powered sled down the jagged space canyon, but be warned - the further you travel, the harder it gets! With over 50 skill levels -



INVADERS

No machine is complete without this, the original cosmic shootout. In machine code with three invader types (plus mother ship), bonus bases, hi-res, double size screen, etc.



SPACE FIGHTER

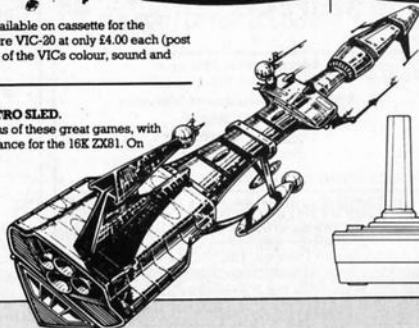
A space dog-fight simulator which, like Asteroids, is written in machine code and uses hi res. Guide your fighter through tight loops and turns to centre the elusive alien craft in your sights. With 10 skill levels.



All the programs are available on cassette for the unexpanded Commodore VIC-20 at only £4.00 each (post free), and make full use of the VICs colour, sound and joystick facilities.

ZX81 SOFTWARE SPACE FIGHTER, ASTRO SLED.

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Continued from Front Cover

fers a lot more in the basic unit than the Spectrum.

It comes with 4K of user RAM and 8K of ROM which contains the BASIC. Its keyboard is made up of the same grey rubber keys as the Spectrum but on the Humdinger they are each mounted on a click switch which gives the keyboard a better feel.

Part of the marketing strategy behind the Humdinger is to produce a vast array of peripherals to complement and enhance the basic system, at a very low cost.

These will include 16K and 64K RAM packs which will retail in the states for 39.95 dollars and 99 dollars respectively. The 16K RAM pack is also being offered with a battery backup for 49.95 dollars so, by using this, you will be able to store programs in memory after the computer has been turned off.

Other peripherals planned for the future include a speech recognition/speech synthesiser unit, a video expansion board to enhance the screen display to 80 by 24, making it compatible with CP/M, the industry standard operating system for business micros, and wordprocessing software, a disc controller for 5¼ and 8 in disc drives and a 16-bit 8088 co-processor unit.

On the graphics side the Humdinger has 12 graphic display modes and will display up to 256 by 192 pixel high resolution.

It has eight colours and a pre-defined graphic character set plus the ability to program user-defined characters. The sound takes the form of a four-voice music and sound synthesiser which ranges over five octaves.

One of the big-selling points of the Humdinger will be the plethora of interfaces which come fitted as standard to the computer.

These are a Centronics parallel printer port, a serial RS-232 for connection to modems and computer networks, a joystick port, a cartridge port and a memory expansion port.

The Humdinger certainly generated a lot of interest and excitement at the show. It remains to be seen how well it will be received in England.

Roger Pitkin, Venture Micro's president, hopes to be at the Personal Computer World show in September with the rest of the team and the Humdinger. You will be able to make up your own mind.



Roger Pitkin, Venture Micro's president, shows off his new Humdinger computer.

'Read Chris Palmer's full show report on pages 7 and 9.

Venture Micro Inc, 10090 N. Blaney Avenue, Suite 6, Cupertino, California 95014, USA.

More want Commodore

More than 30,000 back orders have been clocked up for the new Commodore 64 — now being turned out at 5,000 a week in West Germany.

A spokesman said: "In a situation where demand far exceeds supply, it would be impossible to consider any price reduction on the part of the manufacturer."

By the end of the year, 300 people will be making VIC-20s and Commodore 64s at the company's new £20m factory in Corby, Northants.

Commodore Business Machines (UK), 675 Ajax Avenue, Trading Estate, Slough, Berks SL1 4BG

Let us know

If you are in the home computer business, please keep us in touch with what your company is doing. News items and review samples of your products — software and hardware — should be sent to: Paul Liptrot, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE. Phone 01-437 1002.

Don't rush to replace your micro

Anyone who has been interested in micros for a few years must be pretty frustrated by now. No sooner has a machine been purchased than a "new generation" of computers comes onto the market.

High resolution, sound effects, colour graphics, extra memory — these are the attractions of the latest micros. The old PET and Tandy machines seem almost prehistoric by comparison with the latest computers. The new machines are half the price of the old ones, yet they seem to have twice their performance.

*A survey published in the UK monthly *The War Machine* indicated that between half and two-thirds of readers owned more than one micro. Even allowing for a smattering of ex-ZX81 users many of those surveyed had augmented early personal machines such as the PET and TRS-80 with Ataris, Spectrums or BBC Micros.*

To some extent this finding explains the extraordinary "growth" of the micro market. In fact the experienced microholic may be even more susceptible to the new marketing than the beginner. When many of the old stagers entered the hobby, micro marketing was a pretty rudimentary process. Nowadays the advertising has become much more persuasive (take a bow, Clive Sinclair) — but the product may not be as different as it seems.

After three years computing with an unreliable Apple II and a rather dull but practical TRS-80/Genie system, I decided the time had come for an upgrade. I came across a BBC Micro in a local TV shop, and the prospect of micros by retail was too much for me. I bought a Model B on the spot. (Oh, the joys of batchelor life!)

Within a few weeks I came to treat the BBC Micro specification as rather a cheat. I built a cassette lead for the computer (the BBC didn't bother to supply one) and then found that the tape interface was rather unreliable — worse, in fact, than on any of my previous machines. A new recorder did not cure the problem. Eventually I found out that there were two bugs in the BBC ROM.

Without wishing to seem overly critical of one machine, other features of the BBC computer were not as I'd been led to expect by the glossy advertisements. The provisional BBC Micro manual contained a detailed index — but roughly half the entries had the page number 0 next to them. Those parts of the manual hadn't been written.

To the maker's credit, free copies of the full manual were sent out to users after a few months. The new manual was an eye-opener.

These may sound like minor criticisms, but they are just a sample of the problems I encountered. They all add up to the fact that I'm typing this on my thrifty Video Genie (at least the keys don't bounce). I parted company with my much-vaunted BBC Micro a frustrating six months after I bought it.

The fact of the matter is that, however the makers may tell you, there is not much difference between one micro and the next.

This problem is not confined to BBC Micro users. As a member of four computer clubs I have seen the same disillusionment in those who "upgrade" with Spectrums, DAs or Ataris. Work with a Colour Genie and a Spectrum has confirmed my impression.

The quantum jump comes between not having a computer and having one. Once you have passed this stage all of the "features" add up to little more than bugs by another name.

Simon Goodwin Computer-aided design programmer

● What makes you pleased or annoyed about the micro scene, hardware or software? We welcome contributions for this column. Send them to: Paul Liptrot, Opinion, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE. Please include your occupation and your interest in computing.

Manchester Home Computer Show

MIDLAND HOTEL

April 21/22/23

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Rain, mud and some of the fun of the Faire

San Francisco

California, land of sun, sea and surf turned into the land of rain, tornadoes and mudslides for the staging of the 8th West Coast Computer Faire.

I sympathized with the shell-shocked native San Franciscans as I battled my way to the faire through torrential rain. They were obviously having trouble coming to terms with the fact that they had to endure English weather just because our monarch had visited them.

I arrived at the faire with my mind fully prepared to be blown away by American technoflash and computer wizardry.

However, once inside, I was taken aback to find that the show was more of ZX Microfair style affair and not the larger-than-life experience I had expected. Do not lose heart, though, because the show did reveal some interesting new products which should soon be winging their way to the U.K.

First off, the people from Melbourne House were there promoting their software and books and also publishing some forthcoming titles.

For Commodore 64 owners they will soon have a book of games listings written by Clifford and Mark Ramshaw and also a couple of new books for Spectrum owners. The first is a book full of ready-to-use machine code routines and the second is for Microdrive users. It will be interesting to see whether the book actually precedes the Microdrives onto the market.

Following hard on the heels of Melbourne House's highly acclaimed Penetrator tape comes Terror-Daktil. This is apparently a 4D graphics game which has you defending yourself against prehistoric creatures deep in the heart of the South American jungle.

On the whole there was not a lot of interest shown at the faire for the recently released Timex-Sinclair computers with most of the software and peripherals manufacturers concentrating their efforts on the Commodore 64, which seems to hold a lot more appeal for the average American computer enthusiast than the ZX81 and Spectrum.

What's on the way here from the States? Chris Palmer found out after battling through torrential rain to the West Coast Computer Faire



Broderbund brothers Doug (left) and Gary Carlston with sister Cathy

The prevalent opinion of most people I talked to was that the ZX81 was almost a disposable computer. In some places it was selling as low as 49 dollars, so most people bought one, used it for a few months and then threw it away.

The three most popular computers at the show were the

faithful Apple II, the IBM Personal Computer and the Atari 400. Most of the software companies were exhibiting their latest excesses in arcade games for these machines. One company which particularly caught my eye was Broderbund software.

Broderbund, (which means "Brotherhood") was founded

three years ago in San Rafael by two brothers, Doug and Gary Carlston.

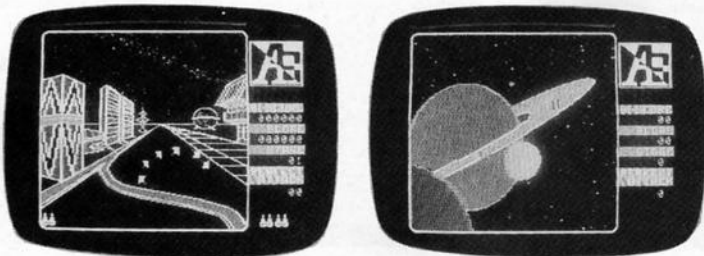
Since then it has become the source for some of the most exciting and dynamic software to ever grace the screens of computer owners throughout the States. It was they who brought out CHOPLIFTER! a game which has topped the best-seller list in the U.S. games magazine Softalk for longer than any other computer game issued to date. You might have already seen this game running on the Atari or Apple computers and Broderbund is putting the finishing touches to versions for the Commodore 64 and the VIC-20.

Two pieces of software which they are especially proud of are A.E. and The Arcade Machine.

In A.E. you have to battle against hordes of mutant aerial string rays in an effort to drive them from the solar system. Each phase of the game is played out against an exquisitely detailed colour background depicting the different sites for the battle. Once again it is available on Apple and Atari computers, but 64 and VIC-20 versions are being completed.

The second program, The Arcade Machine, is one which makes you wonder why nobody thought of the idea earlier.

It allows you to create your very own custom arcade games. Using this package you design your own backgrounds, monsters and spaceships along with sound effects and explosions. You then put them all together and you have your own game. What's more, you don't need to be a programmer to use it.



An example of Broderbund's A.E. game on screen

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Name.....

Address.....

HCW 4

WEST COAST COMPUTER FAIRE

At the moment it is only on the Apple but I talked to the programmer and he assured me that the Atari version would soon be complete.

An interesting insight into how seriously the Americans take their computer gaming was given by a company called Videopro.

It produces what must be the ultimate in game centres. The Videopro centre stands about five feet tall and looks exactly like a proper arcade machine. You fix your games computer onto the front panel where the controls would normally be and your TV or monitor in the back. You can then play your games as you would in an arcade.

Richard Altwasser was at the show with his Jupiter Ace computer and managed to generate a lot of interest from the resident FORTH users in the new American Ace.

He was happy to tell me that the heavily criticised case of the early Aces has now been replaced by a sturdy injection moulded case. For America the Ace has been retitled the Jupiter Ace 4000, as it seems the Americans won't buy computers unless they have a number on them. In the same way the Spectrum is sold as the Timex 2000.

Richard told me that things were progressing nicely back at Cambridge with lots of software for the Ace being written. He was particularly proud of a chess game which he claims can beat Sargon. Also coming are an assembler, a turtle graphics package and a lot of games.

Datasoft was busily showing off its latest software masterpiece in the form of Zaxxon.

Based on the hugely successful Sega arcade game, this piece of software really drives the computer's graphics display to the limits. In it you have to pilot your spacecraft through a series of futuristic land and space battles to confront the Zaxxon robot for the final duel.

All this is achieved in mind-blowing 3D with truly amazing TRON-like graphics. At the show it was running on the Atari and Tandy Colour computers and other versions should soon be available.

Despite the lack of new computers, I did manage to track down the new Panasonic computer, sitting quietly in the corner of one of the software stands. Unfortunately they couldn't tell me much about it but from the pro-

gram it was running it looks like it's got some pretty good graphics.

How would you like a screen display for your ZX81 which was 672 pixels by 480 pixels and could display up to 512 colours on the screen simultaneously?

Well, the Vectrix Corporation can oblige you for a cool 4000 dollars. For this you will get the new Vectrix Graphics Processor which can be added to any computer which is capable of sending out RS-232 or Centronics signals.

With this unit it is possible to create the most stunning high resolution pictures you can imagine. So if you fancy writing your own TRON then this is the system for you.

Joking aside, although this unit is out of the reach of most people it is an indication that this

sort of graphic power is dropping in price.

To wind up this look at the West Coast Faire, here are a few of the other pieces of software which were released and will soon be heading for the U.K.

Lovers of Adventure International's Preppie game will be pleased to know that Wadsworth Jun. has survived the perils of the golf course and reappears in Preppie II, for the Atari computers.

In this game our unfortunate prepster finds himself cleaning out the locker room and still avoiding the dangers of the killer frog and the golf courts, along with all the other nasties that menaced him in the original Preppie.

And if you like theme adventures you will soon be able to buy the E.T. adventure for the Atari 400/800 computers. This game

has Elliott moving around a scrolling screen area trying to pick up the pieces of E.T.'s phone so he can 'Phone Home'. Along the same lines as Atari's VCS cartridge, this game features the FBI agents and the scientist who try to hinder Elliott's progress.

And, finally, taking "that was quick" award is Sirius Software with their Dark Crystal adventure game based on the new film.

In the game you have to return the crystal fragment to the dark crystal before the planets align and the cause of freedom and justice are lost for eternity.

The whole adventure is played out as a mixture of high resolution graphics displays and text. It runs on disk for the Apple but is likely to turn up on other machines soon.



Richard Altwasser preaches the FORTH gospel



The only dry place in San Francisco

THE DRAGON DUNGEON



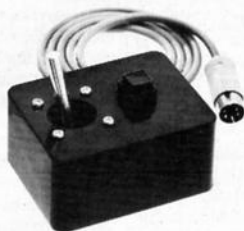
DRAGON OWNERS CLUB

The Dragon Dungeon Club monthly newsletter, *Dragon's Teeth*, is packed with news, reviews and information for the dedicated Dragon-basher. We need your tips, discoveries, reviews and "beefs" and will send out guidelines and payment rates to those of you who feel up to full-scale articles.

The March issue of *Dragon's Teeth* includes both hardware and software offers and Club Members registering before March 31 will be eligible to purchase Dragon badges and sweatshirt at very special prices.

Annual membership, including *Dragon's Teeth*, £6 (six-month trial subscription £3.25).

DRAGON STICKS!



Top quality double potentiometer joysticks for the Dragon owner who demands arcade action Ultra-sensitive, but tough and reliable, Dragon Sticks will keep on zapping when others fail! £19.95 per pair inclusive VAT and postage.

DRAGON GOODIES

Now that we've shifted the rack out of the torture chamber, we've doubled our storage space and now stock the widest range of Dragon software available from a single UK source

The Dungeon master has been persuaded to expand his mingly little Price List and we can now send you a descriptive catalogue (with an outline of each program).

Latest books in stock: "Load and Go with your Dragon" (lots of explained programs and games) and "Enter the Dragon" £5.95 (masses of games, including Invaders, 3-D Treasure Hunt, Flight Simulator, etc).

Latest games in stock: "Space Race" £7.95 (our favourite machine code arcade game), "Lionheart" £5.45 (arcade game and adventure, based on Third Crusade) and "Champions" £5.45 (manage the football team of your choice from 4th Division to European Cup).

And . . . **AT LAST!** Both of the adventure classics "The Valley" £11.45 and "Pimania" £10.00, now available on the Dragon!

THE DRAGON DUNGEON

PO BOX 4, ASHBOURNE, DERBYSHIRE DE6 1AQ. TEL: ASHBOURNE 44626

HCW 4

The affordable FORTH

	Forth: A full implementation of this very fast running language. Ideal for writing fast moving arcade type games. Allows the full colour and sound facilities of the Spectrum to be used. Future Microdrive enhancements will be made available. 48K Spectrum only.	14.95	
	Chess 1.4: 10 levels m/c. Graphic screen display. 16K ZX81 only.	8.95	
	Invaders: Very fast m/c action. Includes mystery ship and increasingly difficult screens. 16K ZX81 only.	4.45	
	Mazeman: A fast action m/c game that reproduces the spirit of the original. The Spectrum version includes excellent graphics and sound. 16K ZX81 and 16/48K Spectrum.	4.45	4.95
	Adventure 1: Based on the original game by Crowther, this game was the start of the Adventure craze. Reviewed Sinclair User.Iss.2. Features save game routine as the game can literally take months to complete. 16K ZX81 and 48K Spectrum.	8.95	9.95

ABERSOFT

7 MAES AFALLEN, BOW ST. DYFED, SY24 5BA

24 hour Ansaphone for Access orders on 0970 828851

Which child gets a place in college?

One of the strongest TV commercials for computers is at present being run by Commodore for its VIC-20. The screen is split vertically, one side showing a child mindlessly playing a video game and the other a child intelligently programming a VIC-20.

I've seen two slightly different versions of the ad. In one the voice-over says that one of these days both of these children may be competing for a college place. The voice then asks which is better: learning how to play a game or learning computer skills and perhaps learning how to create a program for a game? The ad seems very effective and certainly makes good sense.



Trying to bridge the game-computer gap, Atari has introduced an add-on keyboard for its 2600 video game player. Atari, which recently had profits and market share hit by Coleco and Mattel, follows both other companies with its 90 dollar keyboard announcement.

None is yet on the market. The Coleco board is expected to retail at about 170 dollars and Mattel's about 150 dollars and these are expected in the next few months with Atari's late in the year.

Atari is obviously hoping to boost its market share by undercutting the competition and to offering to its 10m owners features such as 8K of RAM and a version of Microsoft BASIC in ROM. If you examine the total price, it both undercuts Coleco and Mattel and rivals the Timex/Sinclair (Spectrum) unit.

The announcements of keyboard add-ons surprises few in the industry. It had been predicted that game sales would taper off with a corresponding increase in purchases of home computers.



A new series of programs has been introduced which are designed to fool children into learning computer concepts while they think they are just playing games.

The first Wizware package, from Scholastic, includes an adventure game, a computer magazine containing programs instead of articles, a Logo-like turtle-graphics package and a program that interacts with the child to introduce it to micros.

The feeling at Scholastic is that many families with low-cost micros will want their children to do more than just play time-filling games.

Each Wizware package will cost about 40 dollars and will eventually be available for the Atari 400 and 800, the TI-99/4A, the VIC-20 and the Apple II Plus.

Scholastic is also planning to publish Microzine, an electronic magazine for the computer aimed at eight- to 14-year-olds. Scholastic believes games do not have to include violence or guns in order to be accepted.

The games will be marketed in consumer outlets nationally with most advertising in Scholastic's own publications.

More from Stateside next week....

Bud Izen
Fairfield, California

Geography on cassette

See the country with a 48K Spectrum, says Kuma Computers, which has brought out a version of the program originally written for Sharp computers.

It costs £11.95 on cassette and shows a large-scale map of the U.K. and Eire. Kuma says the features include a hot-air balloon game, search for a named place, find distance between two places, display latitude and longitudes, remove names for outline map, hide names for "guess the place"

games and copy display area to printer.

Controlled by command letters, it is said to be easy and fast due to the use of machine code.

Kuma has also announced add-on boards at £79.37 for the Sharp MZ80A and MZ80K computers which replace the 2MHz microprocessor with the faster Z80A; Tiny Word, a cassette word processor for the Newbrain, at £24.17; and a Video Touch-Typing Teacher for the Sharp MZ80A, costing £35.17.

Kuma Computers, 11 York Road, Maidenhead, Berks SL6 1SG

Business born in bed

Jeff Minter was so bored at being forced by illness to spend three months on his back that he learned programming.

Now, in partnership with his mother, he has 20 games on sale for the ZX81, VIC-20, Atari, Spectrum and Commodore 64.

Jeff, 20, was due to return to his physics studies at the University of East Anglia in January. But he will not be going back now.

His mother, Hazel, said: "He was on his back from November to January so he decided to learn computing. He already had an interest in it.

"He is fit and well now and he is in America on our business."

Mrs Minter, who has five other sons, and Jeff run Llamasoft from their Hampshire home.

Llamasoft was able to bring out the first Commodore 64 programs available here because Jeff was able to get a machine from America.

The three programs for the Commodore 64 now available from Llamasoft are Grid Runner 64 — a top seller in America — and Attack of the Mutant Camels, both games at £8.50, and Rox 64, at £4.95, which shows the use of the micros graphic sprites and sound.

Llamasoft's most recent release — and more are on the way — is Laser Zone, for the VIC-20 with 8K of RAM, priced at £6.

Although Jeff and his mother mainly run Llamasoft they are assisted at shows and other events by Mrs Minter's husband, Patrick, manager of a drawing office.

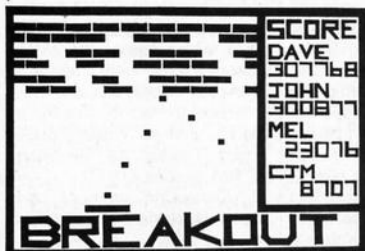
Llamasoft, 49 Mount Pleasant, Tadley, Hants RG26 6BN

Top Twenty programs for the Spectrum

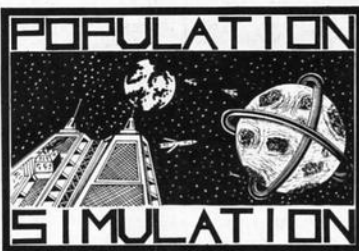
1	The Hobbit	Melbourne House (1)
2	Flight Simulation	Psion (2)
3	Hungry Horace	Psion/Melbourne House (6)
4	Avenger	Abacus (8)
5	Time Gate	Quicksilva (4)
6	Escape	New Generation (-)
7	Penetrator	Melbourne House (5)
8	3D Tanx	dk'tronics (9)
9	Planetoids	Psion (10)
10	VU-3D	Psion (3)
11	Chess	Psion (7)
12	Arcadia	Imagine (-)
13	Planet of Death	Artic (-)
14	Over the Spectrum 3	Melbourne House (-)
15	Nightflight	Hewson (-)
16	VU File	Psion (-)
17	Over the Spectrum 1	Melbourne House (-)
18	Ship of Doom	Artic (-)
19	Inca Curse	Artic (-)
20	Battle of Britain	Microgame (-)

Compiled by W.H. Smith. Figures in brackets show last week's position.

ZX SPECTRUM - TRS80 LV.2 SOFTWARE LIBRARY TAPE



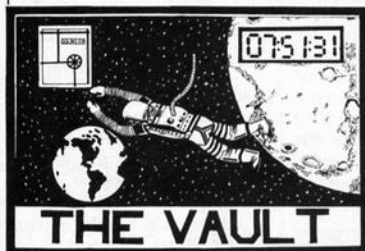
BREAKOUT



POPULATION SIMULATION



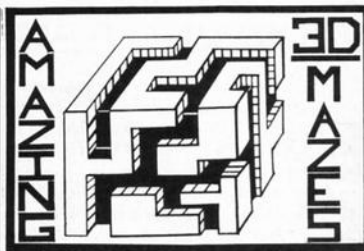
CORRIDORS OF DOOM



THE VAULT



HOUSEBREAK



AMAZING 3D MAZES

25 SUPER PROGRAMMES:- including machine code arcade games, simulations, competitive games, adventures, dungeons & dragons, puzzles and ball games, plus a whole lot more.

BREAKOUT:- A fast action machine code programme, that takes you through nine skill levels. Break through a double and then a triple wall. Smooth motion and good graphics.

POPULATION SIMULATION:- A game for two players, each ruling a planet, a battle to find out who can survive the longest. Each decade a player must decide various things in governing his planet, to balance production and technology against consumption and population and to either negotiate or declare war on his opponent; How about sending out an exploration party to find new wealth. Only the experienced last long.

CORRIDORS OF DOOM:- (Spectrum Version) Dungeons & Dragons type game that is very addictive. The game is not won by chance, you have to discover the secrets of how to deal with the monsters in the game. What liquid will destroy the were-rat? How can you tame a giant spider? What will you do about the blood devil? Collect treasure and find an exit, but first you must cross some nasty pits.

AMAZING 3D MAZES:- For the intelligent, collect all treasures and find your way out, score extra points for shortest routes and don't get frustrated by apparent dead ends.

THE VAULT:- Start at the outer limits of space and find your way home, then release the manager who is trapped in his own bank vault, it's a race against time as this game really puts your powers of logic to the test.

HOUSEBREAK:- Dark rooms, treasures, alarms and viscous dogs are met in a real time, full graphical adventure.

3D NOUGHTS & CROSSES:- Played inside a 4x4x4 cube, it is more like chess than noughts and Crosses and wins, on average, nine games out of ten.

All 25 games on one C30/C48 tape are sent by return post for only £8.95! or send a SAE for full details.

SPARTAN SOFTWARE

Dept. HC2, 9 Cotswold Terrace, Chipping Norton, Oxon. OX7 5DU

PROGRAMMERS:- 25% Royalties paid on original software for the Spectrum or TRS80.

HCW 4

On your marks . . . a Spectrum scoreboard

Organisers of sports days will find my program useful to work out individual performance marks for events like gymnastics, skating and diving.

Written for the 16K Spectrum, it asks for the marks for two categories of grading — artistic merit and technical ability.

It discounts the highest and lowest marks in each category and calculates an average of the marks remaining. Finally it produces the contestant's marks.

There are several options for developing the program.

Ideal for sports events, Dave Judson's Spectrum program works out results fast

The marks for each candidate could be stored and an up-to-date position table produced on request.

The Spectrum's sound or graphics abilities might be used to celebrate a perfect score... or mourn a poor one.

highest and lowest, Z2 as Z1 but for technical ability.

How it works

Lines 10-50: program introduction and setting up of number of judges. 80-130 collect marks for artistic merit.

140-230 sort marks, excluding highest and lowest, and calculate average of remainder.

250-390 as 80-230, but for technical ability.

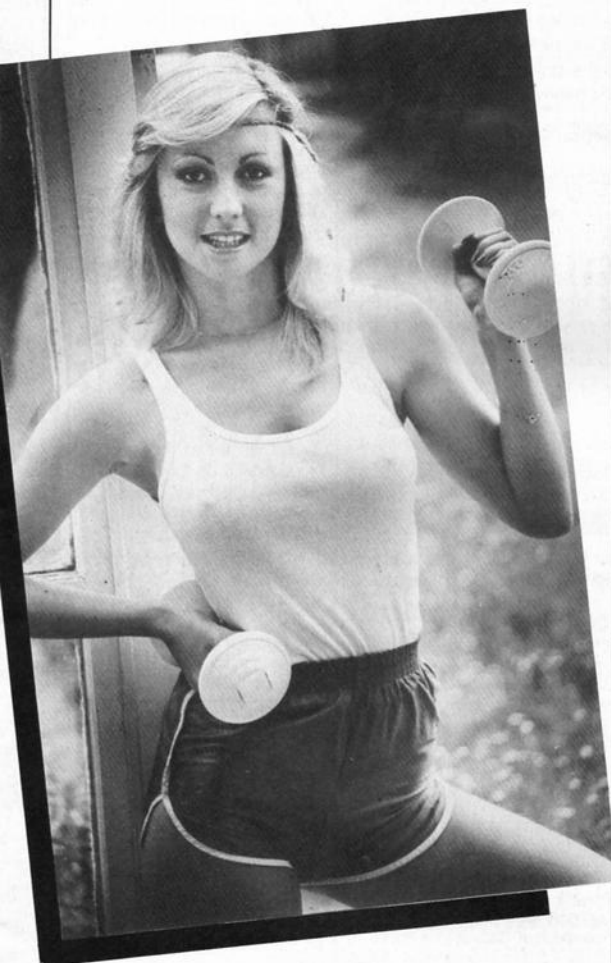
400-420 give two category scores and total them.

Variables used: j number of judges, s score running total, a(j) and t(j) arrays gathering artistic merit and technical ability, Z1 artistic merit — average score of marks awarded after excluding

```

10 REM calculation of performance marks
20 PRINT "TWO CATEGORIES OF MARKS ARE PROVIDED FOR"
30 PRINT "ARTISTIC MERIT & TECHNICAL ABILITY"
40 PRINT "THE HIGHEST & LOWEST MARK IN EACH CATEGORY IS IGNORED & THE MEAN OF THE REMAINING DATA IS CALCULATED"
50 INPUT "ENTER THE NUMBER OF JUDGES "; j
60 INPUT "ENTER CANDIDATE'S NAME OR NO. (XXXX TO QUIT) "; c$
70 IF c$="XXXX" OR c$="xxxx" THEN STOP
80 PRINT "ENTER THE "; j; " ARTISTIC MERIT MARKS "
90 LET s=0
95 DIM a(j): DIM t(j)
100 FOR i=1 TO j
110 INPUT " MARK AWARDED IS "; a(i)
120 LET s=s+a(i)
130 NEXT i
140 FOR k=1 TO j-1
150 FOR l=k+1 TO j
160 IF a(l)>a(k) THEN GO TO 210
210 LET t=a(l)
180 LET a(l)=a(k)
190 LET a(k)=t
200 NEXT l
210 NEXT k
230 LET z1=(s-a(1)-a(j))/(j-2)
250 PRINT "ENTER THE "; j; " TECHNICAL ABILITY MARKS "
260 LET s=0
270 FOR i=1 TO j
280 INPUT " MARK AWARDED IS "; t(i)
290 LET s=s+t(i)
300 NEXT i
310 FOR k=1 TO j-1
320 FOR l=k+1 TO j
330 IF t(l)>t(k) THEN GO TO 370
340 LET t=t(l)
350 LET t(l)=t(k)
360 LET t(k)=t
370 NEXT l
380 NEXT k
390 LET z2=(s-t(1)-t(j))/(j-2)
400 PRINT c$;"S ARTISTIC MERIT SCORE IS ";z1
410 PRINT " TECHNICAL ABILITY SCORE IS ";z2
420 PRINT "TOTAL SCORE IS ";z1+z2
430 GO TO 60
440 STOP

```



In with the IN crowd

I was pleased to see the review of the Tandy CGP115 printer in your second issue — I can confirm that the documentation is excellent for such a low-priced product.

It is actually manufactured for Tandy, and appears to be available from EPG in Middlesex as a complete unit, and as a mechanism with or without drive electronics from Ambit in Essex.

As a founder member of the Independent Newbrain User Group (the IN Group!) I am particularly interested in the CGP115 because it needs very little software change in order to print out Newbrain displays as well.

While I am writing, could I also mention that the IN Group publishes a monthly newsletter containing reviews of hardware and software for the Newbrain?

We are aiming to break even on this newsletter, which as well as Newbrain users may appeal to ZX81 and Spectrum owners thinking of moving on to a more professional machine.

Anthony D Hodge, Independent Newbrain User Group, 15 St Johns Court, Wakefield WF1 2RY.

Six into three will go

As I wait patiently for Commodore to send my Super Expander cartridge and reference guide, I keep myself busy altering programs written for the VIC-20 plus 3K to work on my expanded VIC, using knowledge gleaned from publications such as yours.

Your article on VIC graphics in issue 1 was of great interest, and I set about altering the Memory Maze program published in the same issue.

The array A(505) was obviously the memory eater, so I used your idea of more than one screen location, locating the extra screen at 7168. By altering the top of memory pointers like this!

```
5 POKE 51,255: POKE 52,27:
POKE 55,255: POKE 56,27
I prevented the new screen being overwritten. I then replaced line 180 with
180 FOR T = 0 TO 505: POKE
7168 + T, PEEK (7680 + T):
NEXT: FOR D = 1 TO
(DL * 1000): NEXT: PRINT "
[CLS] [BLUE]"
```

References in line 190 to A(23) and in lines 205 and 350 to

Send your letters to Letters, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE. Software worth at least £5 for the best each week, so please name your computer. We cannot answer queries on this page

A(m) became PEEK (7168 + 23) and PEEK (7168 + m). Lines 370 and 375 were replaced with
370 POKE 36866,22: POKE
36869,240: POKE 648,28: POKE
7649,90: POKE 7168 + m,42
375 FORT D = 1 TO (DL * 800):
NEXT
378 POKE 36866, 150: POKE
36869, 240: POKE 648,30:
RETURN

Using other minor memory savers (eg no REMs), I ended up with 436 bytes still free, having lost none of the original program's features.

I hope this might help other VIC users to see how they might use your excellent article.

By the way, can any of your readers solve a problem for me? Commodore says that the maximum memory expansion for the VIC is 32K, but the Spectrum computer shop chain is advertising a 64K expansion unit which can be expanded still further to 192K!

At around £114, this could be a very good buy — provided it works. I contacted my local shop, but they didn't know much about it. Has anyone got any further information?

Mrs Rosemary Wood, Hinckley, Leics.

Noisy payout for fruit machine

Congratulations on such an entertaining new magazine. As a 48K Spectrum owner I have found plenty to interest me in your first two editions.

Your second issue featured a really first-class Spectrum fruit machine program by Clyde Bish. As a schoolmaster I am constantly looking for new ideas for school-fund raising, and I am sure that this game will prove to be a firm favourite.

The only thing lacking in the program was sound. It is important to hear a payout in the game to attract people to see the game and play. I use a 2-watt sound

amplifier from Micro Power of Leeds, and I added the following line after each payout:

```
BEEP .5,9: BEEP .5,4:
BEEP .5,9: BEEP .5,4:
BEEP .5,9: BEEP .5,4:
BEEP .5,9: BEEP .5,4
```

I also checked the amount of program space taken up by the game and it was almost 2K. Anyone interested in finding out the memory used by a Spectrum program should use the command.

```
PRINT PEEK 23627 +
256 * PEEK 23628 - 23755
```

Brian Curry, Goole, North Humberside.

My long wait for a RAMpack

I have seen a number of letters in the computer magazines complaining about Sinclair's delivery times, but compared to an episode of mine (which is still in progress) Sinclair seems like greased lightning.

In October 1981 I sent a cheque to Audio Computers of Southend on Sea for the purchase of a 64K RAMpack. After waiting about eight weeks they sent me a pack containing 64K in two 32K sections.

All I could use at any one time was 32K, but in the accompanying leaflet it said that this pack was just to enable me "to get used to using them", and promised that in a month's time it would be exchanged for a full 64K.

I wrote to them twice after this month had elapsed, sending SAEs each time, but received no reply. Over the next 12 months I sent them numerous letters, all with the same result.

Just before Christmas last year I wrote again, saying that I was about to get in touch with the computer magazines to see if they could contact them since I had failed on numerous occasions. For all I knew, they might have gone out of business.

Lo and behold, on December

23 I received a letter signed by Hatti Perry of Customer Services, saying that they got somewhat submerged by letters and that replies were often delayed (what? for 12 months?). However she said that if I returned the old pack, they would gladly replace it with a Super Z pack.

I waited until after Christmas and on January 4 returned the RAMpack by recorded delivery. I am still waiting for the replacement. Since January I have written to them twice and — you've guessed it — received no reply. I have had the one letter I did receive from them framed — it is one of my most prized possessions.

J. Ashbourne, Widnes, Cheshire.

Tony Lee, technical director of Audio Computers, told Home Computing Weekly: 'I'll find it right away and send it off. More than 90 per cent of the RAMpacks have been replaced. I'm sorry for him but his was the only one left.'

We have more than 2,000 customers a month so it is not surprising we get a few complaints. I don't know why Mr Ashbourne had to wait for so long when we replaced most of them between January and May last year.

We did have a problem with some people who were refusing to send back their RAM pack so we could upgrade them.

Keeping a Sharp look out

Just a line to say that we intend to form a new Sharp MZ80K/A User Group in the near future. The group aims to produce a quarterly newsletter giving advice, tips, program listings and members' letters. Membership is free to MZ80K/A owners nationwide, and gives access to a members' library. All enquiries should be accompanied by an SAE.

N Brown, 48 Brander Road, York Road, Leeds, W. Yorks LS9 6PR.

Inspiration from the Oric . . .

We were recently inspired to write this little poem:

What makes the Oric so unique is its slim but neat physique.

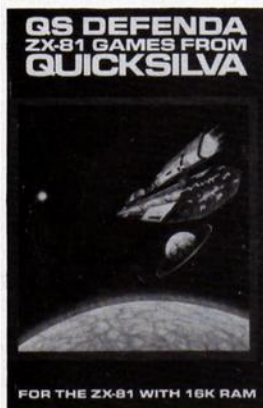
I have not got an Oric yet but when I do, I'll sell my PET.

Maybe one day, you never know I might come over and run your show.

Mr and Mrs R. Hockless, Fareham, Hants

Arcade games: we rate the new releases

Your favourite arcade games, adapted for a range of home micros. Our testers have played them and give you their considered opinions



QS Defenda 16K ZX81 £3.95

Quicksilva, Palmerston Park House, 13 Palmerston Road, Southampton.

Leap Frog 32K BBC £7.50

IJK Software, 9 King Street, Blackpool, Lancashire.

Your task in this game is to hop across the road, avoiding the cars, on to the river bank, then across the river using the turtles and logs, into your home. Once you have mastered that, further dangers appear — snakes and frog-eating parrots — and things move faster!

Excellent colour, graphics and sound — I particularly liked the little tunes and the "squelch" effect. The controls are easy to master (Z/X for left/right, * and ? for up/down), and a simple theme makes this an addictive game which all my family enjoyed.

The initial skill level is right for a beginner, and it advances

This version of the classic Defender arcade game gives you up to 84 moving characters on screen at one time. The display is remarkably fast and surprisingly smooth.

The game progresses at a hectic pace, with aliens, missiles, mutants and the rest streaming towards you and slowing down, only to be followed by another wave of nasties.

A novel 32 x 31 character display is used, and some readjustment of your set may be necessary. The insert and accompanying card list addresses which can be poked to alter the vertical and horizontal hold, and even the character height.

instructions	90%
playability	80%
graphics	60%
value for money	80%



automatically each time a set of home bases are filled to become a fast, difficult game.

The cassette tells you how to load, all other instructions and prompts are via the screen and are good. My cassette, a prototype, needed a few attempts before it loaded, but IJK tells me that the production version is OK. Certainly in my experience all their other tapes have been first time loaders.

A high score is kept and displayed. Players of this game should watch themselves carefully, and when they develop a craving for flies, give it a rest!

instructions	85%
playability	96%
graphics	87%
value for money	90%



The Brood Video Genie £4.99

Buttercraft Software, 14 Western Avenue, Riddlesden, Keighley, Yorks.

Another in the vast range of Pac-man type games, written in machine code and, for those who like this sort of game, excellent value for money.

The instructions are clear, on-ly spoiled by the fact that for "<" and ">", you should read "." and

".". I discovered this after my first few tries at the game, after finding that when I used the keys indicated on the instructions, nothing happened.

Good graphics, considering the limitations of the screen, and sound for those who can use the facility.

instructions	75%
playability	90%
graphics	75%
value for money	90%



QS Invaders ZX81 £3.95

Quicksilva, Palmerston Park House, 13 Palmerston Road, Southampton.

This is a straightforward Space Invaders game for the ZX81, which can be used with or without the QS sound board and Characters board.

It loads with no trouble and the instructions are clear and simple to follow.

Although there are long pauses in between each set, and at the end of each game, the controls work smoothly and efficiently. Sometimes too much so — the Base shoots from side to side so quickly that you need quite a delicate touch to stop it in the right place!

The bombs only fall from directly above the Base, and again they can move so fast as to be difficult to avoid. But that is all for the best, as this game, unlike arcade Space Invaders, does not have many variations.

There are three levels of play, ranging from a slow game scoring 10 points per invader to a fast one which scores 30 points per hit. A randomly generated 'saucer' also passes across the top of the screen for you to shoot down.

Provision has been made for functions such as scores per hit and bomb rate to be altered and the highest scorer can enter his name at the end of a game.

instructions	70%
playability	70%
graphics	60%
value for money	70%



SOFTWARE REVIEWS

GALAXIANS & GLOOPS ZX-81 GAMES FROM QUICKSILVA



FOR THE ZX-81 WITH 16K RAM

Galaxians 16K ZX81 £4.95

Quicksilva, Palmerston Park House, 13 Palmerston Road, Southampton.

Whoever wrote the blurb for *Galaxians* has tried hard to make the scenario arresting. Avoiding the high technology lasers found in most invader games, the writer has opted for an antique bomb thrower with small furry bombs to fight off

the giant gaseous birds dropping exploding eggs on the peace-loving Fragnn of the planet Ptreefnurt. "Splash, ploof, ftang..."

The attackers comprise two types of Galaxian: Ws are fewer, less exposed, and therefore worth ten times as many points as Vs. Swooping Galaxians are worth more than those in formation.

For each game you select speed, firing rate and the numbers of Galaxians swooping. You then move the bomb thrower from side to side with the 6 and 7 keys, firing with the 0. Your current score is displayed continuously, and when the game ends, with the destruction of the third bomb thrower, your final score is added to a table of rankings.

Galaxians can be played very fast — too fast for me, especially when the number swooping was set high. Instructions are well presented, and a demonstration game is played on initial entry.

C.C.

instructions	70%
playability	60%
graphics	65%
value for money	70%



MUNCHEES ZX-81 GAMES FROM QUICKSILVA



FOR THE ZX-81 WITH 16K RAM

Munchees 16K ZX81 £3.95

Quicksilva, Palmerston Park House, 13 Palmerston Road, Southampton.

Nowadays I feel reluctant to spend evenings with Pacman or his close relations. So on learning that *Munchees* inhabit the corridors of a house, dodging ghosts and eating power pills, I set off to meet them without much enthusiasm.

First approaches revealed that their diet wasn't restricted to pills: they'd nibbled part of the program title away, and completely gobbled up the advertised game instructions. Tentative prods at the cursor keys, however, elicited a ground plan of the house, and the option to tackle up to four ghosts.

After that, things became fairly predictable. Each game comprised three plays, 10 points being scored per pill, with bonus plays for clearing all pills from a screen.

The house had a pair of side entrances, bonus fruit appeared fleetingly below the central room, and the ghosts (letter As) and the Munchees (letter O) trotted around at a steadily increasing pace. Unfortunately, a reload was needed to change the number of ghosts.

Minor flaws aside, *Munchees* seemed reliable if unoriginal. Its main attraction is price: all but one of the current rivals I know of cost rather more. But some of them do have extra features for varying the game.

C.C.

instructions	10%
playability	50%
graphics	50%
value for money	65%



QS Scramble ZX81 £3.95

Quicksilva, Palmerston Park House, 13 Palmerston Road, Southampton.

Your ship is flying over the mountainous surface of a distant planet, under alien attack. You must avoid being shot down by the aliens,

while bombing their fuel dumps and grounded rockets. If you miss, the rockets will take off to attack you; and all the time your fuel is running out...

The landscape and fuel dumps are randomly generated and pass from right to left across the screen. But as your own ship remains on the left hand side and only moves up and down, the mountains are easy to avoid. Bombing and shooting are also easy to control.

You can make the game more difficult by changing the rate of fuel use, speeds and scores etc, but even so I found it simple to play and ultimately not very exciting.

However, I had no trouble loading and running it. The screen display is clear and the instructions are easy to follow. (The tape automatically programs the QS sound board and character board if these are available).

A group of children might enjoy this game, perhaps competing

for the highest score. Otherwise, though competently produced and executed, it is rather boring compared to the similar but more sophisticated versions of the game on the market.

C.C.-R.

instructions	80%
playability	60%
graphics	60%
value for money	60%



QS SCRAMBLE ZX-81 GAMES FROM QUICKSILVA



FOR THE ZX-81 WITH 16K RAM

Atlantis 32K BBC £7.50

IJK Software, 9 King Street, Blackpool, Lancashire.

Warning — this game could damage your health! Positively addictive, my upper arms literally ached after I had finished.

Atlantis is an underwater version of the arcade game 'Scramble', and seems to have most of the features of that game, although I could not get far enough to be sure! A game for the advanc-

ed player, it is extremely fast right from the start, and uses the BBC's sound and graphics capability to the full.

You have to move past a right to left scrolling underwater landscape avoiding, shooting or bombing mines, obstacles and missiles. I could not get past the first section, but two of my arcade-mad friends, playing simultaneously, managed to reach the caves of the second stage.

Cassette instructions are minimal — how to load (which it did, first time). Screen instructions set the scene and give the key operations, awkward arrangement:

left and right cursor keys for L/R, A and Z for up/down, space bar or tab for bombs and shift for missiles.

A high score is not kept and more instructions would have been useful — plus some hints for beginners like myself! But a superb game for expert videogamers.

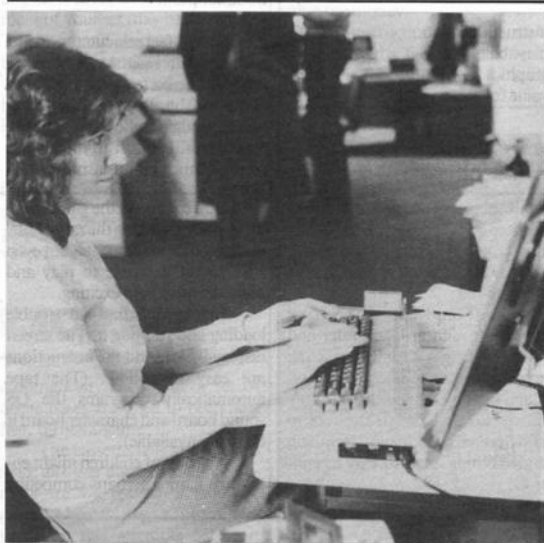
R.E.

instructions	72%
playability	68%
graphics	95%
value for money	85%



After the Space Invaders have come down to earth . . .

What do you do with your micro if you don't want to play games? Candice Goodwin went to see Ivan Berg Software, a company which has come up with a solution



Ros Keeps works on the documentation for a new program

"Most video games are appallingly violent", said Ivan Berg, head of Ivan Berg Software. "What we do could be justified in that it's potentially more mind-enhancing".

Mind-enhancing or not, in a software market dominated by Galaxians and Pac-Man, Ivan Berg is one of the few companies to cater for those who want general-interest or educational programs. Its range for the VIC-20, which started with O-level and CSE revision aids, now includes Know Your Own IQ, Know Your Child's IQ, Know Your Own Personality, and Robert Carrier's Menu Planner.

Coming soon are further educational programs, the Teach and Test and Test Your Child series, and a range aimed at interesting women in using the family computer, covering beauty, health, exercise and slimming.

Quite apart from its unusual products, the company is unusual in the way it got into software in the first place. Most of the software companies around at the moment started life as a computer enthusiast's hobby, only later coming to terms with the problems of producing and publishing cassettes in volume.

Ivan Berg, on the other hand, had all these problems licked before the idea of selling software ever arose. The software operation developed from Ivan Berg Associates, which had been publishing audio cassettes of children's stories, scripts and documentaries since 1963. In the nine years since then, Ivan Berg explains, the company "gained a lot of experience of negotiating, producing cassettes". It even had a shareholding in a tape duplicating company in Aylesbury.

So the scene was set for a successful diversion into software, and "if you're running a small company in today's world, you have to keep thinking up ideas".

The idea actually came from the VIC-20 Berg bought for his son for Christmas 1981. He had previously dismissed programming as "too mathematical", but by playing with his son's machine, found it was "like learning a fairly simple foreign language", and discovered what the computer could and couldn't do.

Looking around at existing programs, Berg was not impressed with their content — or their presentation. He felt there was "scope for improvement", and Ivan Berg Software was born. In April last year, work began on the first programs, which were ready

for the market by September.

In the New Year, the company moved into new offices at 4 Canfield Gardens, North London. These now house Berg himself; his wife Inge, who handles administration and accounts; Ros Keep, on the editorial side; Ken Clark, who works on the programs; and secretary Elaine Ross.

Here ideas for new programs are developed and the specification worked out. The company takes a "publishing approach" to software development: "the editorial

idea is the most important thing — then how it should work". Some ideas are adaptations of existing books. Know Your Own IQ, for example, comes from Hans Eysenck's best-seller of the same name. And no prizes for guessing the origins of BBC Mastermind.

Others, such as the forthcoming Teach and Test programs, are specially commissioned by Ivan Berg. Either way, a detailed script and a set of "screen maps" laying out exactly what will appear on the computer's screen are worked out

before the programming stage is even reached.

The programmer then gets a full specification, which enables the program to be completed quickly, "much quicker than dealing with the whole thing from scratch".

The company's standards are high. The programs, written in BASIC so that they can be easily transferred from one type of machine to another, must be "well structured and robust"; they must also be easy to follow, so that changes can easily be made in-house.

Because of this, "finding good programmers is a continuing problem". Ivan Berg uses a team of freelance programmers whose ages, in contrast with the teenage programmers used by many software companies, average at around 30. One is a maths teacher who teaches BASIC, and many of them are ex-mainframe programmers, professionally trained.

The problem of finding programmers can only get worse as the company expands to keep up with the "enormous market" — it aims to have over 50 titles by the beginning of this summer. There are no plans as yet to move out of its "essentially consumer-market-orientated" range; "We don't want to spread ourselves too thinly.

"There are a lot of small companies trying to be everything to all people, and they come a cropper. We try to do one thing as well as we possibly can, and establish a respected base". This strategy will, Berg hopes, result in turnover of £600-700,000 in the company's first year.

Like Silversoft, profiled in last week's Home Computing Weekly, Ivan Berg sees the software market as becoming increasingly professional. "Consumers are starting to exercise more discretion . . . they're looking around at what software's available before choosing." With this in mind, the company aims to offer good value for money.

A two-cassette package costs £9.90, and each package contains a lot of information. Know Your Own Personality, for example, contains 400 different questions for the user to answer and would, Berg estimates, take three to four hours to complete.

"I don't think any other company is giving that kind of value for money," he said.

A lot of care goes into the design of the packaging and instructions to go with each package, and again, Berg feels this is the way the market is moving.

PROFILE

"You can't get away with just popping a cassette in a polythene bag along with poor photocopied documentation".

The company's philosophy of "doing one thing as well as we can" also lay behind the decision to cater only for the VIC-20, seen as the best machine for the price that was on the market at the time.

"Commodore got it more right than anyone else with the VIC", says Berg. Now the company is also working on packages for the new Commodore 64 ("the best value for money of any under £500"), and is "looking at" the BBC, the TI-99/4A and the Spectrum.

So far, all Ivan Berg software has been sold through Commodore, but in the next few weeks it will also be appearing in selected tape and record shops. If this proves successful, the next stage will be to sell programs through bookshops.

The choice of general consumer outlets rather than specialist computer shops reflects the company's determination to reach "people who want to use computers at home, but don't want to



Ivan Berg looks over the packaging for the Teach Your Child series

know how they work and how to program them" — as opposed to the hobbyists who, Berg estimates, make up only 20 percent of home micro owners.

Berg himself believes that a lot of people are starting to buy home



Putting the finishing touches to some character designs: Ken Clark (left) and Ivan Berg

computers because of propaganda about the joys of information technology, without having any clear idea of what they can use a computer for.

"People will buy home computers because it's the thing to do. I

think it's guilt and Freudian deprivation. Government and media have been going on about computing and how we've all got to know about it, or we'll miss out — without knowing what it is we'll be deprived of".

For these people, he sees computer games as having only a limited lifespan: "the software market will develop in showing what more the computer can do. Whether it'll be useful or viable will depend on the subjects chosen and the way the software can be used."

But according to Berg, the computer's potential has as yet hardly been explored. In the short term "it is an information medium with the real advantage of individual interaction. There's no other medium that responds to you — apart from another person."

In the long term "what we're seeing is the emergence of an intelligence that will eventually dominate us. It will happen without anyone doing anything about it". A worrying prospect, surely? "There'll be lots of opportunity for leisure and creativity... my advice to mankind is, lie back and enjoy it".

Attention Vic 20 Owners

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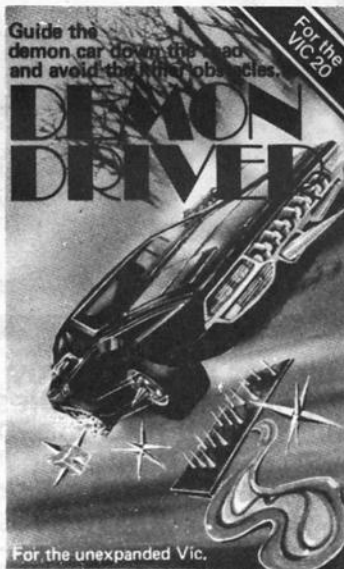
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Stay alert — the zombies are on your trail



As prime operator in Island Cleaners Inc. you have been given the task of ridding an island group of its zombie inhabitants.

You have been parachuted onto an island, but unfortunately your equipment has fallen into the sea.

The only chance you now have of completing the job assigned to you is to lure the zombies into pits dotted about while avoiding the clutches of the zombies themselves.

Fortunately, the zombies are blind so they will walk into a pit, ravine or the sea in an attempt to reach the rather tempting smell of food which your body exudes.

There are several points which must be taken into account:

You're at risk not only from hunger-crazed zombies, but ravines and pits too. David Ryan's 16K game for Atari computers needs quick wits and strong nerves

- The surrounding sea is shark infested, but that doesn't matter as you cannot swim.
- Zombies refuse to cross a cactus grove.
- You may cross a cactus grove, but in doing so you knock them down.
- You or the zombies will die on falling into a ravine or a pit.
- Zombies falling into a ravine will fill that ravine.
- A zombie may cross the water but with a 50/50 chance of dying in the jaws of a shark.
- The ravine appears at any skill level above 5.
- Occasionally a zombie will walk onto your island from a neighbouring island.

For an explanation of each object on the island, look at the key when the program is first run. The following keys are used to move diagonally:

- Q — bottom right to top left
- W — bottom left to top right
- A — top right to bottom left
- S — top left to bottom right

The cursor keys move you in the directions indicated by the arrows.

To remain in the same place for one move type A. All the other keys are inoperative.

On the first run of the program be prepared for a short wait while the character is re-defined.

The program occupies nearly all of 16K. If your computer only has 16K the screen display may be lost when an error occurs or a break is pressed. This is ▶

ATARI PROGRAM

remedied by pressing system reset.

The interesting effect of the moving sea is created by changing

the character make-up of the sea (see lines 3010, 3420 and 8120). My top score is 111.

How it works

Block by block:

- 10-20 set the major variables. Arrays XI(100), YI(100), X(100), and Y(100) hold the zombie positions; C(100) colour of zombie, ie which character is plotted at zombie position, initially set to 162; CM is initial colour of man; SC is score and HI is high score.
- 22-180 set up the initial screen introductions and handle skill level input.
- 1000-2010 contain commands to draw the island based on skill level input L.
- 1000-1055 draw the sea.
- 1065-1070 draw the ravine at any skill level above 5.
- 1080-1090 plot zombies evenly around the edges of the island.
- 1100-1110 plot pits, the same number as there are zombies.
- 1120-1130 plot cacti. As the skill level increases the number of cacti decreases.
- 2000-2010 plot man. MX1 and MY1 will be used to sense the new position of the man when he moves, by using the LOCATE command.
- 3000-3017 alter the screen display with respect to the moving sea and also act as a loop to detect a key press.

- 3020-3095 act on the X value given by X=PEEK(764) to move cursor to the desired new location of the man.
- 3100-3190 use information gathered in lines 3020-3095 to detect pits, ravines etc and to move the man accordingly with corresponding character change, ie the value of CM changes.
- 3200-4220 move the zombies in relation to the island, detect collision and add one to score if appropriate.
- 5000-5070 handle sounds and actions needed for a specific collision, as follows:
 - 5003-5010 fall down a pit — colour 138.
 - 5020-5030 fall down occupied pit — colour 131.
 - 5040-5050 fall down a ravine — colour 81.
 - 5060-5070 bump into a zombie — colour 162.
- 6000-6050 clear screen, flash screen and print score and high score before returning to line 22.
- 7000-7040 prepare for a new screen and level. Control is passed to line 100 to construct a new screen once L has been increased by one.
- 8000-8120 display the key when requested at beginning of play.
- 10000-10300 are used to define characters.

The data from lines 10240 is explained as follows: 10040 the sea (initial), 10060 a zombie, 10080 zombie in a pit, 10100 man running from right to left, 101040 man standing still, 101060 man running left to right, 101080 man running down, 10200 cactus, 10220 a pit and 10240 a ravine.

```

10 BODSUB 10010
15 DIM XI(100),YI(100),X(100),Y(100),C(100):FDR A=1 TO 100:C(A)=162:X(A)=0:Y(A)=0:X1(A)=0:Y1(A)=0:NEXT A:CM=134
17 OPEN #1,4,0,"K:"
18 SC=0:HI=0:POKE 756,P
20 FOR Q=1 TO 22:POSITION 1,Q: ? #6;"          ":NEXT Q
22 POSITION 2,2: ? #6;"PRESS K FOR KEY"
25 POSITION 5,4: ? #6;"#####":POSITION 5,5: ? #6;"#          #"
30 POSITION 5,7: ? #6;"#          #:POSITION 5,9: ? #6;"#          #:POSITION 5,10: ? #6;"#####"
35 POSITION 5,6: ? #6;"# zombie #:POSITION 5,8: ? #6;"# island #"
130 POKE 53279,0
131 FOR A=1 TO 1000
132 SOUND 0,A,10,B:SOUND 1,A,B,8:SETCOLOR 4,A,A:IF PEEK(764)=5 THEN POKE 764,255:GOTO 8000
133 POSITION 4,14: ? #6;"PRESS START"
134 IF PEEK(53279)<>6 THEN NEXT A:GOTO 131
135 SOUND 0,0,0,0:SOUND 1,0,0,0
136 POSITION 4,14: ? #6;"          ":SETCOLOR 4,10,B
137 POSITION 2,2: ? #6;"          "
140 POSITION 7,14: ? #6;"input":POSITION 3,16: ? #6;"skill level":POSITION 2,18: ? #6;"0-9 9-hardest "
150 GET #1,X:IF X<ASC("0") THEN 150
160 IF X>ASC("9") THEN 150
170 L=X-47
180 FOR Q=0 TO 22:POSITION 0,Q: ? #6;"          ":NEXT Q
1000 SETCOLOR 4,1,B:X=INT(RND(O)*4)+1:Y=INT(RND(O)*3)+18:SETCOLOR 1,B,6:COLOR 1:FOR A=0 TO X:PLOT 0,A:DRAWTO 19,A
1020 NEXT A
1030 FOR A=Y TO 23:PLOT 0,A:DRAWTO 19,A
1035 NEXT A
1045 FOR A=1 TO INT(RND(O)*L)+1:PLOT INT(RND(O)*20),INT(RND(O)*24):NEXT A
1050 FOR A=X+1 TO Y-1:X1=INT(RND(O)*5):Y1=INT(RND(O)*5)+15
1055 PLOT 0,A:DRAWTO X1,A:PLOT Y1,A:DRAWTO 19,A:NEXT A
1065 Q=INT(RND(O)*16)+4
1070 IF L>6 THEN SETCOLOR 0,3,6:COLOR 81:PLOT INT(RND(O)*5)+1,Q:DRAWTO INT(RND(O)*19)+1,INT(RND(O)*24)
1080 FOR A=1 TO L:X=INT(RND(O)*20):Y=INT(RND(O)*7)+1:LOCATE X,Y,Z:IF Z<>32 THEN A=A-1:NEXT A
1081 X(A)=X:Y(A)=Y:SETCOLOR 2,4,4:COLOR 162:PLOT X,Y:NEXT A
1082 FOR A=L+1 TO L*2:X=INT(RND(O)*20):Y=INT(RND(O)*9)+15:LOCATE X,Y,Z:IF Z<>32 THEN A=A-1:NEXT A
1083 X(A)=X:Y(A)=Y:SETCOLOR 2,4,4:COLOR 162:PLOT X,Y:NEXT A
1084 FOR A=(L*2)+1 TO L*3:IF RND(O)>.5 THEN X=INT(RND(O)*5)+15:GOTO 1086
1085 X=INT(RND(O)*5)
1086 Y=INT(RND(O)*24):LOCATE X,Y,Z:IF Z<>32 THEN A=A-1:NEXT A
1090 X(A)=X:Y(A)=Y:SETCOLOR 2,4,4:COLOR 162:PLOT X,Y:NEXT A
1100 FOR A=1 TO L*3:X=INT(RND(O)*20):Y=INT(RND(O)*24):LOCATE X,Y,Z:IF Z<>32 THEN A=A-1:NEXT A:GOTO 1120
1110 SETCOLOR 3,12,4:COLOR 138:PLOT X,Y:NEXT A
1120 FOR A=1 TO 30-(L*2.5):X=INT(RND(O)*20):Y=INT(RND(O)*24):LOCATE X,Y,Z:IF Z<>32 THEN A=A-1:NEXT A:GOTO 2000
1130 SETCOLOR 2,4,4:COLOR 169:PLOT X,Y:NEXT A
2000 MX=INT(RND(O)*7)+6:MY=INT(RND(O)*7)+6:LOCATE MX,MY,Z:IF Z<>32 THEN 2000
2001 SOUND 0,0,0,0
2010 COLOR 134:PLOT MX,MY:MX1=MX:MY1=MY
3000 POSITION 3,0: ? #6;"zombie island"
3005 POKE 764,255
3010 FOR J=8 TO 15:POKE N+J,ABS(PEEK(N+J)-(INT(RND(O)*255)+1)):SOUND 1,10,B,8
3015 X=PEEK(764):IF X<>255 THEN POKE 764,255:GOTO 3020
3017 NEXT J:GOTO 3000
3020 IF X=14 THEN MY1=MY-1:GOTO 3100
3025 IF X=22 THEN 3100
3030 IF X=15 THEN MY1=MY+1:GOTO 3100
3040 IF X=6 THEN MX1=MX-1:GOTO 3100
    
```


ATARI PROGRAM

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3050 IF X=7 THEN MX1=MX+1:GOTO 3100
3060 IF X=46 THEN MX1=MX+1:MY1=MY-1:GOTO 3100
3070 IF X=63 THEN MX1=MX-1:MY1=MY+1:GOTO 3100
3080 IF X=47 THEN MX1=MX-1:MY1=MY-1:GOTO 3100
3090 IF X=62 THEN MX1=MX+1:MY1=MY+1:GOTO 3100
3095 GOTO 3000
3100 COLOR 0:PLOT MX,MY
3105 SOUND 3,100,10,8
3110 LOCATE MX1,MY1,Z:IF Z=1 THEN MX1=MX:MY1=MY
3120 IF Z=162 OR Z=131 OR Z=138 OR Z=B1 THEN 5000
3130 IF MX<MX1 THEN CM=CM-1:GOTO 3190
3140 IF MX>MX1 THEN CM=CM+1:GOTO 3190
3150 IF MY<MY1 THEN CM=CM+2:GOTO 3190
3160 IF MY>MY1 THEN CM=CM-2:GOTO 3190
3190 SETCOLOR 3,10,4:COLOR CM:MX=MX1:MY=MY1:PLOT MX,MY:CM=134:SOUND 3,0,0,0
3200 FOR A=1 TO L*3:IF C(A)>162 THEN NEXT A:GOTO 3000
3201 POSITION 3,0:? #6:"zombie island"
3210 COLOR 0:PLOT X(A),Y(A)
3300 IF X(A)>MX THEN X1(A)=X(A)-1
3310 IF X(A)<MX THEN X1(A)=X(A)+1
3320 IF Y(A)<MY THEN Y1(A)=Y(A)+1
3340 IF Y(A)>MY THEN Y1(A)=Y(A)-1
3350 LOCATE X1(A),Y1(A),Z
3360 IF Z=138 OR Z=131 THEN C(A)=131:KC=KC+1:GOTO 4200
3370 IF Z=B1 THEN C(A)=0:KC=KC+1:GOTO 4100
3380 IF Z=1 THEN IF RND(O)>.7 THEN C(A)=0:KC=KC+1:GOTO 4100
3390 IF Z=169 THEN X1(A)=X(A):Y1(A)=Y(A)
3400 IF Z>131 AND Z<137 THEN Z=162:GOTO 5000
3410 IF Z=162 THEN X1(A)=X(A):Y1(A)=Y(A)
3420 FOR K=B TO 15:POKE N+K,ABS(PEEK(N+K)-(INT(RND(O)*255)+1)):NEXT K
4090 X(A)=X1(A):Y(A)=Y1(A):SETCOLOR 2,4,4:COLOR 162:PLOT X(A),Y(A):NEXT A:GOTO 3000
4100 COLOR 0:PLOT X(A),Y(A)
4110 COLOR 0:PLOT X1(A),Y1(A):IF KC=L*3 THEN 5000
4120 NEXT A:GOTO 3000
4200 COLOR 0:PLOT X(A),Y(A):SETCOLOR 3,12,4:COLOR 131:PLOT X1(A),Y1(A)
4210 IF KC=L*3 THEN 7000
4220 NEXT A:GOTO 3000
5000 SOUND 1,0,0,0:SOUND 3,0,0,0
5003 IF Z=138 THEN FOR A=1 TO 255 STEP 4:SOUND 0,A,10,8:NEXT A:SOUND 0,0,0,0:FOR R=1 TO 20:NEXT R:SOUND 0,200,10,8
5005 SC=SC+KC
5010 IF Z=138 THEN FOR R=1 TO 40:NEXT R:SOUND 0,0,0,0:GOTO 6000
5020 IF Z=131 THEN FOR A=1 TO 200 STEP 4:SOUND 0,A,10,8:NEXT A:FOR A=1 TO 10:SOUND 0,50,8,8:FOR R=1 TO A:NEXT R
5030 IF Z=131 THEN SOUND 0,70,8,8:NEXT A:SOUND 0,0,0,0:GOTO 6000
5040 IF Z=B1 THEN FOR A=1 TO 255:SOUND 0,A,10,8:NEXT A:FOR A=15 TO 1 STEP -1:SOUND 0,255,10,A:FOR R=1 TO 20:NEXT R
5050 IF Z=B1 THEN NEXT A:SOUND 0,0,0,0:GOTO 6000
5060 IF Z=162 THEN FOR A=1 TO 30:SETCOLOR 2,4,10:SOUND 0,50+A,10,8:FOR R=1 TO 10:NEXT R:SETCOLOR 2,4,6
5070 IF Z=162 THEN SOUND 0,100,10,8:NEXT A:SOUND 0,0,0,0:GOTO 6010
6000 FOR A=1 TO 200:SETCOLOR 4,A,A:NEXT A
6010 FOR Q=1 TO 22:POSITION 1,Q:? #6:" " :NEXT Q
6020 KC=0:FOR A=1 TO 30:C(A)=162:NEXT A:POSITION 5,16:? #6:"SCORE=";SC
6030 IF SC>HI THEN HI=SC
6040 POSITION 6,18:? #6:"HIGH=";HI:SC=0
6050 GOTO 22
7000 SOUND 1,0,0,0:SOUND 3,0,0,0
7005 SC=SC+KC
7010 FOR Q=1 TO 22:POSITION 1,Q:? #6:" " :NEXT Q:SETCOLOR 4,0,0
7015 FOR A=1 TO 100:POSITION 5,10:? #6:"new level"
7020 C(A)=162:X(A)=0:Y(A)=0:SOUND 0,A,10,8
7030 POSITION 5,10:? #6:"new level":NEXT A:KC=0:POKE 764,255:SOUND 0,0,0,0
7040 POSITION 5,10:? #6:" " :L=L+1:GOTO 1000
8000 SOUND 0,0,0,0:SOUND 1,0,0,0:SETCOLOR 4,10,8
8007 POSITION 2,2:? #6:" "
8010 POSITION 5,4:? #6:" " :POSITION 5,5:? #6:" "
8015 POSITION 5,7:? #6:" " :POSITION 5,9:? #6:" " :POSITION 5,10:? #6:" "
8017 POSITION 5,6:? #6:" " :POSITION 5,8:? #6:" "
8018 POSITION 4,14:? #6:" "
8020 POSITION 5,3:? #6:"-ZOMBIE"
8030 POSITION 5,5:? #6:"&-MAN"
8040 POSITION 5,7:? #6:"*-PIT"
8050 POSITION 5,9:? #6:"Q-RAVINE"
8060 POSITION 5,11:? #6:")-CACTUS"
8070 POSITION 5,13:? #6:"!-SEA"
8080 POSITION 4,15:? #6:"#-ZOMBIE IN PIT"
8090 POSITION 1,19:? #6:"you may only cross":POSITION 1,20:? #6:"cactii with safety"
8100 POSITION 6,22:? #6:"press s"
8110 IF PEEK(764)=62 THEN POKE 764,255:GOTO 20
8120 FOR H=B TO 15:POKE N+H,ABS(PEEK(N+H)-INT(RND(O)*255)+1):NEXT H:GOTO 8110
10010 GRAPHICS 1+16:POKE 106,PEEK(106)-8:P=PEEK(106):N=P*256:FOR M=0 TO 1023:POKE M+N,PEEK(M+N),PEEK(57344+M):NEXT M
10020 FOR A=1 TO 10:FOR F=0 TO 7:READ D:POKE N+F+A*8,D:NEXT F:NEXT A
10025 Q=49*8
10030 FOR F=0 TO 7:READ D:POKE N+F+Q,D:NEXT F
10040 DATA 255,255,255,255,255,255,255,255
10060 DATA 24,36,24,60,90,24,36
10080 DATA 0,126,129,153,129,129,126,0
10100 DATA 24,60,24,60,90,24,24,36
10120 DATA 24,24,72,60,26,24,40,20
10140 DATA 24,24,8,60,90,24,36,36
10160 DATA 24,24,18,60,88,24,20,40
10180 DATA 24,36,24,60,90,24,24,36
10200 DATA 0,16,80,116,20,28,16,0
10220 DATA 0,126,129,129,129,129,126,0
10240 DATA 0,170,255,255,255,255,170,0
10300 RETURN

```

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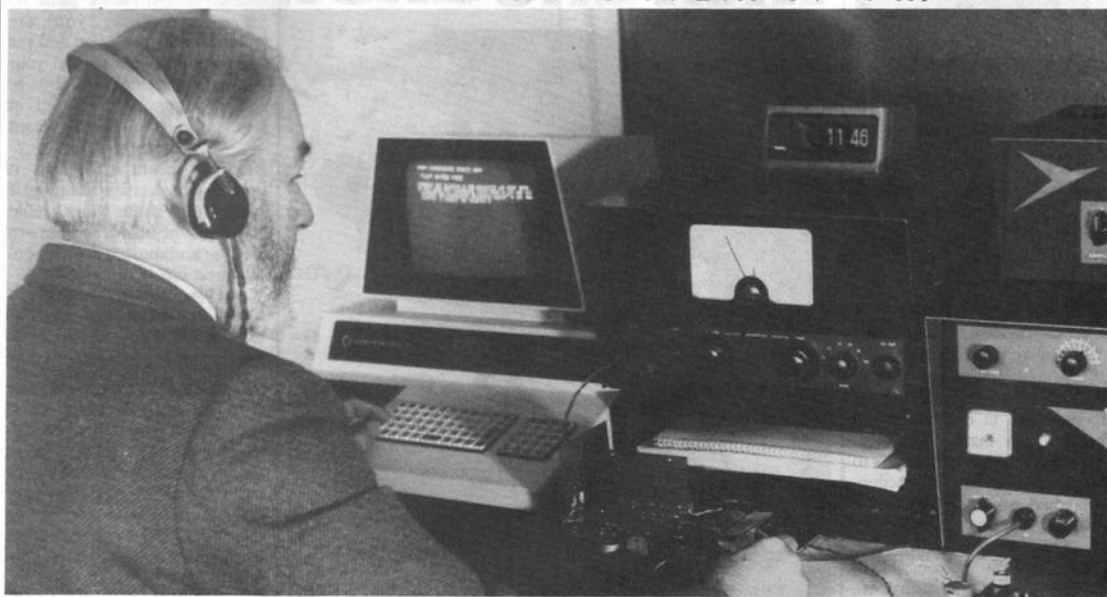
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HCW 4

VIC-20 PROGRAM

```
37 DATA M,---,N,---,O,---,P,---,Q,---,R,---,S,---,T,---,U,---,V,---,W,---,X,---
38 DATA Y,---,Z,---,1,---,2,---,3,---,4,---,5,---,6,---,7,---,8,---
39 DATA 9,---,0,---,".",---,"(",---,"-",---,":",---,"?",---,"/",---,
40 DATA "-",---,"/",---,"(",---,"-",---,":",---,"?",---,"/",---,
```



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Sub Hunt

A thousand leagues under the sea... an enemy submarine is out to get you. Try to torpedo it before it torpedoes you, in this action-packed program by Bill Butcher.

The enemy sub is hiding somewhere in the 9 x 10 grid on your sonar screen. You must track it down by entering a row and column number. As you get closer, the number that comes up on the screen will get lower. To start with, you have 30 tries; as you get better, try reducing the value of X in line 100 to make the game harder.

Vortex

Imagine you are the vortex, a hungry monster which lurks in a maze waiting for unsuspecting creatures to fall into its clutches. To reach safety, your victims have to reach the bottom of the maze without bumping into you, and if they do, they win. You have to try to stand in their way — but time is short, because you only have six tries.



Listing 1 — Widgets

```

5 REM WIDGETS
10 RAND
20 LET Z=1
30 LET P=Z
40 LET M=990
50 LET I=Z-Z
60 LET S=10
70 CLS
80 PRINT "WEEK ";Z
90 LET Z=Z+1
100 PRINT "E";M;"00"
110 PRINT P;" PLANT"
120 PRINT I;"00 WIDGETS"
130 PRINT S;"00 SOLD"
140 IF M<1000 THEN GOTO 200
150 PRINT "BUY?"
160 INPUT Y$
170 IF Y$<>"Y" THEN GOTO 200
180 LET P=P+1
190 LET M=M-1000
200 PRINT "ADS?"
210 INPUT B
220 LET M=M-B+10
230 PRINT "PRDN?"
240 INPUT U
250 IF U>10+P THEN GOTO 250
270 LET I=I+U
280 LET S=INT (S/(RAND*3+4))
290 IF B>6 THEN LET S=S+S*B+14
300 IF B<7 AND B>2 THEN LET S=S
+6*B+7
310 IF B<3 THEN LET S=S+3*B
320 IF S<1 THEN LET S=1
330 LET I=I-S
340 LET M=M+S*10-20*B-S*U-15
350 IF M>=0 THEN GOTO 70
360 PRINT "BROKE"

```

In this adventure game by Steve McCallum, you are represented by the * sign and the computer takes the part of your victim, represented by the > sign. You move it yourself in response to its requests: 2 means →, -2 means ←, 9 means ↙ and 11 means ↘. But it sometimes makes mistakes, and if it asks for a move which would take it off the board, you have to play fair and move it in the opposite direction.

This program must be copied *exactly* as listed. Even an extra full stop will cause a crash.

Alien

Ten alien space ships are on your tail, and you only have fifteen warheads left with which to destroy them. Worse still, the more aliens you kill, the more determined the survivors are to stay alive. Peter Coupe offers some advice on how to come out on top.

You move the warheads by pressing any of the keys on the ZX81. The longer you hold down a key, the further the warhead travels... but to finish the aliens off, you have to get within killing distance in only three key depressions.

Line 120 of the program holds the formula for how close you need to get to the aliens. Try changing it if you find the game too easy — or too hard.

Draw

If you ever owned an Etch-a-Sketch game you will recognise the uses of this program by Roland Daw, which lets you draw lines and block graphics anywhere on the screen.

Just nine keys control the functions. 2, 4, 6 and 8 move you down, left, right and up. 1 lets you draw, and 3 lets you erase. 7 will save on tape anything you have drawn, if you set the cassette on to record before you press it. 9 lets you write an alphanumeric combination at a point on the screen to the right of the last cursor position. And 0 lets you see exactly where the cursor is at the time.

This program fits snugly into 1K of memory, and leaves just enough space to draw in about half the screen.

ZX81 PROGRAMS

Listing 2 — Sub Hunt

```

1 REM SUB HUNT
10 FOR Z=0 TO 9
20 PRINT AT 11,Z:Z
30 PRINT AT Z,11:Z

40 FOR Y=0 TO 9
50 PRINT AT Z,Y:Y
60 NEXT Y
70 NEXT Z

80 LET A=INT (RND*9)
90 LET R=INT (RND*9)
100 LET X=30
110 PRINT AT 13,0;"YOU HAVE ";X
;" TRIES LEFT"
120 LET X=X-1
130 IF X=0 THEN GOTO 220

140 INPUT C
150 INPUT D
160 IF C=A AND D=R THEN GOTO 250

170 PRINT AT D,C;INT ((ABS (D-R
)+ABS (C-A))/2)
180 GOTO 110
220 CLS
230 PRINT "TORPEDGED..TORPEDGED
..TORPEDGED"

240 GOTO 270
250 PRINT "SUB DESTROYED-SCORE=
";X*X
270 PRINT "ANOTHER GO? (A/K)"
280 PAUSE 40000
290 CLS
300 RUN
    
```

Listing 3 — Vortex

```

5 RAND
10 FOR N=CODE " " TO CODE " "
15 PRINT " "
20 PRINT " "
25 NEXT N
30 PRINT " "
35 LET P=CODE " " + 256 + PEEK 163
97 + PEEK 16396
40 LET N=P+CODE "U"
45 POKE P,146
50 POKE N,151
55 FOR X=CODE " " TO CODE " "
60 LET Y=INT (RND*CODE " ")
65 PRINT AT CODE "E",CODE "E";
"ZX ";11+2-2 9"(Y#CODE " ")+CODE
" " TO Y+CODE " " + CODE " "
70 INPUT D
75 POKE P,8
80 LET P=P+D
85 POKE P,146
90 IF P=N THEN PRINT "YOU WIN"
95 IF X=6 AND P<N OR P<N AND
P>17202 THEN PRINT "I WIN"
100 IF P>17202 OR P=N OR X=6 TH
EN STOP

105 PRINT AT CODE "E",CODE "E";
"YOURS"
110 INPUT D
115 LET D=(2 AND D=8)-(2 AND D=
5)+(9 AND D=65)+(11 AND D=68)-(9
AND D=78)-(11 AND D=75)
120 POKE N,8
125 LET N=N+D
130 POKE N,151
135 NEXT X
    
```

Listing 4 — Alien

```

10 REM ALIEN
20 LET A=10
30 LET M=15

40 RAND
50 CLS
60 LET X=0
70 LET L=INT (RND*275)+200
80 PRINT "ALIENS",,"WARHEADS",
,"DISTANCE",000 MILES"
90 PRINT AT 0,10;A;AT 1,10;M;A
T 3,10;L

100 IF A=0 THEN GOTO 270
110 IF M=0 THEN GOTO 290
120 IF L<A*5 THEN GOTO 240
130 IF INKEY$="" THEN GOTO 130
140 FOR I=0 TO 250
150 IF INKEY$="" THEN GOTO 190
170 NEXT I
180 GOTO 160
190 LET X=X+1
200 IF X=4 THEN GOTO 250
210 CLS
220 LET L=ABS (L-I)
230 GOTO 80
240 LET A=A-1
250 LET M=M-1
250 GOTO 40
270 PRINT AT 3,0;"ALIEN FLEET D
ESTROYED-WELL DONE"
280 STOP
290 PRINT AT 3,0;"OUT OF WARHEA
DS-ALIENS WIN"
300 STOP
    
```

Listing 5 — Draw

```

10 REM "DRAW"
20 LET X=110
25 LET A=0
26 LET C=0

30 IF INKEY$="2" THEN LET A=A-
1
32 IF INKEY$="1" THEN LET X=11
0
33 IF INKEY$="3" THEN LET X=12
0
35 IF INKEY$="7" THEN SAVE "DR
AW"
40 IF INKEY$="8" THEN LET A=A+
1
44 IF INKEY$="9" THEN GOTO 46
45 GOTO 50
46 INPUT A$
47 PRINT A$
50 IF INKEY$="4" THEN LET C=C-
1
60 IF INKEY$="6" THEN LET C=C+
1
70 IF INKEY$="0" AND X=110 THE
N GOTO 180

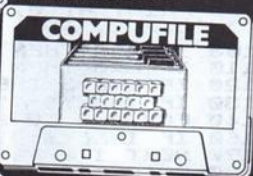
80 GOTO X
110 PLOT C,A
115 GOTO 30
125 PLOT C,A
128 UNPLOT PEEK 16438,PEEK 1643
9
130 GOTO 30
180 UNPLOT PEEK 16438,PEEK 1643
9
190 GOTO X
    
```


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HCW 4

Playing around with pixels — on screen

Creating user-defined characters is a tricky task. The TI-99/4A has a special routine, called CHAR, to deal with it. Even so, to define each 8 x 8 pixel character, you have to work out, then type in, a 16-digit hexadecimal string — and after all that you may well find that the end result that appears on screen is not quite what you intended!

My program, for the TI-99/4A, allows you to design up to four characters on screen. Enlarged version of the characters can be manipulated on a large 16 x 16 grid, and moved around it by using the arrow keys. Individual pixels can be set or removed by using ENTER.

As well as the large grid, the program also displays normal-sized representations of the characters and their hexadecimal string representations. These are only updated when the user moves to another character or when the space bar is pressed.

At the start of the program, users are given the option of supplying initial values for the characters. Only if they wish to do this must a 16-digit hexadecimal number be supplied.

To make the program as foolproof as possible, all user input is checked and any attempt to move the cursor off the 16 x 16 grid is rejected.

Going through the program line by line, this is how it works:

150 dimensions the arrays used in the program. ST\$ holds the strings representing the four characters being defined. MSG\$ holds parts of messages to be displayed during initialisation. REP (3,15) holds the 16 hexadecimal digits making up the representations for the four characters.

160-240 define some functions used in the rest of the program. DIVn (X) produces the integer division of X by n and MODn (X) produces the remainder.

250-270 calls subroutines to carry out initialisation.

280-310 a loop to output the string representation and initial display for each of the four characters.

320 makes a sound

330 STI will always contain the number (0 to 3) of the current character being defined. This line sets STI to represent, the top left hand character.

340 CHANGED will indicate whether the current character (STI) has been changed since the last time its string representation and normal-sized representation were displayed. FALSE (0) implies no change and TRUE (-1) implies a change.

350-360 CRUX and CURY indicate the coordinates of the cursor within the current character (STI). (0,0) indicates the top left hand corner of the character. puts the cursor on the screen.

370 wait for user input.

380-390 removes the cursor from the screen.

400 performs some action depending on the value of the input (KEY) and then goto 370.

410-600 Space bar has been pressed, so updates the display if the character (STI) has been changed.

420 moves cursor left.

480 moves cursor right.

510 moves cursor down.

540 moves cursor up.

570 sets or unsets the current pixel (indicated by CURX and CURY) of the current character (STI).

590 Invalid input, so make a noise.

The remainder of the program is a collection of subroutines.

620-880 clear the screen and set up the user defined characters and colours used in the program. character codes 124 to 127 are used to define the four characters being created.

890-1110 clear the screen and set up the empty display including the 16 x 16 grid.

1120-1220 display the string representation (ST\$(STI)) for the character STI at the appropriate position on the screen.

1230-1540 ask whether the user wishes to supply initial values for the four characters. If so, this subroutine inputs the values and calls the subroutine at 2760 to check that they are valid.

1550-1580 determine the absolute position of the cursor on the screen by using the character number STI and the position within that character given by CURX and CURY.

1590-1660 position the cursor on the screen by finding its absolute position using the subroutine at 1550. The type of cursor plotted depends on whether the cursor is at a set or unset pixel. This is determined by calling GCHAR.



Finding user-defined characters hard to handle on the TI-99/4A? David Gray shows you how to tame them

TI-99/4A PROGRAMMING

1670-1740 removes the cursor and replaces it by the appropriate character to represent a set or unset pixel.

1750-1850 move cursor up.
1960-1960 move cursor down.
1970-2070 move cursor right.
2080-2180 move cursor left.

These four subroutines move the cursor as directed by the user. If any attempt is made to move the cursor off the 16 x 16 grid, a sound is made (by calling the subroutine at 2190) and no action is taken.

If the move takes the cursor to another character, then the display is updated by calling the subroutine at 2920. Otherwise CURX or CURY is updated as appropriate. Note: at this point the cursor is not actually displayed on the screen, but when it is replaced STI, CURX and CURY will indicate its correct position.

```

100 REM Character Generator
110 REM . A.E.Gray
120 REM 1983
130 REM
140 REM MAIN PROG
150 DIM ST$(3),MSG$(3),REP(3,15)
160 REM Some common functions.
170 DEF MOD2(X)=X-2*INT(X/2)
180 DEF DIV2(X)=INT(X/2)
190 DEF MOD4(X)=X-4*INT(X/4)
200 DEF DIV4(X)=INT(X/4)
210 DEF MOD8(X)=X-8*INT(X/8)
220 DEF DIV8(X)=INT(X/8)
230 DEF DIV16(X)=INT(X/16)
240 DEF MOD16(X)=X-16*INT(X/16)
250 GOSUB 620
260 GOSUB 1230
270 GOSUB 890
280 FOR STI=0 TO 3
290 GOSUB 1120
300 GOSUB 2260
310 NEXT STI
320 GOSUB 2190
330 STI=0
340 CHANGED=0
350 CURX=0
360 CURY=0
370 GOSUB 1590
380 CALL KEY(3,KEY,STATUS)
390 IF STATUS=0 THEN 380
400 GOSUB 1670
410 IF KEY<>32 THEN 440
420 GOSUB 2920
430 GOTO 370
440 IF (KEY<>8)*(KEY<>83)*(KEY<>115) THEN 470
450 GOSUB 2080
460 GOTO 370
470 IF (KEY<>9)*(KEY<>68)*(KEY<>100) THEN 500
480 GOSUB 1970
490 GOTO 370
500 IF (KEY<>10)*(KEY<>88)*(KEY<>120) THEN 530
510 GOSUB 1860
520 GOTO 370
530 IF (KEY<>11)*(KEY<>69)*(KEY<>101) THEN 560
540 GOSUB 1750
550 GOTO 370
560 IF KEY<>13 THEN 590
570 GOSUB 2530
580 GOTO 370
590 GOSUB 2190
600 GOTO 370
610 STOP
620 REM INITIALISE CHARACTERS FOR PROGRAM DISPLAY
630 CALL CLEAR
640 CALL CHAR(112,"00000000000000FF")
650 CALL CHAR(113,"FF")
660 CALL CHAR(114,"7EB19DA1A19DB17E")
670 CALL CHAR(115,"0")
680 CALL CHAR(116,"0101010101010101")
690 CALL CHAR(117,"80B0B0B0B0B0B0B0")
700 CALL COLOR(11,2,1)
710 CALL CHAR(120,"FFFFFFFFFFFFFF")
720 CALL CHAR(121,"0000183C3C18")
730 CALL CHAR(122,"FFFFFFC3C3E7FFFF")
740 CALL CHAR(123,"0")

```

2460-2520 extract the DIGITh digit from the string S\$ and turn it into an integer in the range 0 to 15.

2530-2750 change the current pixel when the user presses ENTER. The change is recorded by setting CHANGED to TRUE (-1). The subroutine then updates the display by changing the character at the cursor position. It then replaces the value of REP with the current character STI to reflect the change. At this point the string representation for the character STI remains unchanged.

2760-2910 check a string (S\$) input by the user and report any errors found. If the string is correct a value of TRUE (-1) is returned in OK; otherwise a value of FALSE (0) is returned in OK.

2920-3110 update the string representation and the normal character representation of the character STI, if it has changed. The string representation is updated both internally (ST\$(STI)) and on the display.

```

750 CALL CHAR(124,ST$(0))
760 CALL CHAR(125,ST$(1))
770 CALL CHAR(126,ST$(2))
780 CALL CHAR(127,ST$(3))
790 CALL COLOR(12,2,16)
800 CALL CHAR(128,"01010101010101FF")
810 CALL COLOR(13,2,6)
820 CALL CHAR(136,"FF01010101010101")
830 CALL COLOR(14,2,10)
840 CALL CHAR(144,"80B0B0B0B0B0B0FF")
850 CALL COLOR(15,2,12)
860 CALL CHAR(152,"FFB0B0B0B0B0B0B0")
870 CALL COLOR(16,2,15)
880 RETURN
890 REM SET UP SCREEN
900 CALL CLEAR
910 CALL HCHAR(4,5,124)
920 CALL HCHAR(19,5,125)
930 CALL HCHAR(4,28,126)
940 CALL HCHAR(19,28,127)
950 CALL VCHAR(1,16,116,24)
960 CALL VCHAR(1,17,117,24)
970 CALL HCHAR(11,1,112,32)
980 CALL HCHAR(12,1,113,32)
990 FOR I=0 TO 1
1000 FOR J=0 TO 1
1010 FOR K=0 TO 7
1020 CALL HCHAR(4+8*J+K,9+8*I,128+8*(2*I+J),8)
1030 NEXT K
1040 NEXT J
1050 NEXT I
1060 CALL HCHAR(1,16,124)
1070 CALL HCHAR(2,16,125)
1080 CALL HCHAR(1,17,126)
1090 CALL HCHAR(2,17,127)
1100 CALL HCHAR(24,1,115,32)
1110 RETURN
1120 REM S/R TO DISPLAY STRING REPRESENTATION
1130 X=5+DIV2(STI)*16
1140 Y=1+MOD2(STI)*20
1150 S=ST$(STI)
1160 FOR I=0 TO 1
1170 FOR J=0 TO 7
1180 CALL HCHAR(Y+I,X+J,ASC(SEG$(S,8*I+J+1,1)))
1190 NEXT J
1200 NEXT I
1220 RETURN
1230 REM ASK USER FOR INITIAL VALUES
1240 MSG$(0)="TOP LEFT "
1250 MSG$(1)="BOTTOM LEFT "
1260 MSG$(2)="TOP RIGHT "
1270 MSG$(3)="BOTTOM RIGHT "
1280 FOR STI=0 TO 3
1290 CALL CLEAR
1300 PRINT "---- CHARACTER GENERATOR ----"
1310 PRINT
1320 PRINT " ";CHR$(114);" A.E.GRAY 1982"
1330 PRINT
1340 PRINT
1350 PRINT
1360 PRINT "DO YOU WANT TO SET AN"
1370 PRINT
1380 PRINT "INITIAL PATTERN IN THE"
1390 PRINT
1400 PRINT MSG$(STI);"BOX (Y/N)?"

```


TI-99/4A PROGRAMMING

```

1410 CALL KEY(0,KEY,STATUS)
1420 IF STATUS=0 THEN 1410
1430 IF (KEY<>7B)*(KEY<>110) THEN 1460
1440 ST*(ST1)="0000000000000000"
1450 GOTO 1530
1460 PRINT
1470 PRINT "PLEASE INPUT STRING."
1480 PRINT
1490 INPUT ST*(ST1)
1500 GOSUB 2760
1510 IF OK THEN 1530
1520 GOTD 1330
1530 NEXT ST1
1540 RETURN
1550 REM S/R TO FIND ABS POSITION OF CURSOR
1560 X=9+DIV2(ST1)*8+CURX
1570 Y=4+MOD2(ST1)*8+CURY
1580 RETURN
1590 REM POSITION CURSOR
1600 GOSUB 1550
1610 CALL GCHAR(Y,X,CH)
1620 IF CH=120 THEN 1650
1630 CALL HCHAR(Y,X,121)
1640 GOTO 1660
1650 CALL HCHAR(Y,X,122)
1660 RETURN
1670 REM REMOVE CURSOR
1680 GOSUB 1550
1690 CALL GCHAR(Y,X,CH)
1700 IF CH=122 THEN 1730
1710 CALL HCHAR(Y,X,128+8*ST1)
1720 GOTO 1740
1730 CALL HCHAR(Y,X,120)
1740 RETURN
1750 REM MOVE UP
1760 IF CURY=0 THEN 1790
1770 CURY=CURY-1
1780 RETURN
1790 IF MOD2(ST1)=0 THEN 1840
1800 GOSUB 2920
1810 CURY=7
1820 ST1=ST1-1
1830 RETURN
1840 GOSUB 2190
1850 RETURN
1860 REM MOVE DOWN
1870 IF CURY=7 THEN 1900
1880 CURY=CURY+1
1890 RETURN
1900 IF MOD2(ST1)=1 THEN 1950
1910 GOSUB 2920
1920 CURY=0
1930 ST1=ST1+1
1940 RETURN
1950 GOSUB 2190
1960 RETURN
1970 REM MOVE RIGHT
1980 IF CURX=7 THEN 2010
1990 CURX=CURX+1
2000 RETURN
2010 IF DIV2(ST1)=1 THEN 2060
2020 GOSUB 2920
2030 CURX=0
2040 ST1=ST1+2
2050 RETURN
2060 GOSUB 2190
2070 RETURN
2080 REM MOVE LEFT
2090 IF CURX=0 THEN 2120
2100 CURX=CURX-1
2110 RETURN
2120 IF DIV2(ST1)=0 THEN 2170
2130 GOSUB 2920
2140 CURX=7
2150 ST1=ST1-2
2160 RETURN
2170 GOSUB 2190
2180 RETURN
2190 REM MAKE SOUND
2200 CALL SOUND(100,440,2)
2210 CALL SOUND(100,550,2)
2220 CALL SOUND(100,440,2)
2230 CALL SOUND(100,660,2)
2240 CALL SOUND(100,880,2)
2250 RETURN
2260 REMS/R TO OUTPUT LARGE LETTER AND INITIALISE REP.
2270 S*=ST*(ST1)
2280 IF S* <> "0000000000000000" THEN 2290 ELSE 2410
2290 X=9+DIV2(ST1)*8
2300 Y=4+MOD2(ST1)*8

```

```

2310 FOR DIGIT=0 TO 15
2320 GOSUB 2460
2330 FOR J=3 TO 0 STEP -1
2340 BIT=MOD2(HEXDIGIT)
2350 HEXDIGIT=DIV2(HEXDIGIT)
2360 IF BIT<>1 THEN 2380
2370 CALL HCHAR(Y+DIV2(DIGIT),X+MOD2(DIGIT)*4+J,120)
2380 NEXT J
2390 NEXT DIGIT
2400 CALL CHAR(124+ST1,S*)
2410 FOR DIGIT=0 TO 15
2420 GOSUB 2460
2430 REP(ST1,DIGIT)=HEXDIGIT
2440 NEXT DIGIT
2450 RETURN
2460 REM EXTRACT DIGIT th HEXDIGIT FROM S*
2470 HEXDIGIT=ASC(SEG*(S*,DIGIT+1,1))
2480 IF HEXDIGIT<65 THEN 2510
2490 HEXDIGIT=HEXDIGIT-55
2500 RETURN
2510 HEXDI*GIT=HEXDIGIT-48
2520 RETURN
2530 REM CHANGE PART OF CHAR
2540 CHANGED=-1
2550 GOSUB 1550
2560 CALL GCHAR(Y,X,CH)
2570 IF CH=120 THEN 2610
2580 NEWBIT=1
2590 CALL HCHAR(Y,X,120)
2600 GOTO 2630
2610 NEWBIT=-1
2620 CALL HCHAR(Y,X,128+8*ST1)
2630 REM
2640 BITPOS=8*CURY+CURX
2650 DIGIT=DIV4(BITPOS)
2660 BITPOS=MOD4(BITPOS)
2670 ON BITPOS+1 GOTO 2740,2720,2700,2680
2680 REP(ST1,DIGIT)=REP(ST1,DIGIT)+NEWBIT
2690 RETURN
2700 REP(ST1,DIGIT)=REP(ST1,DIGIT)+2*NEWBIT
2710 RETURN
2720 REP(ST1,DIGIT)=REP(ST1,DIGIT)+4*NEWBIT
2730 RETURN
2740 REP(ST1,DIGIT)=REP(ST1,DIGIT)+8*NEWBIT
2750 RETURN
2760 REM S/R TO CHECK INPUT STRING
2770 OK=0
2780 S*=ST*(ST1)
2790 IF LEN(S*)=16 THEN 2830
2800 PRINT
2810 PRINT "STRING MUST BE 16 CHARACTERS"
2820 RETURN
2830 FOR I=1 TO 16
2840 CH=ASC(SEG*(S*,I,1))
2850 IF ((CH=48)*(CH<=57))+((CH=65)*(CH<=70))
THEN 2890
2860 PRINT
2870 PRINT "STRING HAS NON-HEX DIGIT."
2880 RETURN
2890 NEXT I
2900 OK=-1
2910 RETURN
2920 REM UPDATE DISPLAY WITH MODIFIED CHARACTER
2930 IF CHANGED THEN 2950
2940 RETURN
2950 CHANGED=0
2960 GOSUB 2190
2970 S*=""
2980 X=9+8*DIV2(ST1)
2990 Y=4+8*MOD2(ST1)
3000 FOR J=0 TO 15
3010 HEXDIGIT=REP(ST1,J)
3020 IF HEXDIGIT>9 THEN 3050
3030 S*=S*CHR*(HEXDIGIT+48)
3040 GOTO 3060
3050 S*=S*CHR*(HEXDIGIT+55)
3060 NEXT J
3070 ST*(ST1)=S*
3080 CALL CHAR(124+ST1,S*)
3090 GOSUB 1120
3100 GOSUB 2190
3110 RETURN

```



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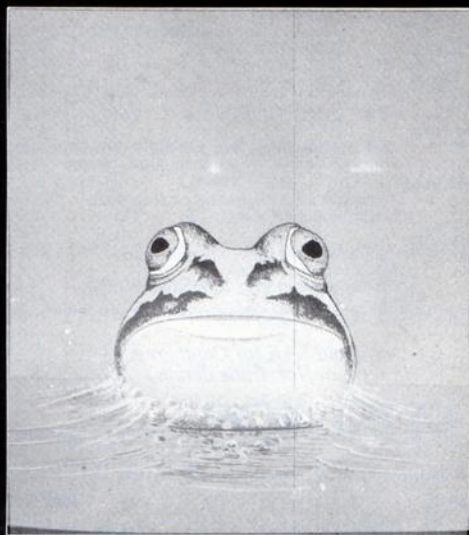
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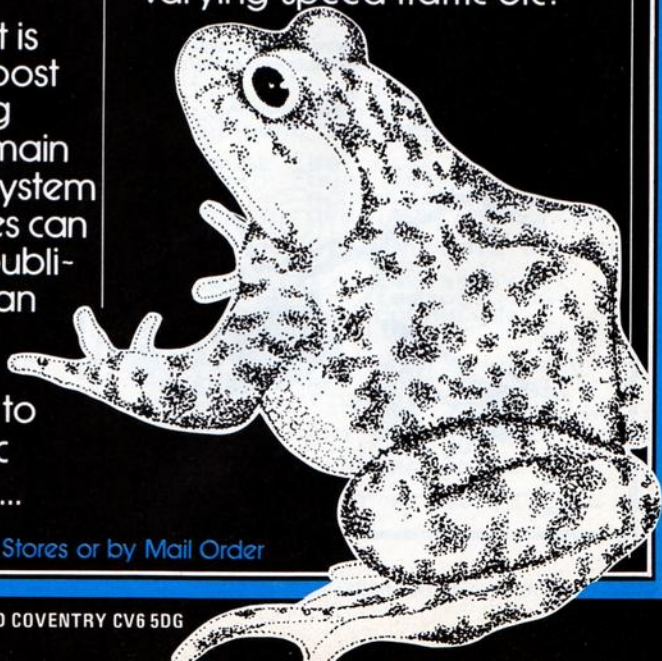
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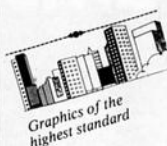
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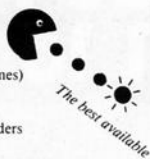
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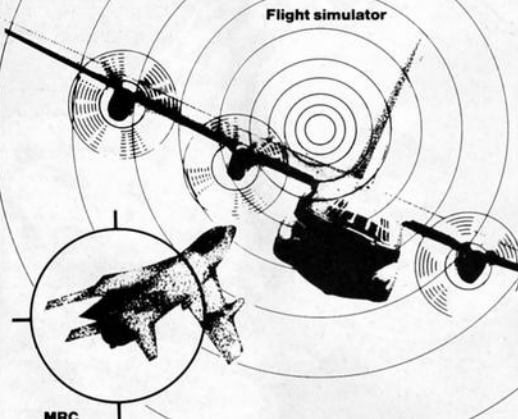
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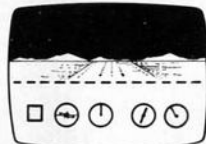
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Variables used: c\$ choice of calculation type, p principal, r rate of interest, t term or period of years, a accumulated amount.

Lines 10 to 190 introduce the program and offer options, 200-298 is the simple interest calculation, 400-530 works out compound interest and 600-740 are for present value calculation.

```

10 REM interesting program
20 REM dave judson 1983
30 PRINT "THE PROGRAM GIVES TH
E OPTION OF"
40 PRINT "VARIOUS FINANCIAL TR
ANSACTIONS"
50 FOR i=1 TO 10: PRINT : NEXT
i
55 PAUSE 100
60 CLS : PRINT "TO CALCULATE S
IMPLE INTEREST"
65 PRINT
70 PRINT "CALCULATE COMPOUND I
NTEREST"
75 PRINT
80 PRINT "CALCULATE A PRESENT
VALUE"
85 PRINT "to choose calculatio
n type"
90 PRINT FLASH 1;"ENTER s OR c
OR p"

```

```

90 INPUT c$
140 IF c$="s" THEN GO TO 200
150 IF c$="c" THEN GO TO 400
160 IF c$="p" THEN GO TO 600
185 CLS
190 PRINT "option not valid": G
O TO 85
200 REM simple interest
205 CLS
210 INPUT "WHAT IS THE ORIGINAL
SUM ";p
220 INPUT "AT WHAT RATE OF INTE
REST ";r
230 INPUT "FOR HOW MANY YEARS
";t
240 LET a1=p*((1+t*r/100))
250 LET a=INT (100*a1)/100
260 PRINT "ACCUMULATED SUM IS
";a
270 PRINT
280 PRINT "OF WHICH £ ";a-p;"
IS INTEREST"
290 INPUT "ANY MORE CALCULATION
S OF THIS TYPE (y/n) ";c$
302 IF c$="y" THEN GO TO 200
304 INPUT "ANY OTHER TYPES OF C
ALCULATION (y/n) ";f$
306 IF f$="y" THEN GO TO 60
308 GO TO 1000
400 REM compound interest
405 CLS
410 INPUT "WHAT IS THE ORIGINAL
SUM ";p
420 INPUT "AT WHAT RATE OF INTE
REST ";r
430 INPUT "FOR HOW MANY YEARS
";t
440 LET a1=p*((1+r/100))↑t
450 LET a=INT (100*a1)/100
460 PRINT "ACCUMULATED SUM IS "
;a
470 PRINT
480 PRINT "OF WHICH £ ";a-p;"
IS INTEREST"
490 INPUT "ANY MORE OF THIS T
YPE OF CALCULATION (y/n) ";c$
500 IF c$="y" THEN GO TO 400
510 INPUT "ANY OTHER TYPES OF C
ALCULATION (y/n) ";f$
520 IF f$="y" THEN GO TO 60
530 GO TO 1000
600 REM present value
605 CLS
610 PRINT "THE CONCEPT OF PRESE
NT VALUE WORKS OPPOSITELY TO
THE COMPOUND INTEREST CALCULATIO
N"
615 PAUSE 100: CLS
620 INPUT "WHAT SUM DO YOU WISH
TO ACCUMULATE ";a
630 INPUT "OVER HOW MANY YEARS
";t
640 INPUT "AT WHAT RATE OF INTE
REST ";r
650 LET p1=a/((1+r/100)↑t)
660 LET p=INT (100*p1)/100
670 PRINT "TO ACCUMULATE £ ";a
680 PRINT "OVER ";t;" YEARS @ "
;r;"%"
690 PRINT "YOU MUST INVEST ";p
700 INPUT "ANY MORE OF THIS TYP
E OF CALCULATION (y/n) ";c$
710 IF c$="y" THEN GO TO 615
720 INPUT "ANY OTHER TYPES OF C
ALCULATION (y/n) ";f$
730 IF f$="y" THEN GO TO 60
740 GO TO 1000
1000 CLS : PRINT AT 20,16;"BYE F
OR NOW"
1010 STOP

```


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HCW 4

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HCW 4

How easy to add on some ZX81 add-ons?



Inverse video module (left) and repeating key module

Electronics expert Bob Bennett examines a selection of the latest firmware for the ZX81

The race to produce cheaper and better computers for the home or hobbyist user has created in its wake a market for firmware or add-on units, either in kit form or ready built.

The ZX81 is a prime target for this market and I have just been looking at four products you can buy for your ZX81. The manufacturers are Haven Hardware, who assume that your ZX81 is still in its original case.

Now mine isn't. The first thing I did was to build a keyboard and put the PCB in a larger casing for cooling and the addition of a larger transformer. To be fair, I cannot comment on how easy or not it is to fit these things into the original case.

The first product was a keyboard repeater module which is fairly easy to assemble

from the instructions given — although mine came ready built — and with care can be fitted and working in about 10 minutes.

The pot on it gave a fair range of speeds, but if you have the original case for the ZX81 I would recommend experimenting with it before putting it all together. It wouldn't be easy adjusting the pot afterwards.

The second unit I tried was Haven's I/O port. Mine was already assembled, but the assembly instructions are quite easy to follow.

It appears that this unit was originally designed for the Spectrum, but fitting a shorter edge connector will allow it to fit the ZX81 when it is in its original case.

The Spectrum has Basic in/out commands, of course, and a simple program demonstrated

the unit working in both modes. The ZX81 has to be programmed via a short machine code routine which should present no difficulties.

There are eight input and eight output ports you can access via direct soldered connections to the PCB.

The third module I tried was a small unit for producing inverse video, quite easily fitted with four connections to the upper side (component side) of the ZX81.

After fitting and switching back on all I had was a rather murky TV screen with the suspicion of an inverted K cursor lurking somewhere on the left hand edge. It may be that I had been sent a faulty unit. This does sometimes happen and if that's the case I would be happy to try another one.

The last module I examined was a keyboard sounder or, as

Haven whimsically call it, a beeper. This has exactly the same connections to the ZX81 as the keyboard repeater and can be fitted in about the same time, but you would have to be very careful if fitting both units together.

The module worked well and gave a reasonable variation in tone using the onboard pot.

Apart from the one exception, the modules did what they were supposed to do. If you have a modicum of skill with a fine tipped soldering iron then construction of the kits should present no problem and instructions for fitting and use are easily followed, always assuming that these add-ons are what you want. With regard to the I/O port, I think Haven could go into a little more detail about the extension of their PCB edge connector and further extensions.

Prices include postage and packing and those in brackets are for kits.

Repeating key module	£5.95 (£3.95)
I/O port	£14.95 (£10.95)
Inverse video module	£4.50 (£2.95)
Keyboard beeper module	£8.50 (£6.95)

Haven Hardware, 4 Asby Road, Asby, Workington, Cumbria CA14 4RR.

Simon says:

try this
game for
youngsters

Youngsters will get hours of amusement from my version of the classic Simon game — it makes a change from arcade-type games.

Simonn is not a spelling mistake, it's just the name I have given to my version. It uses the high resolution graphics of Mode 2 and therefore needs a model B BBC micro to run.

The object of the game is to remember a sequence of computer generated notes. To help you remember these notes they are accompanied by flashes of a corresponding coloured block.

You then repeat this sequence after the starting tone, using the keys 1 to 6. The computer then checks your sequence against its own and gives you a score.

The computer will make the next sequence harder if you get all

Keep children happy for hours with Jeremy Riggs' version of the Simon classic, which runs on the BBC model B micro

the notes correct, but if you fail to do so the sequence will be the same length.

When you reach level 10 or above the computer will only sound the notes so you have to remember the notes and not just the colours.

The program is of a simple construction, using the BBC's PROCedures, and has just four main parts:

- The instructions are displayed using the procedure PROCinstructions.

- Setting up of the variables.

Two arrays are dimensioned on line 30. SE(x) is the sequence of notes to be played. The six notes are kept in S(x) and these are also calculated on line 30. @% on line 50 is used to control the printing field width. *FX9 (line 50) and *FX10 (line 30) are used to set the flash rate of the coloured panels.

- The display is set up using PROCscreen (line 70) which draws six coloured squares with their numbers. The squares are drawn using PROCbox (line

150). PROCscreen also sets the window using the VDU28 statement at line 130. Score and prompts appear in this window. Note: The VDU statement also turns off the cursor. Make sure you get the commas and semi-colons in the right places or weird things will happen.

- The last part is the actual playing of the game. This is called by PROCplay (line 190). The computer waits for you to hit the space bar and then it will generate a sequence of numbers, each being 1-6, in PROCsequence (line 240). After a small tune is called by PROCwhistle (line 490) you must enter your reply, examined by PROCcheck (line 310). You are then given a score (PROCscore, line 380) and the sequence is repeated.

```

10 REM Simon Game for BBC-B
20 REM BY J.P. Riggs FEB'83
30 DIM S(6), SE(20):FOR%1 TO 6: S(%)=255-42*S:NEXT %: *FX10,0
40 MODE7:PROCInstructions
50 @%=@:MODE2: PROCscreen: *FX9,0
60 CLS: PROCplay:MODE7:END
70 DEFPROCscreen: FORcol%1 TO6
80 X1=400*(INT((col%+1)/2))-350: X2=X1+350
90 Y1=400*(col% MOD 2): Y2=Y1+300
100 PROCbox(X1, X2, Y1, Y2, col%)
110 VDUSOUND(0, 7):NDX%1+70, Y1+170:PRINTcol%:VDUA: NEXT: VDUS
120 MOVE460, 390: GCOL0, 7: PRINT"SIMONN":VDUA
130 VDU28, 0, 6, 19, 0, 23, 110:0:0:0:0
140 COLUR135:COLUR0:CLS:ENDPROC
150 DEFPROCbox(A, B, C, D, COL)
160 GCOL0, COL:MOVEA, C:MOVEA, D
170 PLOTB5, B, D:MOVEB, C: PLOTB5, A, C: ENDPROC
180 DEFPROCwait(W):NDX=TIME:REPEAT:UNTILTIME>NDX+W:ENDPROC
190 DEFPROCplayscore@%:SKILL=1
200 REPEAT:PRINT"PRESS SPACE TO START"
210 REPEAT:UNTILGET=32:PROCsequence(SKILL)
220 PROCcheck(SKILL):PROCscore
230 UNTIL0:ENDPROC
240 DEFPROCsequence(SKILL)
250 FOR NUM=1 TO SKILL:BE(NUM)=RND(6):NEXT
260 FOR NUM=1 TO SKILL:PROCdo(SE(NUM), 2):PROCwait(50):NEXT
270 ENDPROC

```

```

280 DEFPROCdo(OO, E):IF SKILL <10 VDU19,00,00+0,0,0,0
290 FORB=1 TO E:SOUND1,-15,S(00),1:PROCwait(30):NEXT
300 VDU19,00,00,0,0,0:ENDPROC
310 DEFPROCcheck(SKILL):CLS:PROCwhistle
320 PRINT"Your turn at level "SKILL:RIGHT=@:FORX%1 TO SKILL
330 A=VAL(INKEY$(200)):IF A=SE(X%):RIGHT=RIGHT+1:*FX21,0
340 IF A=@ AND A<7 PROCdo(A,1)
350 IFA=@ VDU7
360 *FX21,0
370 NEXT:ENDPROC
380 DEFPROCscoreCLS:PRINT"you scored "INT(RIGHT(SKILL+100)): " "
390 SCORE=SCORE+RIGHT:IF RIGHT<SKILL SKILL=SKILL+1
400 PRINT"SCORE IS "SCORE:ENDPROC
410 DEFPROCinstructions:FOR%2 TO1
420 PRINTTAB(15, 2):CHR$(132)"INSTRUCTIONS"
430 PRINTTAB(10, 2):CHR$(132)"INSTRUCTIONS"
440 PRINTTAB(0, 4):"This is the classic game of SIMON. ""The object of the ga
me is to remember ""a sequence of computer generated notes.""
450 PRINT"to help you remember these notes the ""computer flashes coloured b
locks (1-6)"" which correspond to the notes. You ""must press the keys 1-6 w
ithin a perIOD"" of two seconds after hearing the ""starting tone.Like this-""
460 PROCwait(500):PROCwhistle
470 PRINTTAB(3, 23):CHR$(136)"PRESS SPACE TO BEGIN THE GAME"
480 REPEAT:UNTILGET=32:ENDPROC
490 DEFPROCwhistle:FORX=255 TO 255 STEP20
500 SOUND1,-15,ABS(X),1:SOUND2,-15,ABS(X)+1,1
510 SOUND3,-15,ABS(X)-1,1:NEXT:ENDPROC

```

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HCW 4

Testing, testing . . . 10 programs for the Spectrum

Our reviewer has played his way through the latest Spectrum software. Here are his considered opinions, complete with star ratings

Mancala Spectrum **£5.99**

Haven Hardware, 4 Asby Road, Asby, Workington, Cumbria.

Awari, Burnt Houses, Mancala — whatever you call it, it's the same game. Played against the computer, the object is to distribute and capture pebbles as you take it in turns to move

around a rectangular board. There are three skill levels in Haven's version, but in the highest the computer takes up to 30 seconds to think. Since in real life the skill of this game lies in being able to play it very quickly, I don't see this as an ideal game for a computer.

instructions	60%
playability	40%
graphics	30%
value for money	20%



Transylvanian Tower **48K Spectrum** **£6.50**

Richard Shepherd Software, 22 Green Leys, Maidenhead, Berks.

In the third of a series of theme adventures from Richard Shepherd, you are the intrepid adventurer trekking through the rooms and corridors of Transylvanian Tower.

The Tower has five floors, each floor consisting of a maze of 100 rooms. You start off in the dungeons at the very bottom of the tower, where you can practice navigating through the maze in safety, and call up a floor plan at any time to help you find your way out.

As you move up to the next level, though, your ordeal really begins. From now on, you risk being attacked by the evil vampire bats which flit around the rooms;

The bats have their uses, though. Each carries a floor plan, which you can use once

and once only if you manage to shoot down the bat. If you don't, you go without — from level 2 this is the only way to get hold of a plan.

If you manage to reach the final level, you battle directly with the Count. But I only just managed to reach the top level in the few hours I had to play the game, and then he killed me almost instantly.

The graphics and sound are nothing special, though there is imaginative use of colour, plus the odd beep and manic bat-squeak noises. New levels are very slow to materialise as you move up the tower, though this does at least provide a welcome break between levels.

Movement is controlled mainly by the cursor keys, and the laser gun is fired by the O key. Response time is, however, quite slow, and you have to hold down the keys for a second or two each time.

instructions	80%
playability	80%
graphics	70%
value for money	80%



Micro Chess Spectrum **£6.95**

Artic Computing, 396 James Reckitt Avenue, Hull, N Humberside.

Spectrum Micro Chess is Artic's other new chess game for the Spectrum and is, as far as I know, the only version available for the 16K machine.

Despite memory limitations it is well presented and easy to use, keeping to all the standard chess rules. Moves are entered by giving the row number and the column number; all illegal moves are simply ignored.

There is only one level of play, and response time is fast. But it plays a weak game — I once beat it in 36 seconds and seven moves.

Several nice features have

been included. There is a 'help' option, in which the computer makes your move for you, and a clock is displayed at the top of the screen. The graphics are well designed, though it is a bit of a strain on the eyes to play on a magenta and cyan board.

Thorough instructions are given on the cassette box inlay, and on loading you are given the option of watching a demonstration game. In this, you are asked for an opening move, and the computer then plays both sides — entertaining to watch. Micro Chess would make an excellent chess tutor; a shame that it is such a weak player.

instructions	65%
playability	75%
graphics	75%
value for money	75%



Invaders Spectrum **£4.95**

Artic Computing, 396 James Reckitt Avenue, Hull, N. Humberside

Everyone, unless they have spent most of their lives upside down with their head in a bucket, must now know the rules of Space Invaders, and Artic's version is no different. Successive waves of aliens travel across and down the screen in multicoloured ranks, firing missiles at your laser base (you have three) as they go.

Artic's game offers nine

levels of play and four different variations. The game is well presented, the graphics are fast and smooth, and the sound is reasonable — well, how many different noises can an alien make?

Control of your base is straightforward, the keys being well spaced, and playing couldn't be simpler. Instructions and scoring details are given on loading and before each new game.

instructions	50%
playability	70%
graphics	75%
value for money	65%



SPECTRUM SOFTWARE REVIEWS

Voice Chess 48k Spectrum £9.95

Artic Computing, 396 James Reckitt Avenue, Hull, N. Humberside

Voice Chess is based on Artic's successful ZX81 Chess II program, but with the added novelty of speech. Whenever a move is made, Voice Chess speaks its coordinates, if rather indistinctly, and moves the appropriate piece. It will also suggest a move if you ask for help.

There are six levels of play, but the blurb on the cassette inlay advises that the last two are really only suitable for correspondence chess — for which the voice is irrelevant. At level 0, the response time is fast but the computer plays a very weak game. Level 2 is probably the most satisfactory level to play at, with a response time of about 40 seconds.

After loading, and at any time during the game, the 'Analyse' option may be entered. Once in this mode you can move pieces around, swap sides or change the level of play as required. Using this facility occasionally seems to make the computer lose track of the game. At one point, after being

checked, I was able to change sides and capture its king — upon which the computer made a move and promptly crashed.

The speech takes a while to get used to, and amplification is essential. However after a while, as you recognise separate words, the 'voice' becomes more intelligible. To break the monotonous repetition of piece positions, the computer occasionally comes up with some wisecrack such as "I was expecting that" or what sounds like "Oh golly, not again!"

Playing chess with a well-designed board and finely-made pieces is an aesthetic as well as an intellectual experience, and computer chess should seek to make the screen display attractive as well as clear. Artic has achieved this to a certain extent. The pieces are well designed, being large and clear, and the screen display has been kept simple and uncluttered. But the screen colours can be tiring after a while.

A good, well documented chess program, but the speech is just a gimmick.

instructions	65%
playability	75%
graphics	70%
value for money	70%



Invasion Force Spectrum £4.95

Artic Computing, 396 James Reckitt Avenue, Hull, N. Humberside

A threatening alien flagship hovers above you, and the aim of the game is to destroy it. But to fire at it you must first blast holes in the force field. To hinder you, alien bomb ships flap across the screen above the force field, firing rapidly. The force field plays strange tricks, turning one of your missiles into three missiles falling towards you.

If these hazards can be avoided and the flag ship destroyed by hitting a central control point (which flashes blue and white) then your score is boosted, according to how

long it took you, and a warning of superior aliens is given. If your time runs out, or if you lose all of your three lives, then the game is over.

There are two levels of play, standard or suicidal — in the second level, the game rarely lasts more than a few seconds! The graphics are colourful and, to add a nice twist, when you have been hit a little Artic lorry trundles on to repair your base.

The instruction sequence is long and complex, although the game is largely self-explanatory. Invasion Force is simple but addictive, and makes a change from the usual 'Bang-Bang, kill the aliens' format.

instructions	70%
playability	85%
graphics	60%
value for money	70%



Auto-Sonics Spectrum £6.95

Buttercraft Software, 14 Western Avenue, Riddlesden, Keighley, Yorks.

Although Spectrum sound production may seem limited, you can actually use it to produce many interesting and complex effects, and Auto-Sonics is a package designed to help you do just that.

Written in Basic, the program presents you with a selection of 26 predefined effects which can then be bent and twisted to your requirements. Once a sound has been created, the program assembles and prints the line of Basic required to produce that particular effect.

For each of the 26 sounds, the sound specification can be called up on a data-screen showing tone, repeat, pitch values etc. These can be easily altered as necessary. At any time the sound can be played back and the Basic line printed.

This cleverly-written program is relatively easy to use. The screen is well laid out with 'slider' displays showing the components of the sound, and the documentation is extensive and clear. Users may, however, find that some sounds are difficult to obtain, due to the sluggishness of ZX Basic.

instructions	80%
ease of use	50%
screen display	60%
value for money	70%



Galaxians Spectrum £4.95

Artic Computing, 396 James Reckitt Avenue, Hull, N. Humberside

From the arcade game of the same name, Galaxians is very like Space Invaders and the rules are virtually identical. The main difference is in the screen display. There are no shields for your laser base to hide under, and the invaders do not attempt to reach the ground and land.

Occasionally groups of aliens break off from the left or right flanks, flip over and swoop down, firing missiles at you as they go. In Artic's version this is the only time at which the aliens fire, but as time goes on more and more break off and it becomes very difficult to dodge them — let alone hit them.

This is a well-written version and the graphics are fast, although they tend to flicker slightly. The little aliens flip and swoop gracefully. Ample instructions are given at the start, though the game is really self explanatory.

instructions	50%
playability	70%
graphics	80%
value for money	65%



Patience Spectrum £5.99

Haven Hardware, 4 Asby Road, Asby, Workington, Cumbria.

It has always puzzled me why people write computer simulations of games such as Patience, when they can be so easily played with an ordinary, ultra-low technology pack of cards.

In the computer version, I suppose, you don't have to shuffle the cards; and in the case of this game it's also impossible to cheat, since the computer's error checking is very thorough.

Haven Hardware's version takes one of the better-known patience games, in which the player must transfer all the cards of each suit to the appropriate piles in ascending order, aces at the bottom.

After shuffling, the cards are shown on the screen, set out in the time-honoured fashion of a right-angled triangle with a base seven cards long. Cards are then taken from the pack and placed on this triangle in descending order and alternating black and red.

instructions	60%
playability	50%
graphics	40%
value for money	20%



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We were renting a very small, very old house (since demolished) paying at that time 10/- weekly rent—this sum we had to literally 'scrape' together each week.

We did have (I say did have) an old 'banger' of a car, for which I had originally paid £140 on Hire Purchase.

One day along came the Hire Purchase Company Representative to repossess the car—as I then owed them two monthly rentals of £9 each (that was the amount of the monthly rental)—so that was the end of the car and the money paid on it—all lost.

I knew then that I had to do something about this terrible state of affairs—I **KNEW I COULD DO IT**. I had been 'working on' an idea that I had held **SECRET** for many, many years.

Remember—I **WAS BROKE**—in fact, somehow I managed to save the sum of TWO POUNDS (£2) assisted by my wife who had such great faith in me, however just this two pounds to commence—I have never looked back since and I have come a very, very long way, believe me.

I NOW HAVE THREE CARS.

I HAVE A LUXURY HOME and builders have recently completed an extension for me, quite costly of course, it is worth a SIX FIGURE SUM (£100,000) to me now, or if you prefer American Dollars, about \$189,000.

My wife, our daughter and myself live very, very comfortably—TO SAY THE LEAST, surely this you now realise.

To give you just two recent examples of my **weekly** payments into my bank account, **WORKING PART TIME ONLY REMEMBER—**

They were £3,649—THREE THOUSAND, SIX HUNDRED AND FORTY-NINE POUNDS, or if you prefer it in American Dollars, about \$6,896.

The second one for £1,836—ONE THOUSAND, EIGHT HUNDRED AND THIRTY-SIX POUNDS, again if you prefer it in American Dollars, about \$3,470.

Proofed this paper.

Remember, THESE ARE JUST TWO RECENT WEEKS AS EXAMPLES FOR YOU, working only PART TIME, now are you interested?

This advertisement has been written for YOU—YOU can decide which is best for you—to be broke or to HAVE MONEY—YOU DECIDE, you

have my MONEY REFUND INCLUDED of course. There are ONLY TWO KINDS OF PEOPLE IN THIS WORLD—Those who say it can't be done—**AND THOSE WHO DO IT**—like Myself and now, very shortly YOU.

The book I sell is NOT a book of ideas, whereby you have to 'sort out' and secure your own eventual business ideas—it is NOTHING LIKE THAT—it details ONE BUSINESS ONLY at which I've succeeded and at which you will now succeed—it trains you for this ONE BUSINESS ONLY, there is NOTHING ELSE.

I knew what I wanted, when I was down and out—at that time NO ONE WAS INTERESTED IN MY PROBLEMS, this is natural of course—do you know what you want? If it is the ROAD TO RICHES and you SINCERELY wish it, this is for you.

Protect your future and your self respect, whilst at the same time protecting your Family in the future—START MAKING SOME REAL MONEY FOR YOURSELF and STOP DREAMING about it. I've known absolute poverty, been right down, on the floor, it is not very nice—but I DID NOT INTEND TO REMAIN THERE—compare that position with what I have today—apart from my income—THREE CARS—LUXURY HOME—and, Oh Dear so much more than words can ever tell you. I made all the mistakes, discovered all the pitfalls along the way—and I paid for them—none of these will befall you, as you have MY BOOK to guide you and to train you.

Operate entirely from your own Home. No telephone is necessary. No car is necessary. No knocking on doors to sell. Operate solely by post. Every man and woman is a potential customer for you.

Within THREE WEEKS of my commencing on my own, in this business, I can tell you—I HAD PAID OFF ALMOST ALL OF MY DEBTS AND BOUGHT A CAR, yes within the first THREE WEEKS.

YOU can decide how big you wish to become, it was my intention never to get too large, so I simply 'cut down' and worked only part time, enjoying life to the full and the rest of the time doing whatever I WISHED TO DO, no matter what it was—Fantastic—yes, BUT TRUE.

I make my offer at this time, to enable me to secure more time to write my second book, it will take me at least 12-18 months, but when it is published it will prove to be a sensation, believe me.

It is my intention to pass on the SECRET OF MAKING MONEY TO YOU, I KNOW you are already very anxious to learn about it. Even if you are at present employed, you will commence part time, you will soon be presenting your notice to your present employer—TO WORK FOR YOURSELF—remember my own first three weeks

—I EVEN BOUGHT A CAR.

Why 'line the pockets' of your employer any longer, start 'lining your own' before you leave it too late. I am NOT making this offer to MAKE YOU RICH, in order to make myself rich, it is not necessary, you already know why. Working part time, my last financial year shows income well in excess of £70,000 with profits at over £11,000—yes JUST PART TIME, this can be multiplied many times if necessary. For those who wish it, in American Dollars again, this amounts to about \$132,300 and profits about \$20,790.

I mentioned already that "More than half of the people in the World are Asleep", this is what allows the rest of us (Me and You) to MAKE THE REAL MONEY—because you are about to become one of the AWAKE people—if you WISH TO GROW RICH.

The pessimists say—"It is not possible to succeed on your own any more"—what utter rubbish and absolute nonsense—these people belong to the category that are ASLEEP—believe me, it is easier now than ever it was, but only those who WANT TO MAKE MONEY do so, I KNOW.

I was talking to a Rolls-Royce Owner recently, who said, the roads are paved with gold—people just will not help themselves—it is TRUE you know, it is there for you to help yourself. Just taking, as a small example for you my most recent four years of part time working—on each of those years my income has increased each year over the preceding one—whilst others around me have closed down and gone into Bankruptcy. Just examine again some of the cash figures I have given you herein, this is only a part, I'm not disclosing everything to you of course, just sufficient to give you an idea of what YOU can now do in my line of business. I started with a capital of just TWO POUNDS.

This offer is made under my MONEY REFUND, it is your GOLDEN OPPORTUNITY OF A LIFETIME TO MAKE MONEY, it is YOUR SUCCESS that matters to me, hence this REFUND OFFER.

Are you prepared to send me just ten pounds (£10) to receive My Book with details of this new business for yourself, you can commence right away. The ROAD TO RICHES awaits you, despatched to you within 48 hours of your order reaching me. Money Refunded if you do not agree and you return to me within 7 days—can I be any fairer than this?

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Name

Address

..... HCW 2

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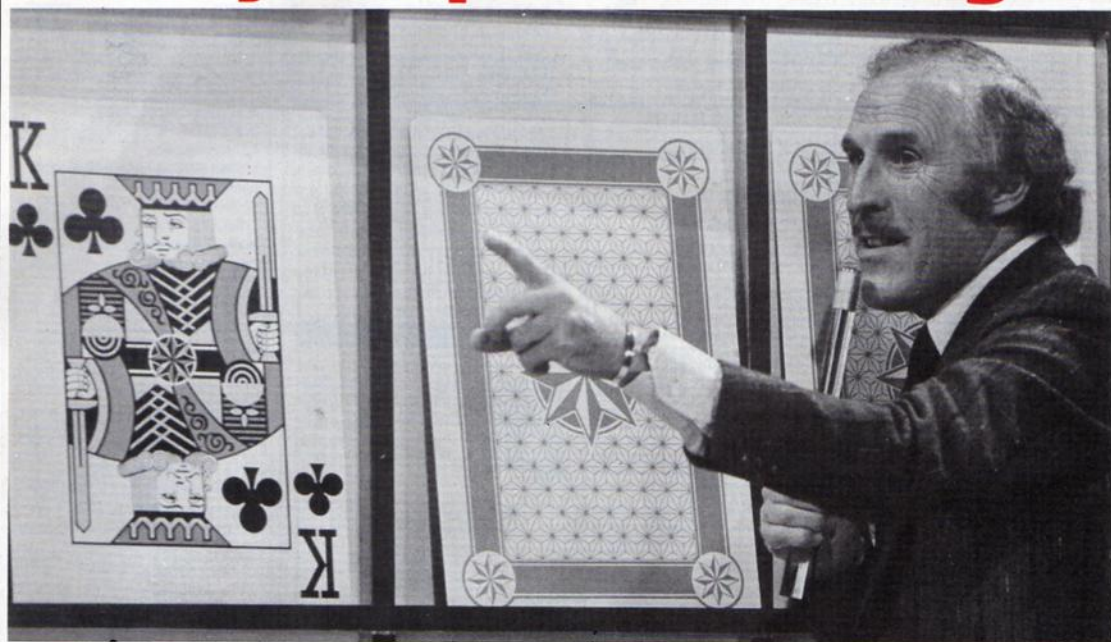
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I would like to add that I am very pleased you have introduced me to this profitable venture'. **J. B., Devon**

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2 You must ascertain, initially by guesswork but eventually by logic, what the code numbers are and in the correct order. You will be given clues as to the identity and position of the four numbers — a graphic space means a number is correct and in the correct position and a graphic shifted H means a number is correct but not in the correct position.

3 If you successfully break the code then the number of turns you have had is displayed on the screen

4 If you take more than 10 at-

tempts then the computer prints the message: YOU LOSE.

How it works

Line 2 sets up the constant S = 6, saving memory.

3-6 set up variables A, B, C, D, as random numbers from 1 to 6.

7 checks the A, B, C, D are all different. If not, they are re-set.

9 tells player he may begin.

10 and 160 form the FOR-NEXT loop N.

20-50 allow input of player's guess (variables AA, BB, CC, DD).

60 prints player's guess.

70 to 140 print coding from which player may eventually deduce the solution.

150 escapes from the loop if the correct solution is input.

170 prints YOU LOSE if the correct solution is not found in 10 tries.

175 halts program until Break is pressed.

180 prints number of guesses player had if the correct solution is found.

```

2 LET S=6
3 LET A=INT (RND*S)+1
4 LET B=INT (RND*S)+1
5 LET C=INT (RND*S)+1
6 LET D=INT (RND*S)+1
7 IF A=B OR A=C OR A=D OR B=D
OR B=D OR C=D THEN GOTO 4
9 PRINT "READY"
10 FOR N=1 TO 10
20 INPUT AA
30 INPUT BB
40 INPUT CC
50 INPUT DD
60 PRINT AT N,S:AA;" ";BB;" ";
CC;" ";DD;
70 IF AA=A THEN PRINT " "
80 IF BB=B THEN PRINT "H"
90 IF CC=C THEN PRINT "H"
100 IF DD=D THEN PRINT "H"
110 IF AA=B OR AA=C OR AA=D THE
N PRINT "+";
120 IF BB=A OR BB=C OR BB=D THE
N PRINT "+";
130 IF CC=A OR CC=B OR CC=D THE
N PRINT "+";
140 IF DD=A OR DD=B OR DD=C THE
N PRINT "+";
150 IF AA=A AND BB=B AND CC=C A
ND DD=D THEN GOTO 180
160 NEXT N
170 PRINT "YOU LOSE"
175 GOTO 175
180 PRINT AT 15,S:"NO OF TURNS="
;N

```


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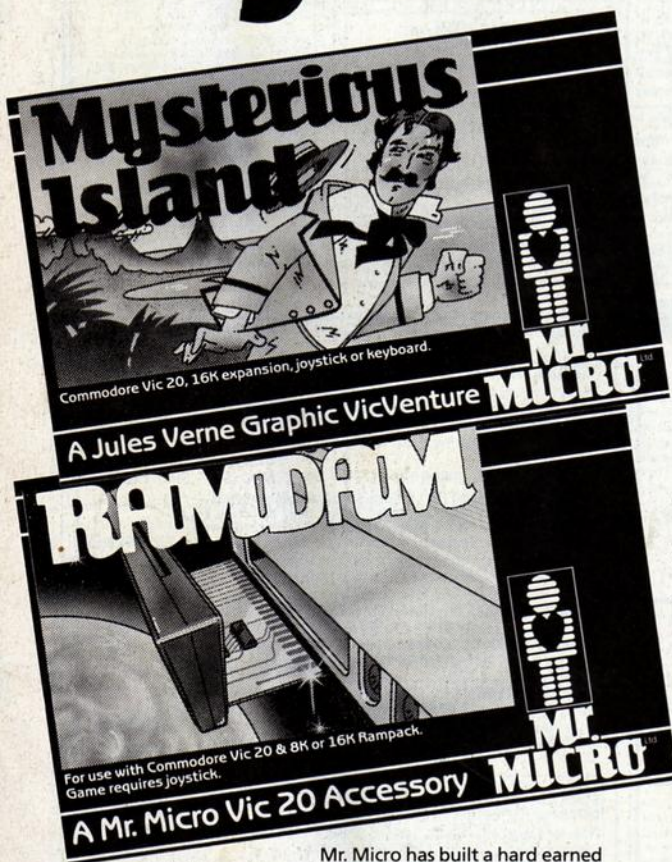
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