

Home Computing WEEKLY

NEW

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No. 3

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MAIL ORDER MICRODRIVES SHOCK

Mail order customers who bought Spectrums last year will have the first chance to buy Sinclair's Microdrives.

Making the surprise announcement, managing director Nigel Searle said: "Some of those people had to wait 16 or 18 weeks... I'd like to think that they will realise that we do value our existing customers."

Each Microdrive will cost £40 and would have a capacity of more than 100K and an access time of better than three seconds. Up to eight could be linked together.

As usual, he would not talk about the recording medium inside the Microdrives, but he did say they would be interchangeable and about the price of 5¼in floppy discs. These retail at about £2 each.

Price of the essential interface unit — which also enables Spectrums to use most popular printers — will be £30.

Mr Searle said: "I think at the time we originally announced the Microdrives last April we expected it to take something like six months to get into production and it will have taken almost twice that time — perhaps even longer.

"Last April the mechanical design was substantially complete, but we had underestimated the difficulties of doing the electronic design.

"We had some production difficulties with the Spectrum and a lot of effort... was put into those problems. It was August last year before it got the full-time attention of the people who are working on it.

"We have made improvements in the performance we expected it to have. It will be more reliable than we hoped to achieve. It's been one of those projects when the engineers would like to go on and on and making more improvements, but a line has to be drawn.

"Now it's a question of waiting for the semi-conductor manufacturers to supply.

"It's not possible at this

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Micro makers in reverse

A new computer is due to make its debut in three months — from a company which is reversing into micro making.

Add-on makers Basicare Micro Systems are to call their machine the Shuttle, because it accepts their modules just like the American spacecraft.

One of the joint managing directors, Peter Choi, is now in Hong Kong with the blueprints getting quotations for making the metallic grey casings.

Benny Leung, the other MD, said: "We had the idea

about a year ago. Instead of going into it like other firms we are doing it the opposite way — the peripherals first, for the ZX81 and the Spectrum.

"Then we introduce the keyboard and the CPU so the whole thing is complete, not the other way round."

The two men — who have been friends for 20 years — are thinking of £150-£200 for the model with a Spectrum-like keyboard and £250-£300 for typewriter-style keys.

The Shuttle would be about the size of a slim portable typewriter with a recess to accept

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Two-page Sinclair report

US Scene

Pages of news

Reviews of programs for BBC, VIC-20

Programs to type in for:

Spectrum, ZX81, VIC-20, PET

Articles on Oric, TI-99/4A

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IN BRIEF

Turn your Spectrum into a word processor, says a company which has brought out a Centronics-type interface module.

It plugs into the back of the computer and, via a ribbon cable, into dot matrix or daisy wheel printers.

The interface, called ZX LPRINT, costs £41.40, cable £12.08.

EuroElectronics, Zlin House, Oakfield Street, Cheltenham, Glos GL50 2UJ



Commodore plans to make 700,00 computers a year at its new £20m factory in Corby, Northants.

By the end of the year, says the company, 300 people will be employed there assembling VIC-20s and Commodore 64s for the UK with the surplus being exported.

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



David Patterson, head of software company Silversoft, has discovered a new hobby — gliding.

David, who said: "I've always wanted to fly", took the plunge a few weeks ago at a gliding club near his home in Wiltshire. He enjoyed it so much that he decided to go back the next weekend.

He said: "One day, I plan to arrive at an exhibition by glider".

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.

Home Computing WEEKLY

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Continued from Front Cover
stage to say when we will be in production, but it's a lot closer than it was."

The cartridges would initially only be available from Sinclair, but it would be possible for software houses to sell programs on them.

A first batch of letters with order forms would go out to 5,000 mail order Spectrum buyers, followed by the rest of the 100,000 and it would be a few months before the orders were filled.

"That will give us an idea how many other Spectrum owners want them," he said. "It's quite impossible with any new product of any complexity to start producing in volume overnight.

"Some of these people had to wait 16 or 18 weeks so I can't think what more we can do than offer them the first Microdrives.

"If we have it in our power to make the new customer happy rather than the person who first bought from us I know who I would choose.

"You will be able to buy them in Smiths as soon as the demand has been satisfied from our mail order customers.

"We are going to control the availability so that those people will get the opportunity to buy one in the same order as they bought the Spectrum from us.

"I think initially the Microdrive is going to make possible applications which are still inconvenient. Typically this will be spreadsheets and database management systems. It will encourage people to write programs of that sort."

And on Sinclair's past delays he said: "It makes me absolutely determined not to have that happen again. Therefore, we are not going to make any estimates or fix any dates."

Sinclair Research, 25 Willis Road, Cambridge CB1 2AQ

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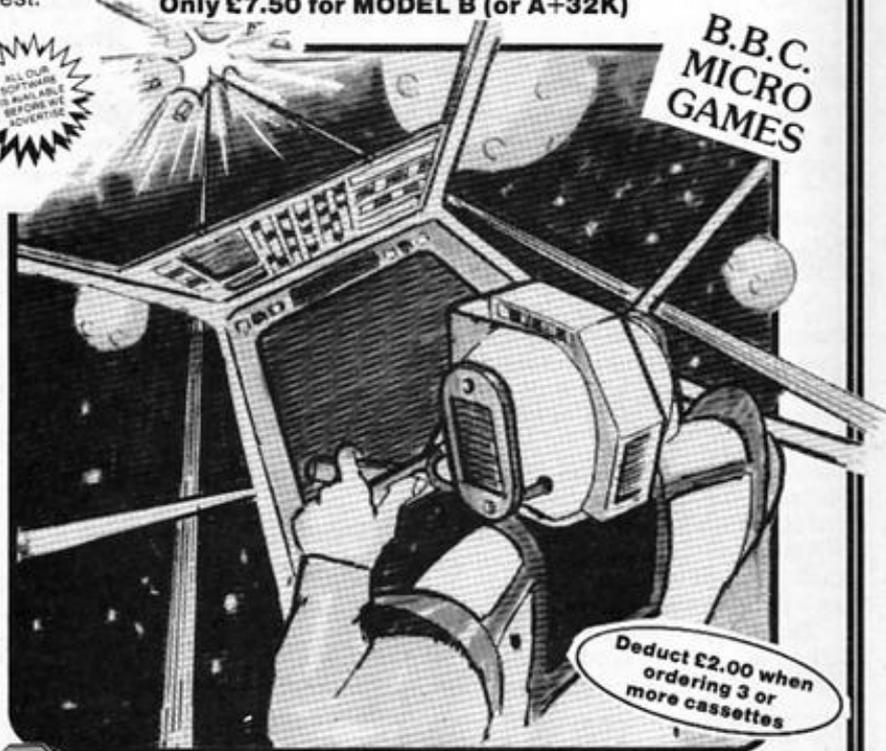
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Continued from Front Cover



Benny Leung

two Basicare modules side by side. Others can be stacked on top.

It would include a 16-bit processor, colour, 16K of RAM, a Microsoft-like BASIC, real sound, the interface from basicare's Persona module and a memory mapping device.

Although the cases would be made in Hong Kong, the computer would be assembled in the UK and a professional marketing company would be brought in.

Mr Leung, 35, whose Fulham-based company has six

staff, said: "We hope to show the prototype publicly in June with the first models on sale by the end of the year."

"We reckon that just to launch it will cost something like £50,000 and we are seeking backing from finance houses.

"Initially it will be our present customers who buy it. Then we hope it will be all the serious computer users. Most of them will be using the ZX81 at present. We want them to bypass the Spectrum."

Mr Choi, 34, has designed the new micro and it is Mr Leung who takes care of the day-to-day running of Basicare. Both came from Hong Kong 10 years ago and set up their company in February last year to produce add-on modules.

Mr Leung said: "How big do I think we'll get? Our ambition is quite high.

"We would like to be something like Sinclair Research. We think that this could be a new breakthrough in micro technology — a stackable system that can be tailor-made

Basicare Micro Systems, 5 Dryden Court, London SE11 4NH

You could be on our pages

We welcome programs and articles from our readers.

- Articles on using home computers should be no longer than 2,000 words. Don't worry too much about your writing ability — just try to keep to the style in HCW. Please include sample routines. We will convert any sketched illustrations into finished artwork. Articles most likely to be published will help our readers make better use of their micros by giving useful ideas and tips.
- Programs should, if possible, be computer printed (use a new ribbon) or sent on cassette. Check carefully that they are bug-free. Include details of what your program does and how, hints on conversion and explain the routines you've used.
- Reviewers of software, add-ons and hardware need to have a good knowledge of computers. In your application as a reviewer please give your occupation or training and, if under 21, your age. Don't forget to name your computer and any expansion.

Keep a copy of your submissions and include an SAE if you want them returned. Label everything clearly and give a daytime and home phone number if you can.

Paul Liptrout, Home Computing Weekly, 145 Charing Cross Road, London WC2H

Libraries take the profits — not the risks

Software libraries need to be controlled or they will kill off the market for programs on cassette. And that will hit not only software houses like ourselves, but the customer too.

We import a lot of our software from America — as well as writing our own — and convert it from the Tandy Colour Computer to run on the Dragon.

We pay 1.50 dollars royalty on a cassette which will retail at £7 and two dollars on a cartridge which is priced at about £20 because they are harder to produce and cartridges are more expensive.

Our commitment is to sell as many as we can or our suppliers would lose interest in supplying the UK. If cassettes are being ripped off no-one's going to invest the money.

Already all our own products are on cartridges because it is better protection. If someone is going to rip off a cartridge it is going to be a dealer because he must have blank cartridges and the equipment.

There is no doubt that libraries have taken multiple copies of a single tape and rented them out for about £1.50 a fortnight. But if they were licensed, how would you control the royalties at, say, 50p per hiring? The administration costs would be too high.

It could kill the cassette market. We may even have to drop the tapes entirely.

One difficulty at present is that many of the software libraries are one-man businesses. They would have to be large and responsible enough to be vetted to make it possible for us to supply software. We would have to guarantee to ourselves that what they told us was the number that they had hired.

You would have to put up the cost of the hiring to £2-£3 to take into account that some people will copy them. It would mean that the vast majority of people would be penalised.

The average life of a game at present is around three months. After that it will have been ripped off to the extent that it's not worthwhile any longer.

One chap came back with a tape he had bought from us and said it would not fit his cassette recorder and he wanted a refund. In my opinion he had taken a copy.

The software libraries take no risks with new products, they are just jumping on the bandwagon. It is very difficult to close them down. With video film copiers their equipment can be seized. Software libraries need very little equipment.

I am very worried about the whole business.

Ted Oprychal
Managing director, Compusense Ltd.

• What makes you angry — or delighted — about the micro market, hardware or software? We welcome contributions for this weekly column. Send them to Opinion, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE. Please include your occupation and your interest in computing.

Fair on the move

The London Computer Fair, run annually by the Association of London Computer Clubs, is moving to the Central Hall, Westminster, due to lack of space at its usual home at North London Polytechnic.

The fourth fair, running

from April 14 to 16, includes stands run by 10 London clubs, the first public presentation of Micronet — the home micro network — and new products from several exhibitors.

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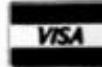
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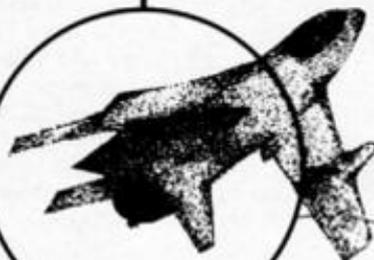
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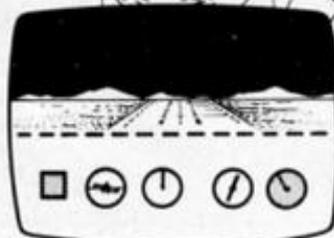
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Spectrum power supplies: how we discovered the danger

What exactly went wrong with 28,000 Spectrum power supplies — setting off a massive recall — was revealed by Sinclair managing director Nigel Searle.

He said: "There is a printed circuit board inside the power supply and the tracks which carry the mains voltage are closer than they should be to those which carry the output to the outgoing tracks.

"It could leap over, if you get humidity or dust inside and a huge spike in the mains — four kilovolts. But you must be holding the metal tip that goes into the computer."

In this country spikes in the mains of that magnitude were very rare.

He said: "We have had two reports from people reporting what they claimed to be an electric shock from our power supplies.

"We have asked them to return them immediately and we will examine them. It's entirely possible that they involved static electricity.

"They both involved children and it could be it was mis-described to their parents. We have had no reports of anybody being badly injured.

"Since we caught this within a matter of three to four weeks of when we sent them out I believe there are probably not too many in the hands of customers."

Mr Searle, 36, who has a PhD in maths, said the problem was spotted by an inquisitive service engineer — not a Sinclair employee — who had opened up a power supply.

A sample was flown to the British Standards Institution, which tests electrical products with a 4kv overload. The power supply was safe with an overload of up to 2kv.

Mr Searle said the batch of power supplies had been bought from a sub-contractor — which Sinclair will not name — by Timex, which makes most UK Spectrums in Dundee.

He said: "Timex had bought from them before. They assumed it would be designed to the same design rules and they only checked it out that it performed the same and it does.

Sinclair Research has opened its £3/4m new HQ. Paul Liptrot went there and talked to the bosses

"I'm afraid I can't say whose fault it was that when samples came in they were checked for functional working and not for safety.

"Obviously, in future we will not rely on that sort of thing."

He said the problem could affect the number of Spectrums available because power supplies for them were being diverted for replacements.

He explained that it was difficult to find makers of power supplies, but now a further manufacturer had been found and was bringing its plans forward to meet demand.

Sinclair spokesman Bill Nichols said power supplies arriving at a specially-opened small warehouse in Cottenham, Cambridgeshire, were being replaced within 48 hours.

When the problem was discovered, about 14,000 were still in stock at retailers or in warehouses.

Potentially dangerous power supplies have a black lead with a thin white stripe and a smooth-surfaced — not textured — finger-grip on the jack plug. It only affects power supplies with Spectrums bought between January 1 and four weeks ago.

The address for recalled power supplies only is: Sinclair Research Ltd, Unit F, Broad Lane, Cottenham, Cambs, CB4 4SW.

No fears about micro rivals

Three types of computer makers are out to tempt buyers in the UK, according to Sinclair's Nigel Searle.

First, there were the home-grown products — like the Oric-1 and the soon-to-be-launched Electron, a "cut down" BBC micro from Acorn. "But we are

quite confident we can deal with them," said Mr Searle.

Then there were the "me-too" products made in Hong Kong and sold here very inexpensively.

Mr Searle said: "If we were to remain at the low end we could conceivably worry about it. If the ZX81 were our only product it could concern us. As long as we're innovative I'm not too worried about it."

And the third challenge? He said: "We would be foolish to dismiss Japanese competition. They can make consumer electronics which are extremely attractive to the consumers and I think it's going to be a very tough competitor in that battle.

"You haven't got to wipe them off the face of the earth, but you have got to be comparable and I'm quite confident we can do that.

"I don't think they compete on price. They have a number of technologies which are not available from other sources. It may well be that a new standard in mini-floppies will be set by them.

"They know how to build a product at a low price and build up volume very quickly. I think everyone in the world has got something to learn from them.



Sinclair's £3/4m new headquarters

SINCLAIR SPECIAL REPORT

We can take our place in the market alongside them.

"The Japanese never make inroads early on. It's not a matter of life or death that they have a product in the market this year or next year. There is an advantage in waiting until the market settles down."

He talked of price-cutting in America and said: "Let Texas Instruments beat their brains out and everyone else's out. We could not afford to sell a machine (the TI-99/4A) for £100 and make enough profit to re-invest."



Managing director Nigel Searle

Cashing in for electric car

Sinclair Research, valued at £124m, will have 50 per cent more staff by this time next year, said new financial director Bill Matthews.

At present there is 55 staff — 33 at the new £¼m Cambridge headquarters, seven in London and the rest in St Ives, working on a flat-screen TV project, and in Winchester, developing "communications based solid state products."

Managing director Nigel Searle said a condition of chairman Clive Sinclair selling five per cent of his Sinclair shares to City institutions was that computer-related products would remain in the company.

Mr Searle said: "He could not, for example, make up an electronic burglar alarm and set up a separate company."

Mr Sinclair's plan is to use the money he raised to finance an electric vehicle project, unconnected with Sinclair Research.

And Mr Searle revealed: "Clive's life is insured for a substantial amount of money."

Mr Matthews said: "The company was not one penny better off as a result of the sale of those shares."

"Although we have a substantial amount of cash compared with other companies we sometimes look at our cash and wonder if we have got enough to do what we want to do. We might have to look at other sources of cash."

He said the company was on target for its predicted £14m profit at its year-end this week.

Tiny TV on your table soon

Sinclair's tiny TV, with a two-inch screen, will be on sale in June or July — "but that's not a hard and fast date."

Cautious spokesman Bill Nichols said: "We want to make sure we have the production in quantity."

"The most interesting thing will be when we blow it up to nine inches and integrate it with a computer."

Made by Timex in Dundee, the TV set will sell at about £50 and measure six inches by four inches by one inch.

Mr Nichols said: "It would be an ideal product for breakfast TV. Instead of walking into the lounge with your cornflakes you could watch it on the kitchen table."

The new Sinclair computer was on the stocks for the second quarter of next year.

He said: "It is something which integrates the flat screen, twin Microdrives and Spectrum technology."

"It's going to be for the more sophisticated user as well. It is very unlikely we would launch anything this year apart from peripherals."

"The strategy is to work our way up-market gradually. We want to take the user with us."

Commenting on an America magazine report about the new computer, he said: "Where they got that £300 figure from I don't know. There just isn't a price on it."

Double boon for upgrade buyers

Owners of 16K Spectrums are being offered two bonuses if they buy 32K upgrades from Sinclair Research.

All purchasers of the £60 upgrade will get:

- A free Sinclair 48K cassette program of their choice, and
- the chance to buy a ZX Printer at £39.95, instead of the normal price of £59.95.

A spokesman said: "To ensure fair treatment, Sinclair is making the upgrade available in sequence of purchase and mailing its customers in batches."

"No orders can be taken at this stage from more recent buyers."



Financial director Bill Matthews

Psion sales top a million

Sinclair Research says it has reached a landmark with the sale of the one-millionth Psion cassette for the ZX81 and Spectrum.

Best seller by far had been Flight Simulation, for both computers, closely followed by applications software like Vu-File and Vu-Calc.

Micro control for new HQ

The new home of Sinclair Research could have been an old church — but in the end they settled on a former Victorian mineral water bottling plant.

At the opening of the £¼m headquarters, architect Christophe Grillet said: "I looked at two old churches with Clive, but it wasn't practicable."

The project took just nine-and-a-half months, starting with a phone call from Mr Sinclair from New York.

Mr Grillet said: "It's probably the most pleasant job I've had in a long time because I only had to deal with Clive Sinclair — no directors, no committees. I went to everyone who worked there at the time and asked them what they did."

The main L-shaped building in Willis Road, Cambridge, has been restored and houses offices and research labs. The former outhouses have been remodelled as general offices and clad in stainless steel.

The yard between the two has been enclosed as a reception area, featuring a bronze sculpture called Double Torso II, by Helaine Blumenfeld.

A heat exchanger extracts heat from the original well, plus a second bore hole, taking out water at 12 degrees and returning it at 10 degrees. More energy comes from solar panels on the roof.

Top Ten programs for the Spectrum

- | | | |
|----|-------------------|-----------------------------------|
| 1 | The Hobbit | Sinclair (Melbourne House) |
| 2 | Flight Simulation | Sinclair (Psion) |
| 3 | VU-3D | Psion (Psion) |
| 4 | Time Gate | Quicksilver (Quicksilver) |
| 5 | Penetrator | Melbourne House (Melbourne House) |
| 6 | Hungry Horace | Sinclair (Psion/Melbourne House) |
| 7 | Chess | Psion (Psion) |
| 8 | Avenger | Abacus (Abacus) |
| 9 | 3D Tanx | D K Tronics (D K Tronics) |
| 10 | Planetoids | Psion (Psion) |

Compiled by W.H. Smith. Originating company given in brackets.

They said he was too young



Nigel Stuart

Micro whizz-kid Nigel Stuart was told he was too young to take a computer science 0-level — although he has a best-selling computer game on the market.

Luckily Nigel, 16 in May, has been accepted in evening classes for a two-year course in computer technology.

Now Nigel, of Timperley, Manchester, says: "I'd like to start my own software company eventually."

He has computer science teacher Edwin Molineaux, of Wellington Boys School, Timperley, for interesting him in the basics of computing.

The first time Nigel used a computer was when he sat down in front of the school's Commodore PET two-and-a-half years ago. Then he bought a

ZX81 and later replaced it with a Spectrum.

Nigel came across Macronics Systems, which is selling his game, at a computer show at the University of Manchester Institute of Science and Technology.

Managing director Ken Macdonald looked at the cassette and decided to put it on the market. There are two games, Devil Birds and Digger Man for the 48K Spectrum, on the same tape for £4.95. Two more at the same price, ET/Seekey, have since been released. These are also available in a 16K version at £3.95.

Another program by Nigel is due out in a month. His newer programs will have at least 20 per cent machine code. Nigel said: "I don't find BASIC difficult, I don't really have to think about it. And machine code is not as difficult as I thought it would be."

Nigel's father, Glenn, is a telephone engineer. Nigel said: "I've tried to explain it to him, but I just lose him."

Mr Macdonald said: "I've got a couple of programs. Would you like to look at them?" He's got a natural flair for programming."

Macronics Systems, 26 Spiers Close, Knowle, Solihull, West Midlands

Together we can help

A group of companies was meeting today to thrash out the details of an association to protect them — and their customers.

The Computer Trades Association aims to boost public confidence in home computing by setting up a professional body with which consumers can lodge complaints about bad service and sub-standard goods.

And by bringing the different aspects of the microcomputing trade together in one association, it hopes to be able to tackle problems like software piracy more effectively.

Hardware and software producers, distributors and retailers, and computer consultants, will all be represented by the association. Later on the computer press may be included too.

The association held its first meeting on March 5. At that time, temporary officials were elected and "had a speculative chat about what we were going to do and how we'd go about it", said a leading member.

Nigel Backhurst was elected acting general secretary, and Tony Shell, of Knot Computing, is acting chairman.

Three working groups, set up at the first meeting to look at different problems facing the industry, are to report back on their preliminary findings today.

The association has asked Chancellor Geoffrey Howe to adjust tariff barriers so that UK manufacturers are in the same position as foreign companies.

At present the import levy on computer components is roughly twice the levy on imported computers

Computer Trades Association, 108 Margaret Street, Coalville, Leics LE6 2LX

Your micro remembers to tell you

You can run your family with your ZX81 plus a new program called Home Clock Family Bulletins. It works like an alarm clock, but also reminds you what you should be doing when the alarm goes off.

It costs a reasonable 20 dollars and consists of two interleaved programs. The first is a clock/calendar which displays a digital clock — showing date, hour and minute — on the top half of the screen.

You can then set an alarm and when that time arrives the program displays the word ALARM at the bottom of the screen.

The other program functions as a bulletin board that can accept up to 10 32-character messages which can be edited or erased. Each appears, one at a time, for 12 seconds each in the centre of the screen.

A special message can also be entered to appear only when the ALARM time comes round.

Even though you cannot use your computer for anything else while the program is running, it does free the TV. It turns out that many users, especially those with smaller home micros, don't realise that they can disconnect their TVs while a program is still running, without detrimental effect to the set or the program.

Error handling is excellent, the manual comprehensive and the company will replace the program free of charge if it gives problems within 30 days. King software is at 85 Myrtle Street, Lowell, Massachusetts 08150. It was written for the US version of the SX81, called the Timex/Sinclair 1000, but will run on the UK model.

TV commercials show the fight for business with widespread price cuts. Texas Instruments has just lowered the price of its TI-99/4A home computer by 48 dollars which means, with the present 100 dollar rebate until mid-April, it can cost under 150 dollars.

The official list price is 450 dollars, even though TI officials consider that ridiculous in view of the fact that the average was closer to 300 dollars even before the 100-dollar rebate.

The latest reduction is a bid to make the machine more competitive — profit margins are a bit higher on some other machines. It's likely that the customer will only get a 30-dollar reduction with the rest improving the dealers' profits. Commodore and Atari are also in the price-cutting game.

I will be watching with interest next month's launch here of the computer you know as the ZX Spectrum. It is being marketed by Timex as the Timex/Sinclair 2000 and is slightly modified from the Spectrum. It is the first colour computer to offer at least 48K of RAM and cost less than 200 dollars.

It is the second Sinclair computer to be offered by Timex. The first, the TS 1000 (ZX81 to you) is said to have sold a million. For the new launch, Timex is planning to offer 40 home management and business applications as well as some educational and games programs.

Timex is predicting that a huge cottage industry will spring up due to the machine. I will also push the micro in educational areas, as well as introducing a line of home health care products to be used with the computer to monitor blood pressure, weight, temperature and the like.

See you next week...

Bud Izen
Fairfield, California



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HCW3

How does your VIC sound?



Most VIC owners who write their own arcade type games in Basic will know how slow and limited Basic is when programming sound effects.

The programs here offer a way of producing a very wide range of sound effects at great speed.

Probably the most common type of sound generating routine is of this form:

```
10 POKE 36878, VOL
20 FOR FR = SF TO FF
STEP DF
30 POKE SR, FR
40 FOR I = 1 to DE:
NEXT I
50 NEXT FR
60 POKE 36878,0
```

The routine plays a sequence of notes on voice SR, starting at frequency SF and finishing at FF with an increment or decrement of DF. This routine is both slow and consequently inflexible.

The machine code routines given are essentially the same as the above routine but with an added 'off period delay'. This enables the user to specify the time that the note is on and the time that the note is off.

The ratio of these two periods is generally called the 'mark-space', ratio. This ratio has a significant effect on the tonal quality of the sound and its volume.

Listing 1 gives a basic loader for the routines. They can be located at any area of free RAM starting at address SA.

The first routine at address (SA + 12) gives a falling sequence of notes and the routine at (SA + 86) a rising sequence. Both routines use a set of memory locations in the cassette buffer for

Looking for faster sound effects for arcade games? Allen Webb offers some speedy advice

parameters. These locations are:

840: Delay fine adjustment
841: Off period delay
842: On period delay
844: Frequency increment or decrement
845: Finish frequency
846: Start frequency

Once stored, these values remain unchanged so that the tone needs only a sys call to play it.

The on or off delays are controlled by locations 840,841 and 842. 841 and 842 are coarse adjustments and 840 the fine adjustment.

The actual delay times are approximately: Time = Coarse setting × (5 × fine setting + 6) + 1 micro seconds.

If the fine setting is 199 then the coarse setting will specify the delay in milli-seconds. The maximum delay possible is roughly a third of a second.

The start and finish frequency and the increment should be specified so that the increment is a whole fraction of the frequency range, such as:

Start 150, finish 100, increment 10 or Start 97, finish 130, increment 3.

Listing 1 — sound demonstration routine

```
10 DATA 166,0,172,72,3,136,208,253,202,208,247
20 DATA 96,72,152,72,138,72,169,15,141,14
30 DATA 144,173,78,3,141,75,3,174,75,3
40 DATA 173,75,3,56,237,76,3,205,77,3
50 DATA 240,32,141,75,3,142,12,144,173,74
60 DATA 3,133,0,32,176,4,173,73,3,240
70 DATA 222,133,0,169,0,141,12,144,32,176
80 DATA 4,76,204,4,169,0,141,14,144,104
90 DATA 170,104,169,104,96,72,152,72,138,72
100 DATA 169,15,141,14,144,173,78,3,141,75
110 DATA 3,174,75,3,173,75,3,24,109,76
120 DATA 3,205,77,3,240,32,141,75,3,142
130 DATA 12,144,173,74,3,133,0,32,176,4
140 DATA 173,73,3,240,222,133,0,169,0,141
150 DATA 12,144,32,176,4,76,22,5,169,0
160 DATA 141,14,144,104,170,104,168,104,96
170 INPUT "START ADDRESS";SA
180 FOR L=0 TO 159
190 READ X:POKESA+L,X:NEXT
200 S1=INT(SA/256):S2=SA-S1*256
210 POKESA+55,S2:POKESA+70,S2:POKESA+129,S2:POKESA+144,S2
220 POKESA+56,S1:POKESA+71,S1:POKESA+130,S1:POKESA+145,S1
230 JA=SA+28:J1=INT(JA/256):J2=JA-J1*256
240 POKESA+73,J2:POKESA+74,J1
250 JA=SA+102:J1=INT(JA/256):J2=JA-J1*256
260 POKESA+147,J2:POKESA+148,J1
270 REM 840.....DELAY FINE TWEAK
280 REM 841.....OFF PERIOD
290 REM 842.....ON PERIOD
300 REM 844.....INCREMENT
310 REM 845.....END FREQ
320 REM 846.....START FREQ
330 REM SYS(SA+12)...FALLING SEQUENCE
340 REM SYS(SA+86)...RISING SEQUENCE
350 REM
360 REM*****
370 REM* SHORT DEMONSTRATION ROUTINE *
380 REM*****
```

VIC PROGRAMMING

If this is not true — e.g. start 100, finish 110, increment 4 — the sound effect will not be as expected.

The basic loader has a short demonstration portion in lines 270-360. This should clarify the use of the routines.

Conversion hints

Since the routines are in machine code they should, in theory, be usable in any machine with a 6502 chip. They do, however, use the specific sound registers in the VIC and these would require alteration for other machines. A source code listing is included for interested readers.

```

390 SA=1024:POKE840,100:POKE841,255:POKE842,255:POKE846,225:POKE845,230:POKE844
1
400 PRINT"MARK SPACE RATIO = 1 RISING SEQUENCE WITH REDUCING ON PERIOD"
410 FORX=1TO25
420 POKE842,PEEK(842)-10
430 POKE841,PEEK(841)-10
440 SYSSA+86:SYSSA+86:NEXT
450 FORX=1TO99:POKE840,PEEK(840)-1:SYSSA+86:NEXT
460 POKE840,100:POKE841,0:POKE842,255:POKE846,225:POKE845,230:POKE844,1
470 PRINT"NO OFF PERIOD RISING SEQUENCE WITH REDUCING ON PERIOD"
480 FORX=1TO25
490 POKE842,PEEK(842)-10
500 SYSSA+86:SYSSA+86:NEXT
510 FORX=1TO99:POKE840,PEEK(840)-1:SYSSA+86:NEXT
520 PRINT"NO OFF PERIOD FALLING SEQUENCE WITH 5 MILLISEC ON PERIOD"
530 POKE840,100:POKE842,10:POKE841,0:POKE846,230:POKE845,200:POKE844,1
540 FORL=1TO30:SYSSA+12:NEXT
550 PRINT"NO OFF PERIOD 845 AND 846 SET FOR A FALLING SEQUENCE BUT
PLAYED ";
560 PRINT"AS RISING SEQUENCE"
570 POKE840,100:POKE842,1:POKE841,0:POKE846,230:POKE845,200:POKE844,1
580 FORL=1TO30:SYSSA+86:NEXT
590 PRINT"INCREASING MARK-SPACE,FALLING SEQUENCE WITH 5 MILLISEC ON PERIOD"
600 POKE840,100:POKE842,10:POKE841,0:POKE846,230:POKE845,200:POKE844,1
610 FORL=1TO100:POKE841,L*.1:SYSSA+12:NEXT
    
```

Listing 2 — source code

MUS.S.....PAGE 0001

```

LINE# LOC CODE LINE
0001 0000 ;VIC SOUND EFFECTS
0002 0000 ;
0003 0000 ; A E WEBB 1982
0004 0000 ;
0005 0000 **$1200
0006 1200 VOL=$900E
0007 1200 TONE=$900C
0008 1200 FINE=$0348
0009 1200 OFFDEL=$0349
0010 1200 ONDEL=$034A
0011 1200 SPARE=$034B
0012 1200 DELTF=$034C
0013 1200 FEND=$034D
0014 1200 FSTART=$034E
0015 1200 COARSE=$00
0016 1200 ;
0017 1200 A6 00 DELAY LDX COARSE
0018 1202 AC 48 03 L1 LDY FINE
0019 1205 88 L2 DEY
0020 1206 D0 FD BNE L2
0021 1208 CA DEX
0022 1209 D0 F7 BNE L1
0023 120B 60 RTS
0024 120C 48 DOWN PHA
0025 120D 98 TYR
0026 120E 48 PHA
0027 120F 8A TXR
0028 1210 48 PHA
0029 1211 A9 0F LDA #15
0030 1213 8D 0E 90 STA VOL
0031 1216 AD 4E 03 LDA FSTART
0032 1219 8D 4B 03 STA SPARE
0033 121C AE 4B 03 L3 LDX SPARE
0034 121F AD 4B 03 LDA SPARE
0035 1222 38 SEC
0036 1223 ED 4C 03 SBC DELTF
0037 1226 CD 4D 03 CMP FEND
0038 1229 F0 20 BEQ OUT1
0039 122B 8D 4B 03 STA SPARE
0040 122E 8E 0C 90 STX TONE
0041 1231 AD 4A 03 LDA ONDEL
0042 1234 85 00 STA COARSE
0043 1236 20 00 12 JSR DELAY
0044 1239 AD 49 03 LDA OFFDEL
0045 123C F0 DE BEQ L3
    
```

```

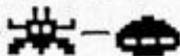
0046 123E 85 00 STA COARSE
0047 1240 A9 00 LDA #0
0048 1242 8D 0C 90 STA TONE
0049 1245 20 00 12 JSR DELAY
0050 1248 4C 1C 12 JMP L3
0051 124B A9 00 OUT1 LDA #0
0052 124D 8D 0E 90 STA VOL
0053 1250 68 PLA
0054 1251 AA TAX
0055 1252 68 PLA
0056 1253 AA TAY
0057 1254 68 PLA
0058 1255 60 RTS
0059 1256 48 UP PHA
0060 1257 98 TYR
0061 1258 48 PHA
0062 1259 8A TXR
0063 125A 48 PHA
0064 125B A9 0F LDA #15
0065 125D 8D 0E 90 STA VOL
0066 1260 AD 4E 03 LDA FSTART
0067 1263 8D 4B 03 STA SPARE
0068 1266 AE 4B 03 L4 LDX SPARE
0069 1269 AD 4B 03 LDA SPARE
0070 126C 18 CLC
0071 126D 6D 4C 03 ADC DELTF
0072 1270 CD 4D 03 CMP FEND
0073 1273 F0 21 BEQ OUT2
0074 1275 8D 4B 03 STA SPARE
0075 1278 8E 0C 90 STX TONE
0076 127B AD 4A 03 LDA ONDEL
0077 127E 85 00 STA COARSE
0078 1280 20 00 12 JSR DELAY
0079 1283 AD 49 03 LDA OFFDEL
0080 1286 F0 DE BEQ L4
0081 1288 8D 00 12 STA DELAY
0082 128B A9 00 LDA #0
0083 128D 8D 0C 90 STA TONE
0084 1290 20 00 12 JSR DELAY
0085 1293 4C 66 12 JMP L4
0086 1296 A9 00 OUT2 LDA #0
0087 1298 8D 0E 90 STA VOL
0088 129B 68 PLA
0089 129C AA TAX
0090 129D 68 PLA
0091 129E A8 TAY
0092 129F 68 PLA
0093 12A0 60 RTS
0094 12A1 .END
    
```

Listing 3 — symbol table

SYMBOL		VALUE	
COARSE	0000	DELAY	1200
FEND	034D	FINE	0348
L2	1205	L3	121C
ONDEL	034A	OUT1	124B
TONE	900C	UP	1256
		DELTF	034C
		FSTART	034E
		L4	1266
		OFFDEL	0349
		OUT2	1296
		SPARE	034B
		VOL	900E

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- INVADERS (32K) £6.50 Cassette/£9.90 Disc**
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More hidden features of the Atari exposed by Marc Freebury. This week: extra graphics modes and how to use them

Atari computers are without doubt versatile. Their graphics and sound are the envy of many — but how do you use them?

In documentation, the Atari fails itself. From the manuals, you might perhaps learn that the Atari has three major support chips, taking a lot of the work from the CPU.

One is called POKEY, and handles the sound generation, the paddles, joysticks and general input/output. ANTIC is dedicated to the TV display, and feeds information to the third chip, CTIA.

CTIA sends the signal that reaches your TV. What the manuals do not say is that British Ataris don't have CTIA, but an upgrade called GTIA. The replacement chip allows three extra graphics modes that are modes 9, 10 and 11 in Basic.

The three modes have a strange format — 80 horizontal pixels by 192 vertical. The differences between the modes are listed below:

mode	colours	luminances	resolution
9	1	16	80x192
10	9	16	80x192
11	16	1	80x192

To make sure your Atari is equipped with GTIA, try this program in Basic:

```
10 GRAPHICS 9
20 GOTO 20
```

If the screen goes black and stays black, you have GTIA. So, now you have it, what can you do with it? Try this simple program:

```
10 FOR I=1 TO 15
20 COLOR I
30 PLOT I *3,0: DRAWTO
I *3, 191
40 NEXT I
50 GOTO 50
```

Don't forget — the first line should be something like 5 GRAPHICS 11. This works well for graphics mode 11 and

displays the default colours, the normal Atari colours. The information for each colour is usually stored in a Colour Register. These registers exist at memory locations 704 to 712 and hold the information on each colour in the form

```
16 *Luminance + Colour
```

Each mode dedicates one register to the background in some way. The registers available and the ones chosen for background vary from mode to mode. In graphics mode 9, Colour Register 4 is the background register. So the command

```
SETCOLOR 4,0,0
```

and

```
Poke 712,0 (Luminance 0,
Colour 0 — 0 *16 + 0 = 0)
```

are the same. Wait a minute, though. Didn't I just say the colour registers began at location 704? Surely register 707 is the one

we want? No, and this is why I've brought in the idea of colour registers.

Registers 704 to 707 cannot be reached by the SETCOLOR command. So, when you use mode 10, with 9 colours, you have to be prepared to do a bit of work with Poke. Try this:

```
10 GRAPHICS 10
20 FOR I=0 TO 8
30 POKE 704+I, I *16+5
40 COLOR I
50 PLOT I *9, 191:
DRAWTO 40,0
60 NEXT I
70 GOTO 70
```

As you can see, this screen format does not give a particularly good vertical resolution. If you change a register, everything drawn with that register is also

changed on-screen. This allows some very interesting possibilities.

What if we cycle the colours through the registers with a simple loop? Modify the above program as follows:

```
70 A = PEEK(704)
80 FOR I=705 TO 712
90 POKE I-1, PEEK(I)
100 NEXT I
```

```
110 POKE 712,A
120 GOTO 70
```

The screen now gives a sort of spinning top effect. This could be developed further to give some quick and easy screen animation. Finally, here is a table of the graphics modes and the registers they use.

mode	register	notes
0	710	background (always COLOR 0)
	712	border
	709	text luminance
1 & 2	708	normal text colour
	709	lower case colour
	710	reverse field colour
	712	border & background
3, 5 & 7	708	COLOR 1
	709	COLOR 2
	710	COLOR 3
	712	border & background
4 & 6	708	COLOR 1
	712	border & background
8	709	luminance of Colour 1 (colour taken from background)
	710	background
	712	border
9	712	colour for background & border. COLOR varies luminance of colour plotted (same as background)
10	704	background & border
	705	COLOR 1
	706	COLOR 2
	707	COLOR 3
	708	COLOR 4
	709	COLOR 5
	710	COLOR 6
	711	COLOR 7
712	COLOR 8	
11	712	luminance for background & border. COLOR varies colour plotted (same luminance as background).

Delaying tactics of micro firms

In your first issue, Henry Budgett, editor of Computing Today, suggests that the micro industry needs a code of practice to eliminate, or at least, reduce, the number of bugs in new machines before being offered to the public. I am sure that all enthusiasts will agree with him.

Another aspect of commerce in general, and the micro industry in particular, which requires looking into is the practice of sending money for a product and then waiting weeks or even months for delivery.

When an advertisement states 'sent by return of post' or 'please allow twenty eight days for delivery', and the weeks go by, tempers are not the only things to be lost.

How much, I wonder, has been added to the original cost of the machining by phone calls and writing letters? How much, I wonder, has been added to the original amount sitting in the manufacturers account?

If we take any recent new micro, put the average cost as £100, and assume 1000 customers sent for it in the first week (not unrealistic figures), that's £100,000 sitting in someone's account gaining interest.

What I visualise is some kind of bureau to which orders are sent. This would hold the money and forward the order to the manufacturer, and only forward the money on receipt of a guarantee of posting to the customer. Running costs would probably come out of the interest, and, who knows? maybe the long-suffering customer could get a rebate.

R.G. Bennett, Rotherham, South Yorks.

My calendar of dismay

I have just bought the first copy of your magazine, and would like to add my observations to those of C. Luke (letters page), regarding his problems with Oric Products.

The sequence of events is as follows:

July 12 last year — order Spectrum.

Send your letters to Letters, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0FE. We cannot answer queries on this page

October — see report in a computer magazine that a new computer, Oric 1, is to be launched. Looks better than Spectrum.

8 October — 13 weeks since ordering Spectrum, still no sign, so write and cancel order.

11 October — Phone Tangerine and order 48K Oric. Confirmation of order received. Delivery date given as third week in January.

22 October — Spectrum arrives.

25 October — Return Spectrum unopened. Wait 6 weeks for refund on credit card.

January/February — see four reviews on Oric in computer mags. Worried to see that all four state only two colours are available on screen at any one time, not all eight as claimed by Oric/Tangerine.

February 7 — Phone Tangerine regarding display colours and told that reviews are "rubbish". Also query delivery as Oric is now nearly three weeks overdue. Told that 48K Orics are having to be tested, hence the delay on that model.

February 24 — Phone Tangerine regarding delivery date. Told I should receive computer within two weeks.

March 9 — Buy first edition of Home Computing Weekly. See on letters page that C. Luke has had problems and read John Tullis's reply. Astounded to see that 48K Orics are being despatched in lieu of 16K machines, when it was implied on 7 February that the delivery problems were with the 48K model only; and that people ordering 16K machines and receiving 48K machines will be able to keep the 48K machines at a reduced price.

Here I am, still waiting for my 48K Oric 21 weeks after ordering it, and still expected to pay the full price.

If I hadn't just purchased a W.H. Smith "computer compatible" cassette recorder, I would probably cancel my order for the Oric and buy a Commodore 64. But I don't want to get yet another recorder.

A.J. Lenton, Poole, Dorset

Oric sales director, Peter Harding told Home Computing Weekly: "Because we want to keep supplying machines and keep people computing, until we get more 16Ks we have offered customers a 48K machine on loan."

"When the 16K becomes available, customers will be asked if they want to purchase the 48K or do a straight swap. The question of discount has yet to be assessed."

How long is a string of strings?

Can any fellow Dragon owner help solve a problem?

I have used the Dragon's CLEAR command to reserve memory space for string use. What I need to know is, how much of that memory has been used, and how much is left, so that I can tell how many characters I can use before the CLEARed memory is used up.

D. Hardy, Hull, Humberside

Piggyback puzzle for games player

Congratulations on your first issue. I think the contact addresses at the end of each article are a good idea.

In fact I am using one of them right now to get in touch with Hales about their Entex 2000 Piggyback for the Atari 2600 games machine.

Since I already have a ZX81, I wondered whether it was worth upgrading my 2600 for use as a second home computer. Would it be better to stick to my original plan of buying a BBC Model B as my second machine?

Can any of your readers tell me more about the 2600 and its potential as a home computer? C.N. Hurst, Felixstowe, Suffolk

All work, no play, on the MZ-80A

Our family has recently invested in a Sharp MZ-80A, Sharp twin disk drive and an NEC printer, mainly for use in our small newsagents' business.

We would like to be able to play games on it too, but no matter how hard I look for arcade-type programs in the computer magazines, I can't find any for the MZ-80A.

Doesn't anyone else out there own a Sharp computer? Please, please, let's see some good games programs for the Sharp.

C. Orton, Claydon, Suffolk

Bulletin boards band together

With reference to the article on bulletin boards in Home Computing Weekly, the following boards have now joined together to form the Association of Free Public Access Systems (AFPAS).

AFPAS has no commercial axe to grind. Our aim is simply to help the hobbyist in the use of computer communications and to standardise computer protocols.

Member bulletin boards include Forum-80 Hull (0482 859169), Mailbox-80 Liverpool (051-220 7933), TBBS London (01-348 6518), Forum-80/Met 80 (0908 613004), CBBS London (01-399 8530), North East Remote CP/M (0207 32447), ACC (0865 721180), and Bettersfield (closed until July).

Since the beginning of this month, all these systems have been configured to the same standard. This is: baud rate = 300; word length = 7; stop bits = 1; parity = even.

Two methods of file transmission will be available. Firstly standard ASCII, and secondly Binary Direct Transfer using Ward Christensen's MODEM protocol, which allows easy error-free file transfer between most types of micros.

The MODEM or XMODEM program for this is available free of charge from the CP/M user group library, or from any bulletin board.

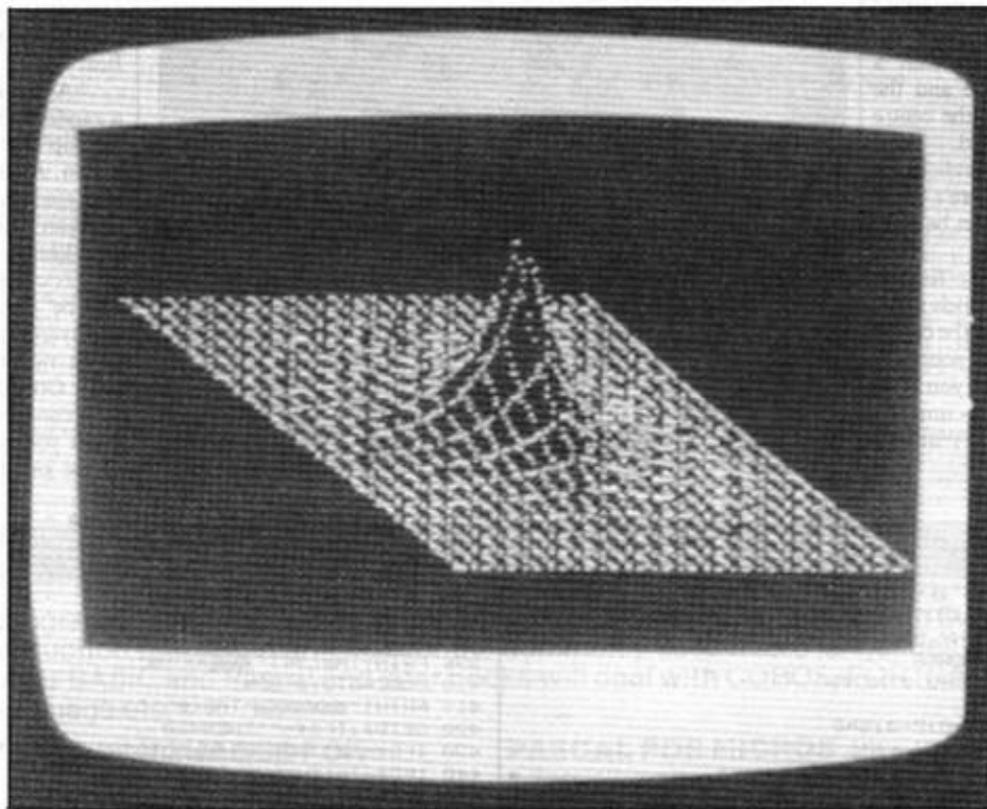
I will send further information to any interested readers on receipt of an SAE.

Frederick Brown, 421 Endike Lane, Hull HU6 8AG.

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```

730 GOTO640
1000 REM ROPE ROUTINE
1010 IFR=0THEN1070
1020 IFM=32934 OR M=32941 OR M=32945.
      OR M=32950THENR1=-40:GOTO1050
1030 IFM=33292THENR1=-1:GOTO1050
1040 IFM=33537 OR M=33544THENR1=40
1050 POKEM-D,87:M=M+1:POKEM,193:R=R-1
1060 GOTO570
1070 M=M-D:GOTO420
2000 REM KEY ROUTINE
2005 IFP=1THEN2020
2010 IFK<>2THEN2040
2020 POKEM-D,87:M=M+1:POKEM,193:K=K-1:P=1
2030 GOTO570
2040 M=M-D:GOTO420
3000 REM KEY CARD ROUTINE
3010 IFK<>2THEN3040
3020 K=K+1:POKE33284,(K+48)
3040 GOTO540
4000 REM ROPE CARD ROUTINE
4010 IFR>4THEN4040
4020 R=R+1:POKE33404,(R+48)
4040 GOTO540
5000 REM MAN HOME ROUTINE
5001 IFS=0THEN5030
5003 H=H+1:S=0
5005 PRINT" WELL DONE,THATS ANOTHER ONE OUT."
5010 PRINT" SO FAR,"H"OF YOUR MEN HAVE"
5020 PRINT" ESCAPED FROM COLDITZ."
5022 PRINT" PRESS ANY KEY TO CONTINUE."
5024 GETC#:IFC#=""THEN5024
5026 PRINT":GOTO590
5030 PRINT" SORRY,BUT YOU HAVE TRIED TO ESCAPE
      WITHOUT THE CORRECT";
5040 PRINT" DOCUMENTS AND HAVE BEEN SHOT AS A SPY."
5050 PRINT" PRESS ANY KEY TO CONTINUE."
5060 GETC#:IFC#=""THEN5060
5070 PRINT":GOTO590
  
```

```

5500 REM DOCUMENTS ROUTINE
5510 IFS=1THEN5530
5520 S=1:POKE33524,(S+48)
5530 GOTO540
6000 REM
6001 PRINT" TAB(32)"GERMANS"
6002 PRINTTAB(35)"50"
6003 FORJ=1TO5
6004 PRINTTAB(34)" "
6005 NEXTJ
6010 FORI=1TOU
6020 W=INT(26*RND(1)+3)
6030 L=INT(19*RND(1)+3)
6040 Q=32768+(40*L)+W
6050 POKEQ,135
6060 FORT=0-42T00-38
6070 IFPEEK(T)=193THENGOTO7000
6080 NEXTT
6090 FORT=0-2T00+2
6100 IFPEEK(T)=193THENGOTO7000
6110 NEXTT
6115 IFQ=MTHENGOTO7000
6120 FORT=0+38T00+42
6130 IFPEEK(T)=193THENGOTO7000
6140 NEXTT
6150 NEXTI
6160 REM
6170 GOTO110
7000 FORN=1TO10
7010 T=M-41:T1=M+39
7020 POKET,160:POKET+1,160:POKET+2,160
7030 POKEM-1,160:POKEM,160:POKEM+1,160
7040 POKET1,160:POKET1+1,160:POKET1+2,160
7050 FORF=1TO10:NEXTF
7060 POKET,32:POKET+1,32:POKET+2,32
7070 POKEM-1,32:POKEM,32:POKEM+1,32
7080 POKET1,32:POKET1+1,32:POKET1+2,32
7090 FORF=1TO10:NEXTF
7100 NEXTN
7120 POKE33131+Y,209:FORI=1TO500:NEXTI
7130 U(Y)=33131+Y:Y=Y+1:GOTO590
  
```

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If you see red when you open your bank statement, you can use your 16K ZX81 to keep you in credit. My DOMAC program will help you plan the effect on your budget of making a major purchase.

DOMAC will keep one year's accounts for up to 14 different items. For each month of the quarter year you enter in your budgeted or actual costs, and adjustments for any unexpected items. The program then works out monthly, quarterly and cumulative totals, gives you the pre-pay balance (this is the one to keep above your bank's minimum for charges!), your after-pay balance, and the yearly balance which tells you whether you have made a profit or loss on the year. Figure 1 shows you what the quarterly display looks like. You can also use the program to show you a bar chart of your total annual expenditure on each item (Figure 2) or of the

Balance your budget with a ZX81

Make your bank manager happy with this financial planning program from George Baldwin

amount you spent each month (Figure 3).

You will probably want to change your budget quite often, updating it for actual costs or modifying it to try out different spending plans. Domac lets you do just that. When a quarter's

display is first shown, the question "ANY CHANGES? (Y/N)" appears on screen. Entering Y produces a marker dot which can be moved around the screen until it is against the item you want to change. Press C for change and type in the new amount, and in a

couple of seconds the totals and subtotals are readjusted. When your changes are complete, those of you with a ZX printer can then choose to print out the display.

If you use the inverse C as shown in line 9030 of the program, DOMAC should load automatically. If not, enter GOTO 100: don't use RUN, or the stored data array will be cleared. First DOMAC will display the program "menu". Entering C produces the quarterly displays, and you can select the quarter you want. G gives you the choice of the two graphs, and Q allows you to quit if, for example, you want to alter the program.

Y starts the New Year routine, which allows the quarterly data to be reviewed and altered for the next year. And S must be used when you have finished, to ensure that the program is saved complete with new data for use next time. It is a good idea to keep a backup copy on a separate tape.

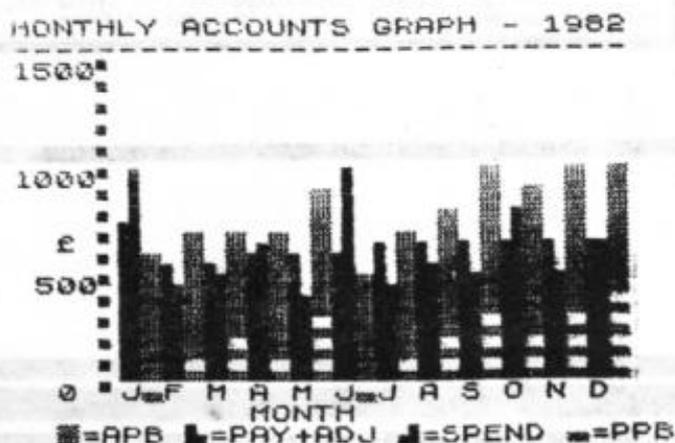
Figure 1. The quarterly display

ITEM	JAN	FEB	MAR	QTOT	82TOT
MORT.	129	129	129	387	1548
RATES	0	0	0	0	515
PHONE	0	54	0	54	180
ELEC.	0	82	0	82	302
GAS	0	0	110	110	261
CAR	0	0	0	0	198
CASH	150	50	90	290	940
INS.	0	0	0	0	600
HOLS.	0	100	0	100	650
SUBS.	24	0	0	24	120
XMAS	0	0	0	0	120
MISC.	15	20	20	55	235
CARD	135	11	53	199	739
SAUS.	500	0	0	500	1510
TOTAL	1022	446	480	1950	7417
P.P.B	-104	115	125		
PAY	555	542	557	1654	7404
ADJUST	100	0	0	100	100
A.P.B	561	657	732	YBAL=177	

Figure 2. Annual spend per item

ITEM	PERCENTAGE OF TOTAL SPEND
MORT.	20.87
RATES	6.94
PHONE	2.43
ELEC.	4.07
GAS	3.52
CAR	2.67
CASH	12.67
INS.	1.11
HOLS.	8.76
SUBS.	1.73
XMAS	1.62
MISC.	3.17
CARD	9.96
SAUS.	20.48
TOTAL SPEND FOR 1982	=£7417-->>
PERCENT	0 10 20 30 40

Figure 3. Amount spent per month



```

1 PRINT " YOU HAVE JUST TR
IED TO RUN ""DOMAC"", YOUR DOME
STIC ACCOUNTS PROGRAM. THIS HAS
DESTROYED YOUR DATA. YOU MUST NOW
RELOAD FROM TAPE. ONLY USE ""R
UN"" TO RESET THE PROGRAM COMPLETE
LY."
2 PRINT "" "" NEXT TIME, USE
""GOTO 100"" TO START THE PROG
RAM."
3 PRINT "" "" IF YOU WISH
TO SET UP A COMPLETELY NEW
ACCOUNTS FILE, USE ""CONT
NOW."
4 STOP
5 REM INITIAL DATA
10 DIM A(19,17)
20 LET Y$=""1982"
30 LET F=0
40 PRINT AT 10,0;" ENTER ""AF
TER-PAY BALANCE"" FROM
1981"
50 INPUT A(16,16)
60 CLS
99 REM MENU
    
```

ZX81 PROGRAM

```

2650 LET A(I,17)=A(I,17)-D+A(I,M)
2660 GOTO 2570
2670 IF I=17 OR I=18 THEN GOTO 2
2680 PRINT AT I,5*(M-5)+6;" "
2690 PRINT AT I,5*(M-5)+6;A(I,M)
2700 PRINT AT 16,5*(M-5)+6;" "
2710 PRINT AT 16,5*(M-5)+6;A(15,
I)
2720 PRINT AT I,21;" "
2730 PRINT AT I,21;A(I,B)
2740 PRINT AT 16,21;" "
2750 PRINT AT 16,21;A(15,B)
2760 PRINT AT I,27;" "
2770 PRINT AT I,27;A(I,17)
2780 PRINT AT 16,27;" "
2790 PRINT AT 16,27;A(15,17)
2800 FOR G=0 TO 2
2810 PRINT AT 17,G*5+6;" "
2820 PRINT AT 17,G*5+6;A(16,S+G)
2830 PRINT AT 21,G*5+6;" "
2840 PRINT AT 21,G*5+6;A(19,S+G)
2850 NEXT G
2860 PRINT AT 21,26;" "
2870 PRINT AT 21,26;A(19,17)
2880 GOTO 1330
2890 PRINT AT I+1,5*(M-5)+6;" "
2900 PRINT AT I+1,5*(M-5)+6;A(I,
I)
2910 PRINT AT I+1,21;" "
2920 PRINT AT I+1,21;A(I,B)
2930 PRINT AT I+1,27;" "
2940 PRINT AT I+1,27;A(I,17)
2950 GOTO 2810
2960 REM GRAPHS
2970 PRINT "WHICH GRAPH?"
2980 PRINT "P=PERCENTAGE SPEND"
2990 PRINT "M=MONTHLY SPEND"
3000 INPUT W$
3010 CLS
3020 IF W$="P" THEN GOTO 3430
3030 IF W$<>"M" THEN GOTO 3000
3040 PRINT "MONTHLY ACCOUNTS GR
APH"
3050 PRINT "-----"
3060 FOR N=16 TO 2 STEP -1
3070 PRINT AT N,5;" "
3080 NEXT N
3090 PRINT AT 17,3;"0 * J F M A M
A S O N D"
3100 PRINT AT 12,2;"500"
3110 PRINT AT 7,1;"1000"
3120 PRINT AT 2,1;"1500"
3130 PRINT AT 10,3;"E"
3140 PRINT AT 16,12;"MONTH"
3150 PRINT AT 19,3;"APB=L=PAY+
S=SPEND P=PAY"
3160 FOR M=1 TO 12
3170 FOR N=16 TO 17-INT ((A(19,M
+50)/100) STEP -1
3180 PRINT AT N,2*M+5;" "
3190 NEXT N
3200 FOR N=0 TO INT ((A(17,M)+A(
16,M)+25)/50)-1
3210 PLOT 4*M+6,10+N
3220 NEXT N
3230 FOR N=0 TO INT ((A(15,M)+25
)/50)-1
3240 PLOT 4*M+9,10+N
3250 NEXT N
3260 FOR N=16 TO 17-INT ((A(16,M
+50)/100) STEP -1
3270 PRINT AT N,2*M+5;" "
3280 NEXT N
3290 IF A(16,M)<=0 THEN PRINT AT
17,2*M+5;" "
3300 NEXT M
3310 PRINT AT 21,1;"COPY? (Y/N)"
3320 INPUT C$
3330 IF C$="Y" THEN PRINT AT 21,
1;" "
3340 IF C$="Y" THEN COPY
3350 IF C$="Y" THEN GOTO 3390
3360 IF C$<>"N" THEN GOTO 3340
3370 PRINT AT 21,1;"PRESS NEULIN
E TO CONTINUE"

```

```

3400 PAUSE 40000
3410 CLS
3420 GOTO 100
3430 PRINT "ITEM PERCENTAGE OF T
OTAL SPEND"
3440 PRINT
3450 PRINT AT 1,0;"MORT.";"RATE
"
3460 PRINT AT 1,0;"PHONE";"ELEC.";"GAS";"CA
RD"
3470 PRINT AT 1,0;"CASH";"INS.";"HOLS.";"SU
B.";"XMAS";"MISC.";"CARD"
3480 FOR N=0 TO 31
3490 PRINT AT 15,N;"-"
3500 PRINT AT 17,N;"-"
3510 NEXT N
3520 PRINT AT 16,0;"TOTAL SPEND
"
3530 PRINT AT 16,0;"Y$=";A(15,17);"-->"
3540 PRINT AT 16,0;"PERCENT "
3550 PRINT AT 16,0;"10 20 30 40"
3560 FOR I=1 TO 14
3570 PRINT AT I,6;INT (100*(100+
A(I,17)/A(15,17))+.5)/100
3580 FOR N=22 TO 21+INT (100*A(I
,17)/A(15,17)+.5)
3590 PLOT N,42-2*I
3600 NEXT N
3610 NEXT I
3620 PRINT AT 20,3;"COPY? (Y/N)"
3630 INPUT C$
3640 IF C$="Y" THEN PRINT AT 20,
3;" "
3650 IF C$="Y" THEN COPY
3660 IF C$="Y" THEN GOTO 3630
3670 IF C$<>"N" THEN GOTO 3580
3680 PRINT AT 20,3;"PRESS NEULIN
E TO CONTINUE"
3690 PAUSE 40000
3700 CLS
3710 GOTO 100
3720 REM NEW YEAR ROUTINE
3730 PRINT "NEW YEAR INPUT ROUTI
NE"
3740 PRINT "APRILS -- THIS ROUT
INE DESTROYS PREVIOUS DATA"
3750 PRINT "ENTER ""GO"" TO PROC
ESS, OR NEWLINE TO PASS"
3760 INPUT W$
3770 IF W$<>"GO" THEN CLS
3780 IF W$<>"GO" THEN GOTO 100
3790 LET Y$=STR$ (VAL Y$+1)
3800 LET F=1
3810 LET A(16,16)=A(16,17)
3820 PRINT "THIS ROUTINE DISPLAY
S LAST YEARS QUARTERLY DATA FOR A
MONTHMENT FOR ";Y$;" . PRESS NE
WLINE TO START"
3830 PAUSE 40000
3840 CLS
3850 LET Q$="M"
3860 GOSUB 1040
3870 LET Q$="J"
3880 CLS
3890 GOSUB 1040
3900 LET Q$="S"
3910 CLS
3920 GOSUB 1040
3930 LET Q$="D"
3940 CLS
3950 GOSUB 1040
3960 CLS
3970 PRINT "NEW YEAR ROUTINE COM
PLETE"
3980 LET F=2
3990 GOTO 100
4000 REM "STOP" ROUTINE
4010 PRINT "PROGRAM STOPPED."
4020 " TO RESTART, ENTER ""GOTO 100""
4030 STOP
4040 REM "SAVE" ROUTINE
4050 PRINT AT 10,0;"START RECORD
ER AND PRESS NEULINE"
4060 PAUSE 40000
4070 CLS
4080 SAVE "DOMA"
4090 LET F=0
4100 GOTO 100

```

ZX81 PROGRAM

```

100 PRINT AT 3,5;"WHICH FUNCTIO
110 PRINT AT 5,5;"C=COMPUTE/DIS
PLAY"
120 PRINT AT 7,5;"G=GRAPHS"
130 PRINT AT 9,5;"Q=QUIT"
140 PRINT AT 11,5;"S=SAVE PROGR
AM"
150 PRINT AT 13,5;"Y=NEW YEAR"
160 INPUT W$
170 CLS
180 IF W$="C" THEN GOTO 1000
190 IF W$="G" THEN GOTO 3000
200 IF W$="Q" THEN GOTO 5000
210 IF W$="S" THEN GOTO 9000
220 IF W$<>"Y" THEN GOTO 100
230 GOTO 4000
240 REM DISPLAY (IN FAST MODE)
250 PRINT "WHICH QUARTER? (M,J,
S,D)"
260 INPUT Q$
270 IF Q$<>"M" AND Q$<>"J" AND
Q$<>"S" AND Q$<>"D" THEN GOTO 10
280
290 CLS
300 FAST
310 PRINT "ITEM";TAB 21;"@TOT
";Y$(3 TO 4);"TOT"
320 PRINT "MORT." "RATES" "PH
ONE" "ELEC." "GAS" "CAR" "CA
SH" "INS." "HOLS." "SUBS." "
XMAS" "MISC." "CARD" "SAVS."
330 FOR N=0 TO 31
340 PRINT AT 15,N;"-";
350 PRINT AT 20,N;"-";
360 NEXT N
370 PRINT AT 16,0;"TOTAL" "P.P
" "PAY" "ADJUST"
380 PRINT AT 21,0;"A.P.B"
390 GOTO 1100+CODE Q$
400 PRINT AT 0,6;"OCT NOV DEC
"
410 LET S=10
420 GOTO 1150
430 PRINT AT 0,6;"APR MAY JUN
"
440 LET S=4
450 GOTO 1150
460 PRINT AT 0,6;"JAN FEB MAR
"
470 LET S=1
480 GOTO 1150
490 PRINT AT 0,6;"JULY AUG SEP
"
500 LET S=7
510 LET B=12+S-2*INT (S/3)
520 FOR I=1 TO 19
530 LET C=0
540 FOR M=S TO S+2
550 LET C=C+1
560 IF I>14 AND I<19 THEN GOTO
1205
570 IF I=19 THEN GOTO 1290
580 PRINT AT I,5+C+1;A(I,M)
590 PRINT AT I,21;A(I,B)
600 PRINT AT I,27;A(I,17)
610 GOTO 1310
620 PRINT AT I+1,5+C+1;A(I,M)
630 IF I<>16 THEN PRINT AT I+1,
21;A(I,B)
640 IF I<>16 THEN PRINT AT I+1,
27;A(I,17)
650 GOTO 1310
660 PRINT AT 21,5+C+1;A(I,M)
670 PRINT AT 21,21;"YBAL=";A(19
,17)
680 NEXT M
690 NEXT I
700 PRINT AT 15,9;"ANY CHANGES?
(Y/N)"
710 SLOW
720 INPUT C$
730 IF C$="Y" THEN GOTO 2000
740 IF C$<>"N" THEN GOTO 1350
750 IF F<>0 THEN RETURN
760 PRINT AT 15,9;"COPY? (Y/N)"
770 INPUT C$
780 IF C$="Y" THEN PRINT AT 15,
9;"-----"
790 IF C$="Y" THEN COPY
1415 IF C$="Y" THEN GOTO 1430
1420 IF C$<>"N" THEN GOTO 1390
1430 PRINT AT 15,9;"ANOTHER QTR?
(Y/N)"
1440 INPUT C$
1445 IF C$="Y" THEN CLS
1450 IF C$="Y" THEN GOTO 1000
1460 IF C$<>"N" THEN GOTO 1440
1470 PRINT AT 15,4;"PRESS NEWLIN
E TO CONTINUE"
1480 PAUSE 40000
1490 CLS
1500 GOTO 100
1509 REM FIND ITEM TO BE CHANGED
15000 PRINT AT 15,5;"SET DOT AND
PRESS "C"-
15010 LET X=20
15020 LET Z=26
15030 PLOT X,Z
15040 IF INKEY$<>" " THEN GOTO 204
15050 IF INKEY$=" " THEN GOTO 2050
15060 IF INKEY$="8" THEN GOTO 219
15070 IF INKEY$="5" THEN GOTO 223
15080 IF INKEY$="7" THEN GOTO 227
15090 IF INKEY$="6" THEN GOTO 232
15100 IF INKEY$<>"C" THEN GOTO 20
40
15110 PRINT AT 15,5;"INPUT NEW AM
OUNT"
15120 LET M=5-1+X/10
15130 LET I=1+(40-Z)/2
15140 IF Z=4 THEN LET I=18
15150 IF Z=6 THEN LET I=17
15160 LET D=A(I,M)
15170 INPUT A(I,M)
15180 GOTO 2500
15190 UNPLOT X,Z
15200 LET X=X+10
15210 IF X>30 THEN LET X=30
15220 GOTO 2030
15230 UNPLOT X,Z
15240 LET X=X-10
15250 IF X<10 THEN LET X=10
15260 GOTO 2030
15270 UNPLOT X,Z
15280 LET Z=Z+2
15290 IF Z>7 AND Z<14 THEN GOTO 2
000
15300 IF Z>40 THEN LET Z=40
15310 GOTO 2030
15320 UNPLOT X,Z
15330 LET Z=Z-2
15340 IF Z>7 AND Z<14 THEN GOTO 2
000
15350 IF Z<4 THEN LET Z=4
15360 GOTO 2030
15370 REM CALCULATIONS
15380 UNPLOT X,Z
15390 PRINT AT 15,5;"----CALCULAT
ION"
15400 IF I=17 OR I=18 THEN GOTO 2
000
15410 LET A(15,M)=A(15,M)-D+A(I,M)
15420 LET A(I,B)=A(I,B)-D+A(I,M)
15430 LET A(15,B)=A(15,B)-D+A(I,M)
15440 LET A(I,17)=A(I,17)-D+A(I,M)
15450 LET A(15,17)=A(15,17)-D+A(I
,M)
15460 LET A(16,1)=A(16,16)-A(15,1
)
15470 LET A(19,1)=A(16,1)+A(17,1)
15480 FOR N=2 TO 12
15490 LET A(16,N)=A(19,N-1)-A(15,
N)
15500 LET A(19,N)=A(16,N)+A(17,N)
15510 LET A(18,N)=A(16,N)+A(17,N)
15520 NEXT N
15530 LET A(19,17)=A(17,17)-A(15,
17)+A(18,17)
15540 GOTO 2000
15550 LET A(I,B)=A(I,B)-D+A(I,M)

```

COMPETITION

Must be won:



15 Spectrums plus £2,500 in software

Watch out for more great competitions soon in Home Computing Weekly.

This is the big day — your chance to win a share of the £6,200-worth of prizes we've got waiting. But you can only enter by sending three correctly completed coupons, from this issue and issues 1 and 2.

These are the prizes in our free, easy to enter competition:

★ Fifteen 48K ZX Spectrums, each with a printer and three programs from Sinclair's range. Each of these prize packages would cost you £250 in the shops.

★ Software worth £2,500 from Quicksilver, divided into 100 vouchers of £25 to each winner. The catalogue contains a total of 39 programs for the Spectrum, VIC-20, ZX81, BBC, Dragon and Atari.

All you have to do is answer the questions in the coupon — all based on this week's issue of Home Computing Weekly — fill in your name and address and post it off to us.

Entries will only be accepted if they contain all three coupons (not copies) and they must be correctly addressed to: Spectrum/-Quicksilver competition, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE.

The first 15 correct entries we open will win the Spectrum prizes and the next 100 will win the £25 software vouchers.

Closing date is first post on Friday April 8 and the winners will be named in Home Computing Weekly.

This competition is not open to the staff of Home Computing Weekly, Argus Specialist Publications, Alabaster Passmore, Sinclair Research and Quicksilver. The editor's decision is final and no correspondence will be entered into.

Entry coupon No. 3

- 1 Speedy advice from?
- 2 Star rating for centipede
- 3 Subroutine 600 is called by
- 4 Y starts what?
- 5 Dougie's surname
- 6 What runs in less than 8K?
- 7 Boss runs on which micro?

You must include the coupons from issues 1 and 2

Name

Address

..... post code

Please write clearly and send your entry to: Spectrum/Quicksilver Competition, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE. Closing date is first post on Friday April 8.

Strategy for survival in the software game

Frantic last-minute preparations for the launch of three new Spectrum programs were underway when I called into Silversoft's offices at 2 Broadway, Hammersmith, west London. Technicolor posters of the new offerings — Cyber Rats, Slippery Sid and Muncher — brightened up the walls, and boxes of cassettes awaited despatch.

Hammersmith is just a temporary resting-place for Silversoft, bridging the gap between the cramped office it occupied in central London — "you couldn't get four people in there at once" — and the more spacious premises in Ealing that it is due to move to shortly. But Silversoft itself is also making a transition, "from a hobby to a way of life", as founding partner David Paterson puts it.

It all started up in Glasgow and, like many a good idea before it, in a bar. David Paterson, then a management services manager in a brewery, and Dougie Bern, a computer engineer for Olivetti, were discussing computers and bemoaning their lack of money. The two themes came together, and David and Dougie started to write games for the ZX81 in their spare time, selling them by mail order.

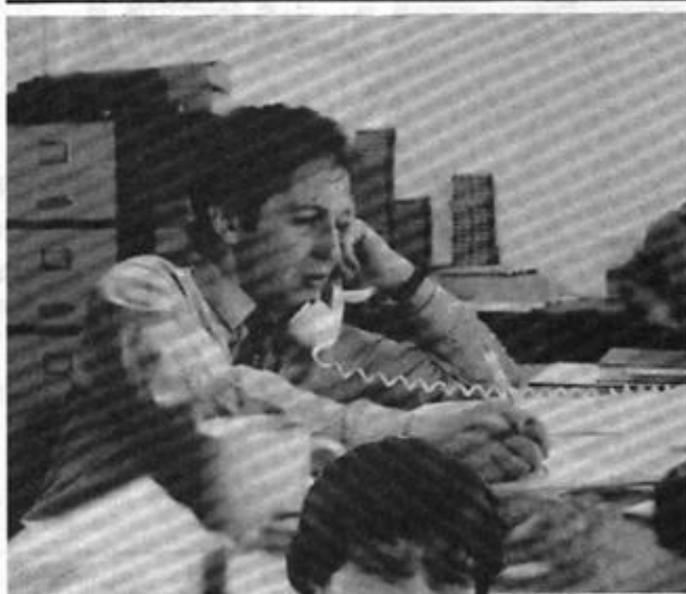
Their first attempt, a Startrek game written by David and launched in October 1981, was an immediate success. Business boomed, and in February 1982 David started to work for Silversoft full time.

But shortly afterwards, a combination of factors hit Silversoft hard, leading to a "disastrous" next few months. The launch of the Spectrum meant that sales of ZX81 software plummeted. At the same time, the big High Street retailers started to sell software, undermining mail order sales.

For a while, things looked bleak. But David and Dougie rallied, by diversifying into software for the Spectrum and selling their programs through W H Smith & Boots. Now Silversoft is a thriving concern again, and estimated turnover for 1983 is around £1 million.

But for Silversoft's staff, work is still pleasure rather than business. The company now has three fulltime employees — David, Dougie and Hugh Jarse — who all know each other from their Glasgow days. Dougie is David's wife's cousin, and Hugh is an old friend of Dougie's, who

Tough times are ahead for software companies, but Silversoft is determined to come through. Candice Goodwin finds out how



David Paterson — "I'm the bureaucrat"



Dougie Bern handles Silversoft's advertising

joined them to help out with the Christmas 1982 rush and stayed on.

As the business developed, David and Dougie had to give up writing programs themselves. David now handles administration — "I'm the bureaucrat", he says — and acts as company spokesman. Dougie deals with advertising and publicity. And Hugh takes care of distribution; his is the daunting task of ensuring that all the programs get parcelled off to their correct destinations.

To write the programs, they have a team of 10 freelance programmers, whose ages range from 15 to 35, but are mainly school kids and students. David himself is positively elderly by the standards of the software business at 35, though he claims to be "a child at heart", while Dougie, at 21, has done a degree in electronics and worked for Burroughs' small business machines division as well as working for Olivetti and helping to set up Silversoft.

They receive a lot of material from hopeful would-be programmers, but only a small proportion of it can be used. "One per cent of it is fine, nine per cent has potential, but ninety per cent is useless", according to Dougie.

Silversoft concentrates on adaptations for the ZX81 and Spectrum of popular arcade-type games, a formula which has worked well. "We sell established games because people won't pay five or six quid for something they don't know". David and Dougie have painful memories of Alien Dropout — "a great game, a sort of mixture of Galaxians and Invaders" — which flopped because people didn't know what to expect from it.

When Silversoft's name is firmly established in the High Street, though, they may start to experiment again: "people think, well, I've bought ten games from them and they've all been good, so let's give this new one a try".

Talking of names, Silversoft must be one of the few companies whose name was actually chosen by computer. The partners got together for a brainstorming session and came up with a

PROFILE

list of 60 names — "some of them were really ridiculous" — out of which they picked a shortlist of four. They had written a program that assigned random numbers, and used it to give marks to each of the names on the shortlist. In five trials, the name "Silversoft" came out top four times.

Partly to write new games and partly to diversify into software for new machines, they plan to take on some full-time programmers in the summer. Despite reservations about some of the Oric's features, they plan to support it, and possibly the BBC Micro too.

Along with other software companies, Silversoft's partners foresee "a shake-out" in the next few months, with many of the smaller companies going to the wall. "The market is changing. It was largely a mail order, hobbyist market. Thanks to Clive (Sinclair), it has become much more of a consumer market. People are becoming more discriminating".

They are optimistic, though, about Silversoft's prospects. Says David, "I have no doubts that we will weather it. We intend to be here in three years' time".

Change is the price of survival in such a competitive market, and Silversoft is increasingly having to adopt a "more professional approach" to both producing and marketing its products.

At the moment, physically producing the program cassettes is a major problem. There are very few companies offering a tape duplicating service, and the ones that do have more business than they can handle. To decrease the lead time between writing a program and actually getting it on to the retailer's shelves, Silversoft plans to tighten up coordination between itself and its duplicating company.

By better organisation, it also hopes to offer a better level of service to its retail outlets. As well as Smiths and Boots, it is negotiating with Debenhams and John Menzies, through which it already sells programs in Scotland — "they say to us, oh, you're Scottish, we'll take 5,000". But it will continue to support its loyal mail order customers too.

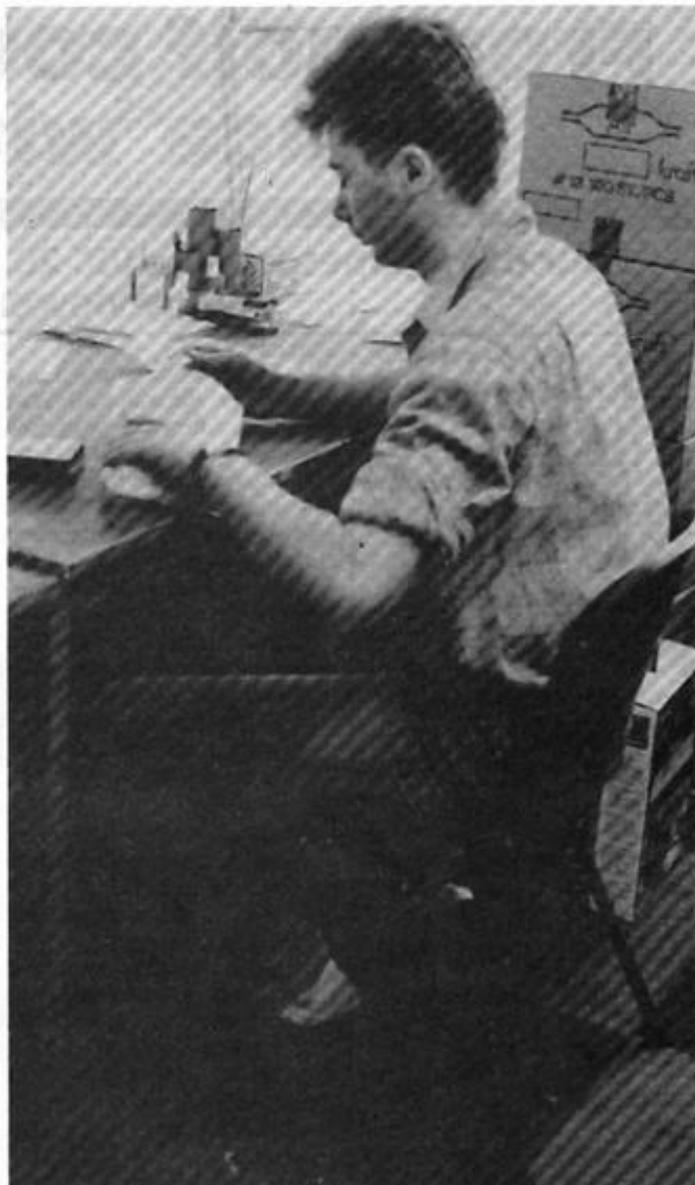
As for advertising, David and Dougie estimate that they

will have to spend around £50,000 per year just to keep up with the competition — a sum that drastically reduces the profit that they can expect to make on each cassette. As part of their advertising campaign, the posters adorning the office walls reflect their new, glossier image: they aim to better even the "red-hot" presentation of software companies like Imagine, profiled in Home Computing Weekly a fortnight ago.

Advertising is all-important because software companies' survival depends on selling a lot of cassettes — according to Silversoft, the profit on each cassette is fairly small after paying for distribution, manufacturing, royalties, packaging and promotion.

Because of this, David feels particularly strongly about software libraries — "pirates without the skull and crossbones" — which copy cassettes and lend them out without software companies' permission. "Ultimately it will make the customer suffer if it's not an economic proposition to bring out new programs". He hopes that software companies will act together to take legal action against software pirates.

For the time being, though, sales are holding up well. With new offices, new staff and a new image, Silversoft will have well and truly emerged from what David calls its "cottage industry stage" — hopefully without losing the enthusiasm that carried it through the hard times.



Hugh Jarse prepares a program for despatch to a mail-order customer



Dougie, Hugh and David check out a Silversoft program

From golf course to outer space with VIC-20

Four new games for the VIC-20 are put through their paces by our reviewer Allen Webb



Golf
VIC-20 plus 3K
£7.95

Audiogenic, PO Box 88,
Reading, Berks.

In my experience, golf programs vary tremendously, simply depending on the programming method used. Through good use of graphics, this package has done the job well.

Even with the extra 3K of memory needed, fitting the program in is a problem. Memory limitations account for several of the game's peculiarities. A booting program giving a full set of instructions precedes the main program, which loads automatically.

The data for each hole also has to be loaded from tape as and when required. While keeping the memory load down, this results in long pauses during the game. Shortage of memory also explains why only nine holes are offered.

Each hole is displayed as a map using standard graphics characters and colours to indicate the rough, sand traps and other hazards. This is done well, and the holes are attractive and clear.

You "hit" the ball by first selecting a club and the angle of

shot. The ball's behaviour is also affected by the value of your handicap. After each shot, the position of the ball is shown on the map as a flashing square, allowing you to see the effect of your stroke. This is a very good idea, in my opinion, which increases the feeling of hitting a real object.

Once the ball has landed on the green, you see a close-up of the putting field. When you succeed in potting the ball, your score card is displayed prior to loading the next hole.

Only one real complaint — too little information is given on the position of the ball relative to the hole after each shot. The program gives the approximate distances per character, but it's not easy counting the number of characters on a uniformly coloured area.

instructions	90%
playability	80%
graphics	80%
value for money	85%



Alien Blitz
VIC-20
£7.95

Audiogenic, PO Box 88,
Reading, Berks.

In spite of the unfamiliar name, this game turned out to be a rather unexceptional version of the old favourite — Space Invaders.

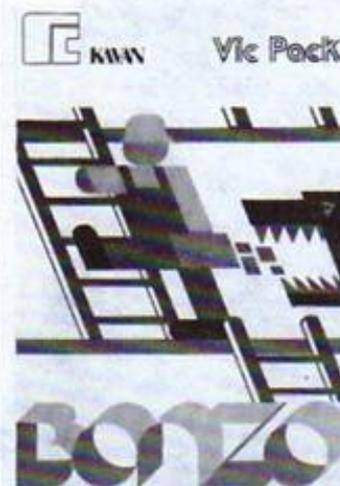
Standard-shaped aliens are well-drawn and nicely animated, but I was surprised at the lack of colour: all objects on the screen are white.

The aliens move smoothly, accompanied by the mandatory "heart-beat" sound. Unfortunately all other sound effects are very poor, and started to get on my nerves very quickly.

The moveable laser bases can either be controlled by joystick or by the two shift keys and space bar. But I found the latter method very awkward to use.

Level of play can be varied for 0 (easy) to 9 (you must be joking), but seems to be no more than a simple control of the aliens's speed. Level selection is followed by a demonstration game. Surprisingly, no high score option is available.

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



Bonzo
VIC-20 plus 3K
£7.95

Audiogenic, PO Box 88,
Reading, Berks.

This is an original game with some of the flavour of Panic. A small man has to be moved down a series of levels linked by ladders, using either a joystick or the keyboard.

On the various levels are boxes which the man picks up by moving over them. Each box yields points to the player. But to make life difficult, the levels are inhabited by green nasties called Bonzos, whose greatest delight is to leap on the man if they can.

If the screen is cleared, it is refilled with higher scoring boxes, but an extra nasty is supplied. This is repeated three times before returning to the first screen. The player has four lives, and at the end of the game there

is a high score table for successful players.

Technically the game is excellent, using both sound and colour to the full. An extra large screen is used, and the figures, because they consist of six redefined characters, are brilliantly animated. The author has put a lot of effort into designing the characters and giving them an endearing quality. I particularly liked the small man, who with his bald head and dungarees, looks rather like the hero in Krazy Kong.

instructions	70%
playability	80%
graphics	95%
value for money	80%



VIC-20 SOFTWARE REVIEWS



Boss VIC-20 plus 8K £14.95

Audiogenic, PO Box 88,
Reading, Berks.

Although you wouldn't guess it from the title, Boss is a chess program. Being cassette-based, it is much cheaper than packages like the CBM Sargon, but it does require 8K of memory expansion.

When the program is run, a neatly-drawn board takes up some two thirds of the screen. The pieces, too, are well drawn and easy to identify. Playing information, including the level of

play and the current depth of search, is displayed below the board.

The playing level can be set to one of ten levels, giving average response times ranging from 1 second to 4 hours. It can be altered at any stage of the game.

On either side of the level indicator are two clocks to let you compare your speed with the VIC's. You can see the current moves by each player in the bottom corners — the right hand corner actually shows the machine's alternative moves as it is thinking. Between the two move indicators is a move counter.

The program uses the usual alphabetic notation and is very easy to use. The input is well written, and all errors were trapped.

I played the program at level 0 using my standard opening, and found that it reacted identically to the Apple Sargon II up to move 9. This suggests that the Audiogenic program may use a similar algorithm to the more expensive program.

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



Subspace Striker/Zor 16K VIC-20 £7.95

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

Subspace Striker is an outer space version of Submarine Attack. You lurk in subspace until a target appears on your scanner. Then you pop and fire as your prey speeds across the screen.

Retaliation comes mainly in the form of space mines. You select a depth and position, and just sit it out.

This game is no classic, but the graphics are very good and sound effects add to the atmosphere. Once mastered, little skill is needed and whether or not you obtain a high score is largely up to the ran-

dom number generator. But a good game nonetheless.

In Zor, you take part in a battle between two robots, each taking turns to do their worst to each other as the range slowly closes.

Any hits on you drain your energy, as does putting up your shields to cut down the effect of the enemy fire and, in the second-stage close-combat battle, firing your weapons. But at least your opponent is in the same position.

The aim is to wear down your opponent before he wears you down. Again, once you get the hang of it, it doesn't take much skill, and the sound effects are nothing special. Quite nice graphics, though.

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



Tornado VIC-20 £5.95

Quicksilva, Palmerstone Park House, Palmerstone Road, Southampton.

This adaptation of Scramble features the usual scene setting for your mission. I have my doubts about the idea of "mercy bombs" and sentences like "meanwhile destruction blossoms all around, a necessary destruction" — but let's not mix morals and micros.

There's a one or two player option, high score recording, plus the right sort of sound effects. After you have reached 1,000 points, the enemy fighters swarm on in never-ending waves, until your three lives are used up.

Unfortunately there is no keyboard equivalent of the joystick controls, and my Commodore joystick responded only fitfully even after several attempts.

Though this game is sold for the unexpanded VIC, it loads quite happily in the expanded version. Without the expansion, it ran out of memory!

There are better version of this game around, but they cost more. you pays your money and you takes your choice.

B.J.

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



their score on to the next round.

I assume memory limitations are the reason why the program does not check that players move in turn — and why however many players are taking part, there are always four harvesters shown on the grid. Nevertheless an enjoyable, simple but lasting game.

Brainstorm is basically a variation of the old logic problem about how to get a number of people and animals across a river in a small rowing boat with a weight limit.

Once you remember, look up, work out or are told the solution, the game is of no further interest.

B.J.

instructions	70%
playability	70%
graphics	30%
value for money	50%



Starquest/ Encounter 16K VIC-20 £7.95

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

Based around the voyage of the Starship Enterprise, your task in Starquest is to explore new stars. Though attempts are made to recreate the Startrek theme, with hyperspace journeys and photoscans of each new planet, these features are not linked into the game itself, which is fairly un-substantial.

In Encounter, a lengthy introduction with shades of Close Encounters is followed by what amounts to a logic test. All you are told is that the aliens are four-fingered humanoids — the rest you work out for yourself.

A clever test, but once you've understood what you're supposed to do, that's it. You can't rerun Encounter, and being second on the tape, it's a nuisance to reload.

B.J.

instructions	20%
playability	30%
graphics	50%
value for money	30%



How does your TI screen seem?



Standard Basic treats the screen of the TI 99/4A computer as having 32 by 24 characters. But you can get higher resolution by dividing each character position into a number of pixels.

I'll be giving a series of Basic sub-routines to allow you to define and manipulate these pixels.

If we divide each character position into four pixels then, since each pixel may be set or unset, we need 16 (2^4) different patterns, each of four pixels.

We can represent each of these patterns as a four-bit

Dreaming of higher screen resolution with your TI 99/4A micro? David Gray shows you how

numeral; one bit for each pixel as shown in the illustration. The patterns and their associated binary numerals are shown also.

Using four pixels per character position gives us a

screen consisting of 64 by 48 pixels. However, since Basic only allows us to write characters we must define one character for each pattern and to set or unset a pixel we must change the com-

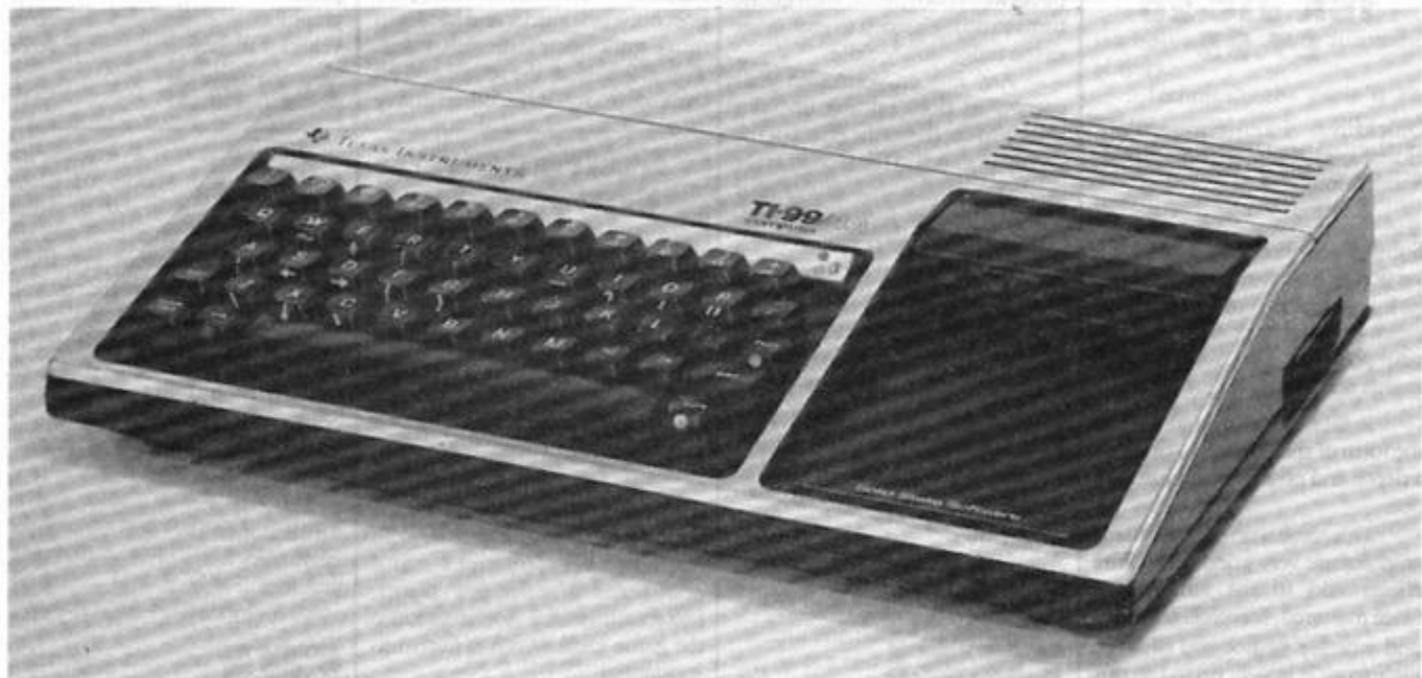
plete character containing that pixel.

Our method of numbering patterns makes the determination of the new pattern very simple.

If we start with a pattern p (0...15) and wish to set pixel n (0...3), we get pattern $p+2^n$ (providing pixel n is not already set).

Similarly, unsetting pixel n of pattern p gives pattern $p-2^n$ (providing pixel n is already set). For example, setting pixel 2 in pattern 8 gives pattern $8+2^2 = 12$.

On the TI 99/4A computer,



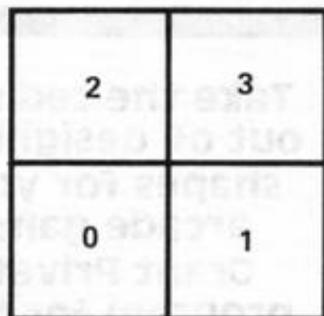
PROGRAMMING

the character at the top left-hand corner of the screen has co-ordinates (1,1). Here we assume that the Xco-ordinates run horizontally from 1 to 32 and that the Yco-ordinates run vertically from 1 to 24.

For this article we wish to

treat the pixel in bottom left-hand corner as (0,0), so pixel (0,0) will be pixel 0 of character position (1,24).

To access any pixel we must determine which character position it belongs to and which pixel it is of that character position.



3	2	1	0
X	X	X	X

1 CHARACTER

How one character is divided into four pixels. Each character can be represented as a four-bit numeral

```

10 DEF DIV2(X)=INT(X/2)
20 DEF MOD2(X)=X-INT(X/2)*2
30 REM A SIMPLE TEST PROGRAM
40 REM FIRST FILL PART OF THE SCREEN PIXEL BY PIXEL
45 GOSUB 500
50 FOR PLOT_X=30 TO 35
60 FOR PLOT_Y=25 TO 30
70 GOSUB 1000
80 NEXT PLOT_Y
90 NEXT PLOT_X
100 REM NOW REMOVE SOME OF THE PIXELS
110 FOR PLOT_Y=30 TO 25 STEP -1
120 FOR PLOT_X=33 TO 30 STEP -1
130 GOSUB 1100
140 NEXT PLOT_X
150 NEXT PLOT_Y

160 STOP
500 REM S/R INITIALISE GRAPHICS CHARACTERS
510 DIM PLOT_S*(3)
520 PLOT_S*(0)="00000000"
530 PLOT_S*(1)="FOFOFOFO"
540 PLOT_S*(2)="OFOFOF"
550 PLOT_S*(3)="FFFFFFF"
560 PLOT_CH=128
570 FOR PLOT_I=0 TO 3
580 FOR PLOT_J=0 TO 3
590 CALL CHAR(PLOT_CH,PLOT_S*(PLOT_I)&PLOT_S*(PLOT_J))
600 PLOT_CH=PLOT_CH+1
610 NEXT PLOT_J
620 NEXT PLOT_I
630 CALL COLOR(13,13,16)
640 CALL COLOR(14,13,16)
650 CALL HCHAR(1,1,128,24*32)
660 RETURN

1000 REM S/R TO PLOT POINT <PLOT_X,PLOT_Y>
1010 GOSUB 2000
1020 IF PLOT_FLAG THEN 1060
1030 GOSUB 2500
1040 IF PLOT_FLAG THEN 1060
1050 CALL HCHAR(PLOT_Y1,PLOT_X1,PLOT_CH+2*PLOT_BIT)
1060 RETURN
1100 REM S/R TO UNPLOT POINT <PLOT_X,PLOT_Y>
1110 GOSUB 2000
1120 IF PLOT_FLAG THEN 1160
1130 GOSUB 2500
1140 IF PLOT_FLAG+1 THEN 1160
1150 CALL HCHAR(PLOT_Y1,PLOT_X1,PLOT_CH-2*PLOT_BIT)
1160 RETURN

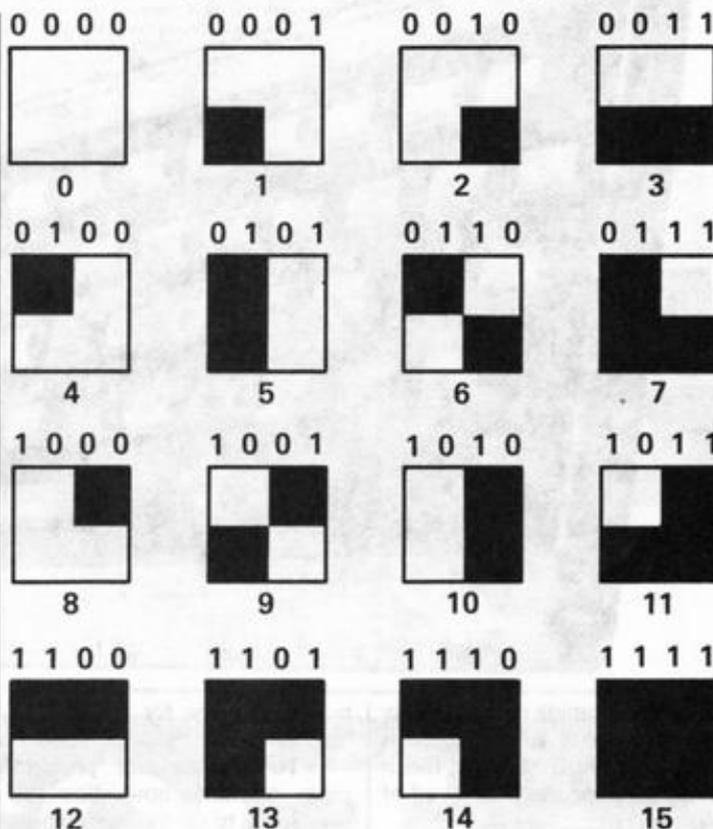
2000 REM S/R TO DETERMINE CHARACTER AND PIXEL
2010 PLOT_FLAG=-1
2020 IF (PLOT_X<0)+(PLOT_X>63)+(PLOT_Y<0)+(PLOT_Y>47) THEN 2080
2030 PLOT_X1=DIV2(PLOT_X)+1
2040 PLOT_Y1=24-DIV2(PLOT_Y)
2050 PLOT_BIT=MOD2(PLOT_X)+2*MOD2(PLOT_Y)
2060 CALL GCHAR(PLOT_Y1,PLOT_X1,PLOT_CH)
2070 PLOT_FLAG=0
2080 RETURN
2500 REM S/R TO SEE IF PIXEL ALREADY PLOTTED
2510 PLOT_FLAG=MOD2(INT((PLOT_CH-128)/(2*PLOT_BIT)))=1
2520 RETURN
    
```

Given pixel (x,y) then the corresponding character position is given by $(1 + x \text{ DIV } 2, 24 - y \text{ DIV } 2)$ where $x \text{ DIV } 2$ is the integer result of dividing x by 2.

The pixel of the determined character position is given by $(x \text{ MOD } 2) + 2 * (Y \text{ MOD } 2)$

where $x \text{ MOD } 2$ is the remainder of dividing x by 2.

Using the above scheme we can write three Basic sub-routines to produce higher resolution — one to initialise a character for each pattern, one to plot a pixel and one to unplot a pixel.



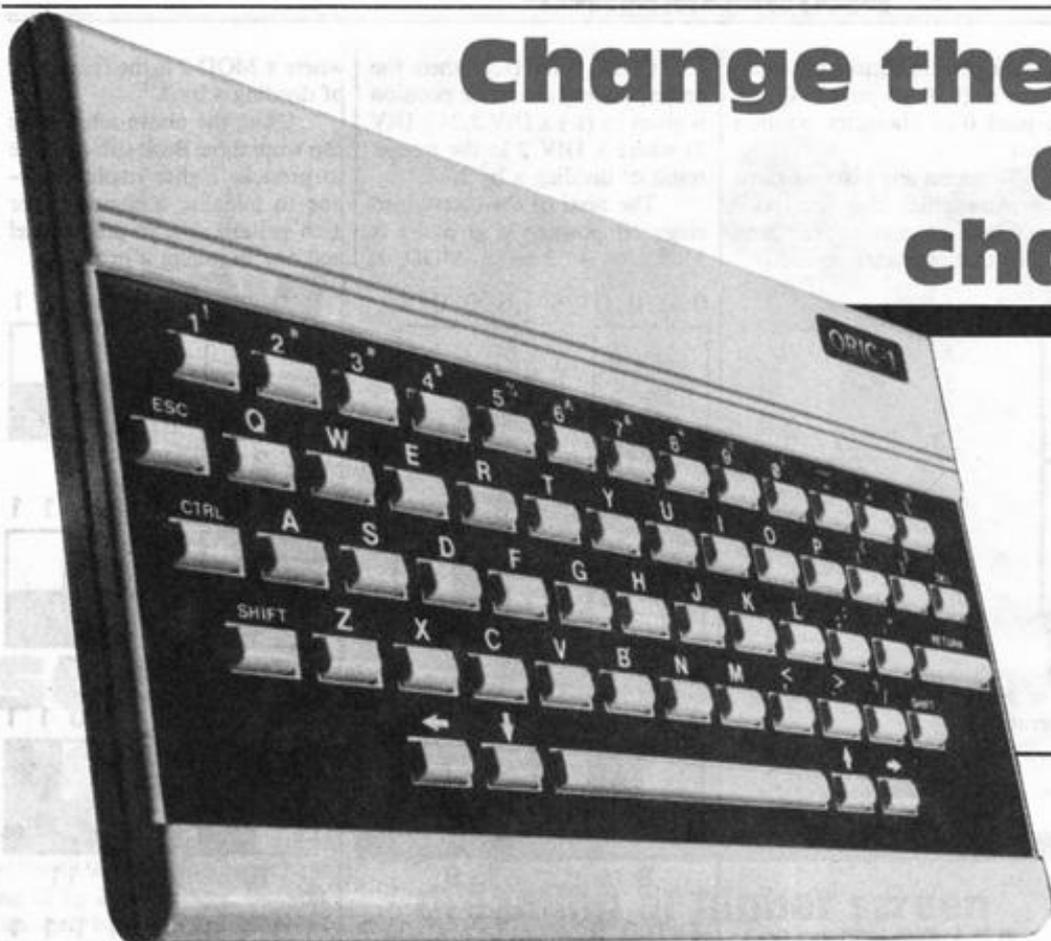
15 different shapes can be created by using four pixels in one character pattern. Their binary numbers are shown above each

How it works

10,20 Definitions of two commonly used functions.
 30-160 A simple test program
 500-660 A subroutine to initialise the characters representing the various patterns. These patterns are represented by the characters 128 to 143
 650 Sets all character positions to the blank pattern
 1000- This subroutine plots the point (PLOT - X, PLOT - Y) on the screen. It first makes sure that the point is valid by calling subroutine 2000 and then ensures that the point hasn't already been plotted by calling subroutine 2500. Line 1050 uses the formula $p + 2^n$
 1100- Similar to the subroutine 1000 but for unplotting the point (PLOT - X, PLOT - Y)

2000- This subroutine determines if the point PLOT - X, PLOT - Y is actually on the screen (see Line 2020). If the point is not on the screen then PLOT-FLAG is left as true (-1). If the point is on the screen then PLOT-FLAG is left as false (0) and the following variables are set: -(PLOT - X1, PLOT - Y1) are set to the coordinates of the character position containing the pixel. PLOT - BIT is set to the pixel number within the character position. PLOT - CH is set to the current character in the character position
 2500- This subroutine returns the value false if the pixel PLOT_BIT of the character PLOT - CH is not set and true if it is set.
 2520

Change the shape of your character



Take the tedium out of designing shapes for your arcade games. Grant Privett's program for the Oric-1 makes it easy

The programming of high quality graphics into a BASIC game is often very much a limiting factor in determining the final speed of the game.

It's simply a matter of how many bytes have to be changed every time some elaborate shape — a plane or invader, for example — moves from one screen location to another. The bigger and more elaborate the figure, the slower the movement.

This may vary from machine to machine but the principle re-

mains the same for virtually all machines.

To alleviate this problem many machines now allow the user access to the locations where the shape of every character is kept. In this respect the Oric is no exception. In fact both character sets can be altered.

This means the shape of any normal character may be changed into either a figure by itself or become part of some greater whole. To do this it is necessary to decide which bits of the bytes

that make up a character must be set (visible) and which are not set (dark).

If done manually this can be a tedious and painstaking task, particularly since the character sets occupy different locations depending on the mode (hi-res or text) in which the change is made.

My program allows you to effortlessly experiment with new designs.

The cursor controls on the bottom row of the keyboard are used to move an asterisk around

within a six by eight grid. By pressing either S or U, members of the grid are either set — represented by a £ — or left blank.

The design currently under construction is displayed throughout so your masterpiece may be considered as it will finally appear, thus reducing errors of scale.

When the design is finished pressing F allows you to choose which character is to be changed. The values of the locations to be changed and the values required are then presented.

```

2 CLS:DIMXY(9,9),V(9):RELEASE:TEXT
4 DIMMC(12):FDR1=0T011:READMC(1)NEXT
5 N=INT(128/RND(1)*5):CC=42
9 PRINTCHR*(10)CHR*(17)
11 PRINTCHR*(140)CHR*(133)"ORIC-1"
12 PRINTCHR*(10)" CHARACTER GENERATOR."
20 PRINT" *****"
22 PRINT" MOVE THE ASTERISK AROUND WITHIN"
23 PRINT" THE MATRIX. WHEREVER YOU WISH"
24 PRINT" TO SET A GIVEN MATRIX LOCATION"
25 PRINT" SIMPLY PRESS 'S'. SIMILARLY"
26 PRINT" PRESS 'U' TO UNSET A POINT"
27 PRINTCHR*(1)" WHEN YOU ARE SATISFIED ITH"
28 PRINT" THE MATRIX SHAPE PRESS 'F'."
29 PRINT" SHOULD YOU WISH TO QUIT THE "
30 PRINT" PROGRAM PRESS 'Q'."
31 PRINTCHR*(10)CHR*(10)CHR*(N)TAB(19)"PRESS 'C' TO CONTINUE"
35 AS=KEY$:IFAS<>"C"THEN35
100 HIRES:PRINTCHR*(17)
101 POKE49000,32:POKE49040,32:POKE49080,32
102 FORX=1T06:FDY=1T08
103 XY(X,Y)=32:NEXTY,X
104 FORI=40704T040711:POKEI,0:NEXT
110 CURSET30,20,0
120 I=96:J=154
130 DRAWI,0,1:DRAWO,J,1
140 DRAW-1,0,1:DRAWO,-J,1
160 CURMOV1,1,0:I=I-2:J=J-2
170 DRAWI,0,1:DRAWO,J,1
180 DRAW-1,0,1:DRAWO,-J,1
190 CURMOV-2,0,0
210 FORX=1T03
220 CURMOV 16,0,0:DRAWO,J,1
240 CURMOV16,0,0:DRAWO,-J,1
    
```

```

260 NEXT
280 FORX=1T04
290 CURMOV0,19,0:DRAW-1,0,1
310 CURMOV0,19,0:DRAW1,0,1
320 NEXT
322 N$="F TO FINISH"
323 X=140:Y=30:GOSUB4000
324 N$="U TO UNSET"
325 X=140:Y=60:GOSUB4000
326 N$="S TO SET"
327 X=140:Y=50:GOSUB4000
328 N$="Q TO QUIT"
329 X=140:Y=40:GOSUB4000
330 N$="C CHARACTER"
331 X=147:Y=70:GOSUB4000
332 N$="USE CURSOR CONTROLS TO MOVE ASTERISK."
333 X=5:Y=180:GOSUB4000
340 Y=28:X=36
350 CURSETX,Y,0
360 CHARCC,0,1
370 GETA$
376 IFAS="U"THENXY((X-20)/16,(Y-09)/19)=32:GOSUB2000:GOTO350
377 IFAS="S"THENXY((X-20)/16,(Y-09)/19)=35:GOSUB2000:GOTO350
378 IFAS="Q"THEN3000
379 IFAS="F"THEN1000
380 I=ASC(A$)
390 CHAR127,0,0
395 CHARXY((X-20)/16,(Y-09)/19),0,1
420 X=X+(I=8)-(I=9)*16
430 X=X+(X>116)-(X<36)*16
480 Y=Y+(I=11)-(I=10)*19
490 Y=Y+(Y>161)-(Y<28)*19
520 GOTO350
1000 TEXT
    
```

ORIC PROGRAMMING

```

1010 PRINTCHR$(10)CHR$(133)"CHARACTER ASSIGNMENT";
1030 I=FRE(0):F1=1
1031 IF I<16384 THEN A$="" (16K VERSION):MC=4
1032 IF I>16384 AND I<32768 THEN A$="" (32K VERSION):MC=2
1033 IF I>32768 THEN A$="" (48K VERSION):MC=0
1040 PRINT A$
1050 PRINTCHR$(133)"-----"
1070 PRINT" WHICH CHARACTER SET WOULD YOU?"
1080 PRINT" CHOSEN PATTERN BE A MEMBER OF?"
1085 PRINT" 1- STANDARD OR ALTERNATE."
1090 PRINTCHR$(10)
1100 INPUT" PLEASE INPUT S OR A":A$
1110 IF A$<>"S" AND A$<>"A" THEN I=0
1115 PRINTCHR$(10)
1120 PRINT" CHARACTER REPLACED IN HIRES"
1130 PRINT" (RELEASE) OR TEXT (GRAB) MODE. ?"
1150 PRINTCHR$(10)
1160 INPUT" PLEASE INPUT H OR T":B$
1170 IF B$<>"H" AND B$<>"T" THEN I=0
1180 PRINTCHR$(10)
1190 PRINT" WHAT IS THE NUMBER OF THE "
1200 PRINT" CHARACTER TO BE REPLACED?"
1210 PRINT" MIN.=32,MAX.=127"
1215 PRINT" (EXCEPT ALT. TEXT MAX=111)"
1217 PRINTCHR$(10)
1220 INPUT" PLEASE INPUT NUMBER":C$
1235 IF VAL(C$)<32 OR VAL(C$)>127 THEN CLS:GOTO1180
1250 IF VAL(C$)>111 AND B$="T" THEN CLS:GOTO1180
1260 CN=VAL(C$):CLS:I=0
1270 PRINTCHR$(10)CHR$(133)"DATA FOR REPLACING CHARACTER ";CN;"
1280 PRINTCHR$(133)"-----"
1290 PRINTCHR$(10)
1300 IF B$="H" THEN I=6
1310 IF A$="A" THEN I=1
1315 T=CN#B+MC(I+MC)
1320 PRINT"START ADDRESS. = ";T
1325 A$="HIRES":IF B$="T" THEN A$="TEXT"
1330 PRINT"END ADDRESS. = ";T+7
1332 PRINTCHR$(10)"IN "A$" MODE."
1335 PRINTCHR$(10)CHR$(17)
1340 FOR I=1 TO 8
1345 GOSUB2005
1350 PRINT"LOC. NUMBER ";T+I-1;"NEW VALUE = ";-V
1360 NEXT I:F1=0
1400 PRINTCHR$(10)" PRESS ANY KEY TO CONTINUE"
1410 GET A$
1420 GOTO3000
2000 FOR I=1 TO 8
2005 V=(XY(2,I)=35)*16+(XY(1,I)=35)*32
2010 V=(XY(6,I)=35)+(XY(5,I)=35)*2+(XY(4,I)=35)*4+(XY(3,I)=35)*8+V
2035 POKE40703+I,-V
2037 IF I=1 THEN RETURN
2040 NEXT

```

```

2050 CURSET140,70,0
2055 CHAR127,0,0
2056 CHAR96,1,1
2070 RETURN
3000 TEXT:CLS:PRINTCHR$(10)CHR$(17)
3010 PRINT"DO YOU WANT TO RERUN (Y/N) "
3020 GET A$:IF A$="Y" THEN RUN
3030 CLS:PRINTCHR$(17):CLEAR:END
4000 CURSETX,V,0
4010 FOR I=1 TO LEN(N$)
4020 CHARASC(MID$(N$,I,1)),0,1
4030 CURMOV6,0,0
4040 NEXT
4050 RETURN
9999 REM MEMORY MAP INFORMATION
10000 DATA46080,47104
10010 DATA29696,30720
10020 DATA13312,14336
10040 DATA38912,39936
10050 DATA22528,23552
10060 DATA6144,07168

```



AMSOFT

OPERATING AND CONTROL SYSTEMS FOR DISCERNING SPECTRUM AND ZX81 USERS

All Amsoft products are designed to help users to get the most out of their machines. No additional hardware is needed to run them, but they can be used to support other devices if needed.

Am-ZX FILE is a system which allows you to use large cassette data files in BASIC programs. There is no limit to how much data you can store or retrieve. Gives tape facilities like a large machine. ZX81 version £4.00, Spectrum version £5.00.

AM-ZXMON is the ultimate operating system. With it you can create, edit, run and checkpoint machine code programs, and can save, load and merge portions of programs to or from tape. You can build and use your own subroutine libraries. ZX81 version £6.00, Spectrum version £7.00.

Under the control of **AM-ZXMON** you can run, **AM-ZXEDIT**, the text editor which allows you to produce source tape files for input to the **AMAZON** assembler. An easy-to-use product with exceptional facilities including tape merging and renumbering, are ZX81 and Spectrum versions £4.00.

Am-AZON, a full two pass assembler which converts assembler source tapes created by **AM-ZXEDIT** into machine code tapes which can be loaded and run by **AM-ZXMON**. All ZX80 op. codes are recognised. Symbols can be up to 5 characters and symbolic, hex, string, or decimal are permitted. ZX81 version £8.00, Spectrum version available end of March £9.00.

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HCW3

Straighten out a mixed-up masterpiece



It looks like modern art, but there's an ordinary picture in there somewhere. The trouble is, the pieces have got mixed up — and the game is to unscramble them.

Our Picslide game, for the ZX81 plus 16K RAMpack, is an updated version of those letterslide games that most of us have played at one time or another. But instead of rearranging scrambled letters to make words, the player has to rearrange the segments of a picture. And since the design of the picture is up to you, you can change the image whenever you like to increase the game's variety.

When you run the program, the first thing you will see is a sixteen-square grid with a black square at top left and the rest of the squares white. In the middle of the grid is a flashing cursor. Using the cursor and keys 1 to 8,

Puzzle your friends with Picslide, an updated version of the well-tried letterslide game, presented by Lenora and Nick Godwin

draw a picture on the grid. Try to ensure that the picture extends into every white square. Figure 1 shows how the drawing builds up.

a precaution against the dreaded Wobbly RAMpack Syndrome.

RUN the program and

When you have finished your masterpiece, press STOP and the cursor will disappear. From this point on, the program can be saved with the picture intact.

Now you go on to scramble the picture, as shown in Figure 2. The black square represents the space on the picture slide board, and to move any square into that space, press the appropriate cursor control key. When the display is thoroughly mixed up, challenge your friends to sort out the mess!

We have included a machine code loader to make the picture squares move smoothly. To use it, reserve 358 bytes at the beginning of RAM by typing 1 REM

followed by 358 characters, as shown in Listing 1. Then type in the rest of Listing 1. It is wise to save the program at this stage, as carefully enter in the machine code data set from Listing 2, which should be read across, line by line. The value of the CHECKSUM must be 31553 on completion. Any other value means you have made a mistake somewhere, which must be tracked down and corrected. Errors can be corrected by direct POKE command: for example, POKE 16517, 255. We recommend that you SAVE the program again at this point.

Before entering the BASIC program in Listing 3, type in POKE 16419,2. If you don't, the program will automatically list from line 1 after every operation. Do not try to LIST line 1. Enter Listing 3, overwriting Listing 1 where necessary.

Keep your head in an asteroid field

They say troubles always come in pairs, and you've no reason to doubt it as you guide your craft through space.

Not only have you hit an asteroid field, but a fleet of alien ships is bearing down on you — and it doesn't look friendly.

Can you blast your way to safety by destroying the enemies, while weaving about to avoid a fatal crash with an asteroid? Test your skill as a space pilot with my program for the unexpanded VIC-20.

You are allowed three ships. Press the B key to fire — three cheers will boost your morale if you manage to shoot down an enemy ship. But if you crash, look out for fireworks.

Full instructions are given at the beginning of the program. Line by line, this is how it works.

Line 20 sets the volume to maximum and the screen and border colours to black and blue respectively.

Lines 30-75 set up the main variables, position the ship and start a blipping sound (this is one of the few space ships running on a two-stroke engine).

Lines 79-96 poke multi-coloured asteroids and enemy



copyright Walt Disney

So you think you'd make a good space pilot? Glenn Fair challenges you to test your skill

ships on to the screen in random positions, while lines 105 and 110 poke your ship and its "exhaust" on to the screen at position x.

Lines 120 and 125 control the movement of the ship, and line 130 checks to see if the fire

button B has been pressed. Lines 135 and 140 ensure that the ship does not disappear off the edge of the screen.

Lines 150 and 155 check to see if the ship has crashed into an asteroid or enemy ship. Line 160

changes the border colour (blue) to red to warn you that only one ship is remaining, while line 165 sends the program to its ending routine when the last ship is destroyed.

Subroutine 300 creates the explosion effect when the ship crashes, and deducts one ship from your original three.

Subroutine 400 controls the fire sequence when you press the B key. Line 420 checks to see if you have hit an enemy ship and line 425 checks whether you have hit an asteroid. If you hit an asteroid, ten points are taken off, to deter players from simply staying in one place and shooting everything out of the way.

Subroutine 600 is called by line 420 if you shoot an enemy ship. It changes the screen and border to white, and produces three "whoops", then adds ten points to your score and checks to see if you have reached 500 points. If you have, it adds an extra ship.

Line 1000 restores the screen to its normal colours, and prints out the score for the game along with the previous high score, which is retained until the program is ended. You can opt to continue to play if you wish.

```

1 REM*ASTEROID FIELD
5 PRINT"*****ASTEROID FIELD*****"
9 REM*INSTRUCTIONS
10 PRINT PRINT"YOU ARE IN COMMAND OF A SHIP (V) MOVING"
11 PRINT"THROUGH AN ASTEROID FIELD. YOU MUST AVOID THE ASTEROIDS AND"
12 PRINT"SHOOT THE ENEMY SHIPS (N)."

```

```

165 IFL=0 THEN GOTO 1000
170 GOTO 55
300 L=L-1:POKE36879,42
305 POKE36877,220
310 FOR P=15 TO 0 STEP -1
315 POKE36876,P
320 FOR#=1 TO 100
325 NEXT#
330 NEXT P
335 POKE36877,0
340 POKE36876,15
345 POKE36879,14
350 RETURN
400 FOR B=C+22 TO C+68 STEP 22
405 Z=PEEK(B)
410 POKE B,46:FOR T=1 TO 20:NEXT T
415 POKE B,32
420 IF Z=13 THEN GOSUB 600
425 IF Z=90 THEN D=C-10
430 NEXT B
440 RETURN
600 SC=SC+10:IF SC=500 THEN L=L+1
601 POKE36879,25
605 FOR D=1 TO 3
610 FOR#=180 TO 235 STEP 2
615 POKE36876,#
620 FOR#=1 TO 10
625 NEXT#
630 NEXT#
635 POKE36876,0
640 FOR#=1 TO 50
645 NEXT#
650 NEXT D:POKE36879,14
655 RETURN
1000 POKE36879,27:PRINT"███"
1005 PRINT"SCORE=#SC"
1010 PRINT PRINT"HI-SCORE=#HI"
1015 IF SC>HI THEN HI=SC
1020 PRINT PRINT"ANOTHER TRY? (Y OR N)"
1030 GET# IF#="" THEN GOTO 1030
1040 IF#="Y" THEN GOTO 20
1045 IF#="N" THEN GOTO 1050
1050 PRINT"███"
1055 PRINT PRINT"GOODBYE"
1060 END

```

Give your printer a right turn

For producing program listings and hard copies of the screen display, the ZX printer is fine. But for more ambitious applications such as word processing or printing out large tables of results, the 32-character line width is a serious restriction.

Do not despair, though — there is a way to increase the printer's line width to any size you like. Imagine that you could turn the printer on its side to convert character columns to rows and rows to columns. Then you could have any character width you wanted, with a fixed number of 32 rows.

My Right Turn program, written for the 16K Spectrum, does just that. It is so called because the original characters are rotated through 90 degrees to lie on their right sides.

An example of output produced using this program is shown in Figure 1. If you want more than 32 rows, of course, several 32-row 'pages' have to be pieced together.

To load the new character set to a higher RAM address in the 48K Spectrum, just substitute the values in square brackets for those appearing earlier in the line (line numbers 40, 50, and 270). The new character set is stored above a lowered RAMTOP, to allow it to be transferred from one program to another.

Right Turn takes several minutes to run, as 768 decimal-to-binary-to-decimal conversions are carried out. Once the program has finished, you can save the new character set on tape with the direct command: SAVE "chars", CODE 31488,768 (48K version; 64512,768)

To keep you amused while the new character set is created, the original and new characters are shown on the screen in an

Your ZX printout can be broader than it's long. David Nowotnik describes two programs to turn the printer's character set around and use it for word processing

enlarged form. Finally, a screen message appears which uses the new character set, to show you that it has worked.

The new character set is brought into use by altering the value held by the system variable CHARS (line 270, see p173 of the handbook); CHARS is reset to its original value (line 390) before the program stops.

The program could be modified to turn characters anti-clockwise, or upside-down, by altering lines 170-210. Those changes that are necessary are shown in Listing 2.

An example of the use of this new character set is the word processor program in Listing 3. First, use Right Turn to create the new character set starting at address 31488 (for both 16 and 48K Spectrums). After using NEW, type in the program in Listing 3.

The program requires one user defined graphic (UDG) symbol. This is the " " in lines 3050 and 8010, and is used as an end of paragraph marker. Type this as "a" in graphic mode. The UDG is created with the following direct commands:

```
POKE 23676,127
POKE USR"a",0
POKE USR"a"+1,16
```

```
POKE USR"a"+2,64
POKE USR"a"+3,127
POKE USR"a"+4,64
POKE USR"a"+5,16
POKE USR"a"+6,0
POKE USR"a"+7,0
```

Save the program first with the direct command: SAVE "word" LINE 10. Once saved, stop the tape, and enter the direct command to save the character set and UDG: SAVE "chars" CODE 31488,1120. Press Record on your tape recorder, and save the character set so that it follows immediately after the program on the tape. This allows the character set to be loaded automatically when the program is re-loaded.

The printout in Figure 1 describes how the program is used. The program just fits a 16K Spectrum and is limited to one printed page only.

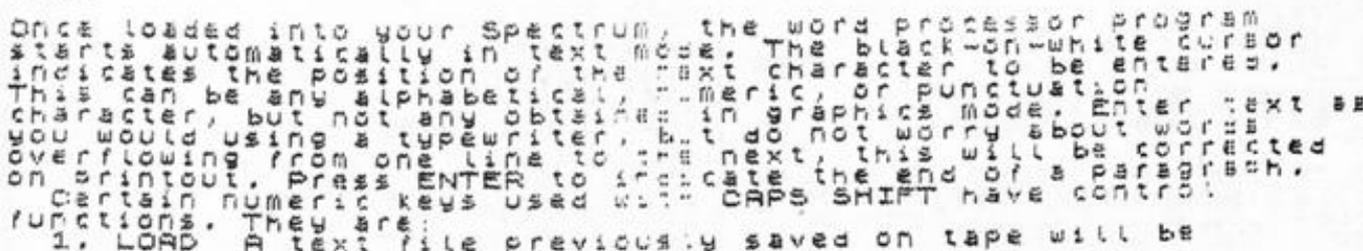
If you have a 48K Spectrum, it is possible to expand the text file (b\$) to hold several pages, although the output routine (line 3000-) will have to be modified to deal with more than one page. Figure 2 lists the main routines and variables used in the program.

Figure 2 — summary of the main routines and variables used in the word processor program

Routines	
100-180	Initialise main variables
500-640	Main routine
530-540	Wait for a keypress
550-580	Check for a valid keypress (alphabetic, number, control or ENTER)
600-640	Print a character and enter in the text file; move cursor to next position, checking for end of text file, end of line, and end of display file
700-740	SCROLL (by overprinting)
750-780	Reverse SCROLL
1000-1050	Load a text file from tape
2000-2030	Save a text file
3000-3500	Print text file; the routine involves line justification, then placing strings of up to 64 characters into a\$ for printing
4000-4040	Move cursor left
5000-5060	Move cursor down
6000-6070	Move cursor up
7000-7040	Move cursor right
8000-8070	End of paragraph marker; place on the screen, and move print position to the next line

Variables	
a\$	Formatted text
b\$	Unformatted text
cur	Cursor position in attribute file
c(8)	Command key CODE numbers
mk	Used in formatting; marks the position reached in a\$
x,y	Cursor co-ordinates on the screen

Figure 1



SPECTRUM PROGRAMMING

```

0000 GO SUB 700
0010 INPUT "NAME - ENTER FILE NO"
0020 SAVE AS DATA B$( )
0030 GO TO 510
0040 REM OUTPUT
0050 PRINT #1, AT 0,4: "AWARI" - P
(leave wait)
0060 POKE 23507,122: LET BK=1
0070 FOR I=32 TO 1 STEP -1: LET
C=1
0080 PRINT HI 20,4: "1" "11" BK "
" BK
0090 FOR J=BK TO BK+63
0100 IF B$(J)="+" THEN GO TO 510
0110 NEXT J
0120 FOR K=BK+63 TO BK STEP -1
0130 IF B$(K)=" " THEN GO TO 514
0140 NEXT K: LET K=BK+63: GO TO
5140
0150 IF J=BK THEN LET B$(BK)=" "
GO TO 5140
0160 FOR G=BK TO J-1
0170 LET A$(C,I)=B$(G): LET C=C+
1
0180 NEXT G: LET BK=1+32*INT ((G
+31)/32): GO TO 5170
0190 FOR G=BK TO K
0200 LET A$(C,I)=B$(G): LET C=C+
1: NEXT G
0210 LET BK=G
0220 NEXT I
0230 FOR J=1 TO 64: LPRINT A$(J,
TO 32): NEXT J
0240 POKE 23507,60: GO TO 500
0250 STOP
4000 REM cursor left
4010 IF cur<22520 THEN GO TO 530
4020 POKE cur,56: LET cur=cur-1
4030 LET x=x-1: IF x<0 THEN LET
x=31: LET y=y-1

```

```

4040 LET tc=tc-1: GO TO 520
4050 REM cursor down
4060 LET tc=tc+32
4070 IF tc>2048 THEN LET tc=tc-3
20: GO TO 530
4080 POKE cur,56
4090 LET y=y+1: IF y>21 THEN GO
TO 5060
4100 LET cur=cur+32: GO TO 520
4110 LET y=y-1: GO SUB 700: GO T
O 510
4120 REM cursor up
4130 LET tc=tc-32
4140 IF tc<1 THEN LET tc=tc+32:
GO TO 530
4150 POKE cur,56
4160 LET y=y-1: IF y<0 THEN GO T
O 5060
4170 LET cur=cur-32: GO TO 520
4180 LET y=y+1
4190 GO SUB 750: GO TO 510
4200 REM cursor right
4210 IF cur>23260 THEN GO TO 530
4220 POKE cur,56: LET cur=cur+1
4230 LET x=x+1: IF x>31 THEN LET
x=0: LET y=y+1
4240 LET tc=tc+1: GO TO 520
4250 REM enter
4260 PRINT AT y,x: "+": LET B$(tc
)="+"
4270 LET x=x+1: IF x>31 THEN LET
x=0: LET y=y+1: GO TO 5040
4280 FOR I=x TO 31: PRINT AT y,x
";": LET x=x+1: LET cur=cur+1:
LET tc=tc+1: LET B$(tc)=" "; NE
XT I: LET y=y+1: LET x=0
4290 LET tc=tc+1: LET cur=cur+1:
IF tc>2048 THEN LET tc=tc-1: LE
T cur=cur-1: GO TO 520
4300 IF y<22 THEN GO TO 520
4310 GO SUB 700
4320 LET y=21: LET cur=cur-32: G
O TO 520

```

ZX81	SPECTRUM	DRAGON	TANDY	BBC
16K	16/48	32	LEVEL 2	A/B

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- ★ The ancient African game of logic. It takes 2 minutes to learn the rules but far longer to master the tactics.
- ★ Select the 'Goat-herd' level of play and it's an addictive game for children (8+) that exercises their minds - not their laser fingers.
- ★ Select the 'Witch-doctor' level and it's a threat to your sanity. We haven't beaten it and we wrote it!

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BBC games: the good, the bad and the ugly



Galaxians
32K BBC
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Superior Software, 69 Leeds Road, Bramhope, Leeds.

Galaxians is another of the old favourites, and whilst this is not a full implementation of the arcade game, nor are any of the others that I have seen. Sadly, none of them have the circling aliens that swoop down at you in formation.

However, the aliens in this game do move about quite a lot and show fiendish intelligence in avoiding your lasers. Just when you think you are safe from one it reverses direction and crashes straight into you — very frustrating.

There are six skill levels — the sixth requiring more skill and dexterity than I have at the moment. The levels are well chosen and should last most players quite some time. A high score table is also included.

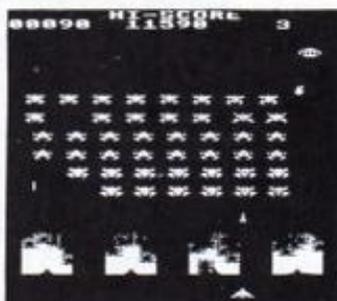
The program loaded first time and contains good instructions. The graphics are well presented and smooth, even when the action gets frantic.

My only complaint is about the sound, which is very exciting at first but begins to grate after a while. This is a common fault that applies to most games and not just Superior Software so how about an option to cut out the sound or at least reduce it, you software writers? D.C.

instructions	80%
playability	80%
graphics	80%
value for money	77%



Our fearless panel of reviewers comes to grips with some new games for the BBC Micro



Invaders
32K BBC
£8.05

Superior Software, 69 Leeds Road, Bramhope, Leeds.

Being asked to write a review about Space Invaders is like being asked to write an original review of the Bible — it can't be done. Everything there is to say about it has been said, but anyway, here goes.



Fruit Machine
32K BBC
£8.05

Superior Software, 69 Leeds Road, Bramhope, Leeds.

Fruit Machine is the only non-arcade-type game from Superior Software. It is also the only program in their catalogue that I would not personally recom-

The program loaded first time, and the instructions are quite adequate, even though this must be the only game that would be usable without instructions. The usual features of different values for the invaders and random mother ships are included, but there is no optional skill level.

As the Invaders near the bases, they speed up, and get very fast near the end. I liked the way the shields cracked and crumbled instead of a slice just disappearing. A high score table for the top ten is provided and you can get back to the title page by pressing ESCAPE. D.C.

instructions	80%
playability	80%
graphics	75%
value for money	65%



mend. It isn't that it is a bad program, indeed, the graphics are excellent, but I just cannot see the point in sitting in front of a screen playing a one-armed bandit. Where's the fun in it without a slot for the winnings to fall out of?

However, the program itself is well written and well presented, only lacking in prompts to remind you of the winning combinations. All the features that you would expect are there: hold, nudge, gamble, collect and so on. D.C.

instructions	55%
playability	40%
graphics	70%
value for money	30%



Centipede
32K BBC
£8.05

Superior Software, 69 Leeds Road, Bramhope, Leeds.

This program, like most of Superior's products, loads in two sections, the first being a short program to identify the suppliers and the second part loading automatically. This program loaded first time every time without any problems. The instructions displayed after loading are clear and concise, but do not include tips. The keys used are Z, X and COPY, and are sensibly chosen.

The aim of the game is stop the centipede reaching the bottom of the screen and eating you. You score 50 points for destroying a section of the body and 100 for a head. To reach a high score, the best tactic is to break the centipede into as many sections as possible, all consisting of just a head worth 100 points.

All the expected items are there including snails, flies and spiders, which gain you points, and mushrooms which act as shields for the centipede. Centipedes appear in blue, green and red with increasing difficulty.

Six skill levels and a high score table for the top five are provided. The screen display is well laid out and smooth in action and the game varies in its start up position and paths taken. D.C.

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



BBC SOFTWARE REVIEWS

Firien Wood 32K BBC £7.50

MP Software & Services, 165 Spital Road, Bromborough, Merseyside L62 2AE.

You either love adventure games or you loathe them. I love them, and this one is a beauty which should appeal to novice and experienced adventurer alike. Your task is to track down the Golden Bird of Paradise which has been captured by an evil wizard lurking somewhere in the heart of Firien Wood.

The game starts by giving a brief description of your surroundings, and then waits for you to type in instructions to determine what it should do next. Instructions are either a direction (eg "NORTH", meaning go north) or a verb followed by a noun (eg ENTER BUILDING). If you are lucky the computer responds with some new information; if you are unlucky it responds with "I don't understand" and you must try something else.

Firien Wood features the usual gamut of fiendish puzzles, magic passwords, knife-throwing goblins, quirky humour, and all

manner of treasures and monsters to be dealt with en route. You can also save a game to tape, ready to be resumed at a later date.

The game is written entirely in machine code which makes for some very fast responses (and also stops you from cheating!) but means the program has to be *RUN rather than CHAINED into the micro.

Although there are no graphics in the game (what do you expect in 32K?) good use is made of colour — non-committal messages usually appear in purple, warning messages in red (severe warning messages in flashing red), useful information in green, magic messages in yellow etc.

It's impossible to fully check an adventure program in a few days, but an initial examination reveals a large number of locations and puzzles to keep an adventurer happy for weeks.

Nice one MP Software! **I.D.S.**

instructions	60%
playability	67%
graphics	10%
value for money	83%



Space Fighter 32K BBC £8.05

Superior Software, 69 Leeds Road, Bramhope, Leeds

This program is a cross between Defender and Scramble with features of both games used to good effect. There are five (yes, FIVE) types of alien to destroy: Mutant (50 points), Swarmer (100), Trimort (150), Baiter (150) and Baryon (150).

The Trimort is particularly nasty and has to be hit three times before it is destroyed. Mutants and Trimorts move randomly, Swarmers move away whilst Baiters and Baryons will try to ram your ship. Asteroids also appear on the screen and will blow you up if you hit them.

An unlimited supply of lasers are at your disposal but you have only three smart (ie homing) bombs needed to destroy the Baryons and Asteroids. A smart bomb will destroy everything on the screen so it is good strategy to use them when lots of Asteroids and Baryons are present. You are governed in your quest by the amount of fuel you have, but do not despair, you can replenish your fuel tanks by destroying a fuel dump.

The program loaded first time and the control keys are well chosen. Six skill levels are available and the instructions state that bonus ships are provided after 10,000 and 20,000 points, but I will have to take this on trust as I could not score above 7,000! A thoroughly enjoyable program, well worth the money — pity that the graphics used for the space ship are not as good as the rest. **D.C.**

instructions	80%
playability	85%
graphics	80%
value for money	90%



Spaceguard 32K BBC £7.50

MP Software & Services, 165 Spital Road, Bromborough, Merseyside L62 2EA.

A fairly simple, but quite addictive arcade game this one! As the "space guard" of the game's title you control a spaceship under attack from various alien vessels determined to turn the screen into a mine field.

Points are scored by firing a laser at the alien vessels (150 points) or the mines they have deposited (50 points), with a bonus 1000 points being awarded for each screen cleared.

Initially, the emphasis is on "space" rather than "guard", screen presentation being a little unimaginative and consisting of a large black space occupied by your ship and a few alien vessels. But with successive screens, more and more alien spacecraft appear, making the game increasingly difficult.

There are three different types of alien vessel, resembling a traditional green space invader, a blue dumb-bell (this splits into two flashing "liquorice allsorts" when hit) and a pair of red lips!

Movement of the player's space ship is by keyboard or joystick. I didn't like using the keyboard because of the close grouping of the keys used to move the ship, but control by joystick was superb and the best I've encountered in any joystick game for the BBC machine.

The graphics are perhaps a little crude (Mode 2 is used for the screen display) but this is more than compensated by the speed of the machine code program and the good use of sound effects. **I.D.S.**

instructions	60%
playability	
-joystick	70%
-keyboard	52%
graphics	57%
value for money	68%



Swamp Monsters 32K BBC £7.50

MP Software & Services, 165 Spital Road, Bromborough, Merseyside L62 2AE.

Swamp Monsters is MP Software's variation on the classic Space Panic arcade game. Pursued by alien monsters (which bear a marked resemblance to Zebedee from "The Magic Roundabout") you control the movement of a robot around a maze of stepping stones set in a deadly swamp.

As your robot moves he can pick up stones, to leave "holes" for the monsters to fall into. Stones can then be dropped on a drowning monster to speed up his demise, or to help form a new path across the swamp.

On starting the game you have the option of using a joystick or the cursor movement keys on the keyboard to control the robot. Unfortunately you cannot switch between the two options without reloading the

whole game. Movement of the robot and pursuing monsters is slow and jerky so that use of the joystick is not really viable, whilst the cursor keys are grouped very closely together making control of the robot from the keyboard more difficult than it should be.

The graphics are quite good, although the robot — a sort of pink paper bag with stick insect arms and legs — looks ridiculous, and I often found it difficult to tell exactly which stone he was standing on.

Once the swamp has been cleared of monsters a fresh lot appear — apparently more intelligent and worth more points if you're watching your robot's score. I say "apparently" because I didn't progress so far as to meet them — I became bored with the game long before I'd cleared the second swamp of monsters. **I.D.S.**

instructions	60%
playability	40%
graphics	60%
value for money	42%



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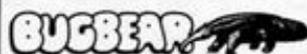
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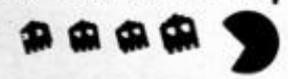


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