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PERSONAL Computer NEWS

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Sir Clive rallies QL support

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Ways with words on your Sinclair

AMSTRAD RS232
Interfacing for modems a & printers

64 GARDEN
Grow for broke in this free game

SHARP MZ800
Bridging the gap in home and business

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With Quest the QL really means business

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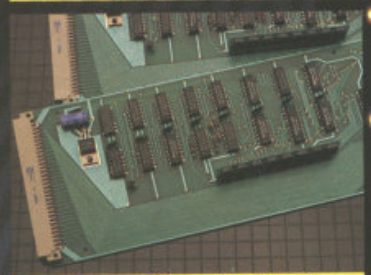
QL Expansion Console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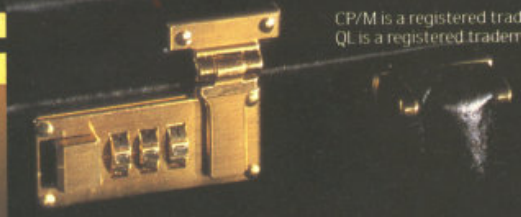

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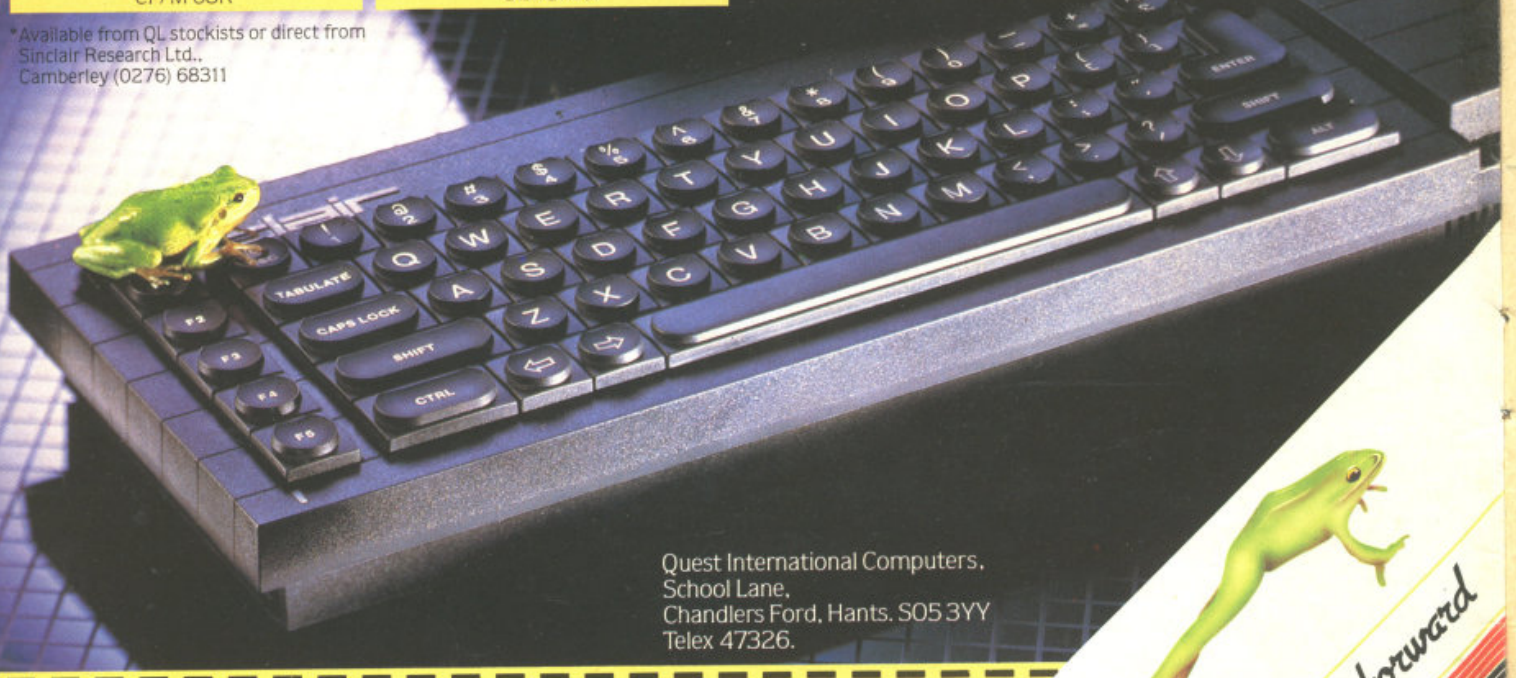

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MENU

COVER STORY

QL queue 2

Sinclair's Quantum Leap opened with a series of no jumps last year but the machine is well in gear and accelerating off the curve into 1985. Upgrades, peripherals and software are generating a buzz of interest around the system. We examine the current state of the QL art, and in Home Front look at the prospects for the system.

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Text any which way but normal is yours with this free listing.

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We investigate Quantum Leap Mechanics and supply — exclusive to *PCN* readers — a handy routine. Inner secrets of system variables revealed.

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Flower power replaces killing invaders as you strive to nurture a plant in time of drought in this neat game.

IBM PC goes to Chequers 21

Sargon III is tried and tested in *PCN*'s monthly chess feature.

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AMSTRAD RS232 30

Amstrad owners feel good! A thumbs up for the RS1 serial interface comes hot on the heels of last week's rave review of drives for the machine.

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PCN whips out the magnifying glass and looks over Sleuth, a Basic-based ROM for the Beeb.

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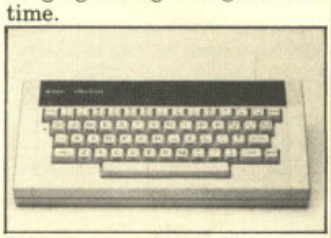
That's quite enough of that for now. Tune in next week.

MONITOR

Acorn waits for home revolution

Acorn hit back angrily last week at the suggestion that it was quitting the home computer market — but it redefined home computing in the process.

It re-affirmed its backing for the Electron and stated its intention to continue to sell micros into the top end of the home computer market — above £300. The new head of its consumer section, Peter O'Keefe, looked forward 'to what people will usefully want to do' with home micros. These things, he said, were wide ranging and growing all the time.



Electron — repackaging planned.

According to Mr O'Keefe they include home entertainment, interactive video, and interactive terminal activities like home banking. Further ahead, he said, there would be home micros used in home control functions, personal computers in home offices, and micros built into motor vehicles.

Acornsoft will concentrate on this consumer section; Acorn's acting chief executive, Alex Reid, said that about 90 per cent of its output was already aimed in this direction.

Dr Reid said firmly: 'We're producing the Electron and continuing to sell the Electron,' and he said that this would remain the case for the rest of the year and possibly beyond. Acorn is also thinking 'very actively' about packaging it (perhaps with joysticks) and bundling it (with software).

He also repeated the plan to produce a new version of the BBC Micro later this year, and decried suggestions that the BBC machine is too old. There will continue to be a market among computer enthusiasts, affluent parents who want the best for their teenage children, and home workers for a quality micro at £400, he said.

He described the relationship with Olivetti as being 'at arm's length'. 'We haven't sat down with Olivetti and gone over individual products,' he said in answer to a question on what Acorn products Olivetti might market elsewhere in the world.

Away from the top-end of the home computer market, the ABC business machines are to be rerouted to scientific and industrial users.

■ See *PCN* next week for a full assessment of Acorn's outlook.

Commodore prices Booted into touch

Commodore's pricing is in tatters with high street retailers giving the Plus/4 treatment to the Commodore 64 and C16.

Commodore cut 50 per cent off the price of the Plus/4 a month ago (issue 99) and Dixons and Boots have reacted by trimming the prices of the 64 and the 16. You should be able to pick up a 64 for £150 or a C16 for £80, but you might have to shop around because stock is becoming scarce.

Boots' Peter Frost said: 'We've told Commodore that we thought the reduction of the Plus/4 price was going to do nothing but confuse the customer.' Its price in relation to the 64, he explained, was difficult for buyers to make sense of in the light of previous Commodore promotions. 'Our prices are likely to be permanent until such time as Commodore can convince us that it has a coherent pricing policy,' he added.

Dixons and other stores led the way in the new round of Commodore cuts, and Boots had to respond to protect its Price Pledge offer. At the new low prices stock will probably be rapidly depleted, but Boots is shifting systems from smaller branches to those that do the lion's share of its business. It also has some stock awaiting refurbishment by Commodore.

Commodore itself is staying tight-lipped. But its prices are under pressure on all fronts. In

C64 — prices Booted into touch.

the US the 64 has been brought down to $150 and in the UK it is normally discounted to around £175.

The C16 has escaped Commodore's price pruning so far, but the machine has never taken over the starter-system mantle of the Vic 20 and recent price cuts to rivals with more memory — the Atari 800XL, the Spectrum Plus and the Electron — have increased the pressure on it.

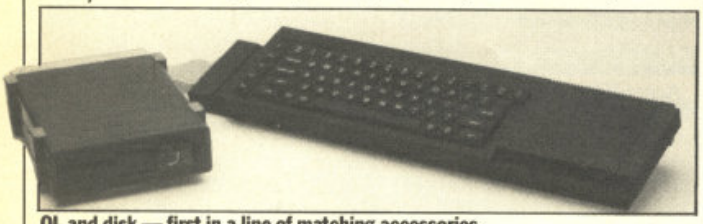
MONITOR

QL support takes a quantum leap at last

A year after its launch the QL is just beginning to look as if it's getting there — and if it doesn't it won't be through lack of effort on the part of Sinclair Research. Last week saw Sir Clive and staff playing host to a number of journalists and, more important, a number of third party manufacturers who are producing software and add-ons for the machine.

The QL hasn't had the best of years, partly because of the unfamiliarity of its 68008 chip and partly because Microdrive cartridges have been expensive. But 68000 programming can be learned, and cartridges are now a more realistic price, so Sir Clive feels the time is ripe for a quantum leap in third party support.

At the end of QL year zero, the machine seems to have gravitated towards a sort of low-key, business machine status. It hasn't achieved anything like the third party support the Spectrum had after its first year, but in hardware terms at least there's enough around for it to form the centrepiece of a credible business system.



QL and disk — first in a line of matching accessories.

There are disk drives available from Medic Datasytems, Micro Peripherals, Quest CST, and Sinclair itself intends to release a ½Mb RAM and disk later this year.

Disk drives now apparently being ten a penny, OEL's QCOM system was the star of the show. QCOM is a three part communications system, consisting of QCON, a communications interface switchable from 75-9600 baud, QCALL, an auto answer auto dial module, and QMOD, which is a 75/1200 or 1200/1200 modem. The assembled kit will put you in touch with Telecom Gold and Prestel, and, if you really have nothing better to do, Micronet 800.

As far as software is concerned, the poor old QL is currently being bombarded with languages, monitors and assemblers. Computer One has Pascal, Forth, a monitor and an assembler, Micro APL has APL, while Metacomco has an assembler, BCPL and Lisp. GST took the opportunity to announce a C compiler, available towards the end of this month.

As for the rest, CP Software had implemented Bridge Player 2 on the QL, while Eidersoft had QL Art, QL Archiver an a machine code screen dump routine.

On the hardware side Eidersoft also had a version of the Quickshot joystick with a QL plug on the end, a cheap (£9.50) printer lead, and QL to Atari joystick converters.

The QL's new ROM, the JS version, is one of a series of Sinclair. A number of new commands are included, but Sinclair's intention in launching JS at this point is to improve Microdrive handling. The new ROM itself is totally compatible with previous versions, but the new commands are partly experimental, and may not be documented until later versions of the ROM are produced. *PCN* will carry full details of them in the next few weeks.

If you're buying a QL in the next few weeks you should make sure you've got the JS version (type PRINT VER$) and that it includes version 2 of the Psion applications.

And in the beginning there was the QL

Last week's all-day seminar ended with what was billed as 'an informal press briefing' by Sir Clive himself. In the event, it was more of a religious rally, at least on the Sinclair side of the table — Sir Clive preaching the QL gospel.

He foresees a rosy future for his latest brainchild. The brightest spot on the horizon is Strathclyde University's commitment to take 7,000 QL systems — one on the desk of every student, and beyond that Sinclair's intention to dominate the university and college computing field.

In addition, OEL's communications package could take the QL into the heavyweight business sphere.

To date, there are 50,000 QL users in Britain but Sinclair is talking of boosting that figure by 200,000 this year. Sir Clive wouldn't be drawn on his hopes for the US market other than to say that managing director Nigel Searle will return to America to head the mail order launch of the machine there.

Sir Clive was boisterous in dealing with questions on the expected competition in the low-cost, 16-bit micro arena from Commodore's Amiga and the ST range from Jack Tramiel's Atari.

'We're not impressed by the competition,' he said. 'I don't belive that Tramiel is in a position to compete. Realistically, he is at least a year behind us.'

● Expert Systems International will add another string to the QL's bow by implementing an interpreter for its Prolog-1 on the QL.

Prolog is an artificial intelligence language and its presence on the QL will make the machine appeal to a completely different type of user. The QL version of Prolog-1 will cost less than £100, Expert Systems says.

● Sinclair has now unveiled new versions of its bundled software. Version 2.0 of Xchange (as Quill, Abacus, Easel and Archive are known collectively) will be supplied with QLs from March 4. Existing QL owners, provided they are paid-up members of QLUB (QL Users Bureau), may claim free upgrades from Sinclair.

The main criticisms of the original suite were that it was very slow to load into memory, spent far too long loading overlays and left little room for data.

Apparently, compression techniques and 'conversion to machine code' make version 2.0 of Xchange load twice as fast, run 20-30 per cent faster, occupy less RAM, and it will no longer be held up by overlays. The revised version of Xchange also supports floppy and hard disks.

What the Sinclair future holds, by Sir Clive

More details have emerged of Sinclair's next major computer projects — the silicon disk drive and the Spectrum portable.

The wafer disk was dubbed by Sir Clive 'the most exciting development in computing this year.' He revealed that it will be launched later this year for the QL offering a ½Mb of storage for around £300.

The unit contains a single, large wafer of silicon and combines the functions of RAM memory and a disk drive. A battery ensures that data is retained when the QL is switched off, or when the drive is disconnected from the machine. It features a power indicator to warn of a low battery charge, and batteries can be changed while the unit is plugged into the QL. As a failsafe, data can be backed up on to Microdrives.

The silicon disk also features in Sinclair's plans for the portable Spectrum, probably in a year's time. Its specification begins to bear out our prediction (issue 42) that the Spectrum would become the Apple II of its time.

The only firm details so far are that it will be Z80-based and will be compatible with Spectrum software. Sir Clive told Wednesday's gathering that a change of interface would allow the silicon disk to be used as main storage on the portable although Microdrives are still an option.

The toughest part of the design is likely to be the display. Sir Clive has ruled out the use of liquid crystal technology, and is looking to further developments on his flat-screen TV.

MONITOR

Radofin gives disks a quick whirl

A 100K disk drive costing about £140 will soon hit the high streets for Sinclair and Commodore owners.

The unit is a 2.8in 'Quick Disk' of the style that's growing in popularity in Japan, and an MSX version should not lag far behind the Spectrum and Commodore 64 models. It comes from Radofin Electronics, which by sheer persistence is shedding the image of the company that picked up the pieces when Mattel dropped the Aquarius.

Radofin's Gary Leboff expects to have drives on sale in this country by mid-April. 'We're not aiming to produce the world's best disk drive or compete with 5.25in drives — the Quick Disk is for the ordinary user who wants an inexpensive form of disk storage,' he said.

A 48K program that might take 12 minutes to load from cassette will take seven seconds from the disk, he said. The unit's operating system, T-DOS, won't take up any user memory and its commands are simple and familiar.

You'll be able to double up on drives. The Quick Disk's interface box has a rear expansion port to hook up a second unit or a ZX printer.

Diskettes are due to cost £1.99 each but the price of the drive will depend on the state of the dollar when the unit goes on sale. 'We're looking at between £129 and £149,' said Leboff, 'but the dollar is making life awkward because all the parts are paid for in dollars.'

At those prices the unit looks attractive on paper. Other disk systems for the Spectrum give you much more storage but their prices start at £200 — the Opus Discovery, for example, was launched two weeks ago at £200 for 180K. The cost per 1K is roughly the same, but Radofin argues that a disk unit for the Spectrum should cost more or less what the micro costs.

The Spectrum unit will be black and the 64 add-on off-white. *PCN* expects to Pro-Test the Spectrum Quick Disk soon.

Gift of the gab costs less for Spectrum

Talking Spectrums are cheaper this week as a result of Cheetah's decision to bring the Sweet Talker's price down to £24.95.

The Sweet Talker package gives you a plug-in module, a demonstration cassette, and an instruction manual.

It uses allophones to increase the quality and scope of your experiments in speech synthesis.

Cheetah calls the price-cut 'aggressive', but it could also be a reaction to events at Currah.

The late Leonardo draws some flak

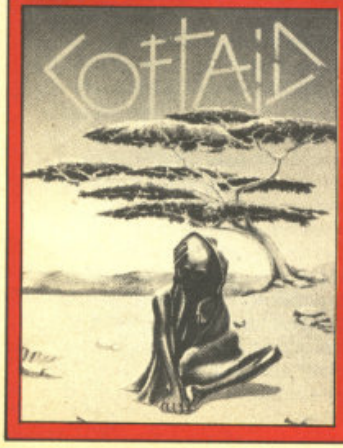
Creative Sparks' slightly delayed Spectrum extravaganza Leonardo is now due to be launched on March 11.

The tale grew in the telling, is what Creative Sparks says of Leonardo, which was advertised as long ago as November. 'This product just kept getting bigger and bigger throughout the final stages of development,' said Gordon Reid, product manager for Creative Sparks.

This growth has led to the inclusion of 18 new functions in the Spectrum equivalent of MacPaint.

There are also three drawing styles with five separate drawing modes, and a number of the functions have been speeded up and improved by machine code routines.

Creative Sparks describes Leonardo as 'arguably the best package of its kind for the Spectrum 48K'. For a program that doesn't officially exist, this is arguably an outrageous claim . . . some would say nonsense.



SOFTLINE — This week saw the software industry's response to the pop world's Ethiopian fund-raising success. Softaid is a compilation of ten chart-toppers for the Spectrum and Commodore 64 and will retail at £4.99. Among the games are Ocean's Gilligan's Gold, Flak (US Gold), Gumshoe (A'n'F), and Ant Attack (Quicksilva). The cassettes also contain two recordings of the Band-Aid song, Do They Know It's Christmas? Softaid will be distributed exclusively by Microdealer (0727-34351) and about £3 per tape will go to the Band-Aid Trust. But for each tape sold another 75p will get only as far as Westminster and the miserly Chancellor's pocket.

VIEW FROM JAPAN

Technology spawns new tyrannies

Technology is supposed to improve the quality of our lives as well as providing jobs for the future. It should be a liberating influence, freeing us from all sorts of drudgery. So you'd expect Japan to be particularly liberated, since this is the country where the cult of technology is the strongest.

Not a bit of it. You only have to look at half the population — the female half. For women, the currents of women's lib and technology ought to be joining forces, but instead they seem to be pulling in opposite directions.

It isn't simply that in Japan, as elsewhere, micros are something that girls don't get interested in, or that business computers are operated by and for men almost exclusively. Technology is reinforcing the traditional role of women in Japan — instead of liberating them it's exploiting them.

The popular image of the Japanese woman is an agreeable one: small, delicate, pretty, unobtrusive, eager to please, and in some ways this isn't far from the truth. Visiting feminists have usually made little headway in this country. But you should remember that in Japan women have had the vote only since the end of the last war — Japanese society doesn't have the foundations for women's liberationists to build on.

So perhaps it isn't surprising that technology is failing to live up to its billing as the twentieth-century's great liberating influence. Women who use technology at work are prone to nervous and physical disorders; women who work on the manufacturing side of the industry are at a disadvantage where pay, hours, and job security are concerned.

'Computer is an enemy of women
Though it glitters and looks clean
It makes a woman cry'

This is part of a poem written by a female worker at the office of an agricultural co-operative. It has apparently become popular among women office workers; as rallying cries go it lacks plenty but it makes its point.

Not that women are suffering alone. Since 1980 NEC, the computer and communications giant, has reported that three in every 100 male workers suffers from stress-induced neurosis; a division chief collapsed at work; two male researchers committed suicide; and there have been cases of experienced men suddenly losing the ability to talk to their colleagues, and of a technician being put into hospital because of a nervous disorder.

What makes the picture gloomier for women is that they have always been lower paid and more expendable than men. Increasingly, their full-time jobs are turning into part-time jobs and the normal working day is turning into a series of shifts.

Against this you have to set the aspects of technology that do help to improve standards of living, but for the people employed by the computer industry it's a high price to pay.

In other parts of south-east Asia the position is far worse. If your micro was assembled in this part of the world, or uses chips sourced here, you can bet that the workers involved don't see themselves as helping to usher in a bright new age of prosperity. There are no dark Satanic mills out here, but apart from that the microelectronics industry could probably compare with the Industrial Revolution where wages and working conditions are concerned.

None of this is supposed to make you feel guilty about enjoying home micros. The product is consumer electronics, with the emphasis on 'consumer' as far as you and I are concerned. If you worried about the processes and the practices that brought every product on to the shelves of shops you'd probably never buy anything, and then there wouldn't be jobs of any kind.

But when people talk about the benefits of technology it's as well to remember that there are disadvantages on the other side of the coin. Perhaps the disadvantages are acute in Japan precisely because the benefits are so well developed. If that is so, every developing country can expect to find the same problems as they move further down the road of automation.

That means the rest of the world. Perhaps it's just a phase that countries go through . . . or perhaps Japan's social structure and traditions make us particularly vulnerable. Either way it isn't a very comforting thought. We must look to the Scandinavians, famous for ergonomics, to come up with something to take the strain — a computer, for example.

Stomu Ng

MONITOR

Amstrad leap frogs to top position

In a big week for Amstrad the company has announced record sales and profits for the last half year and its CPC464 has been voted Computer of the Year by the Computer Traders Association.

Amstrad made £9.5 million on sales of just over £69 million. Chairman Alan Sugar said that the micros sold well in the UK and overseas and made a large contribution to figures that are in marked contrast to the recent results of other home micro makers.

This year's LET show (issue 101) points to the Amstrad gaining enough support to boost it into third or even second place in the UK hierarchy.

With manufacturers producing ROM boards, disk drives, interfaces, and excellent conversions of Spectrum games, all of a sudden the CPC464 is looking very like the BBC Micro.

The sideways ROMs are perhaps the biggest pointer. The first, from Arnor, costs £59.90 for an assembler, disassembler, editor, monitor with an expansion board available very soon that will take other ROMs, including a word processor, comms, tracker ball and touch pad software, and a graphics system.

The other ROM board is from Micro Power, formerly a staunch BBC Micro supporter. This will apparently have four ROM bays.

Other peripherals include a serial interface from RSX systems (see this issue), the same from Timatic and from Amstrad itself a disk drive running CP/M and DR Logo.

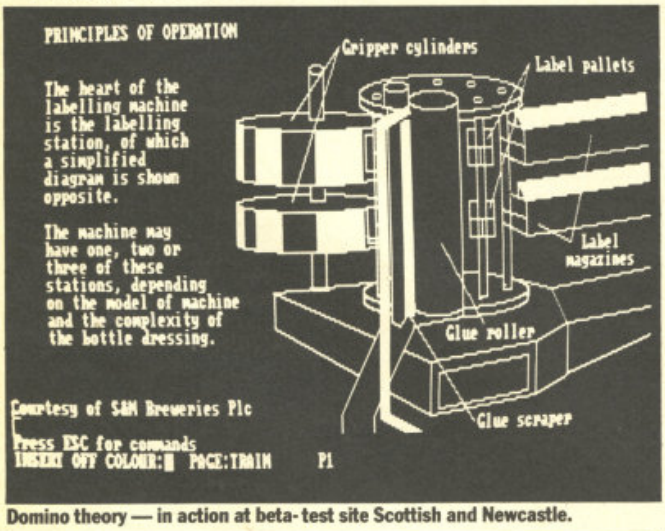
Domino spots a hole in PC market

Compsoft looks likely to set a new style in useful software with its latest product, Domino.

Domino is difficult to put a tag on. It's a new kind of authoring system for the IBM PC and compatibles, and it will set you back £495 when it's released on March 18, but the versatility of the package should be enough to persuade software suppliers to try something similar at a lower price.

The program looks ideal for anybody producing training, testing and examination material. It covers text and graphics design and editing, the making of rolling demonstration screens, test-data capture, and the ability to focus precisely on the user's response.

The approach used — positional co-ordinates — will make mouse-based applications easy to develop. Each page you create has the capacity to accept and act on ten possible replies, and marks can be allocated if you're using this feature in the context of an examination.



Domino theory — in action at beta-test site Scottish and Newcastle.

More jewels in the crown for DR GEM

The momentum behind Digital Research's GEM (Graphics Environment Manager) is building up with the release of the GEM Programmer's Tool-kit.

DR's GEM looks like putting Macintosh-like features on to a wide range of machines at a much lower price (issue 87). The Tool-kit, costing £400, includes an icon editor, resource construction set, language bindings and a debugging tool.

What that little lot should mean is that by the time GEM becomes widely available on production micros the people who develop applications to exploit it should be well prepared. According to DR its GEM seminar in London last week was attended by some turncoat software producers who are already delivering applications for the Mac.

HOMEFRONT

Crowd catches up to lonely QL

Looking for a ray of sunshine in the gloom that has descended on the fens, where better to start than last year's winter downer, the QL?

'This will be the year of the QL,' said a Sinclair man boldly last week. He could have been echoing Sir Clive's words from last year but this time round there are signs that the corner has been turned. More significant may be the fact that other manufacturers are about to spring 68000-based home/business micros on the market — there's nothing like competition for raising public awareness.

The QL has been slow to take off for several obvious reasons and for some obscure ones. There was the initial delay and the kludged nonsense that eventually appeared. There were doubts about the Microdrives, and software publishers hung back. There was uncertainty about what Sinclair intended for the machine, and how far it was going to support it with peripherals from its own stable.

There was also a kind of inverted snobbery about the 68008. The only firm evidence we have of this comes from the Continent, where German users have been unsure of why a home computer needs a 68008 chip. Perhaps this feeling has been more widespread; perhaps users would have felt more at home with something humbler.

But Sinclair didn't intend the QL as a home computer, and even German users must have noticed that there are no games for it. The problem comes down to the QL's identity crisis — nobody knew what the machine was for.

It celebrated its first anniversary in January with fanfares about the riches available to QL users — languages, applications, disks, RAM packs and so on. As we pointed out at the time, several of the items listed were not actually available.

But last week saw two developments that point to a brighter future for the system — upgrades to the operating system and the main applications. There were also implementations of languages to talk about. The QL seems to be maturing.

It won't be a moment too soon. Just over the horizon are Atari's ST series 68000-based micros, due to arrive here by May. Atari claims to be opening a new market with these machines, creating new users.

If Sinclair's promotion of the QL had worked, those new users might already have been created. They inhabit the area between home computer users and business users. There have been attempts to create them in the past, but none has worked. They all lacked what should turn out to be the magic ingredient — the 68000 processor.

Naturally, the processor alone wouldn't make the difference, but where Sinclair and Atari (and later in the year, Commodore with the Amiga system) will score is awareness. The summer promises to be long and troublesome for micro makers. Cash flow problems will probably be a common feature. The companies that can attract limelight and generate interest will help themselves and they'll help others into the bargain because you can already name them.

Atari is one. The ST machines have already attracted enough attention to guarantee them a high degree of interest for the rest of the year. The QL will develop in scope, and if the gloom in the home computer business lingers it will distract attention from the Spectrums Plus and minus.

And as the end of the year approaches, Commodore's visually exciting Amiga will become a focus of interest. All use a processor of the 68000 family; suddenly, everybody will be aware of what these devices can do.

In a sense this will be the lowest common denominator, since the QL, the STs, and the Amiga are as different from each other as Harvey, Kendall and Ball. Each will catch the eye in a different way. It looks certain that the new users due to be created (are you ready out there?) will be doing different things with them.

But the processor's name will be made. Instead of being a series of digits that crops up with monotonous regularity in the technical press it will become a recognisable feature of several widely known systems. Instead of being restricted to high price, high performance business computer it will be available at about the price of the BBC B.

David Guest

ROUTINE ENQUIRIES

Consult the experts with your problems by writing to Routine Enquiries, *PCN*, Evelyn House, 62 Oxford Street, London W1A 2HG.

I'm game for some serious programming

Q Until now I have played games on my Commodore 64 but I have decided to program machine code. I find I enjoy programming more than playing games so I would like to upgrade my system. Which computer would you recommend and how much should I get for a trade-in on my 64?

Richard Dunlop, Portlethen.

A Since you don't say what kind of programs you want to write, it's virtually impossible to answer this question. Assuming you want to write 6502 machine code, what's wrong with your 64? In a sense, it's the ideal machine for low-level programming with loads of memory, colour, excellent graphics and sound and some top quality development tools.

The other possibility is that you want to write commercial software for other machines in which case you'll have to decide whether you're going to write games, or utilities — perhaps even heavy stuff like languages and operating systems, then choose a machine which looks like a winner.

Any machine we could recommend would entail learning a new processor — the QL with the 68008, or the Amstrad with the Z80.

You'll be lucky to find anyone who will accept your 64 in part exchange for a new machine. Selling it secondhand should raise about £100, with perhaps £15 for the cassette recorder. Any software will be worth about a quarter of what you paid for it.

Easy path to Spectrum upgrade

Q Could you tell me if there are companies which could upgrade my 16K Spectrum to 48K?

N Whitting, West Wickham, Kent.

A Yes, lots. Sinclair does one, and although it's the most expensive of the lot, it won't invalidate your warranty. East London Robotics, Guildford (0483-505605 — it's moved on a bit since starting in Barking) does one for £27, while TV Services of Cambridge (0223-311371) does one for £30.

Your best bet is to check the small ads in a few magazines.

Trouble and strife from loading noise

Q How can I eliminate the loading noise from my Spectrum when required? I use it in my living room and it can be a little annoying to my wife when loading long programs from tape.

I am not adverse to a little simple soldering if any explicit instructions are given, but I'm not an expert.

N D Pritchard, Newport, Gwent

A Your problem is similar to one that taxed brains in RAF Strike Command over a number of years — the engine noise of fighter aircraft was so great that pilots tended to hum at very high volumes when on the ground, thus revealing their presence to Soviet agents.

The RAF solved the problem simply by taking the wave form of the engine noise, inverting it then playing it through the pilot's headphones, thus cancelling out the exterior noise, and allowing the pilot to hum quietly. Our hi-fi expert says that you should be able to do a similar job on the Spectrum's speakerette for a couple of quid.

There are, however, easier ways of solving the problem. Solution one is divorce.

Solution two involves variations on the 'cut the beast's vocal chords' theme (the Spectrum, not the wife). If you open up the Spectrum you'll see there are two little wires running into the speakers, and you can either sever them or run one of them through the cutout switch, which will silence your machine when you want.

We should point out, however, that of the two possible solutions, divorce is the one that doesn't invalidate the warranty on your Spectrum.

Software action on the Atari 800XL

Q Can you tell me where I can get the following games for the Atari 800XL? Ghostbusters, Blue Thunder, Bruce Lee, Zaxxon, Decathlon, Air Wolf.

Leslie Hewitt, Bromley, Kent.

A Of the titles you mention, only Zaxxon and Bruce Lee are available for your Atari. Both are distributed in the UK by US Gold and any software retailer worth his salt should be able to order them for you.

CHARTS

GAMES

TW	LW	TITLE	PUBLISHER	MACHINE	PRICE
1	1	Ghostbusters	Activision	SP,C64	£10.00
2	15	Alien 8	Ultimate	SP	£9.95
3	2	Technician Ted	Hewson	SP	£5.95
4	9	Raid over Moscow	US Gold	SP,C64	£9.95
5	3	DT's Decathlon	Ocean	SP,C64	£6.90
6	8	Impossible Mission	CBS/Epyx	C64	£9.95
7	5	Match Day	Ocean	SP	£6.90
8	7	Brian Bloodaxe	Edge	SP	£7.95
9	6	Monty is Innocent	Gremlin	SP	£6.95
10	4	Zaxxon	US Gold	SP,C64,AT	£9.95
11	10	Blockbusters	Macsen	SP,C64,AC	£7.95
12	12	Airwolf	Elite	SP	£7.95
13	—	Frak!	Aardvark	C64,AC	£7.90
14	—	Castle Quest	Micropower	C64,AC	£12.95
15	13	Knight Lore	Ultimate	SP	£9.95
16	—	Blue Max	US Gold	SP,C64	£9.95
17	16	Lords of Midnight	Beyond	SP,C64	£9.95
18	—	Star Strike 3D	Real Time	SP	£5.95
19	11	Elite	Acornsoft	AC	£15.00
20	18	Booty	Firebird	SP,C64	£2.50

SPECTRUM

TW	TITLE	PRICE
1	Alien 8	£9.95
2	Technician Ted	£5.95
3	Ghostbusters	£9.95
4	Raid over Moscow	£9.95
5	Match Day	£6.90
6	Brian Bloodaxe	£7.95
7	Monty is Innocent	£6.95
8	DT's Decathlon	£6.90
9	Zaxxon	£9.95
10	Airwolf	£7.95

COMMODORE

TW	TITLE	PRICE
1	Ghostbusters	£10.90
2	Impossible Mission	£9.95
3	Frak!	£8.95
4	DT's Decathlon	£7.90
5	Raid over Moscow	£9.90
6	Battle for Normandy	£9.95
7	Select 1	£12.49
8	Sentinel	£9.95
9	Lords of Midnight	£9.95
10	Booty	£2.50

MICROS

BELOW £1,000

TW	MACHINE	PRICE
1	Spectrum	£129
2	CBM 64	£199
3	Electron	£129
4	Amstrad	£349
5	BBC B	£399
6	Atari 800XL	£125
7	CBM 16	£140
8	MSX (series)	£250
9	Memotech	£250
10	Einstein	£500

ABOVE £1,000

TW	MACHINE	PRICE
1	IBM PC/XT	£2,349
2	ACT Apricot	£1,760
3	Compaq	£1,795
4	DEC Rainbow	£2,359
5	Wang Professional	£3,076
6	Olvetti M24	£1,595
7	Ericcson PC	£2,095
8	Televideo 1605	£2,640
9	Macintosh	£1,795
10	Columbia	£2,065

These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets during the week up to **February 28**. The games chart is updated every week. The prices quoted are for the no-frills model and include VAT. Information for the top-selling micros is culled from retailers and dealers throughout the country and is updated every month. PCN Charts are compiled exclusively for us by RAM/C, who can be contacted on 01-892 6596.

SHEKHANA COMPUTER SERVICES

★ ★ ★ SPECTRUM ★ ★ ★	RRP	OUR PRICE
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Daley Thomp Decathlon	6.90	4.99
Matchday	7.95	5.50
White Lightning	14.95	12.99
Sherlock Holmes	14.95	11.20
Doomsdarks Revenge	9.95	7.50
Everyone A Wally	9.99	7.25
Trashman	5.95	4.45
Matchpoint	7.95	5.50
Technician Ted	5.95	4.45
Eddie Kidd Jump	7.95	5.95
Dark Star	7.95	5.95
Star Strike	5.95	4.45
Havoc	7.95	5.95
Hunchback II	6.90	5.25
Tir Na Nog	9.95	7.25
Airwolf	6.90	5.20
Pyjamarama	6.95	5.20
Blue Max	7.95	6.50
Pole Position	7.99	6.70
Raid Over Moscow	7.95	6.40
World Cup Football	6.95	5.30
Pitfall II	7.95	6.50
Valkyrie 17	9.95	7.50
Gift of the Gods	9.95	7.50
Kung Fu	6.95	5.50
Project Future	6.95	5.25
Spiderman	9.95	7.50
Manic Miner	5.95	3.50
Cyclone	5.95	4.45
Beachead	7.95	6.70
Sabre Wulf	9.99	7.50
Lords of Midnight	9.95	7.50
Frank N Stein	5.95	4.45
TLL	5.95	4.75
Classic Adventure	6.95	5.50
Monty Mole	6.95	5.50
Full Throttle	6.95	5.50
Twin Kingdom Valley	7.95	6.70
Scrabble	15.95	6.99
★ ★ ★ AMSTRAD ★ ★ ★		
Jet Set Willy	8.95	7.50
Football Manager	7.95	5.95
American Football	9.99	8.25
Flight Path 737	6.95	5.75
Steve Davis Snooker	7.95	5.95
Technician Ted	7.95	6.20
Guide to Basic Part 1	19.99	14.99
Zen — Assembler	19.95	14.99
Jewels of Babylon	6.00	4.75
Message From Andromeda	6.00	4.75
Empire of Karn	6.00	4.75
Forest at Worlds End	6.00	4.75
Chopper Squad	6.00	4.75

★ ★ ★ SPECTRUM ★ ★ ★	RRP	OUR PRICE
Blockbusters	7.95	6.50
Eureka	14.95	11.25
American Football	9.99	8.00
Boulder Dash	7.95	5.95
Run For Gold	7.95	6.50
Jewels of Babylon	6.00	4.99
Alien 8	9.99	8.00
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★ ★ ★ BBC ★ ★ ★		
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Havoc	9.95	7.50
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All Level 9	9.99	8.00
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Kokotini Wilf	6.95	5.20
Zaxxon	9.95	7.50
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Raid Over Moscow	9.95	7.25
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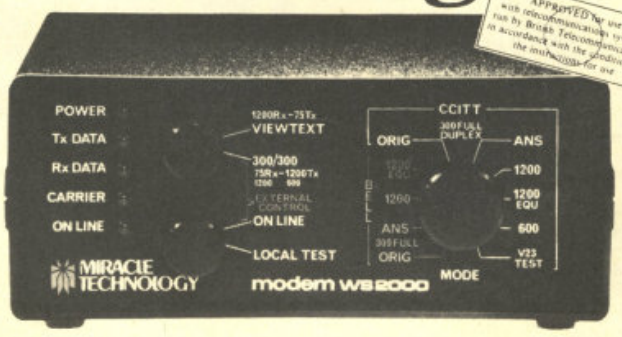

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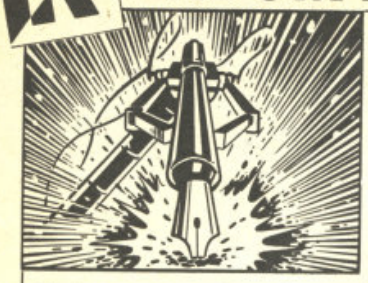

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Oric user gets entry to interpreter . . .

In reply to R Brooksby's question on the subject of the RAM behind the ROM in the Oric. I cannot help with the STZ question except to say 'If they won't tell you about it, it probably doesn't work, like other things on the early 6502s'.

About entry points into the Oric interpreter. If you had a copy of it in RAM, a DEBUG tool could be used to set 'break points' and it should be quite easy to find entry points by experiment.

The RAM which shares the same address space as ROM (#C000 to #FFFF) is accessed by use of the MAP line on the bus expansion socket. A simple machine code routine and some hardware (see M4 series TTL chips) will allow the ROM to be copied into the RAM 'behind' it and the map switched so that the interpreter copy in RAM does the work.

My simple map unit was a prototype for a more extensive map, since the address space can be extended indefinitely by the use of external RAM or ROM (Virtual Memory).

This could provide a plug-in program facility. If anyone were interested in constructing their own Simple MAP Unit, I could supply a circuit diagram, machine code Test and ROM copy routines on cassette and instructions for a small fee to cover research costs; say £8.

According to my circuit diagram of the Oric the ROMDIS line only disables the internal ROM so that *external* RAM or ROM may be enabled to use the address space #C000 to #FFFF. The internal dynamic RAM can only be accessed using MAP.

Dr R Jones,
35 Sanpiper Crescent,
Malvern Link, Worcs.

. . . a fast answer to STZ instruction . . .

The following may be of help to R Brooks by and his problems with the Oric:

1 The STZ instruction is available on the 65CO2 which is the upgraded CMOS version of the 6502. Addressing modes available are absolute (#9C), Zero page (#64), Zero page, x (#74) and Absolute, x (#9E) with the usual number of bytes required for each addressing mode. The numbers in brackets are the hexadecimal operating codes for the modes described.

2 BASIC entry points. Those points that the designers have seen fit to publish are documented in chapter seven of my book, *Getting More From Your Oric*, published by Sigma.

3 The same book contains complete information on such I/O as is possible with the Oric, with the exception that I did not include using the printer port for input.

H Hicks,
St Leonards Gate, Lancs.

. . . and clues to Oric's hidden data sheet

With reference to R Brooksby's letter in Routine Enquiries (issue 99), a data sheet for the CMOS 6502 can be obtained from Rockwell International, Semiconductor Products Division, Heathrow House, Bath Road, Hounslow TW5 9QQ.

Although the Oric 1 and Atmos use an NMOS 6502, the data sheet may provide some clues as to the STZ op-codes.

Unfortunately I cannot help with the ROM calls for VAL, STR$, CSAVE, and PLOT but I have managed to find most of the floating point routines. Perhaps R Brooksby could contact me so that we can compare notes on the Oric.

K Crowley,
23 Cardigan Drive,
Bury, Lancs BL9 9LG.

Expert opinion? You must be joking

The amazing reductions in the prices of computers finally tempted me to invest in a home micro. My search for the best buy took me to a number of city centre stores, including Dixons and Laskys.

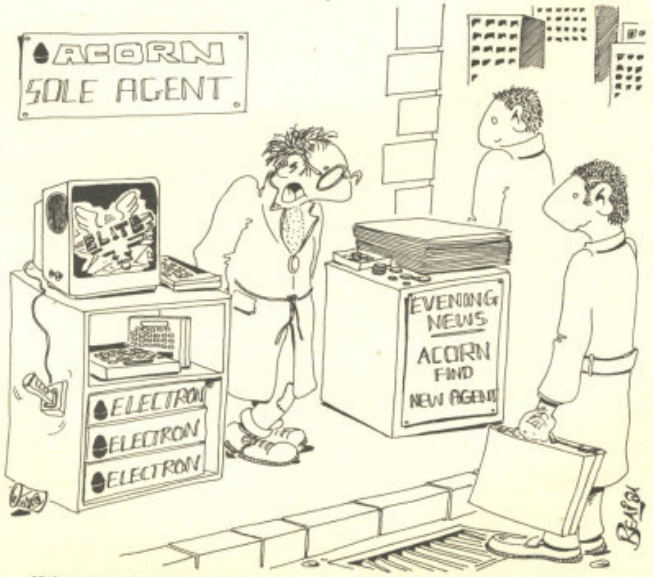
In Dixons, the salesman suggested the Acorn Electron but I declined in view of Acorn's recent financial difficulties; I didn't want a micro from a company that looked as if it was going bankrupt. I was staggered when the salesman admitted that he didn't know that there were problems at Acorn.

At Lasky's, the Atari 800XL, including recorder and some software, was on offer at just under £130. This was just a Lasky's special, I was informed, and nothing to do with Atari.

Bearing in mind the recent reports in *PCN* over the past few weeks I found these statements astonishing. Would it not be possible for *PCN* to send a digest of news to such shops? That way we might be given some honest information, not half-truths.

P K Coleborn,
Birmingham.

Despite laudable efforts on the part of some national retailers, the level of expertise in some stores remains laughable. Of course, PCN *is available to shop assistants as much as to would-be customers — Ed.*



If they drop the price any more, even I won't be able to afford to sell them.

Corrections follow assembler review

I want to thank Simon Williams for his comments concerning the Arnor Assembler (issue 100).

Arnor fully accepts the criticism of the documentation, and this has now been corrected. Maxam now includes a full 50-page instruction manual. Disk and ROM versions include a complete monitor, so all the normal debugging facilities are easily implemented.

I am forced, however, to correct an unfortunate error which crept into the summary and has caused us some embarrassment *ie* the price. The mail order price is £13.50 for cassette, £26.90 for disk and £59.90 for Maxam in ROM. The correct address is PO Box 619, South Norwood, London SE25 6JL.

We will, of course, honour the published price for a period of two weeks, but you will appreciate that I am facing angry customers who have just paid the correct price.

David Fisk,
Arnor, London SE25.

Our humble apologies for the error — and thanks for your generosity — Ed.

Brother takes yet another £ of flesh

Regarding the Brother M1009 printer. I bought mine in October 1984 and it has been in almost daily use with no problems, except that I could not persuade it to print the £ sign.

The printer is coupled to a Spectrum, and although I have Interface 1 fitted, I still use a Kempston Centronics interface to drive the printer.

I use Tasword Two, and while Transform was, as usual, very helpful, it could not solve the £ sign problem. Brother has yet to reply to my letter sent in November.

Your correspondent A R Harford pointed out that the printer dip switches could be 'fiddled with' and having put 2/3 to Off and 2/2 to On, I at last managed to print the £ sign. Incidentally, the hash on key three now prints as a £ as well.

Yes, it's a very nice printer, but Brother has sold itself short with the manual.

Pete Speirs,
Cupar, Fife.

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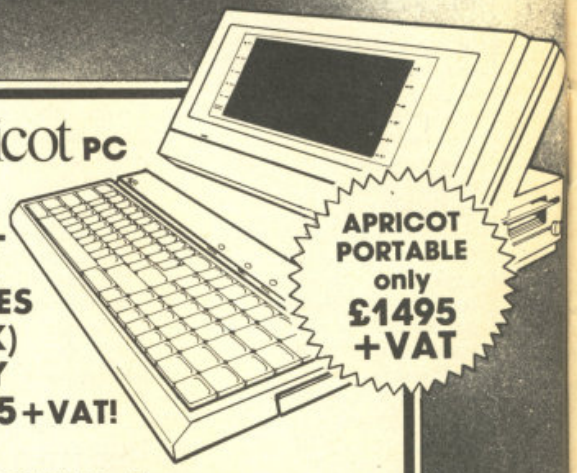

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Stop chattering while reading programs

When loading commercial software, the 1541 disk drive often makes a loud chattering noise while reading the program. This is usually caused by a copy protection technique, whereby the disk drive is forced to read a bad track or sector on the disk.

This repeated vibration of the drive's head could eventually damage the drive, or cause the stepper motor assembly to slip out of alignment.

To protect your disk drive, here is a short program to prevent bumping when going to track one. This is performed by the memory write command in the DOS.

To execute it from Basic, type in the one line program in command mode (*ie* without a line number) and press Return. It should be entered before loading a commercial program.

This program should be about 90 per cent effective, but there will be cases when it will not stop the chattering.

Jan Roland Stromsnes, Mjolkeraen, Norway.

```
OPEN 1,8,15,"M-W"+CHR$(106)+CH
R$(0)+CHR$(1)+CHR$(133):CLOSE 1
```

Beeb game save routine screened

This BBC routine allows users to save a screen of their favourite game at any time during the play. It uses the BBC's facility for trapping events (interrupts) and tests for depression of the '_' key. If the key is pressed then the screen will be saved to disk.

Unfortunately, some games, such as *Elite, Rocket Raid,* and *Meteors* use this interrupt as part of the keyboard control, so the program will not work.

Once the screen has been saved, it can be reloaded with *LOAD SCREEN, as it stands, into Mode 2.

It is possible to use other screen modes simply by changing the address in S$.

The program can easily be altered to work with the tape filing system by making $DISK="TAPE" although a VDU21 will need to be sent to the screen to stop the Record and Return message appearing on the screen.

Steve Johnstone, Colchester, Essex.

```
10FOR PASS=0 TO 3 STEP 3
20P%=&380
30AOPT PASS
40PHA:TXA:PHA:TYA:PHA:PHP
50CMP#ASC("_"):BNE FIN
60BNE FIN
70LDX #(DISK MOD 256)
80LDY #(DISK DIV 256)
90JSR &FFF7
91LDX#(SCREEN MOD 256)
92LDY#(SCREEN DIV 256)
93JSR &FFF7
100.FIN
110PLP:PLA:TAY:PLA:TAX:PLA
120RTS
130.SCREEN
140U
150S$="SAVE"+CHR$(34)+"SCR
EEN"+CHR$(34)+" 3000 8000":$
P%=S$
160P%=P%+LEN(S$)+1
170AOPT PASS
180.DISK
190U
200$DISK="DISK"
210NEXT
220?&220=&80:?&221=&03
230*FX 14 2
```

Oric ROM calls conversion chart

It is very useful when writing machine code programs on the Oric (especially in high resolution), to have the ROM calls available for the various Basic commands.

command	location
PAPER	#F17F
INK	#F18B
CURSET	#F02D
CURMOV	#F064
DRAW	#F079
CHAR	#F0A5
FILL	#F1E5
CIRCLE	#F331
CLEAR HIRES	#EDBC

As an example, when converting the command CURSET 120,100,3 into machine code, each number must be stored in consecutive pairs of memory locations starting at 737 — two bytes for each number.

The following example shows how to do this.

location	contents
737	120
738	0
739	100
740	0
741	3
742	0

The routine may be executed with CALL #F02D or from machine code with JSR #F02D.

Barry Silver, New Ash Green, Kent.

QL screen wrap goes both ways

When writing graphics routines for the Sinclair QL, I noticed that the built-in scrolling routine does not wrap back onto the screen on the opposite side to which it scrolled off.

The following routine solves this problem. It can be called with CALL r. The length is about 70 bytes and, as it stands, it will only scroll from left to right.

S Wilson, Middlesex.

```
10 GOSUB 110
20 FOR T=0 TO 80
30 CALL r
40 NEXT T
50 STOP
110 RESTORE 170
120 r=RESPR(68)
130 FOR a=r to r+62 STEP 2
140 READ b
150 POKE_W a,b
160 NEXT a
170 DATA 9340,2,-32768,12834,-
11012,2,8828,32766,13372,16381,13601,20938,-
4,8828,2,128,9340,2,0,13372,254,13457,-11524,128,-
11012,128,20938,-12,13953,17024,20085
180 RETURN
```

Calculating space in the BBC's buffer

To calculate how much space there is left in the soft key buffer on the BBC, type in:

```
M=&B01:FOR N=0 TO
15:E=-M?N>=E)*M?N:
NEXT:PRINT\255-E)"
BYTES FREE"
```

Stuart W Moore, Horndean, Portsmouth.

Oric simulation of Beeb's Page

A useful command on the BBC is PAGE, which enables a Basic program to load and run virtually anywhere in memory.

The Oric is not blessed with such a feature but can quite easily simulate it. The best way to explain is with an example that sets the bottom of Basic to #2000. Type:

```
NEW
DOKE #9A,#2001
DOKE #9C,#2003
DOKE #9E,#2003
DOKE #A0,#2003
FOR T=#2000 TO #2010:POKE T,0:NEXT
```

Any Basic program you type in will now start at #2000 leaving #500 to #1FFF free for machine code etc. You may CSAVE as normal, but must type in the above before loading or relocating a program.

James Eibisch, Cheltenham.

Simple code confuses prying disassemblers

A neat trick for budding 6502 assemblers, to confuse the prying eyes of the disassemblers, is to put a few &80,&20 bytes strategically placed around your code.

This has no effect on the program at all but when the code is disassembled, the effect can be quite dramatic.

The &80 will cause the 6502 to skip the next byte, whereas the disassembler will either produce an error, or ignore it and produce the &20 as a JSR.

For example, if you had a piece of code such as:

```
LDA &FF [A5 FF]
```

and before it you had put &80, &20, the disassembled version would read:

```
JSR &FFA5
```

which is enough to confuse all but the very wary.

Note that extra instruction may not work on every 6502, as any deviations from the standard instruction set depend on the manufacturer of the chip.

David Barrett, Blackpool, Lancs.

Amstrad wave tops the January pops

Congratulations are in order to D Bright, of the Hague, Holland, for his (or her) Microwave on listing Basic variables on the Amstrad (issue 96). It wins £50 and the accolade of being named Microwave of the Month for January.

FLEXITEXT

Variety is definitely the spice of this listing from David Lockett.
Flexitext allows you to print double height, upside down, sideways and any which way to give your programs that extra zip.

Flexitext provides a flexible character set for the Spectrum. It's ideal for labelling graphs and diagrams, and for improving your program presentation.

The program begins at line 9000; the preceding lines are a demonstration. Lines 9601 onwards hold the data for drawing the characters, stored as letters to save space.

There are six variables to be set when using Flexitext:

- **y** y-axis value for print start (0-175)
- **x** x-axis value (0-255)
- **o** text orientation (1,2,3 or 4)
- **t** text thickness — 1 for normal, 2 for bold, 4 for extra bold
- **h** character height
- **l** character length

The variable a$ holds the text to be printed, and Flexitext is called by GOSUB 9000. As an example, try this:

```
5 LET a$="FLEXITEXT":LET y=100:LET x=100:LET o=2: LET t=4: LET h=2: LET l=2: GOSUB 9000
```

These lines will print FLEXITEXT in the middle of the screen, double size, extra bold and upside down. Once the variables have been set they don't have to be set again every time Flexitext is called. For example:

```
6 LET y=80:LET 0=1:GOSUB 9000
```

would print FLEXITEXT the right way up.

Get to grips with the program by watching the demonstration a couple of times, and then erase all the lines before 9000, and try your own experiments.

AN INTRODUCTION TO FLEXITEXT

NORMAL **BOLD** **AND EXTRA BOLD**
TEXT IS AVAILABLE WITH SOME
FASCINATING VARIATIONS

VARIATIONS

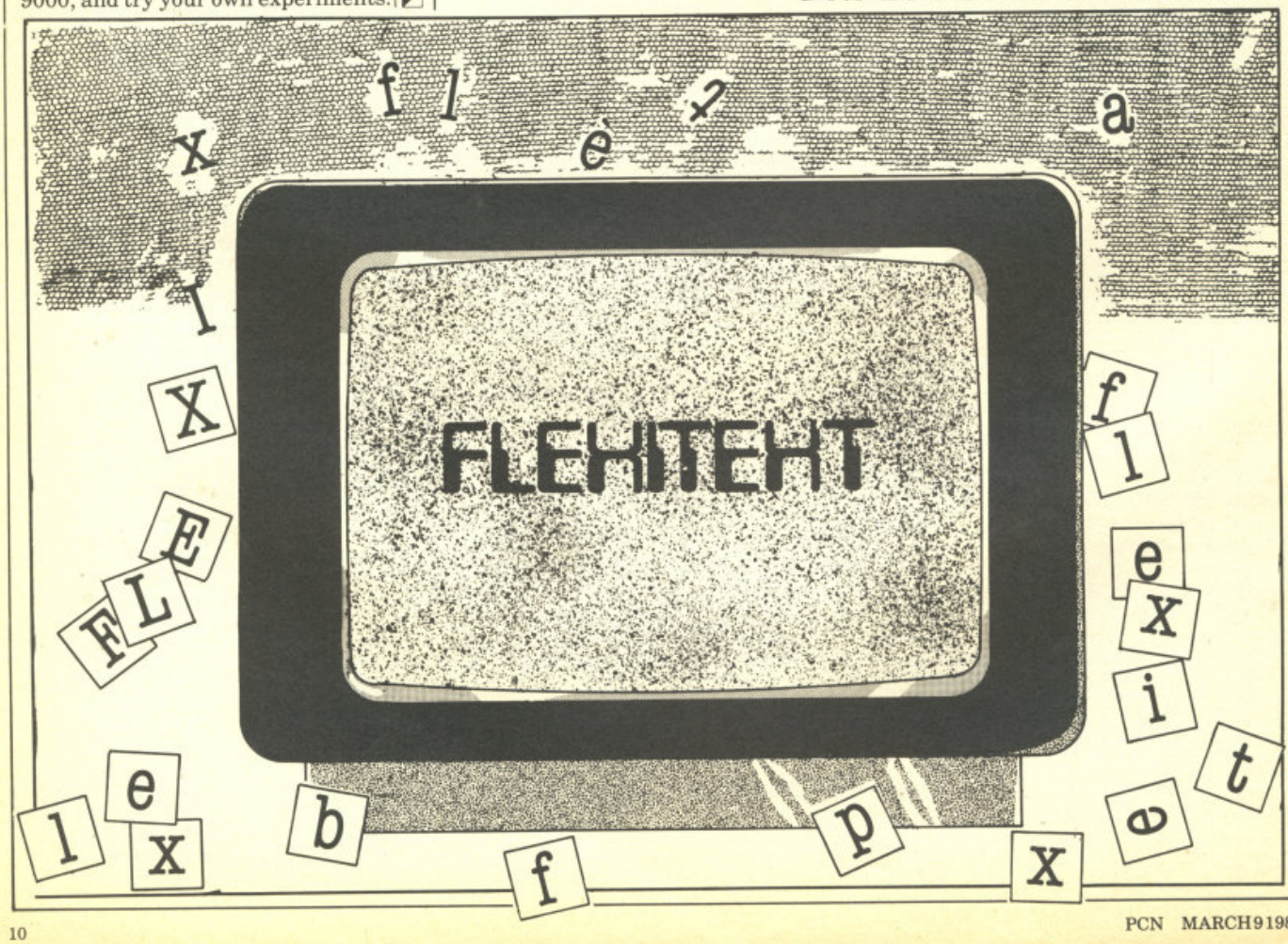
VARIATIONS

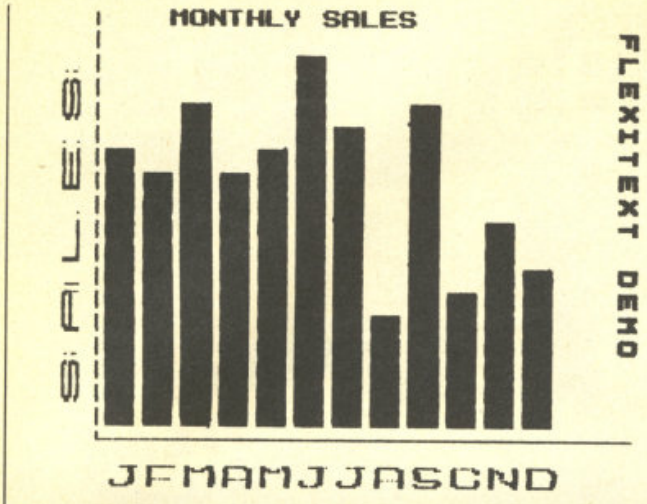
VARIATIONS

VARIATIONS

VARIATIONS

THE MAIN USE IS FOR
LABELLING DIAGRAMS





Listing

```
  10 BRIGHT 1: INK 7: PAPER 0: B
ORDER 1: CLS
  20 LET a$="  AN INTRODUCTION T
O FLEXITEXT": LET y=160: LET x=0
: LET o=1: LET t=1: LET h=1: LET
 l=1: GO SUB 9000
  30 LET a$="NORMAL": LET y=143:
 GO SUB 9000: LET a$="BOLD": LET
 x=64: LET t=2: GO SUB 9000: LET
 a$="AND EXTRA BOLD": LET x=120:
 LET t=4: GO SUB 9000
  40 LET a$="TEXT IS AVAILABLE W
ITH SOME": LET y=134: LET t=1: L
ET x=0: GO SUB 9000
  50 LET a$="FASCINATING": LET y
=125: GO SUB 9000: LET a$="VARIA
TIONS": LET x=92: LET t=2: LET l
=2: GO SUB 9000
  60: LET y=120: LET o=4: GO SUB
 9000
  70: LET y=24: LET o=2: LET l=1
: LET h=3: GO SUB 9000
  80: LET y=80: LET x=0: LET o=1
: LET l=3: LET h=5: GO SUB 9000
  90: LET y=30: LET x=250: LET o
=3: LET l=1: LET h=1: GO SUB 900
0
 100 LET x=130: LET o=1: LET l=1
: LET h=6: GO SUB 9000
 110 LET a$="THE MAIN USE IS FOR
": LET y=10: LET x=100: LET h=1:
 LET l=1: INK 6: GO SUB 9000: LE
T Y=1: LET X=106: LET a$="LABELL
ING DIAGRAMS": GO SUB 9000
 190 FOR k=1 TO 200: NEXT k
 200 BORDER 2: CLS
 210 PLOT 20,165: DRAW 0,-145: D
RAW 225,0
 220 LET i=3: FOR k=3 TO 25 STEP
 2: LET j=INT 14-(RND*12): FOR z
=18 TO j STEP -1: PRINT INK i;AT
 z,k;"  ": NEXT z: LET i=i+1-4*(
i=6): NEXT k
 230 INK 7: LET a$="SALES": LET
y=30: LET x=12: LET o=3: LET h=3
: GO SUB 9000
 240 INK 6: LET a$="JFMAMJJASOND
": LET y=4: LET x=24: LET o=1: L
ET h=1: LET l=2: GO SUB 9000
 250 INK 4: LET a$="MONTHLY SALE
S": LET y=160: LET x=50: LET l=1
: GO SUB 9000
 260 INK 5: LET a$="FLEXITEXT DE
MO": LET y=160: LET x=240: LET o
=4: LET t=4: GO SUB 9000
 270 FOR k=1 TO 200: NEXT k: GO
TO 1
9000 IF o=2 OR o=3 THEN LET l=-1
9010 IF o=2 OR o=4 THEN LET h=-h
9020 FOR z=0 TO LEN a$-1
9025 IF a$(z+1)=" " THEN GO TO 9
100
9030 FOR j=1 TO t
9040 RESTORE 9536+CODE a$(z+1)
9050 READ c$: LET v=CODE c$(1)-1
05: LET w=CODE c$(2)-105
9060 IF o<3 THEN PLOT x+8*z*l+((
j=2 OR j=4)+v*l),y+(j>2)+w*h
9070 IF o>2 THEN PLOT x+(j>2)+w*
l,y+8*z*h-((j=2 OR j=4)-v*h)
9080 FOR c=3 TO LEN c$ STEP 2
9090 LET a=l*(CODE c$(c+(o>2))-1
05): LET b=h*(CODE c$(c+(o<3))-1
05): DRAW a,b: NEXT c: NEXT j
9100 NEXT z: RETURN
9601  DATA "jiinjjlijhigdiniif"
9602 DATA "jiiomijhihhheimijhihh
hei"
9603 DATA "ojhhfihjimjjlijh"
9604 DATA "jiiomijhiehhei"
9605 DATA "oidiilmieiilni"
9606 DATA "jiilmieiilni"
9607 DATA "onhjfihhiejhlijjikgi"
9608 DATA "jiioifniilic"
9609 DATA "jimigiiogimi"
9610 DATA "jkihjhkijjingili"
9611 DATA "jiioifkillfflf"
9612 DATA "oidiio"
9613 DATA "jiiokgjikkic"
9614 DATA "jiiondihio"
9615 DATA "jjimjjlijhiehhfihj"
9616 DATA "jiiomijhihhhei"
9617 DATA "jjimjjlijhifhhhjkghjh
hgihj"
9618 DATA "jiiomijhihhheikilf"
9619 DATA "jjjhlijjjihjfihjijjjl
ijh"
9620 DATA "liiogimi"
9621 DATA "joidjhlijjin"
9622 DATA "joigjhihjhihjiijjjijj
jik"
9623 DATA "joickkjikgio"
9624 DATA "jondihijgkhiijjiihhil
lddih"
9625 DATA "joigjhjiifiljjjjik"
9626 DATA "joniihddni"
```

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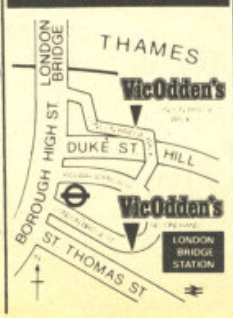

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QUANTUM MECHANICS

Alan Turnbull reveals the inner secrets of your QL's system variables and shows how you can disable the Break key sequence.

The secrets of Quantum Leap Mechanics — details on QL system variables, special tables of information in the QL Read Only Memory (ROM) and, exclusively for *PCN* readers, a single POKE statement that enables the QL programmer to disable the Break key sequence from within SuperBasic are revealed in this article. Let us start by looking at QL system variables.

Static

By 'static variables', I mean the system variables analogous to those present in the ZX Spectrum system. On the QL, they appear at address 28000 (hex) or 163840 (decimal).

The system variables contain information such as pointers to areas of QL memory like Transient Programs (multi-tasking machine code) and Resident Procedures (the space, reserved by RESPR, where machine code additions to SuperBasic reside).

The static system variables may be simply accessed from SuperBasic with PEEK, PEEK_W or PEEK_L statements.

Dynamic SuperBasic

These variables hold information relating to the current state of the SuperBasic system, rather than the QL system as a whole. As the SuperBasic area is dynamic itself (*ie*, it moves around memory as other items change in size), the system variables associated with this SuperBasic area also move around.

For this reason, QDOS — the QL's operating system — keeps a pointer to these dynamic system variables. This is held in the MC68008 processor register A6. For example, the current line number (16-bit word) being executed by SuperBasic is held in the SuperBasic variable, BV_LINUM and is referenced from machine code by $0068 (A6) (*ie*, 0068 (hex) bytes offset from where A6 points).

This article covers the system variables starting at address 28000 (hex) and in particular, the pointers at addresses 2803C, 28040, 28044 and 28048, called SV_PLIST, SV_SHLST, SV_DRLST and SV_DDLST.

SV PLIST: indicates a list of 'polled tasks' or 50/60 Hz interrupt servers. It is these which test for keyboard entry and the Break key sequence.

SV SHLIST: points to a list of tasks which re-schedule the jobs running under QDOS.

SV DRLST: marks a list of device drivers or routines which serve the individual devices wired up to the QL (SER1, CON_, NET0_, etc).

SV DDLST: points to a list of directory device drivers (for MDV_).

Listing 1 shows a SuperBasic program which can be used to print out the contents of the special ROM table pointed to by the system variable SV_DRLST. The information held in the table is:

1. Pointer to next item
2. I/O routine address for this device
3. Open channel routine address
4. Close channel routine address

The output from Listing 1 (for an 'AH' QL) is shown in Figure 1 and this may be used to reveal hidden secrets about the way the various devices are treated on the QL.

The program works by skipping through the linked list of device drivers until a null or zero pointer is found which marks the end of the list.

As the table of polled tasks is stored in a similar fashion to a linked list, it follows that if we set up the pointer in system variable SV_PLIST to zero, we effectively disable all polled tasks.

To disable the Break key use the following as a line in a SuperBasic program:

POKE_L163900,0

and to enable the Break key again, use

POKE_L163900,V

where v is 11270 for 'AH' QLs and is the value returned by the expression PEEK_L(163900) when you first switch on the QL.

This simple method of disabling the Break key from within SuperBasic has only one drawback — all keyboard input is disabled, too. This can be avoided by using KEYROW to read the keyboard directly.

Figure 1

```
Device drivers
Table address =  2650
    Input/output routine =  2896
    Device open routine  =  2666
    Device close routine =  2856

Table address =  3068
    Input/output routine =  14010
    Device open routine  =  3084
    Device close routine =  3198

Table address =  3242
    Input/output routine =  3536
    Device open routine  =  3258
    Device close routine =  3492

Table address =  4190
    Input/output routine =  4320
    Device open routine  =  4206
    Device close routine =  4274
```

Listing 1

```
100 REMark SuperBASIC Program to output contents of Device Driver Table
110 REMark May be used for other tables by altering value in Line 170
120 REMark          COPYRIGHT (c) December 1984, Alan Turnbull
130 :
150 PRINT "Device drivers"
160 PRINT
170 LET table_addr=PEEK_L(163840+4*16+4)
180 REPeat print_out_table_contents
190   IF table_addr=0 THEN EXIT print_out_table_contents
200   PRINT "Table address = "!table_addr
210   LET io_addr=PEEK_L(table_addr+4)
220   LET open_addr=PEEK_L(table_addr+8)
230   LET close_addr=PEEK_L(table_addr+12)
240   PRINT "     Input/output routine = "!io_addr
250   PRINT "     Device open routine  = "!open_addr
260   PRINT "     Device close routine = "!close_addr
270   PRINT
280   LET next_table_addr=PEEK_L(table_addr)
290   LET table_addr=next_table_addr
300 END REPeat print_out_table_contents
```

DRIP DROP

Give your green fingers a spot of spring exercise with this gardening game for the Commodore 64, courtesy of Zack Jones.

You are a gardener desperately trying to keep your flowers growing in time of drought in this game for the Commodore 64. Luckily, a cloud is passing overhead and it starts to rain. You grab your watering can, and run out underneath the cloud to catch the sparse raindrops. All the time you empty the can onto the flower which grows.

When the rain stops, one of two things happens — either the flower is tall enough and you are allowed another garden, or you have not watered it satisfactorily and you have to start again.

Controls are L for left, ; for right and S waters the flower. Remember that you happens — either the flower is tall

There are two listings; the loader program and the main program. The loader program should be run first, as it contains all of the data for the characters, sprites, and a downwards machine code scroll.

If any of the data statements have been typed incorrectly, then line numbers 830-850 should detect these errors.

Then load and run the main program to play the game. Make sure that you save both of the programs before running them.

Finally, here are some hints to obtain high scores:

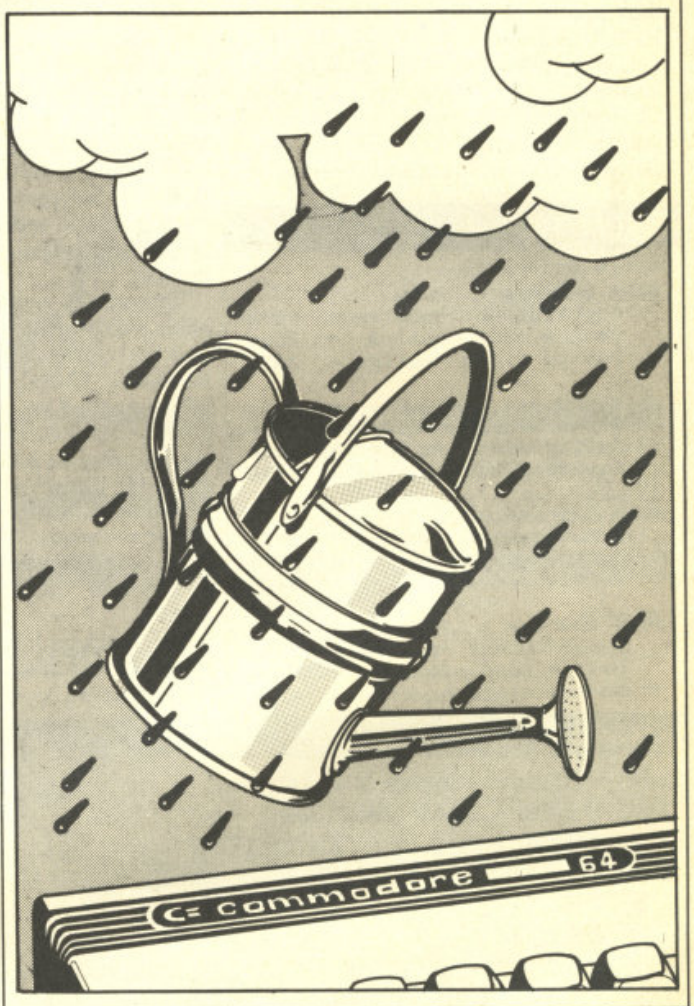
1 Don't let the flower grow to its full height until the cloud has finished dropping raindrops. This allows you to get the maximum bonuses for the growth of the flower.

2 Keep the watering can as full as possible, for example on the first frame you get one point for the first drop, up to 11 for the last drop of water in the watering can.

If you fill the can and let one drop out at a time and then catch another drop you will get 11 points for each drop.

Loader

```
10 REM LOADER PROGRAM
20 POKE53280,6:POKE53281,14:PRINTCHR$(8)
CHR$(142)
30 PRINT"[CLEAR][DOWN][DOWN][DOWN][DOWN]
[DOWN][DOWN][BLUE]                    DRIP  DR
OP"
40 PRINT"[DOWN][DOWN]                      [BLA
CK](C) 1985"
50 PRINT"[DOWN][DOWN][BLUE]                ZA
CHARIAH JONES"
60 PRINT"[DOWN] PUTTING DATA IN MEMORY -
 PLEASE WAIT"
70 REM
80 REM"  [s T]HANKS TO [s T]RACY [s F]OW
LER FOR HER HELP.
90 REM
100 DATA128,96,120,192,96,108,224,96,102
,112,96,99,56,96,99,28,96,99,14,96,99
110 DATA7,96,102,3,224,102,1,224,108,0,2
24,120,0,127,240,0,0,0,0,0,0,0,0,0,0
120 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,128,96,120,192,96,108,224,96,102
130 DATA112,96,99,56,96,99,28,96,99,14,9
6,99,7,96,102,3,224,102,1,224,108,0
140 DATA255,248,0,127,240,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
150 DATA0,0,0,128,96,120,192,96,108,224,
96,102,112,96,99,56,96,99,28,96,99,14
160 DATA96,99,7,96,102,3,224,102,1,255,2
36,0,255,248,0,127,240,0,0,0,0,0,0,0,0
170 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,128,96,120,192,96,108,224
180 DATA96,102,112,96,99,56,96,99,28,96,
99,14,96,99,7,96,102,3,255,230,1,255
190 DATA236,0,255,248,0,127,240,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
200 DATA0,0,0,0,0,0,128,96,120,192,96,10
8,224,96,102,112,96,99,56,96,99,28,96
210 DATA99,14,96,99,7,127,230,3,255,230,
1,255,236,0,255,248,0,127,240,0,0,0,0
220 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,128,96,120,192,96
230 DATA108,224,96,102,112,96,99,56,96,9
9,28,96,99,14,127,227,7,127,230,3,255
240 DATA230,1,255,236,0,255,248,0,127,24
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
250 DATA0,0,0,0,0,0,0,0,0,0,0,0,128,96,120
,192,96,108,224,96,102,112,96,99,56
260 DATA96,99,28,127,227,14,127,227,7,12
7,230,3,255,230,1,255,236,0,255,248
270 DATA0,127,240,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,128
280 DATA96,120,192,96,108,224,96,102,112
,96,99,56,127,227,28,127,227,14,127
290 DATA227,7,127,230,3,255,230,1,255,23
6,0,255,248,0,127,240,0,0,0,0,0,0,0
```




```
300 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,128,96,120,192,96,108,224
310 DATA96,102,112,127,227,56,127,227,28
,127,227,14,127,227,7,127,230,3,255
320 DATA230,1,255,236,0,255,248,0,127,24
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
330 DATA0,0,0,0,0,0,0,0,0,0,0,0,128,96,120
,192,96,108,224,127,230,112,127,227
340 DATA56,127,227,28,127,227,14,127,227
,7,127,230,3,255,230,1,255,236,0,255
350 DATA248,0,127,240,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
360 DATA0,128,96,120,192,127,236,224,127
,230,112,127,227,56,127,227,28,127,227
370 DATA14,127,227,7,127,230,3,255,230,1
,255,236,0,255,248,0,127,240,0,0,0,0,0
380 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
```

```
0,0,0,0,0,0,0,0,128,127,248,192,127
390 DATA236,224,127,230,112,127,227,56,1
27,227,28,127,227,14,127,227,7,127,230
400 DATA3,255,230,1,255,236,0,255,248,0,
127,240,0,0,0,0,0,0,0,0,0,0,0,0,0,0
410 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,12
,0,0,12,192,0,15,192,0,15,0,0,12,0,3
420 DATA204,0,0,204,0,0,60,48,0,12,240,0
,15,192,3,15,0,3,204,0,0,204,0,0,252
430 DATA0,0,60,0,0,12,0,0,12,192,0,15,19
2,3,15,0,0,204,0,0,60,0,0,0,0,0,0,0
440 DATA0,0,0,0,0,0,0,0,0,0,0,42,0,0,166
,128,2,153,160,10,102,104,10,102,104
450 DATA9,149,152,10,102,104,10,102,104,
2,153,160,0,166,128,0,42,0,3,8,48,3
460 DATA204,240,0,204,192,0,63,0,0,12,0
470 REM END OF SPRITE DATA
480 DATA255,255,255,255,255,255,255,255,
24,60,102,126,102,102,102,0,124,102,102
490 DATA124,102,102,124,0,60,102,96,96,9
6,102,60,0,120,108,102,102,102,108,120
500 DATA0,126,96,96,120,96,96,126,0,126,
96,96,120,96,96,96,0,60,102,96,110
510 DATA102,102,60,0,102,102,102,126,102
,102,102,0,60,24,24,24,24,24,60,0,30
520 DATA12,12,12,12,108,56,0,102,108,120
,112,120,108,102,0,96,96,96,96,96,96
530 DATA126,0,99,119,127,107,99,99,99,0,
102,118,126,126,110,102,102,0,60,102
540 DATA102,102,102,102,60,0,124,102,102
,124,96,96,96,0,60,102,102,102,102
550 DATA60,14,0,124,102,102,124,120,108,
102,0,60,102,96,60,6,102,60,0,126,24
560 DATA24,24,24,24,24,0,102,102,102,102
,102,102,60,0,102,102,102,102,102,60
570 DATA24,0,99,99,99,107,127,119,99,0,1
02,102,60,24,60,102,102,0,102,102,102
580 DATA60,24,24,24,24,0,126,6,12,24,48,96,
126,0,60,48,48,48,48,48,60,0,8,28,28
590 DATA62,58,123,54,28,60,12,12,12,12,1
2,60,0,0,24,60,126,24,24,24,24,0,16
600 DATA48,127,127,48,16,0,0,0,0,0,0,0,0
,0,24,24,24,24,0,24,24,0,0,0,0,0,112
610 DATA249,255,255,0,0,0,0,58,255,255,2
55,0,0,0,0,30,191,255,255,0,0,0,0,0
620 DATA227,255,255,60,102,60,56,103,102
,63,0,6,12,24,0,0,0,0,0,12,24,48,48
630 DATA48,24,12,0,48,24,12,12,12,24,48,
0,0,102,60,255,60,102,0,0,0,24,24,126
640 DATA24,24,0,0,0,0,0,0,0,0,24,24,48,0,0
,0,126,0,0,0,0,0,0,0,0,0,0,24,24,0,0
650 DATA3,6,12,24,48,96,0,60,102,110,118
,102,102,60,0,24,24,56,24,24,24,126
660 DATA0,60,102,6,12,48,96,126,0,60,102
,6,28,6,102,60,0,6,14,30,102,127,6
670 DATA6,0,126,96,124,6,6,102,60,0,60,1
02,96,124,102,102,60,0,126,102,12,24
680 DATA24,24,24,0,60,102,102,60,102,102
,60,0,60,102,102,62,6,102,60,0,0,0,0
690 DATA24,0,0,24,0,0,0,0,24,0,0,24,24,4
8,14,24,48,96,48,24,14,0,0,0,126,0
700 DATA126,0,0,0,112,24,12,6,12,24,112,
0,1,2,4,8,16,32,64,128
710 REM END OF CHARACTER DATA
720 DATA160,111,185,0,135,153,40,135,136
,192,255,208,245,160,39,185,216,134
730 DATA153,0,135,136,192,255,208,245,16
0,215,185,0,134,153,40,134,136,192
740 DATA255,208,245,160,39,185,216,133,1
53,0,134,136,192,255,208,245,160,215
750 DATA185,0,133,153,40,133,136,192,255
,208,245,160,39,185,216,132,153,0,133
760 DATA136,192,255,208,245,160,215,185,
0,132,153,40,132,136,192,255,208,245
770 DATA160,39,169,32,153,0,132,136,192,
255,208,248,96
780 REM END OF MACHINE CODE DATA
790 POKE56,131:POKE55,255:CLR
800 FORI=35840TO36734:READA:POKEI,A:TS=T
S+A:NEXTI
810 FORI=34816TO35327:READA:POKEI,A:TC=T
C+A:NEXTI
820 FORI=38912TO39015:READA:POKEI,A:TM=T
M+A:NEXTI
830 IFTS<>61581THENPRINT"ERROR IN SPRITE
 DATA":END
840 IFTC<>31105THENPRINT"ERROR IN CHARAC
TER DATA":END
850 IFTM<>16108THENPRINT"ERROR IN MACHIN
E CODE DATA":END
860 PRINT"[DOWN][WHITE]NOW LOAD AND RUN
THE MAIN PROGRAM"
```

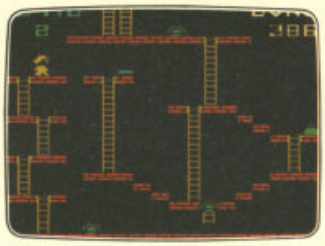
Listing

```
10 REM MAIN PROGRAM
20 DEFFNR(X)=RND(1)*X
30 D=33792:C=55296:V=53248:S=54272
40 POKE648,132:POKE56576,197:REM MOVE VI
C CHIP TO 3RD 16K PAGE
50 POKE650,255
60 FORI=0TO28:POKES+I,0:NEXTI
70 POKES+24,15
80 REM VOICE 1
90 POKES+0,0:POKES+5,1:POKES+6,24
100 REM VOICE 2
110 POKES+7,0:POKES+12,1:POKES+13,247
120 REM VOICE 3
130 POKES+14,0:POKES+19,1:POKES+20,244
140 GOSUB710
150 POKE53281,15:POKE53280,5:TI$="000000
"
160 FF=1:SC=0
170 DR=201
180 PRINT"[CLEAR][DOWN][DOWN][DOWN][DOWN
][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DO
WN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][
DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN
][BLUE]SCORE :          [c 2]@@@@@@@@@    "
CHR$(31)"DROPS :";
190 WS=0:FW=0
200 POKEV+21,0:FORI=0TO5:POKEV+I,0:NEXTI
210 FORI=920TO959:POKED+I,34+FNR(3):POKE
C+I,9:NEXTI
220 POKED+1016,61:POKEV,160:POKEV+28,3:P
OKEV+39,7:POKEV+38,5
230 POKEV+37,2:POKEV+29,3:POKEV+23,3:POK
EV+27,3:POKED+1017,60:POKEV+2,160
240 FH=30
250 CA=D+1018:CX=174:POKEV+41,0:CF=0:POK
EV+5,140
260 PRINT"[HOME]":FORI=0TO21:PRINT"
                                        ":NE
XTI
270 POKEV+21,7
280 IFDR>0THENPOKED+1+FNR(38),28
290 SYS38912:DR=DR-1
300 REM PUT FLOWER ON
310 AA=PEEK(197):A=PEEK(56320):IFAA=42OR
(AAND4)=0THENCX=CX-8:IFCX<22THENCX=22
320 IFAA=50R(AAND8)=0THENCX=CX+8:IFCX>3
18THENCX=318
330 IFAA<>13AND(AAND16)THEN360
340 IFCX<157ORCX>207THEN360
350 IFCF>=1THENFW=FW+3:CF=CF-1
360 POKECA,48+CF:POKEV+16,-(CX>255)*4:PO
KEV+4,CXAND255
370 IFCF>10ORPEEK(D+439+INT(CX/8))<>28TH
EN400
380 CF=CF+1:SC=SC+(INT(CF)*FF):POKED+439
+INT(CX/8),32
390 POKES+15,60-CF:POKES+18,33:POKES+18,
32
400 POKEV+1,230-FH
410 IFFH>17THENPOKEV+3,272-FH
420 IFFH<18THENPOKEV+3,255
430 IFFH>75THEN520
440 IFFH<5THEN600
450 FH=FH-(FW>0)-FF/20-WS+2*(DR<-22):IFF
W>0THENFW=FW-1
460 FS=FH*200:POKES+1,FS/256:POKES,FSAND
```

SILVER RANGE

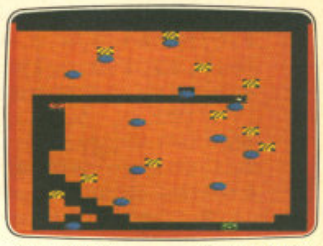
Seeing

001 Arcade VIC 20 (UNEXPANDED)
SNAKE BITE – Simply the slitheriest game of its kind.

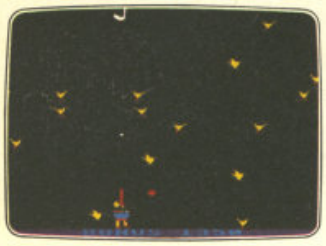


002 Arcade, VIC 20 (UNEXPANDED)
MICKEY THE BRICKY – Four screens packed with fun.

003 Arcade BBC MICRO B
BIRD STRIKE – Wing the planes and shoot the pigeons.



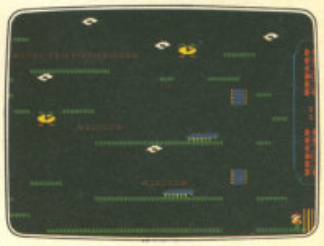
004 Arcade BBC MICRO B
GOLD DIGGER – The hazards of digging for gold down under.



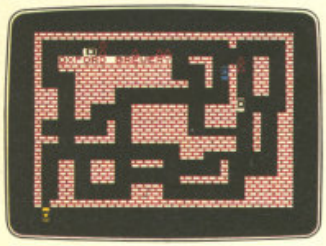
005 Arcade BBC MICRO B
DUCK! – Comedy and music in this duck shoot.

013 Arcade BBC MICRO B
ACID DROPS – Fly through to tackle the mutant spinners.

022 Arcade BBC MICRO B
ESTRA – Recover the sacred statue of Estra the snake god.



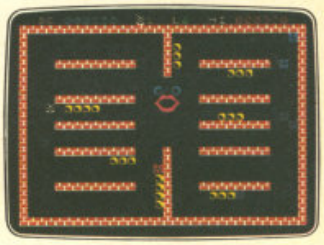
023 Arcade/Strategy BBC MICRO B
THE HACKER – Terminal to modem, telephone network to mainframe.



006 Arcade SPECTRUM 16K/48K
RUN BABY RUN – Multi-car cop chase and shoot-out.

009 Arcade SPECTRUM 16K/48K
TERRA FORCE – Terra man defends earth against all odds.

010 Arcade SPECTRUM 16K/48K
MENACE – What happens when teacher turns his back.

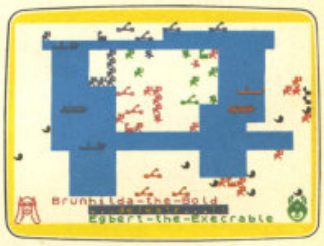


021 Arcade SPECTRUM 16K/48K
CRAZY CAVERNS – Ten crazy caverns, ten hungry mouths to feed.

007 Arcade SPECTRUM 48K
EXODUS – Strange creatures emerging from the pits.

014 Arcade/Strategy SPECTRUM 48K
MR. FREEZE – Six compartments, each tougher to de-ice.

016 Arcade Adventure SPECTRUM 48K
BOOTY – Twenty holds crammed full of pirate loot.



008 War Game SPECTRUM 48K
VIKING RAIDERS – A test of strategy against the computer or friends.

SCREEN PRINT SERVICE

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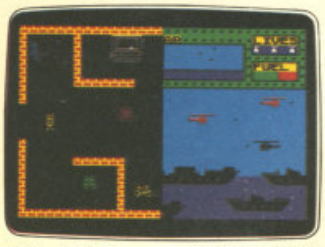

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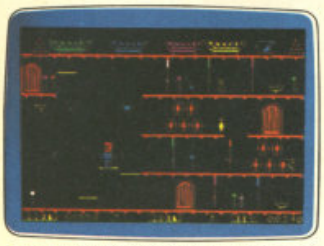

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Listing (cont)

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```
255:POKES+4,17:POKES+4,16
470 WS=WS+.0001:SC=SC-(((FH-30)*(FH>30))
/10)*FF
480 CF=CF-(FF-1)/50:IFCF<0THENCF=0
490 IFFH<28THENPOKES+8,FH:POKES+11,17:PO
KES+11,16
500 PRINT"[HOME][DOWN][DOWN][DOWN][DOWN]
[DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOW
N][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][D
OWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN]
[RIGHT][RIGHT][RIGHT][RIGHT][RIGHT][RIGH
T][RIGHT]"INT(SC);:IFDR>=0THENPRINTTAB(3
4)DR"[LEFT] ";
510 GOTO280
520 REM FLOWER GROWN TALL
530 POKEV+21,0
540 PRINT"[CLEAR][DOWN][DOWN][DOWN][BLUE
]          YOU SAVED THE FLOWER !!"
550 FF=FF+1
560 PRINT"[DOWN][DOWN][PURPLE]
NOW GO ON TO FRAME"FF
570 IFFF=2THENPRINT"[DOWN][DOWN][BLACK]W
ATCH OUT FOR THE LEAKY WATERING CAN !!"
580 FORI=1TO1000:NEXTI
590 GOTO170
600 REM FLOWER DIED
610 POKEV+21,0
620 PRINT"[CLEAR][DOWN][DOWN][DOWN][DOWN
][DOWN][BLUE]          THE FLOWER HAS DIE
D !!":POKE53280,7:POKE53281,7
630 IFINT(SC)>INT(BS)THENPRINT"[DOWN][BL
ACK]      BUT YOU HAVE THE BEST SCORE !"
640 PRINT"[DOWN][RED]                YOUR SCO
RE : "INT(SC)
650 IFSC<=BSTHENPRINT"[DOWN]                B
EST SCORE : "INT(BS):GOTO670
660 BS=INT(SC)
670 PRINT"[DOWN]                    PRESS ANY
KEY"
680 FORI=0TO10:GETA$:NEXTI
690 GETA$:IFA$=""THEN690
700 GOTO140
710 POKE53272,21:POKE53280,5:POKE53281,5
720 PRINTCHR$(142)CHR$(8)"[CLEAR]
[BLACK]COMMODORE 64   "CHR$(5)"DRIP DROP"
730 PRINT"[DOWN]          FROM ZACHARIAH J
ONES"
740 PRINTTAB(15)"[DOWN][YELLOW](C)1985":
PRINT"        FOR PERSONAL COMPUTER NEWS"
750 PRINT"[DOWN]THE PURPOSE  OF THE GAME
  IS TO KEEP THE";
760 PRINT"FLOWER ALIVE !!. YOU DO THIS B
Y CATCHING";
770 PRINT"RAINDROPS  IN  THE  WATERING
CAN,   AND";
780 PRINT"WATERING THE FLOWER. BUT BEWAR
E !... FOR";
790 PRINT"THE RAINCLOUD ONLY CONTAINS 20
0 DRIPS."
800 PRINT"[DOWN]  CONTROLS : L - LEFT,
 ; - RIGHT"
810 PRINT"                S - WATER (SPRINK
LE)"
820 PRINT,"[DOWN]OR USE THE JOYSTICK":PR
INT"        (FIRE BUTTON TO SPRINKLE)"
830 PRINT"[DOWN][DOWN][DOWN][BLUE] PRESS
 ANY KEY OR GAME BUTTON TO START";
840 GETA$:A=PEEK(56320)
850 IFA$=""ANDA=127THEN840
860 POKE53272,19:RETURN
```


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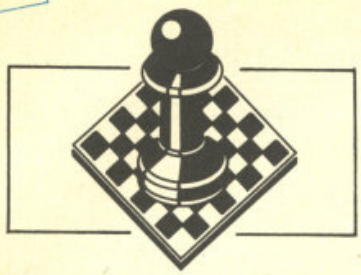


CHEQUERED CAREER

Tony Harrington puts Sargon III to the test and finds that it's a good upgrade of Sargon I and II: John Nunn tries it in action.

Since designers Dan and Kathe Spracklen have already tested *Sargon IV* in competitions, you might get the impression that *Sargon III* is outmoded. In fact, it's practically impossible to get hold of it in this country, so I had to get the review copy direct from Hayden Software.

This exercise is well worth the effort, if only because the Spracklens' reputation makes any new program from them of interest. But though this latest is by no means the strongest of programs, it plays a mean — and in some cases unnerving — game.

Sargon III is disk based, running on the IBM PC and XT, and the Apple Macintosh. I tested it on an XT, which produced some weird graphic results, but it ran fine on an IBM PC.

Sargon III has all the features you expect from a screen-based chess program and also enjoys the advantage of a potentially huge user base.

As far as I know, this is the only chess program that runs on the PC. It costs $19.50.

As far as playing strength is concerned, it is some way behind the Spracklens' programs for the Fidelity range of dedicated chess computers, such as the Fidelity Elite and the Fidelity Elegance. But it is much stronger than the old *Sargon I* and *II* programs that Apple users in particular will remember.

Aside from the excellent manual, a major plus feature is that the reverse side of the disk contains 107 Great Games compiled and annotated — in the manual, at least — by US chess master Boris Baczynskyj. The point is that you can instruct the program to give you an animated move by move display of any or all of these games. Included are such historic clashes as the 1866 Anderssen-Steinitz encounter in London, and the 1974 Karpov-Korchnoi head-to-head in Moscow.

You can also build up a file of your own games against the computer, saving them to disk and calling them up whenever you want to relive past glories.

One strong point about designing a program for a proper business machine is that full use can be made of the printer facilities. *Sargon III* can be made to print out a diagram of the current board position at any point in a game (by typing Control-W) and a full list of the moves to date (Control-P).

A novelty of this program is its preference for fianchettoing its Bishops for the Modern openings. This frequently makes for a lively game, at least against human players, since the whole point of the Modern opening theory is to produce asymetrical, unbalanced positions with very sharp play.

The program uses nine of the IBM's ten function keys as 'playing level' keys, ranging from five seconds a move at level one to 'infinite' analysis on level nine.

Although there will undoubtedly be stronger chess programs for the IBM PC, this will give most average chess players a good game.

Sargon III is available in the UK from Softsel dealers for the rather steep price of £43.15, or in the US from Hayden Software (Tel: 0101 617-937 0200).

Human touch

John Nunn annotates this month's game, an encounter between an anonymous human player (White) and the *Sargon III* program (Black) operating on level 6.

1 d2-d4	**Ng8-f6**
2 c2-c4	**g7-g6**
3 Nb1-c3	**Bf8-g7**

Sargon III likes the flank development of bishops and in this game it brings both bishops into play by the same method.

4 e2-e4	**d7-d6**
5 f2-f3	**Nb8-d7**
6 Bc1-e3	**0-0**
7 h2-h4?	

A rash advance. Any textbook will tell you that the correct way to meet a flank attack is by a counter action in the centre, so Black should have played 7...e7-e5 8 d4-d5 Nf6-h5 when White would have had cause to regret such haste.

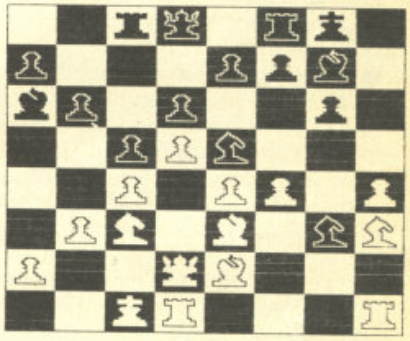
7 ...	**b7-b6?**
8 Qd1-d2	**Bc8-b7**
9 0-0-0	**c7-c5**
10 d4-d5	**Ra8-c8?**

By castling queenside White has served notice on his opponent that he intends to launch a massive kingside onslaught. Black should have reacted with equal speed, but his slow meandering development has landed him in a critical position. Here he misses his last chance for counterplay by 10...a7-a6 followed by ...b7-b5.

11 g2-g4	**h7-h5**

White threatened to augment his attack by h4-h5 followed by Be3-h6, so Black decides to halt the further advance of White's h-pawn.

12 g4xh5	**Nf6xh5**
13 Ng1-h3	**Nd7-e5**
14 Bf1-e2	**Bb7-a6**
15 b2-b3	**Nh5-g3**
16 f3-f4!	



It's the best move of the game. By sacrificing rook for knight, White gains time and rips open the kingside files.

16	**...**	**Ng3xh1**
17 Rd1xh1		**Ne5-d7**
18 h4-h5		**g6xh5**
19 Nh3-g5		**Bg7xc3?**

Black was lost in any case, but exchanging off the Black king's sole defender can only hasten the end.

20 Qd2xc3	**h5-h4**
21 Rh1xh4?	

Up to here White has played well, but now he misses a number of chances to finish the game quickly. 21 Qc3-e1 Kg8-g7 22 Qe1xh4 Rf8-h8 23 Ng5-h7 would have led to a rapid mate.

21	**...**	**Nd7-f6**
22 e4-e5		**Nf6xd5**
23 c4xd5		**Ba6xe2**
24 e5xd6		

Again White inexplicably overlooks a simple win by 24 Qc3-c2 f7-f5 25 e5xf6 followed by a deadly queen check at g6 or h7.

24	**...**	**f7-f6**
25 Ng5-e6		**Qd8-e8**

This makes it easy for White but even after 25...Qd8xd6 White could win by 26 Qc3-c2.

26 Qc3-e1	**Be2-d3**
27 Rh4-g4+	**Bd3-g6**
28 d6xe7	**Rf8-f7**
29 Rg4xg6+	**Kg8-h7**
30 f4-f5	**Kh7-h8**
31 Qe1-h4+	**Rf7-h7**
32 Qh4xf6+	**Rh7-g7**
33 Qf6xg7 mate	

SHARP BUSINESS PRACTICE

Sharp bills its MZ800 as a small business computer. Brendin Lewis checks it out.

Hot the heels of Sharp's MZ700 comes the MZ800. It's similar in design, but with more features — one of which is switch selectable compatibility with the MZ700.

Some of its other features include: 64K bytes of RAM, high resolution colour graphics, three voice sound facilities, two standard joystick ports and a built in cassette recorder. Expansion options allow extra video RAM, RAM disks, and most important, IBM compatible floppy disks.

On its own, it runs the new version of CP/M, PCP/M. The P means personal and offers a new user friendly environment to work in. Sharp has released it as a small business computer, but how will it stand against the likes of the Apricot?

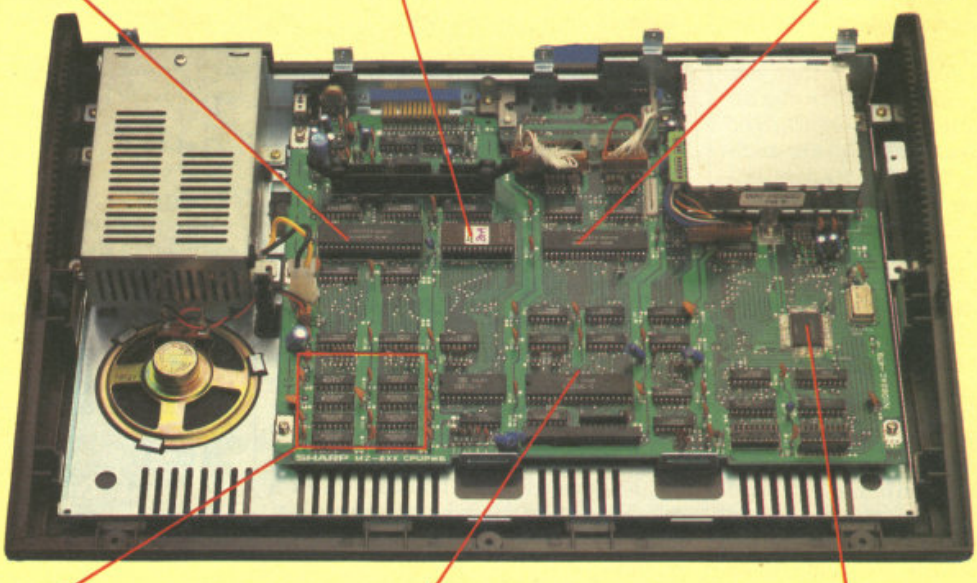
First impressions

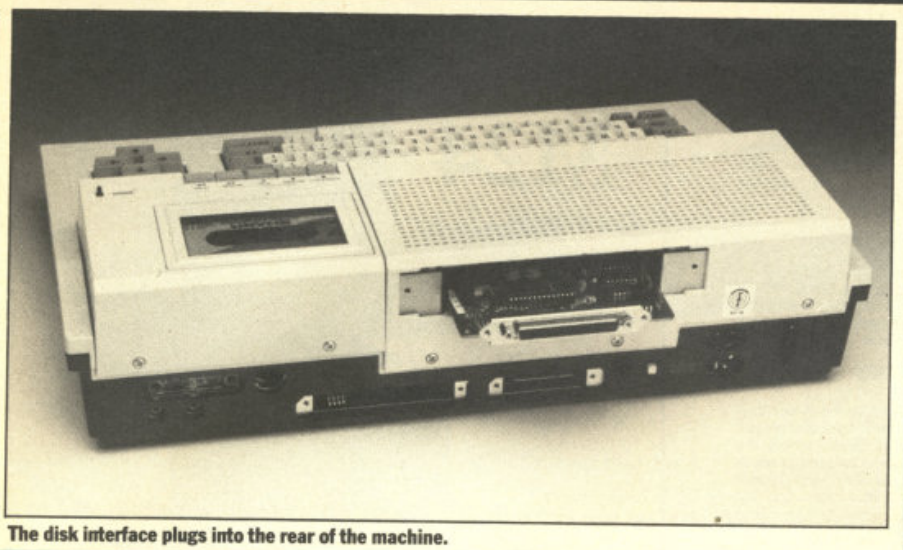
At first sight, the MZ800 looks similar to an MSX machine, especially with its keyboard layout. This, though, is where the similarity ends.

The machine has an attractive cream and brown two tone case which is split into two, a front sloping level on which the keyboard is mounted, and a flat, grilled upper level which contains the cassette recorder and the expansion port.

The 70 key keyboard was, to me, a bit of a let-down. The keys have a tacky feel to them, but still are a great improvement on some systems. They are split into three main sections: the main alpha keys, the function keys, and the editing keys.

There are few peculiarities on the main keyboard, except the addition of keys marked Alpha, Graph, and a blank keytop. I found the position of the Alpha key irritating. On the right hand side is a large shift key, but on the left, the same





The disk interface plugs into the rear of the machine.

amount of space is made up by both the alpha and shift keys, so I was forever hitting Alpha instead of shift.

Along the top is a row of five easily definable function keys, and finally, the insert, delete and four cursor keys. The cursor keys are in the north south east west format, which I prefer. The other two keys also serve as home and clear keys when shifted.

At the rear of the machine are the various connectors through which the MZ800 communicates to external devices. Video output options are threefold — UHF, composite video or RGB — with a small slide switch to select either monochrome or colour output.

A useful feature is the use of a colour trim control which is easily accessible. Unlike on the MZ700, two standard joystick/control ports are provided, enabling a wider range of joysticks to be used. But this also means that any MZ700 software controlled by joystick will not run on the MZ800 even in MZ700 mode.

The parallel printer port has no connector; instead there is an edge connector from the main PCB. Surprisingly, the system allows for an external cassette recorder to be used by providing two 3.5mm jack sockets for read and write. The system switch is also rear mounted, allowing printer and mode settings to be changed.

The final connector — the expansion slot — is recessed well inside the case where the floppy disk interface is located. Recessing this connector would normally hide any interface boards, but the result is that the floppy disk interface card pokes about one inch into the open air — just enough to catch any stray cigarette ash or spilt coffee. Perhaps Sharp could consider supplying a purpose-built cover as part of the floppy disk pack.

Documentation

Though the manual with the review machine was only a draft copy (or tentative as Sharp calls it), it covered Basic in detail and also featured a section on the system monitor. It also offers an in-depth hardware section, including small circuit diagrams. I wonder if your average business user would be interested in how the Centronics port operates? Or is this system aimed elsewhere than the business sector?

Missing with the review machine was the PCP/M documentation from Digital Research. From what I can gather though, it is similar to CP/M (which means I haven't missed much).

Features

The graphics capability of the MZ800 must be one of its best features. The system allows high resolution graphics of 320 by 200 pixels. If the extra video RAM is installed (there is space on board), this goes up to 340 by 200.

These are good, but they do lead to a poor aspect ratio *ie* vertical to horizontal line lengths. If you plot a square using the same number of units in both the x and y directions, it will be higher than it is wide.

The graphics interface provided by Basic is good. Though the machine has no sprite capabilites, Basic does provide a very useful command called SYMBOL. This allows the plotting of user defined graphics anywhere on the screen in any colour with 255 steps of magnification in both the horizontal and vertical directions. It is also possible to plot the shape at 90, 180 and 270 degrees away from normal.

Three sound channels and one noise channel are available via a programmable sound generator and internal speaker, which has a volume control on the rear. The main method of accessing this chip is with the MUSIC command, which enables the user to play the notes of a variable duration over eight octaves.

Three other commands also deal with sound. TEMPO varies the rate at which the notes of the MUSIC command are played; the SOUND command creates sounds of variable pitch and duration to produce special effects; and NOISE creates white noise effects from the chip's own white noise generator.

In use

The MZ800 should be regarded as one of the 'bread and butter' micros of the industry — you have enough time to go and make some sandwiches (and a cup of tea, for that matter) while the Basic interpreter loads off the cassette. It takes about five minutes, not a long time

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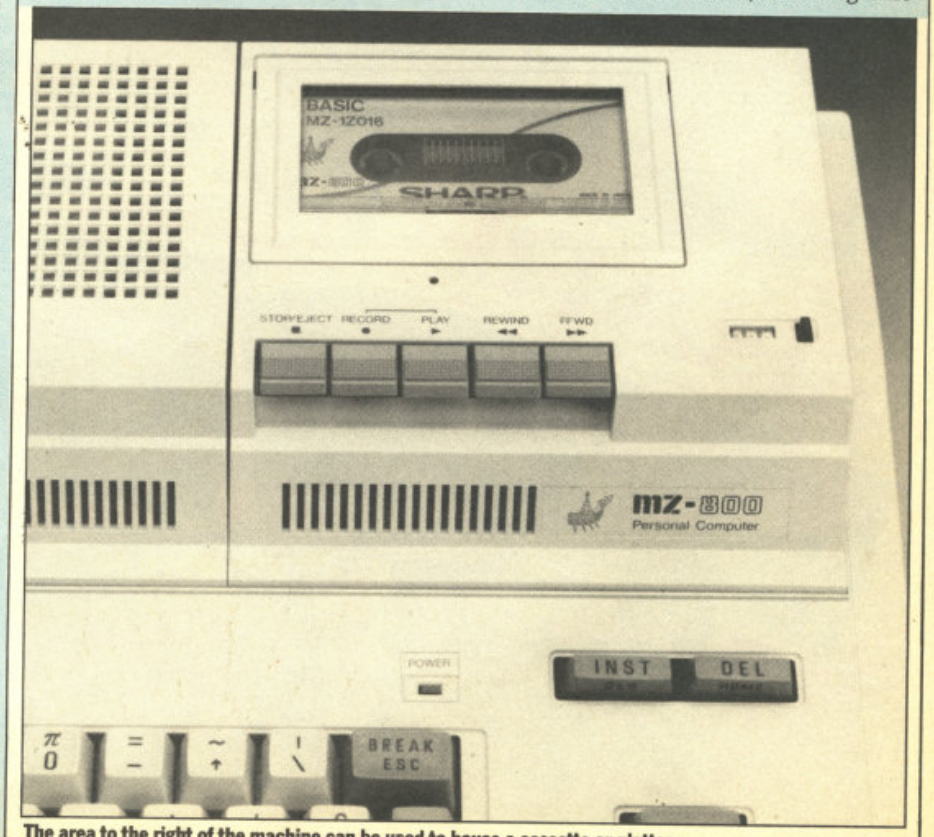

The area to the right of the machine can be used to house a cassette or plotter.

DUCKWORTH ADVENTURES

COLOSSAL CAVE ADVENTURE
by Peter Gerrard

The original and best mainframe adventure, now available for the Amstrad and Commodore 64. Unlike other versions, this game follows the original layout, complete with all the infuriating traps and bewildering mazes, not to mention the Troll, the Dragon, the Pirate or the mysterious shadowy figure. You can't call yourself an adventurer until you have conquered this mammoth quest! As a concession to the faint-hearted, you are allowed to resurrect yourself twice. £7.95

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CASTLE DRACULA
by Ray Davies

Available for the Amstrad, BBC 32K and the Commodore 64, this game starts in a deserted village, overshadowed by Dracula's sinister castle. Your mission is to enter the castle and serve His Putrescence a well prepared stake. There are many useful objects to be found along the way, and from time to time the program can be persuaded to give you hints. There are 100 locations to explore and you have the option to save your progress on tape at any time. £7.95

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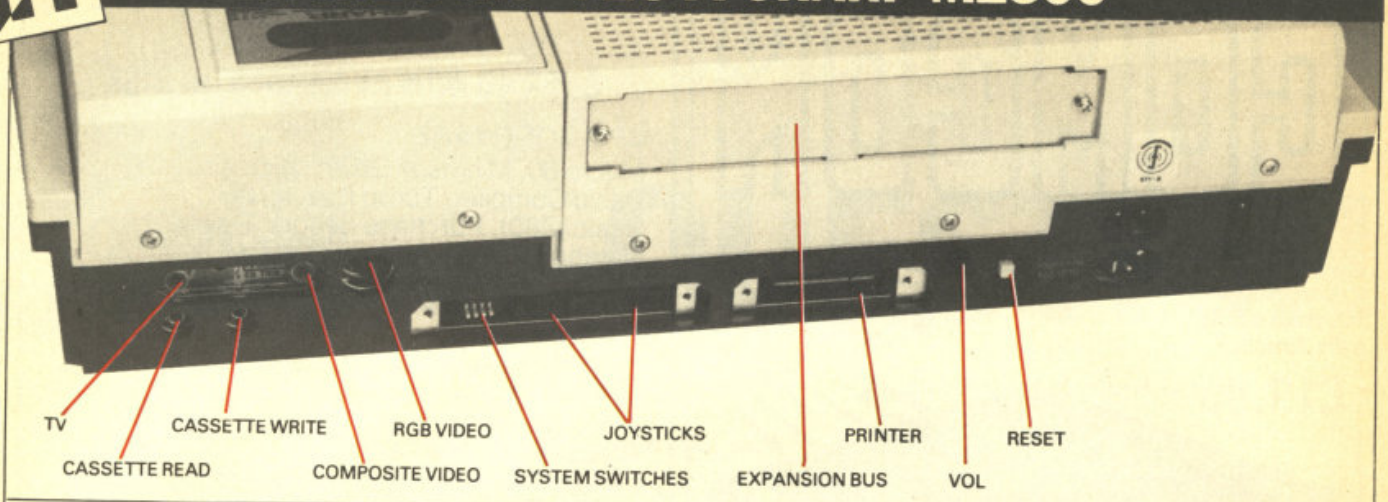

◀ 23

really, but long enough to have to wait each time you power the machine up.

If the machine is designed as a business machine, why waste valuable memory having Basic in ROM? And why provide a cassette recorder? Most business software doesn't run on a cassette-based system.

After Basic has loaded, another problem arises. There's only just over 22K of memory left out of the full 64K.

The manual describes how to load the demo program which follows Basic on the cassette. When this is loaded and run, the message 'Just a moment' appears on the screen.

Table 1

Auto exec file
Character/background colours
Device assignments
Keyclick on/off
MSB mask
Printer mode
RS232 parameters
User definable keys

When the demo started to do something, it proved well worth the wait. It's written to show off the best features of the machine (as all demo programs should, but quite often don't) including the fast line drawing and fill capabilities. Screen scrolling within windows is fast and smooth.

The options available when you power up are: load Basic from cassette or run the system monitor. If, on the other hand, the disk interface is plugged into the expansion slot, then 'Boot PCP/M from the floppy' also becomes an option. If the disk is in the drive when power is applied, the machine automatically boots PCP/M and offers no options.

The differences between CP/M and PCP/M become apparent as soon as the system disk is booted. The screen contains three sections. On the right is a vertical list of the normal CP/M commands DIR, ERASE, TYPE etc. Also included is a help command which describes how to use the VCCP (Video Console Command Processor).

Any of these commands can be accessed by moving the cursor to the appropriate level and pressing Return. This is fine for most of the commands, but RUN didn't work on my machine. When it accesses the disk, a 'Disk or Directory Full' error message is generated. Obviously all is not perfect on the MZ800 PCP/M front yet.

Most of the screen is occupied by the main window. On start up, it displays the directory of drive A. Obviously, I couldn't get a full performance from the VCCP, not being able to run programs.

Personal CP/M (PCP/M) requires a disk drive.

Those commands that did work, I found a little time consuming. A 'type ahead' facility would be a useful feature for zipping through the sections you're not interested in.

Below the two windowed sections lies the keyboard entry section. The top line is for entering program parameters and for one line help facilities for all the commands in the right hand window; the bottom displays the contents of the user defined function keys.

Sixteen functions are available in all, by using the fifth key to display extra sets of functions for the other four keys.

The final command in the right hand window is QUIT, which allows the user to exit the VCCP and drop into normal CP/M mode. Problems even arose when I tried to use this command — a 'Disk I/O Error' was generated. Sharp really has got its work cut out with its friendly CP/M interface.

The system disk contains all the usual utility software and more. Two utilities really shine out, one because it is not normally included and the other because it's a well written and well presented version of one that is.

Diskedit allows the user to read and write to the actual tracks and sectors of the disk. It allows some measure of control over re-creating corrupt disks without the need to re-format the entire disk. The version of Setup provided with the MZ800 is excellent. It's well laid out and simple to use, it allows the setting and consequently the altering of system parameters listed in Table 1.

Verdict

As a business micro the Sharp MZ800 has some clear pros and cons. In its favour are its high resolution graphics, a variety of interfaces and PCP/M (when it finally works). Against it must be the inclusion of the cassette recorder and its physical size. With a free standing monitor, floppy disk drives and machine, it takes up a lot of room on a desk. Sharp has a lot to work on here if the machine is to compare with the likes of the Apricot F1.

SPECIFICATIONS

Machine	Sharp MZ800
Processor	Z80
RAM	64K, optional 64K disk, 16K video RAM expandable to 32K
ROM	16K, IPL plus monitor
Graphics/sound	320 by 200 or 640 by 200 with extra RAM. Three voices, six octaves, one noise channel
Language included	Basic
O/S available	PCP/M when disks installed
Interfaces	Printer, RAMfile card, floppy disks, cassette
Distributor	Sharp, 061-205 2333

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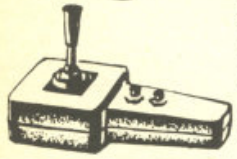

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BURNING QUESTION

Just occasionally a work of literature gets the micro adaptation it deserves, and Fahrenheit 451 is one of them, says Bob Chappell. With fire in his soul he then sought the last dragon's lair.

Question: what are firemen? Answer: people who put out fires. Marks out of ten: zero. I should perhaps have mentioned first that the firemen I had in mind come from the 21st century as depicted in Ray Bradbury's classic science-fiction novel, *Fahrenheit 451*. Books have become illegal and the firemen come not to douse the fires, but to start them.

The temperature of the title refers to the burning point of book paper; the firemen are book burners. Guy Montag is such a fireman with a fatal vocational weakness — he likes books. So he goes on the run, becoming the most wanted fugitive in the country. Montag joins the underground, a resistance group who have each memorised an entire book — every member is thus a living, breathing work of literature. I wonder who got to be Burns?

Good feeling

Trillium Software has collaborated with Ray Bradbury to produce a text and graphics adventure game as a sequel to the brilliant novel. And, my word, the authorship shows. Never, in an adventure, have I seen text so literary and which for the first time really does give the *feel* of a book. Trillium calls its adventures 'interactive fiction' — you can believe it.

Fahrenheit 451 is distributed in the UK by W H Smith Distributors, Leicester. The adventure comes on two double-sided disks, costs £19.95, and is available for the Commodore 64 and Apple micros.

The game has a slightly unusual presentation. The top third of the screen is used to display up to three separate high-resolution pictures — it's almost like watching a slide show. The rest of the screen is filled with fulsome, scrolling text. When there's not enough room to get all the text on screen, the program obligingly pauses at an appropriate point to await a key-press before scrolling onwards.

There's no need to play 'guess the right word' with this adventure. Not only does the game have a wide vocabulary (over 90 verbs/commands and 120 nouns, not to mention an assortment of conjunctions, articles, prepositions, etc) but they're all conveniently listed in the accompanying booklet. For those who hate to get stuck, Trillium also lists a number of coded hints in the booklet. Whether you consult the vocabulary or hints is up to you — but it's comforting to know help is at hand if you need it.

The adventure itself is extremely user friendly, even to the extent that it occasionally gives a little nudge in the right direction if you seem to be struggling with a certain problem.

Light a flame

I began the adventure in Central Park, New York City, a hazardous place even in the year 2070. Being drowned in a pond or torn limb from limb by a tiger is not my idea of a pleasant trip through the park. A pile of leaves alerted my Dungeon Master's seventh sense and with a swift kick, I had uncovered a route that I hoped, with luck, would help me avoid death by drowning or dismemberment.

A member of the underground soon contacted me and offered helpful advice. First I would need a lighter — the underground's ironic means of recognising a fellow sympathiser. I was also given a very special password phrase: 'It was a pleasure to burn', to be used only on certain occasions.

Great care had to be excercised if I was not to be spotted by patrolling mechanical hounds. These are merciless, robotic tracker-dogs programmed to identify any fugitives and to despatch them swiftly with a poisonous bite.

Memory Lane

How many adventures do you know that allow the main character to have the power of instant recollections? Your memory takes many forms: a snatch of conversation, an incident, a face that stayed in the mind, a sensation. This device provides a wealth of background to the character you play and brings a unique dimension to adventures.

Then there's the text. If you want full-bodied, vibrant writing; if you want poetic imagery; if you want thought and depth; if, in a nutshell, you want literature, you've got it. 'He could feel the Hound, like autumn, come cold and dry and swift, like a wind that didn't stir grass, that didn't jar windows or disturb leaf shadows on the white sidewalks as it passed.'

Fahrenheit 451 is superb. It has everything: attractive and unusually presented graphics, text whose quality knocks spots off most other adventures, a powerful command parser, a wide vocabulary, good use of sound, several friendly features, excellent documentation and an original theme. Lastly, but most important of all, it provides many hours of adventuring pleasure. Go out and buy it.

The last dragon

Trillium has three other adventures on the market. My fellow Dungeon Master, Mike Gerrard, will be reviewing two of them, *Rendezvous With Rama* and *Amazon*. There's just room for a meritorious mention of the third, *Dragonworld*.

Having the same qualities but possibly slightly easier to solve, *Dragonworld* has you searching for your great friend, the last dragon, who has been kidnapped by the Duke of Darkness. You and another close friend, Hawkwind, must scour the vast land of Simbala to rescue him.

Beautiful graphics in an adventure covering three disks (five sides). Same price, same high quality, same recommendation.

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SERIAL PACKET

Green with envy over BBC owners who can use a wide variety of modems and printers? Well, you'll soon be in the pink with the RS1, says David Janda.

Amstrad owners who have been holding their breath waiting for a serial interface for the CPC 464 can breathe again at last. RSX Systems, of Manchester, has stepped into the breach and produced an RS232 interface that comes complete with its own internal power supply and a cassette containing a terminal emulator and serial printer driver.

Features

The hardware for the RS1 is housed in a black box, measuring 65 by 150 by 175mm. The interface is controlled by a dedicated Z80A cpu and comes with its own internal PSU. Two rocker type switches are used for power and CTS control (more on that later), a red LED is also provided to indicate that the RS1 is powered up.

Unlike certain manufacturers I could name (Acorn), a decent length of power supply cable is provided — 4ft to be exact. A total of 18in of ribbon cable is used to connect the RS1 to the Amstrad, so the unit can be connected up without a tight squeeze.

A D-type 25 way RS232 connector (male) is housed in the rear of the unit. Seven lines are used in all, catering for practically anything that you might wish to connect to the unit. The pins used are indicated in Table 1.

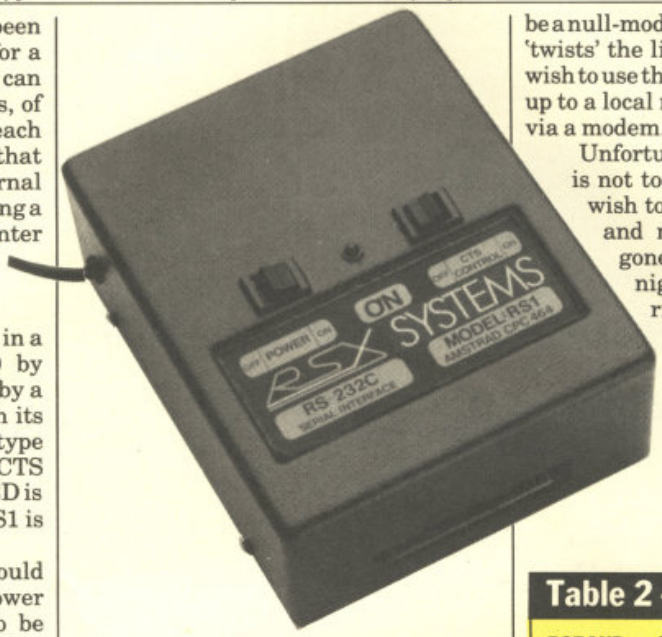
Table 1

PIN	PURPOSE
2	Transmit data T×D
3	Receive data R×d
4	Request to send RTS
5	Clear to send CTS
7	Signal earth
8	Data carry detect/data set ready DCD/DSR
20	Data terminal ready DTR

It would appear that some items you would like to use may not be able to control the RTS or DTR line. If this is the case, the CTS line can be switched in so that it is always active. In other words, in this mode, the RS1 will always transmit a clear to send signal. It's rare that you will experience this, but it's comforting to know that you can get round the problem if it arose.

The Amprint program allows you to use a printer with RS232 port, instead of the Centronics type. To achieve this, the program installs an extension to the Locomotive Basic, allowing the extra commands to be used within programs or in direct mode (see Table 2).

Once the re-direction has been enabled, any print command, such as PRINT #8; "Farewell my friends" or LIST #8 will be sent to the RS1 rather than the Centronics port. Printer spooling (of a sort) can be achieved by selecting a buffer size.



The unassuming RSX's large case is due to the through connection of the system expansion bus.

Amterm converts the CPC 464 into a dumb terminal, making communications with another computer locally (DCE), or remotely (DTE) possible. At present, a limited number of features are available, but RSX Systems will be producing an updated version with file transfer, VT100 emulation and other features.

Written in machine code, Amterm is menu-driven and enables the user to change terminal characteristics and program the serial port. Baud rates between 50 and 19200 can be selected independently for the CPC 464 and the host system, as can word lengths.

A second menu enables terminal characteristics to be set up. Here, it's possible to control echo, switch to inverse video, and change the screen colour between green and amber.

A very handy option allows the line feed sequence to be controlled not only for the host, but the RX1 as well. Basically, when communicating with another micro, a CR is only sent; however Amterm enables a line-feed to be inserted/removed.

In use

Plug-in-and-go is not the order of the day here. No RS232 cable is supplied so it is left up to the user to buy or make up their own. If you wish to go DIY, then you could get away with only spending a few quid; made-up cables will cost a lot more.

Another item on the shopping list may be a null-modem. This is a connector that 'twists' the lines — quite crucial if you wish to use the same cable for connecting up to a local micro and a remote system via a modem.

Unfortunately, the documentation is not too clear for those who may wish to wire up their own cables, and more thought could have gone into this area. Another niggle is that the connecting ribbon cable at the RSX end had no polarizing bump, and is easily inserted the wrong way round.

Table 2 — commands

RSBAUD	Select baud rate
RSPRINT	Enable re-direction to serial interface
CENPRINT	Restore printed output to Centronics port
RSABORT	Clear buffer
RSHALT	Disable printing
RSGO	Enable printing
RSHELP	Displays extra commands

Amterm proved to be very nice indeed. Mode 2 is used when on-line and any incoming control codes are intercepted. XON/XOFF is provided and control characters are intercepted and displayed in textual form. I would have liked to have made some comments about the Amprint, but the program was corrupted on both sides of the tape.

Verdict

A price tag of £74.95 is slightly over the top, but the unit is well built and worked without any problems. Amterm was excellent and it will be interesting to see the updated version. Highly recommended.

REPORT CARD: 1 TO 5

Features	●●●
Documentation	●●
Performance	●●●●
Overall value	●●●

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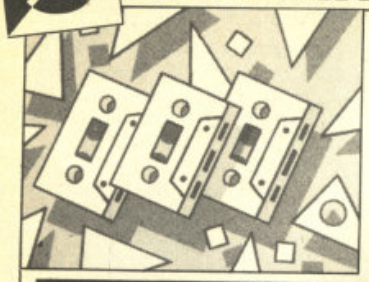

We check out the latest contenders on the software market, and cast an eye to the future. Don't forget, if you want your company's package to be included on this page, send your latest releases to Bryan Skinner, *PCN*, 62 Oxford Street, London W1A 2HG, along with prices and 'phone numbers.

AMSTRAD

Amsoft is at last turning out some serious programs. Unfortunately this week's offerings are on the expensive side, but they do have some useful, if unusual applications.

Project Planner uses Critical Path Analysis techniques to analyse best and worse cases — whether you're constructing a garden pond or planning a business project, this could help your planning.

Decision Maker takes you into the realms of Decision Analysis and Decision Trees. *Masterfile* is a fairly complex database which allows you to define 'parent-child' relationships between data items, making it at least partly relational, an unusual feature for home micros. All three feature teaching sections, a welcome inclusion, and the manuals are substantial and detailed.

Heroes of Karn	**£6.00**	**Interceptor Micros 07356-71145**
Decision Maker	**£24.95**	**Amsoft 0277-230222**
Project Planner	**£24.95**	**Amsoft 0277-230222**
Masterfile	**£24.95**	**Amsoft 0277-230222**

BBC

Acorn may be experiencing difficulties and the future of the Beeb may be in question, but this week saw the release of two substantial educational packages for this machine. *Honey Logo* is supplied with all sorts of work sheets for the classroom and at only £16 makes Addison Wesley's *Picture Logic*, at £32.10, more than a bit overpriced, especially as it lacks list management.

The other package comes from Osmiroid, as an extension of its teaching aids. Osmoid, as the series is dubbed, offers Maths and Science software for 5-14 age group. Developed in conjunction with the University of Sussex it includes teacher's notes and worksheets.

Honey Logo	**£16.00**	**Glentop 01-441 4130**
Osmoid	**£11.95**	**Osmiroid 0329-232345**
Kissin' Cousins	**£4.95**	**English Software 061-835 1358**

MSX

The Hobbit	**£14.95**	**Melbourne House 01-940 6064**
Sorcery	**£8.95**	**Virgin Games 01-727 8070**

SPECTRUM

Learning packages dominate this week. *Interactive Basic* contains 12 modules designed to help you learn ZX Basic. The course includes problems and hint levels for when you get stuck.

Collins' Gem Revision Software is aimed at those looking forward (or not) to taking O level and CSE exams this year. The packages are professionally presented and each contains nine programs.

Interactive Basic	**£9.95**	**Eigen 051-423 6201**
Physics	**£8.95**	**Collins 01-493 7070**
Biology	**£8.95**	**Collins 01-493 7070**
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GAMEPLAY

SPECTRUM

SUBTERRANEAN STRYKER

STAR GAME

This is one tricky little number. It's like a sophisticated *Scramble* — you pilot a small white jet around a dangerous cavern system.

The aim of *Subterranean Stryker* is to rescue as many humanoids as possible and destroy the underground enemy Power Crystal.

The caverns are mostly rocky corridors and space is very tight, especially when you've got mean alien cavern fighters after your blood. The game kicks off with your fighter hovering above the ground. First task is to rescue humanoids working on the surface, and then get underground. There's only one entrance, guarded by some vicious looking plants.

Sadly, you can't redefine the keys, but the ones used for up/down, thrust, reverse and fire are pretty ergonomic.

A cross-sectional view of the part of whichever of the five levels you're in takes up most of the display, with the ship al-

ways central. Below that is a small-scale view of the entire playing area of that level. From this 'radar' display you can spot the aliens and head off to sort them out — their movement is mirrored in the radar display.

These aliens (colourful jellyfish) are extremely nasty indeed. They don't all have entirely predictable patterns of movement for a start. They seem to follow a series of patterns of different lengths, so just when you think you've got one sussed, it breaks out and you're in trouble. Also, they fire tiny white dots, sure to hit anyone who hangs about and which give hot pursuit across several screens.

In the caverns there are many hazards, most of which end a life if you don't get your timing and manoeuvring absolutely spot on. Most are a bit samey, however, as the main theme is dodging between moving hazards blocking your way. There are large blue drops of some unpleasant liquid falling regularly, red wiggly snakes in Indian file (and not much space between them), armour piercing drills, unnameable pulsating monstrosities and so on.

Some of the hazards don't wipe you out but do sap your shield's energy as you can tell from the instrument display between the main view and the radar display. Also shown is the amount of fuel, number of lives left, depth, score and number of rescues. Fuel is replenished from fuel dumps, but getting at them isn't easy. In fact, getting anywhere takes time, patience and plenty of practice.

Rescuing the humanoids is easy — just get close by them and pop, they're on board. They're cleverly animated, regularly hacking away at the rock with tiny hammers.

Sound is limited, except at the beginning of a session when it is quite amazing — you'd think your Spectrum had a couple of voices and sound shaping. The only other slight let-downs are the flickering of the plane as it's updated, and the background scrolling leaves a little to be desired. So, whether you're a fan of the type or just into good games, buy it.

Bryan Skinner

Price £6.95 **Publisher** Insight 0744-22013

COMMODORE 64

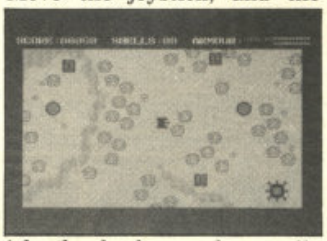
FRONT LINE

Taking the hot seat in this tank may be tricky, but it's not that realistic. You drive a heavily armoured Death Tank round an enemy-occupied island collecting vital supplies and avoiding unfriendly enemy attention. There are land mines, artillery batteries, enemy tanks, jet fighters, heavy bombers and helicopters with homing missiles and some mysterious fireballs. Your tank's armour survives eight hits and each supply dump visited lets you make sufficient repairs to survive one more.

Pressing fire launches a shell in whichever direction you face, and releasing the button explodes the shell.

As well as points for a hit, each supply dump retrieved brings you a bonus. The aeroplanes fly in straight lines, making easy targets, but the helicopters wheel about.

The screen depicts an aerial view of a section of an island with your tank in the centre. Move the joystick, and the



island background scrolls smoothly in any of eight directions. The graphics are flat but acceptable, with some excellent effects: several sorts of explosion, whistling bombs, whining shells and clouds of smoke. The island is wooded, with deep inlets and rivers.

Not bad, but more attention could have been paid to achieving a more realistic effect.

Tony Lydeard

Rating 6/10
Price £7.00
Publisher Interceptor Micros 07356-71145

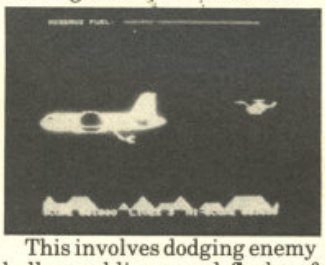
ORIC/ATMOS

CHOPPER

This sideways scrolling game starts with various menu options: skill level, sound level, show hi-score table, clear hi-score table.

The first screen has you in control of the chopper of the title. You can move up or down against the left-scrolling background and of course you can fire. Enemy helicopters and the odd plane fly toward you, firing missiles.

Points are gained for each of your hits but you don't have to clear all enemy craft before moving on to the next screen.



This involves dodging enemy balloons, blimps and flocks of wild geese. The enemy doesn't shoot at you, but then you can't shoot at them either.

Screen three sees you arrive at the enemy base. Here you have to blast the controls at the end of the ventilator shafts. If successful, a hole appears in the barrier, through which you have to fire to completely annihilate the base. However, the shafts are guarded by indestructible helicopters, which makes the task a lot harder.

Between each screen there's a refuelling screen in which you must guide your chopper's refuelling pipe to a dangling hose. Once all three screens have been mastered, they're repeated with faster action.

Chopper's graphics and use of colour are superb and sound is used to good effect. The second screen might get tiresome after a few plays, but overall this is a good shoot-em-up.

B A Briscombe

Rating 7/10
Price £8.50 **Publisher** Severn Software, 15 High Street, Lydney, Glos. GU5 5PD

COMMODORE 64

WITCHSWITCH

This is an arcade game with a very original theme. The idea is to navigate your way through a number of screens in time to save a village from being destroyed by an erupting volcano.

Your ultimate destination is the evil witch's lair where a magic powder has to be dropped into her cauldron. This will convert her to the cause of good (hence *Witchswitch*) and she'll fly off to save the village.

At any time, a press of the space bar replaces the scrolling screen with a picture of the village and the progress of the lava flow from the volcano. Another press and you're back to the point where you left off.

The initial screen shows a leprechaun with a rope. You must first make him lasso a nearby monkey and then steer both of them across a swamp, leaping from toadstool to toadstool. Marauding birds can be fended off with a well-aimed flick of the monkey's tail but you must take care not to let the rope be severed by snapping plants.

Other screens involve you pelting dive-bombing ravens

with pebbles, turning into an owl, leaping a broomstick with torpedo tendencies, dodging thunderclouds and lightning bolts and fighting snakes, tortoises, beetles, snails and sundry other insects.

The graphics are attractive (but not a patch on English's superb *Henry's House*) and the game is certainly unusual, to say the least. Worth trying out.

Bob Chappell

Rating 7/10
Price £8.95
Publisher English Software 061-835 1358

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PERSONAL COMPUTER NEWS HIT!

STAR GAME

Basketball fans should love this simulation of the game—It has some of the most lifelike animation ever seen in a sports game—

■ To see your player spin 180 degrees, dribble past the defender and shoot close in, gives a vicarious thrill quite unmatched in any other sports simulation I've seen.

All this adds up to one heck of a great game.

Bob Chappell
Personal Computer News

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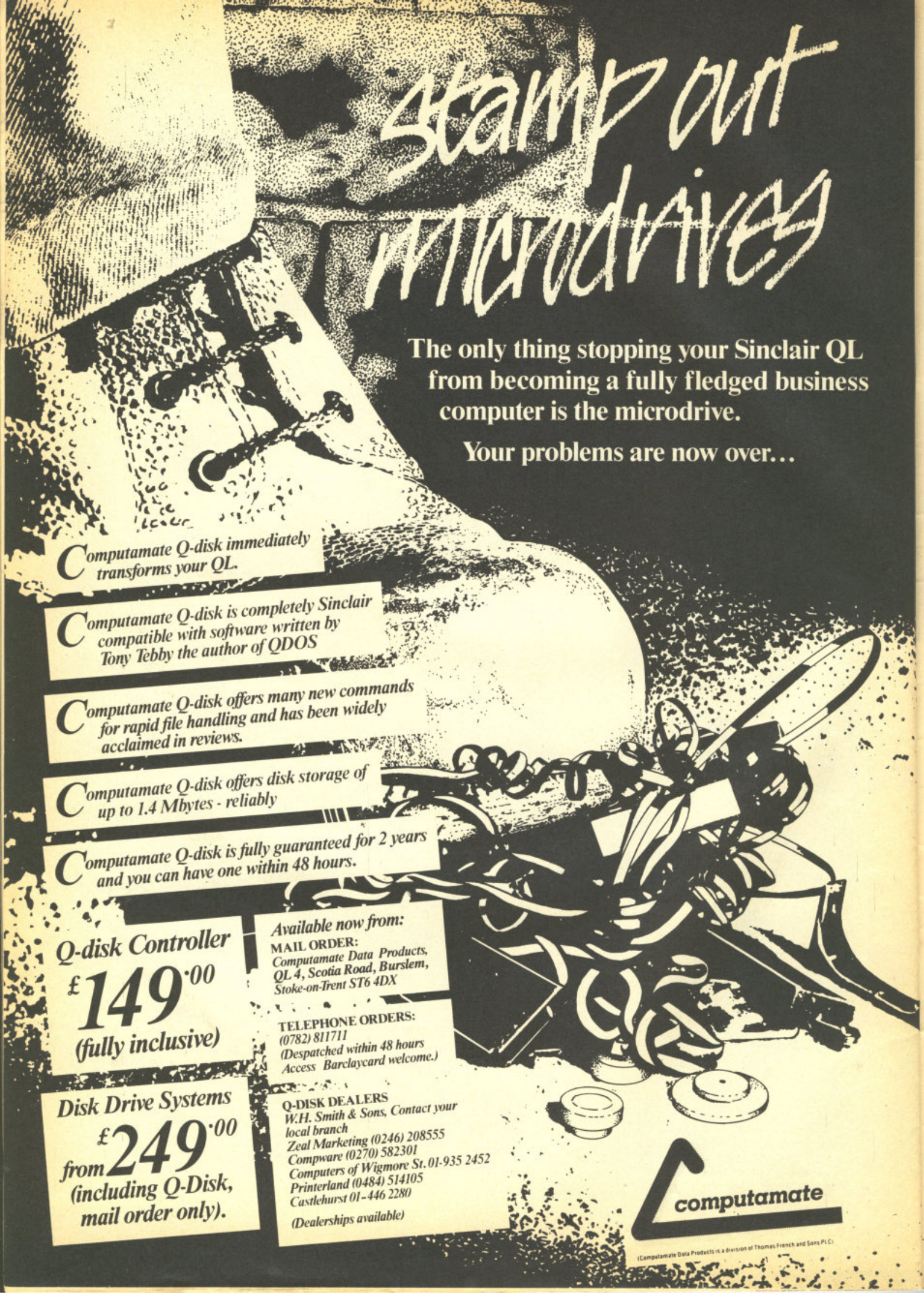

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GAMEPLAY

SPECTRUM

TECHNICIAN TED

STAR GAME

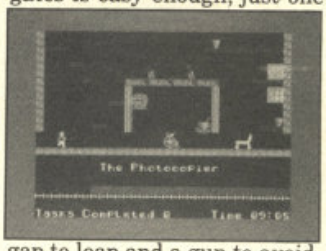
After an unusual loading screen and a stylish title screen I perked up, relieved not to find another so-called arcade/adventure jumping platforms *Manic Miner* rip-off. The game may be a cross between *Manic Miner* and *Pyjamarama*, but I bet my joystick you'll find it harder than either. The game is, in fact, compatible with Kempston, Protek and Interface II, but as your only controls are left, right and jump (apart from pause and music on/off) the keyboard will do.

Technician Ted works down the local chip factory, made up of 40 screens, the first of which finds Ted at the factory gates ready to clock on. A clock shows 8.30, and before you can leave again at 5.30 you must complete 27 tasks. A slight drawback is not knowing what they are, though the first few screens simply ask you to hit two flashing boxes in the right order in each.

A cryptic note on the cover says that solving one problem may change the nature of another problem elsewhere, so you'll be trying to map out the screens which are inter-connected in *Jet Set Willy* fashion.

You're shown how the first nine screens fit together, and told that Ted must visit his desk before the Silicon Slice Store. After that you're on your own.

Getting through the factory gates is easy enough, just one



gap to leap and a gun to avoid, taking you to reception (slightly harder).

Fall through the floor and you're in the boardroom, which seems impossible to get out of if arriving from the ceiling. Exit right and you're in the cloakroom . . . this is getting tough, and you haven't even seen any boxes yet. Two are next door in the Silicon Slice Store, one of them flashing, but you've been told to go to your desk first so should you risk touching one . . . can you avoid touching one? Help!

Meanwhile time is passing and your life-line is dwindling whenever you hit something or try a foolhardy leap. The graphics are excellent — worth wasting a little time just to go slowly through the elements making up Ted's walk. You must leap coffee cups and filing cabinets, climb stacks of chairs in the canteen, watch your exits, and if you've got time you can sit back and listen to the music. All in all it's Hewson's best yet.

Mike Gerrard

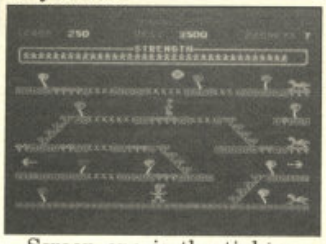
Price £7.95 **Publisher** Hewson Consultants 0235-832939

COMMODORE 64

BIGTOP BARNEY

Roll up, roll up, ladies and gentlemen, 'cos the Commodore Circus has come to town, starring Bigtop Barney: see him leap through those flaming hoops, see him jump over those blasted chimps, and all without the aid of a safety pin let alone a safety net. You thought you'd seen it all with the three-ring circus, well this is a four-screen circus, so roll up, roll up.

Barney obviously wants to steal the show — there are four acts for him to choose from, graded from easy to hardest, and each act has three separate skill levels as well. You can also give Barney any number of lives from one to eight, and decide how often you'll earn a bonus life, so even if you find the toughest screens easy you can still make it as hard as possible for yourself.



Screen one is the tightrope where Barney must walk 100 metres, jumping over the chimps and through the hoops, leaping to collect the bonus points as well. You can speed Barney up or slow him down; the fire button makes him jump. I could hardly get ten metres down the tightrope on the easy level, and when I tried the hard level with chimps coming at me in twos and threes I was down in the crowd with a 'Drat!' every time.

Barney's second act is to collect ten ballons from a network of platforms where he's also being pestered by Otto the circus strongman. He can leap around a little but this diminishes his own strength, and he's also got to keep a eye out for the sea-lions' balls. Act three is unicycling and jumping on and off platforms . . . can be painful if you mistime a jump, while act four is a trampolining sequence where you bounce round collecting keys and avoiding the fire-eaters who are trying to breath flames up the legs of your baggy trousers.

Even taken individually the games are better than average, though the graphics could perhaps be improved a little, but they are excellent value for money, and addictive even without that music compelling you to keep playing. Definitely should be a Big Top seller.

Mike Gerrard

Rating 9/10
Price £7
Publisher Interceptor Software 07356-71145

AMSTRAD

THE SURVIVOR

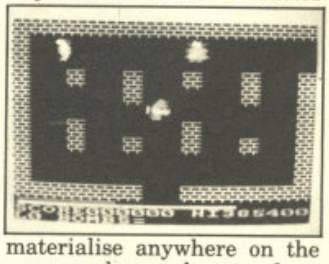
The opening credits of *The Survivor*, which boasts more than 1,000 screens, are nicely put together, describing the various objects you will find in the game, both animate and inanimate. The hero marches across with an opening banner before you start each foray into the underworld.

The plot has you searching through a maze of similar-looking rooms, trying to collect treasure and avoid dragons, daleks and the like. As an aid, you can pick up bottles of something quite potent. These renew your strength and incinerate your opponents if they come too close.

There are also guns distributed randomly about the place. Picking these up will enable you to shoot monsters as well.

The game involves balancing your energy and number of bullets so that you can explore and plunder for as long as possible. The occasional signpost offers directions.

There's quite a lot going on, but overall it seems a bit haphazard. The monsters



materialise anywhere on the screen and move about randomly. Often you are caught in a room with all the exits blocked and are almost certain to lose a lot of energy or bullets.

A map would certainly help, and I guess part of the fun is supposed to be drawing one up. If the scenery was a bit more inspiring or the game a bit more predictable, then this might be the case. Well animated, but notta lotta plot. **Simon Williams**

Rating 6/10
Price £6.95
Publisher Anirog 0322-92513

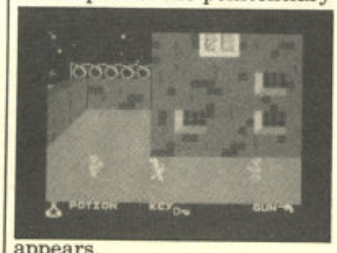
SPECTRUM

MONTY IS INNOCENT

As the follow up to the successful *Monty Mole*, this chase-me-round-the-rooms game from Gremlin Graphics introduces a new superhero — Sam Stoat.

You won't see much of Monty because he's been incarcerated in the bowels of Scudmore Prison. It's Sam's job to find Monty and set him free.

There are 45 playing screens, each featuring part of the prison. Move Sam up a rope or ladder, behind a wall, through a door, down a hole, or simply off the left or right of the screen and a new part of the penitentiary



appears.

Sam has to collect a key from the Governor's office. Since there are eight keys and eight cell doors, it is a matter of luck if he stumbles on the key that will open Monty's cell first time. If Sam isn't careful, he could be as badly off as Monty by getting trapped in solitary confinement with no visible means of escape.

The prison is full of nasties like walking skulls, ghosts and mad axemen. Sam can become invisible for a short while by grabbing one of the bottles of potion that lie around the place. If he finds the armoury, he can also arm himself with a gun and five bullets.

The variety of screens and the illusion of 3D depth (passing behind pillars and sprinting down corridors, for example) are the highspots of the game. The animation is fairly minimal and slightly jerky and there are the usual colour attribute problems when hero and enemy collide. Not bad, and good value for money. **Bob Chappell**

Rating 7/10
Price £6.95
Publisher Gremlin Graphics 0742—753423

SLEUTH

Basic programmers can now have the same dual screen facilities that machine code programmers find so useful for debugging programs, thanks to Sleuth, from Beebugsoft. But it has its limitations, says Simon Williams.

When developing a machine code program, it's helpful to have a monitor which shows which piece of code is being executed at any time, as well as the display your program is producing at the time, making it a lot easier to debug. If such a program is a godsend to the assembler programmer, why shouldn't it also be so to a Basic programmer? So runs the thinking behind *Sleuth*, the latest ROM to come out of Beebugsoft, the doyen of useful utilities.

In use

Sleuth aims to offer the same dual-screen facility seen in several machine code monitors in recent months (not least of which is Beebugsoft's own *Exmon II*). *Sleuth* boots up with its control screen, which is where your Basic program is displayed, and where you can select the various monitoring options.

It takes 1.25K, and normally lifts PAGE by this amount to cover itself, although its workspace is relocatable. The screen divides into four main areas. Along the top is a status strip; beneath that a window onto the line of Basic program currently being executed, with the current statement in a multi-statement line highlighted; further down is a list of the values of certain variables and the title of any current procedure or function; and the bottom of the screen is occupied by a four line command window.

The status line offers a continuous display of the nesting level of loops, procedures and subroutines, the selected speed of the accelerator (which is actually a decelerator), various status flags (single-stepping, trace etc), and the current start of *Sleuth* workspace as a Hex number.

The command window at the bottom shows the last four commands issued. All *Sleuth* commands are of one or two letters only, but the full command is displayed in the window — a nice touch. Some of the more useful commands are given in the box below.

Some Sleuth commands

A	Accelerator speed (1-100)
B	Breakpoint flag
D	Invoke dual screens
LI	List program
M	Multistep
P	Set PAGE
Q	Quit Sleuth
R	Run program
SI	Single Step
T	Toggle Trace
VS/VU	Variable set/update

The Accelerator allows you to slow a program down to one instruction per second; even at full speed, a program under *Sleuth* runs quite a bit slower than on its own.

This is because it must keep interrupting the Basic program to find out what's going on. It does mean that, unless you're aware of it, you can think the machine has hung, when in fact it's performing a section of your program slower than you'd expect.

Up to four breakpoints may be set at any point in your program, and may be unconditional or based on a complex expression; for example, the manual quotes `A%=(33*score%+B*3^2` as a permissible condition. These conditions may be displayed instead of the selected variables in the middle window.

Second opinion

In essence, *Sleuth* is quite a good idea, although a hardened Basic programmer may well find it tiresome to use. Some of the facilities are useful, such as the single step and display of the variable values.

Unfortunately, there appear to be a number of bugettes in the system: occasionally it crashes without cause, and *TAPE appears to confuse it somewhat. The multi-stepping is very confusing — it appears to be the wrong way around — it should skip all PROCs, and FNs.

The documentation is not very good, and contains a few confusing misprints which don't help you to understand some of the more obscure features.

Overall, it's a nice idea but, unfortunately, Beebugsoft doesn't seem to have carried it off with any degree of style. Personally, I wouldn't give it ROM space. **Kenn Garroch**

As mentioned, one of *Sleuth*'s most powerful features is its ability to maintain your program display as well as its own control screen. When running your program you elect to display either the control, program or both screens for each statement within the program. Bear in mind that if you run in the 'control screen' mode, the program screen is not maintained. You also have to make sure to remember whether you've selected Dual screens, as each time you press 'D' RETURN, *Sleuth* will take an extra 1.25K, and reset PAGE.

You can list your program from within *Sleuth*, and you're provided with a listing that you can scroll (rather slowly) up and down like a text editor. Unfortunately, you can't edit from within *Sleuth*, but you can Quit, edit your program and then re-enter without disturbing *Sleuth*'s settings.

As well as setting breakpoints, you can step your program through a statement at a time, and toggle between the two screens after each step. *Sleuth* allows Multistep across a loop, subroutine or procedure, treating each as a single statement. You can use this facility to miss out sections of code which you have already debugged.

The Trace utility is a variant of Basic's TRACE, but is much easier to use as it displays the current line in the top left hand corner of the program screen — rather than all over it.

Sleuth displays the values of all variables in the current line. If there are more variables than the window can show, you can use the cursor arrows to scroll up or down. You can also nominate up to four variables that *Sleuth* will monitor continuously — very useful if you find a variable takes on an unexpected value in the middle of a program.

A rather annoying bug, however, means the variable display is truncated to 22 characters, so if you use long variable names or are displaying strings, check that their values aren't being cut short.

Verdict

The idea behind the package is excellent, and no doubt will appeal to many people, but I feel the ROM is struggling at the limit of interrupt tolerance on the Beeb. When testing the ROM with a variety of pure Basic programs (although *Sleuth* will handle assembler sections in hybrid programs), there were several occasions when the user programs produced unscheduled beeps, or toggled the hard-copy indicator on the control screen.

I succeeded in hanging the machine more than once — I'm not sure how, but would feel uneasy about trusting *Sleuth* with a program I was trying to debug.

REPORT CARD: 1 TO 5

Features	●●●●
Documentation	●●●
Performance	●●
Overall value	●●●

Name Sleuth **System** BBC Micro B **Price** £29 **Publisher** Beebugsoft, 0727-60263 **Format** ROM **Other versions** None **Language** m/c code **Outlets** mail order and dealers

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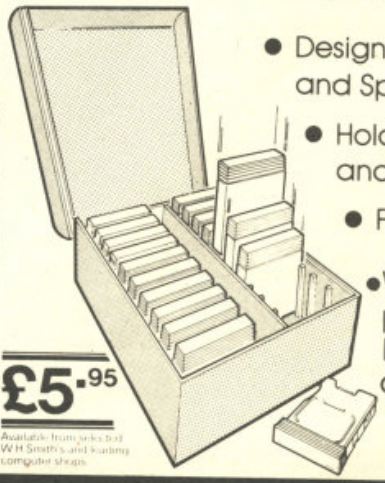

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QUIT

Jack Tramiel has been in town again. You may not have seen him personally but you can always tell, because suddenly all the papers start repeating his latest memorable comment.

It was 'Business is War' that made him a household name. He's followed that up with the observation that home computing had become boring, and the promise that Atari would produce 'for the masses, not the classes'. The momento left from his latest trip is the promise to 'manufacture a million computers this year, minimum.'

'That may sound a lot,' Tramiel told a seminar, 'but at the last company I worked for we were making 400,000 a month.'

Ah, yes, but how many were you selling, Jack? It was probably not far off 400,000 a month but since then his former company, Commodore, has had to trim its sails. Howard Stanworth, Commodore UK's general manager, has resigned, and there are a number of senior executives on the market.

Bruce Everiss, formerly of Imagine, is now formerly of Tansoft too. Alex Reid, appointed to the hot seat at Acorn barely a month ago, is just keeping the chair warm for a new chief executive.

Where will they go? If the fate of ailing micro manufacturers is any guide they'll be snapped up by foreign companies to join the brain drain to places like Holland, Spain, France and Italy. Who better than the nimble Everiss to bamboozle the packed Italian defences, or stolid Stanworth to help an enthusiastic but naive Spanish outfit master the offside trap?

Doesn't time fly when you're enjoying yourself — and even when you're not, and the company that you've slaved over for years faces disaster. Here's *The Times'* version of chronology in the Acorn affair from the Tuesday February 26 edition:

> ...ell, ...t a ...ill. space to put its house in order. Olivetti agreed last week to pay £10.4 million for a 49.3 per cent stake in Acorn – a company valued at more than £30 million when its shares were suspended nearly three years ago.
>
> The deal takes the share of Acorn owned by its founders, Chris Curry and Herman Hauser, from 85.7 per cent to 36.5 per cent. With a ...ill...

WHAT'S MY LINE — According to legend, the letters of the alphabet were first revealed by the patterns made by whooping cranes flying in formation across the sunny skies of yesteryear. Scientists now dismiss this story as picturesque nonsense and seek the truth elsewhere — 'Oghams!' said a spokesman for the British Rune Readers Association tetchily. Here is one of his colleagues attempting to decipher the markings on a Minoan chimney pot recovered almost intact from the Rochdale Canal, with the aid of a Kaypro 4 running Bourne Educational Software's Whooping Crane.

SYNTAX ERROR

Issue 100 didn't assemble entirely without errors. In our review of the ADE assembler for the Amstrad we gave the wrong address for Arnor. The company is at PO Box 619, London SE25 6JL, Tel: 01-653 1483. Since the release of ADE in November, the product has been improved and the price increased. The assembler now costs £13.50.

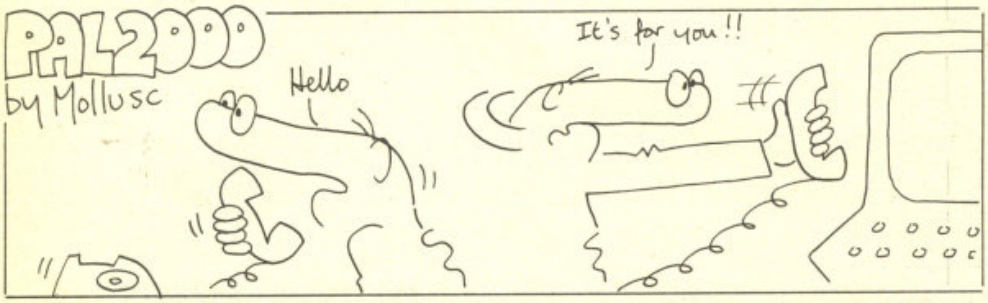
Spectrum owners may have noticed that the Flashy Routine in issue 100 was not so flashy. In all of the DATA statements, the last number of each line is repeated at the beginning of the next. To get the routine working, take out the last number of each DATA line except the first.

NEXT WEEK

Graphics bonanza
Calling owners of Atari, Commodore and Apple systems! Don't miss the next *PCN* — we'll make your eyes pop out of your head with our exclusive review of the graphics capabilities of these machines.

Graduate honours
The long-awaited Graduate add-on that turns the BBC Micro into a form of IBM PC compatible sits its finals on our pages next week.

500cc
Hybrid Technologies takes the stage with its package for the BBC Micro, as we put the turbocharged Music 500 through a few demanding scales.



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Scottish Computer Show & Conference	March 12-14	Anderston Centre, Glasgow	Cahners Exhibitions, 01-891 5051
Personal Computer Show	March 13-16	Sydney, Australia	OES 01-486 1951
Personal Computer Show	March 21-24	Amsterdam, Holland	RAI Gebouw BV, Europaplein 2, 1078 GZ Amsterdam
COMDEX/WINTER	March 21-24	Anaheim, USA	Interface Group, 300 First Avenue, Needham, Mass 02194 (617) 4496600
COMDEX/JAPAN	March 26-28	Harumi Centre, Tokyo	Interface Group, 300 First Avenue, Needham, Mass 02194 (617) 4496600
Info 85	March 26-28	Olympia, London	BED, 01-647 1001
6809 Colour Show	March 30-31	Royal Horticultural Hall, London SW1	Computer Marketplace, 01-930 1612
Softcon	March 31-Apr 3	Georgia World Congress Center, Atlanta	Northeast Expositions, US 617-739 2000
London Festival of Computing	April 9-20	Various	Contact Jim Lagden, 01-240 8206 Prestel page No. 81018
(Festival Fair)	April 18-20	Central Hall, Westminster	
Computer Assisted Learning Exhbn	April 11-13	East Midlands Conference Centre, Nottingham	Dr Phillips, Shell Centre for Mathematical Education, Univ of Nottingham, Notts NG7 2RD

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