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Computing
WEEKLY

18 - 24 April 1985

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Vol 4 No 16

CBM 64 in trouble

THE FUTURE of Commodore's best-selling C64 micro is suddenly in doubt following a decision last week by top retailers Boots and Lasky to discontinue sale of the machine.

Commodore has also run into trouble with its new C16 and C128 models.

Boots has already dropped the C16 - and other high street multiples seem likely to follow suit. Additionally, neither Boots nor Lasky's will initially be stocking the C128.

Although some High Street stores - including WH Smith - have stuck to the usual price of £199.95 for the Commodore 64, Boots was selling it at £149.95. Lasky now only has ex-demo models left which it is selling at £129.90.

Once existing stocks of the Commodore 64 are sold out though, it now is very unlikely that either Boots or Lasky will re-order.

Peter Frost, Boots' Assistant Merchandise Controller, blames the situation on Commodore's price slashing on the Plus/4. Apparently this

has adversely affected sales of the Commodore 64.

"When Commodore cut the Plus/4 to £150, we told them it would add confusion to an already confused marketplace," he said. "Effectively Commodore has a price structure geared to the old situation, with the Plus/4 as a logical step up from the Commodore 64, even though they have cut the price of the Plus/4."

"We have no plans to buy any more Commodore 64s because we cannot buy at a low enough discount to continue the £149.95 price."

Philip Holton, Lasky's computer buyer, said, "We are clearing out our demo models at £129.90, and will not be stocking the 64 any more because the cost price is more than it is being sold for in the marketplace."

In addition to dropping the Commodore 64, Boots will also be getting rid of the C16. Again, there are no plans to buy more when present stocks have sold.

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Bug Byte faces the liquidator

BUG BYTE, one of the veteran companies of the software industry, is insolvent.

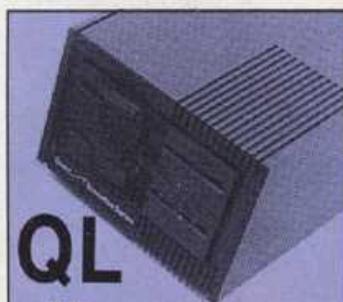
The company has appointed Christopher Chambers, of accountants Arthur Young McClelland Moores, to act as advisor to the company.

"The company will be liquidated," said Chris Chambers, who also acted as liquidator for Imagine Software last summer. "As the company is insolvent, it cannot continue to trade. Liquidation is the only appropriate action."

Creditors should by now be notified of the time of the Creditors' meeting, when the liquidator, probably Chris Chambers, will be appointed.

Bug Byte was one of the first companies to market its prod-

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QL discs
- Medic & Quest
- p.17



VIRGIN'S latest Commodore 64 game is *Gates of Dawn*, an animated arcade adventure. The game, available within the next couple of weeks, costs £8.95.

INSIDE >

SMC'S COMMODORE 64 MOUSE TRAPPED >

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View

What a mess Commodore has got itself in.

And everything was going so well in the months immediately after the launch of the Commodore 64. Then, just as the weight of C64 software being produced in the US seemed certain to overwhelm the Spectrum, instead of making strenuous production engineering efforts to refine the C64's design and bring its price down, Commodore appears to have panicked. Fearing some world-beating successor to the Spectrum perhaps, Commodore designed the Plus/4 as a direct 64 replacement with a better Basic which was cheaper to produce.

The trouble started when Sinclair unveiled its QL - and despite all its problems it did set new expectations for a home micro - 128K memory became a standard to match. And it was designed to sell in parallel with, rather than replace the Spectrum. By now it was too late to stop the Plus/4. It was launched to poor reviews - its built-in software was appalling, it offered no big advance on the C64 and sold for £50 more. Worst of all nobody would write software for it and it looked set to take sales from the C64.

Commodore stuck to its guns - instead of reducing the price of the C64 before Christmas and ditching the Plus/4 as a lost cause it pressed ahead. Its reaction was to begin work on a new C64 software compatible micro with 128K.

After losing market shares dramatically at Christmas because the 64 was overpriced it took the incredible step of trying to dump Plus/4s at £50 under the C64 and the inevitable happened - C64 sales plummeted.

So the C64 dies? If so it is all Commodore's fault.

POPULAR Computing WEEKLY

Vol 4 No 16

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News > Tatung price cuts

Software Reviews > Bruce Lee from US Gold on Spectrum > Microsoft wordprocessor on Amstrad CPC 464

Hardware Review > Quest and Medic Datasystems head to head as Roger Thomas tries out two disc systems for the QL

Star Game > Take the part of the last cricket on earth with Cricket's Revenge for the CBM 64 by Jolyon West

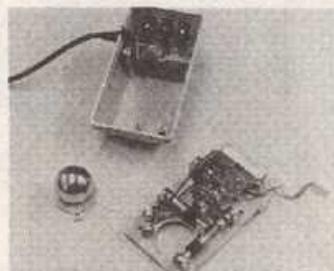
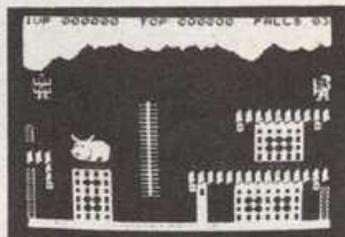
The QL Page > Andy Pennell puts the new JS Rom under the microscope

BBC and Electron > Part Three of the Tracer project for the BBC B by Calvin Woodings

Spectrum > Ever wondered what happened to your programs in memory... this week find out!

Amstrad > Brian Cadge concludes his utility program for the CPC 464

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Amstrad Star Game - Stock market on the CPC 464... Tracer Project concluded on BBC B. . .Our QL Mail Merge adapted for Quill version 2

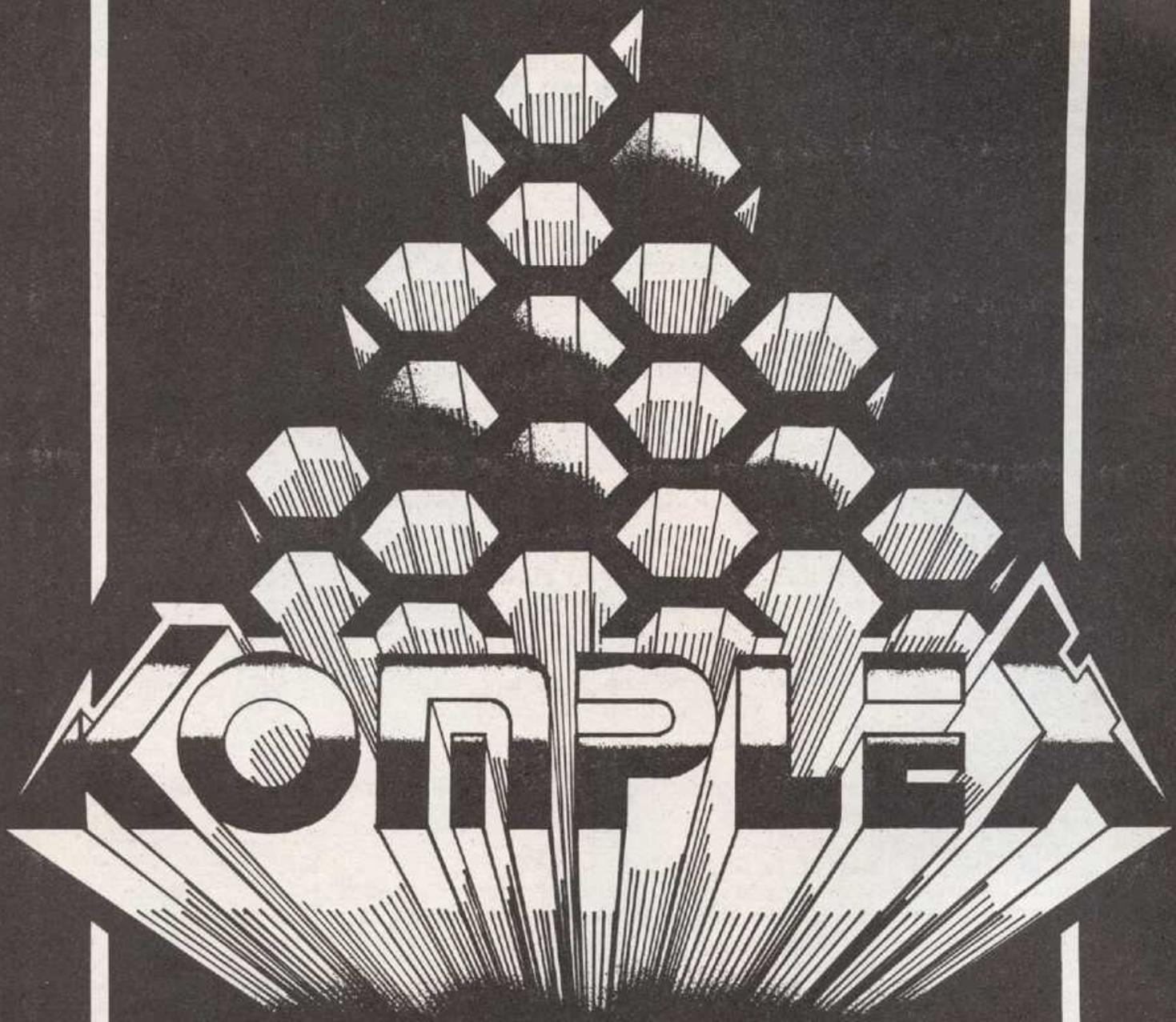
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ABC

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Computer Trade Association Magazine of the Year



LEGEND

Commodore 64 hits trouble

◀ continued from page 1

"We were forced into selling the C16 at £79.95 by Dixons - then Smith's brought it down to £69.95. We are making very little or no money on it," said Peter Frost.

Lasky will not be stocking the new Commodore 128 either, at least not at first. Commented Philip Holton, "We are going to wait on the C128 until we see if it is viable in the range."

Boots also looks unlikely to stock the C128. According to Peter Frost, Boots Assistant Merchandise Controller,

"We want to keep our range static - the priority is to sell through our existing stock rather than take on new lines in the first half of 1985."

W H Smith, at least for the time being, is sticking with the C64 at £199.95 and the C16 at £69.95, according to the company's computer buyer George Bradbury.

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

Atari/Amstrad race for shops

THE RACE is on to see which of the two new micros launched this week - Atari's 130XE and Amstrads CPC 664 - will reach the shops first.

The first Atari 130XEs look likely to be on sale in Lasky's within the next ten days at a price of £169.90 for the 128K machine.

"The first shipment is at Heathrow at the moment, and we will have them in our shops next week," said Lasky's Philip Holton.

Lasky's is also likely to be taking the 512K Atari 520ST, which it hopes to stock in June. "From what we have seen of the 520ST, it is a superb machine which exactly fits into plans," commented Phillip Holton.

Rumbelow looks set to be first with Amstrad's CPC 664 - as it was with the CPC 464.

According to Rumbelow's marketing director Peter Jackson it will be in its shops in two to three weeks time. No price for the 664 has yet been agreed between Rumbelow and Amstrad.

Despite the decision by Boots to restrict its new lines there is a possibility that it will take the Atari 130XE and ST ranges.

"We are having discussions with Atari, and we have not yet made a definite decision to wait," said Boots' Peter Frost. Boots will not, however, be taking the 664 despite its success with the 464.

W H Smith has yet to decide which of the new machines it will take. According to Smith's Martin Cresswell, the company is "looking at a number of additions to its range at the moment".

Sinclair float looks far off

SINCLAIR'S proposed share flotation, already postponed from this spring, looks increasingly further away as the company's shares continue to trade at around £10 to £15. This compares with the value of £34 when 10% of the shares were privately placed in January 1983.

"It is only a small number of the shares that are changing hands," said a Sinclair spokesman. "It is also important to remember that 90% of the company is owned by Sir Clive Sinclair, but certainly the City has a great lack of

confidence in the market at the moment.

"The environment has not changed for the better as regards the float since it was postponed."

However, he felt that the lack of new products in the short-term from Sinclair - the ½ Mb extension for the QL is now not expected before the end of this year - did not affect the company's credibility.

"We are still the clear market leader in a problem-ridden industry, and it may well be that new machines in the 68000 field will help the QL by enlarging that market and giving the 68000 more credibility," he said.

Tatung cuts Einstein

TATUNG has also slashed the price of its Einstein micro from £500 to £350 for the basic model.

In addition, an agreement with High Street chain Dixon's means the Einstein plus monitor, BBC Basic, word processor, spreadsheet and six games is now selling at £499 in Dixon's branches. Tatung had sold around 20,000 units of the Einstein at the beginning of 1985.

The company also has a new micro under development - called the Micro Einstein - a more compact lower cost version of the Einstein.

The Z80-based machine, comprising CPU monitor,

disc drive and 80K Ram, will not be made available for some months yet, because of problems with production of its ULA chips. Tony Adams, Tatung's commercial manager, denied reports that Tatung would launch the Micro Einstein in May, at the 'brown goods' Trade Show. "We are not launching a new product at the Show in May, although we do have a number of new products in development at the moment."

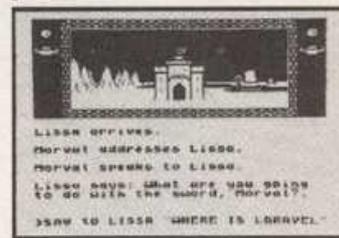
● Tatung has recently merged its computer and television operations in Telford resulting in 70 redundancies, around 25 within the computer division.

Latest from Games Workshop

RUNESTONE is a sophisticated new adventure program from Games Workshop - combining *Lords of Midnight* - style 3D graphics and complex language analysis.

You control three characters - Morval, Eliador and Greymarel - moving them around a landscape of wastelands, mountains lakes, huts and citadels. There are dozens of other characters with whom you can communicate using standard English sen-

tences and the game incorporates a complex language parser.



Games Workshop say the game can be played on several levels: as an adventure in which you must find the Runestone of Zaphir or as a wargame where you must defeat an invasion by Kordomir the Dark One and his tribes of Orcs.

The game is due for release later this month and costs £7.95. Details from Games Workshop, 27-29 Sunbeam Road, London NW10 6JP.

Rodent horror for micro game

HORROR addicts will be delighted to hear of a new game to be released by Hodder and Stoughton.

Called *The Rats*, it is an adventure based on the best-selling book by James Herbert for the C64 and Spectrum at £9.95.

Bug Byte

◀ continued from page 1

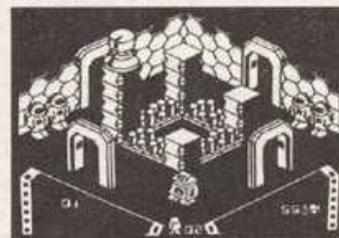
ucts professionally and enjoyed success with *Twin Kingdom Valley* and *Manic Miner*, before the latter's programmer, Matthew Smith, took the game to his own company, Software Projects.

Bug Byte recently signed a deal with Argus, whereby Argus would handle the marketing for six titles. It is unclear what will become of these titles.

Converts to Ultimate

ULTIMATE'S best selling *Alien 8* is to be converted to the Amstrad CPC464 and the BBC B.

Both versions will be straight copies of the Spec-

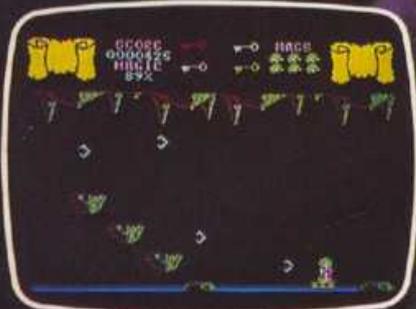


trum game, according to Ultimate's Louise Stamper and will be available by the summer on cassette, priced at £9.95.

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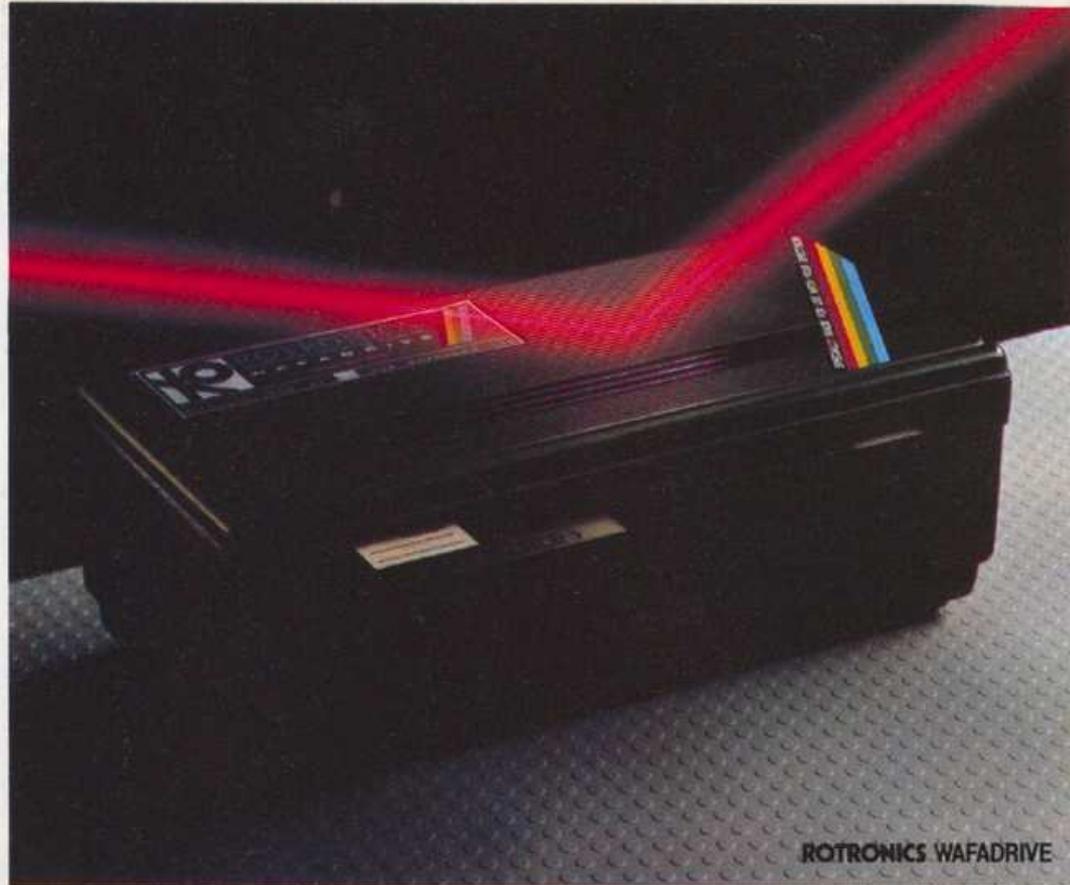
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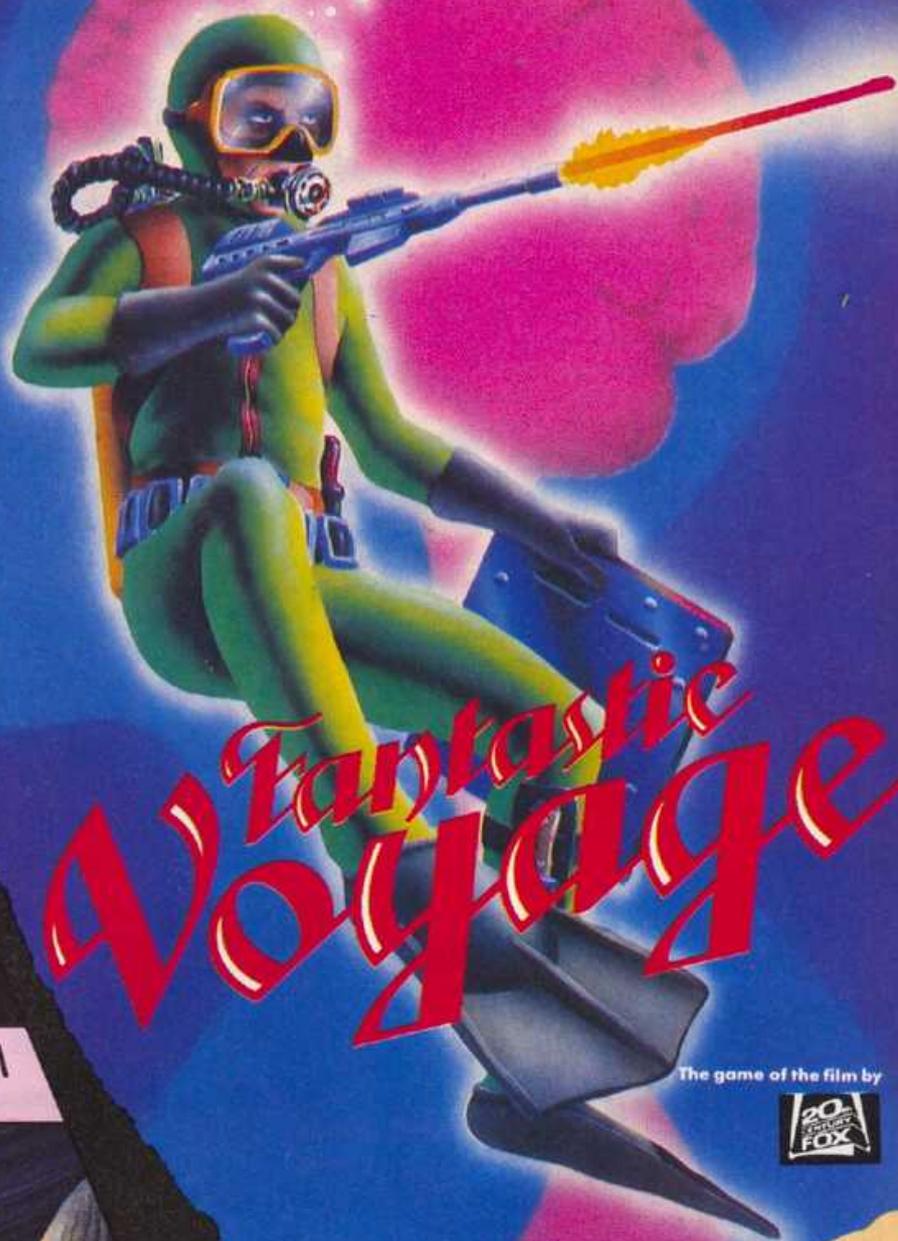
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C16 and Amstrad on April 2nd with versions for the BBC/B Electron, MSX, Atari and Einstein to follow.

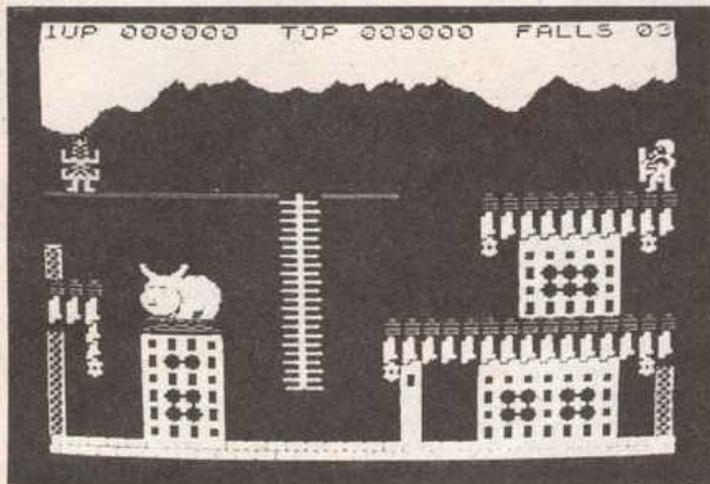
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Kung fu

Program Bruce Lee Price £7.95 Micro Spectrum 48K Supplier U.S. Gold, Unit 24, Tipton Trading Estate, Bloomfield Road, Tipton, West Midlands DY8 9AH.

Remember Bruce Lee, the 'Little Dragon' who kicked and crunched his way into a million hearts,



not to mention jaws ribs and other even less mentionable parts? Well, now Bruce has been immortalised in the micro in this, the latest addition to the oriental games genre, and this time I'm going to resist the temptation to make martial arts noises.

What we have here is basically a platform/maze game (oh no, I feel a non-martial arts 'yawn' coming on) enlivened by some fisticuffs. Quite

why having your sprite duck, kick and chop should be so satisfying I'm not sure, but it beats the hell out of normal dodging and collecting games - as do various ninja and dreaded Green Yamos.

The adventure element is pretty lively too, with various lanterns to collect before doors will open and finally the deadly fire breathing wizard to face (he must have been eating his Green Yamos with Chilli Sauce). The graph-

ics are nice and the animation positively balletic, but the switchable sound is pathetic. Why no ass-kickin' boogie?

With the pressure of pursuing baddies this is a worthy step up from plain platform adventures and despite my earlier promise is probably worthy of a 'Haii-eee-aaaghh!!!'

John Minson



In writing

Program Microscript word processor Price £49.95 Micro CPC 484 Supplier Amsoft, Brentwood House, 169 King's Road, Brentwood, Essex CM14 4EF.

This is the first C/PM format business software to be launched for a mass produced home micro at a suitably cut down price. But it is still expensive compared to purpose written software such as *Tasword* and it's far from clear whether it's worth the extra money.

The main advantage is that each text file can be as long as

there is room on the disc, facilitating printing and block movement of large documents. Unfortunately, for single disc drive systems you must have a copy of script on every disc and that leaves an unbelievably small 26K free per disc. Allowing for one back-up file, this is comparable to the amount you could fit into one *Tasword* file, and at £4 per disc is also a terrifyingly expensive way of storing data; for large projects it is cheaper to buy a second drive! (Anyway, we can soon expect an upgraded 'disc only' *Tasword*, which will also support very large files.)

Even though *Script* has over 140K of code in the program, it doesn't always per-

form better than *Tasword*. Insert mode is better, you can find and replace paragraphs as well as words, delete options are a bit more versatile, blocks aren't forgotten as soon as they are moved, printer page layout is slightly better, you can embed 'rulers' in the text to change margins and tabs for different sections, and there is also the ability to do calculations on numbers within the document.

Conversely, justification is not automatic, and to reformat an altered page you must save text, leave edit mode, load code for formatting and reload the text - a slow complex process which is matched by two keystrokes in *Tasword*. *Script* also seems to fail with an 'out of string space' error when reformatting large paragraphs. Screen scrolling is excruciatingly slow as is printing since each line is put on the screen before it is put on paper. There is also no means of customising the printer control codes; 'underlining is available' says the manual - but not on my machine.

Quick plug

Program Plug It Micro Commodore 64 Price £1.99 Supplier Scorpio Gamesworld, 307-313 Corn Exchange Building, Manchester

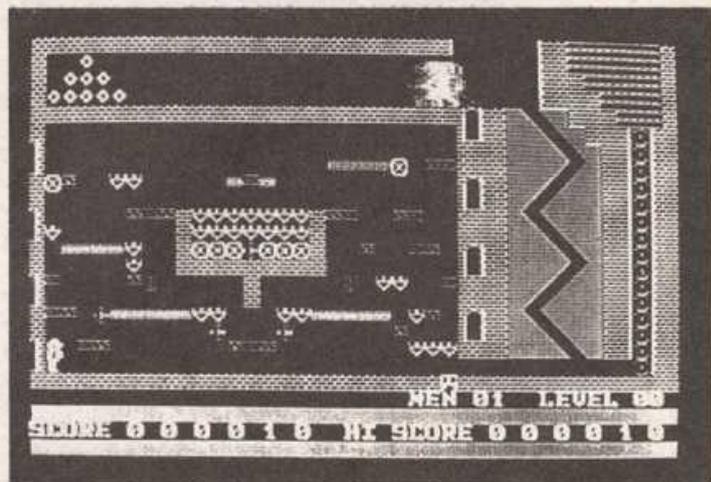
The screen layout is poor - no help menus, no word count, no status reports such as 'insert on'. This is aggravated by an appalling manual, minimalist in content and turgid in style. There is not even a list of the available commands, forcing you to hunt for them through the book (and some are completely missing).

The program is saved by the fact that it allows a control language to be inserted into the text which can be executed at a later date. This takes full advantage of disc handling, allowing files to be inserted at marked points within others such file merging can be nested many times), pauses for input from the keyboard alters formats, prints, etc. So powerful is this feature that it can be used to create tailor-made applications packages for invoicing, mail merge, etc. It's a very clever feature, but unless you have a specific use for this in mind, you will be better off sticking to *Tasword*.

Tony Kendle



fore the giant above drops enough bombs to blow away the container of green gunge. To stop him, a number of yellow plugs which are scattered around the platform structure, have to be collected avoiding various objects that get in the way.



Plug It is yet another platform-type game, but at least it has the saving grace of being very cheap.

You must plug the gap at the bottom of the screen be-

Plug It could do with a bit of touching up to make it into a really good game. Still, at the price, who's complaining?

Tom Hussey



Wargames

Program *Siege on the Volga*
Price £8.95 **Micro** Spectrum
 48K **Supplier** Omega Games,
 2 Lyly House, Great Dover
 Street, London SE1 4EQ.

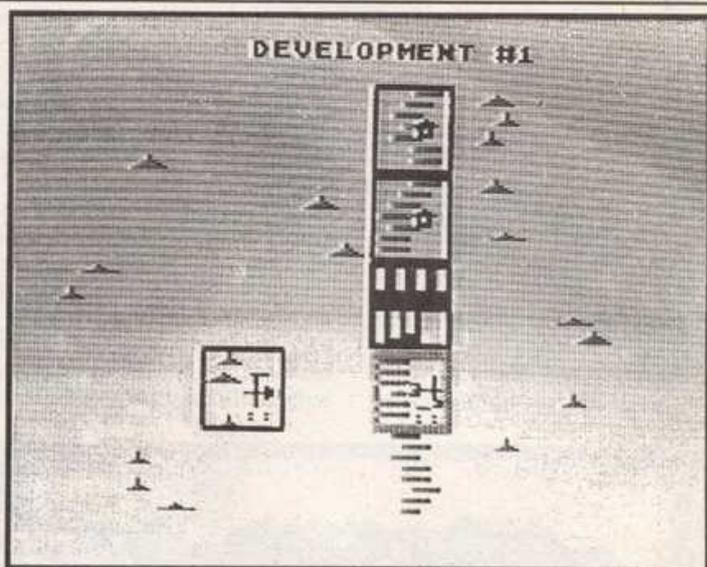
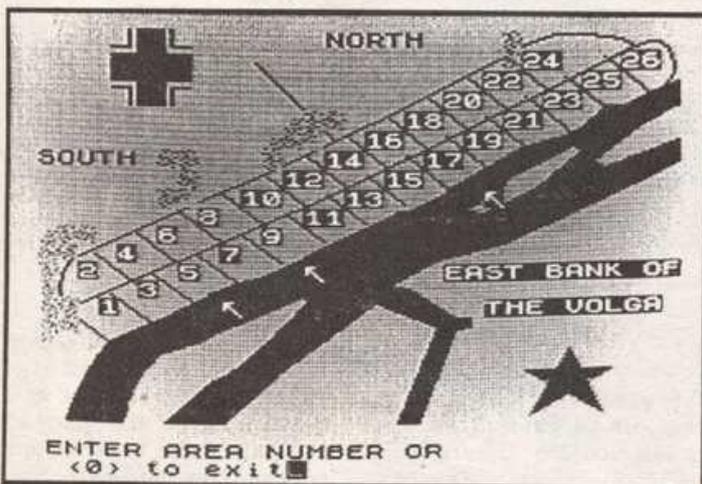
This program causes me problems. It's a wargame, you see - a single player operational level simulation of the German assault on Stalingrad in 1942, with the eventual aim being to occupy 25 of the city's 26 areas, after eight turns. The problem for me as a reviewer is the inclusion of a small map and counters. Purists will argue that a computer wargame should be played solely on the micro.

On the other hand the fusion of silicon and cardboard

chips seems a reasonable idea, though keeping track of where a division is (they can spread over three zones) can still be tricky. At least there are no messy grid references or hex boards to bother about.

With two levels of difficulty and choices by menu, I found the game played relatively smoothly, but then again I was fighting board battlers long before I got my first micro, so this sort of hybrid doesn't worry me. Sadly the Basic is badly protected and crashes too easily on wrong inputs. In the end it's best suited not to the general computer gamer but the cardboard general could find it a satisfyingly different experience to die rolling.

John Minson



affect your production and you may be lucky enough to win a swamp-eel eating competition or a ballet-dancing contest. At the end of the day, the space-settler with the most resources wins.

One word of caution: although the beginner level of the game gets you playing

straight away, it takes a little while to really get the hang of developing a sensible strategy. Don't despair. Stick with it, and you can look forward to hours of superb entertainment.

Tom Hussey



In code

Program *Disassembler/Relocator* **Price** £7.95 **Micro** Spectrum 48K **Supplier** Draysoft, 2 Bedford Way, Rugeley, Staffs WS18 1LB.

This is a tape providing two useful functions for machine code programmers - disassembly and program relocation. The disassembler is pretty standard stuff, dumping out pages of instructions to the screen or a printer. It does handle numerous Z80 instructions, though, as well as the data that tends to follow the Restarts, with the curious exception of RST 10s in Interface 1 programs.

The more interesting part of the program is the disassembler - it takes up to 32K of code and can relocate it so it runs at another place. It is an 'intelligent' disassembler - that is, you give it a start address and it goes through the program working out which bits get executed, and which do not. If your program has more than one entry point the program may get the relocation wrong though.

During relocation certain errors may occur, pointing out to the user certain instructions that may have been relocated wrongly. The screen memory is used as a workspace area for the program, producing strange patterns during the process, and if you lose your nerve you can always press *Break* in the middle.

Once a program has been relocated it is saved to tape with a false header, so that when it's loaded it will go in its new location, but no option to use Microdrives. There are no restrictions on either the old or new addresses of the code to be relocated, even if it clashes with the relocation program.

The disassembler works perfectly, though most m/c programmers already have one along with a monitor anyway. Possible uses of the relocater are for moving programs that don't work with disc or microdrives connected, and adding normally incompatible programs together. If you have a need for such a relocater then this program is definitely worth considering.

Andrew Pennell



Pioneer spirit

Program *Mule* **Micro** Commodore 64/Disk Drive **Price** £14.95 **Supplier** Retail

In case you're wondering, the letters M.U.L.E. stand for Multiple Use Labour Element. It's easy to see why this game was a US top-ten hit - it really appeals to the American pioneering spirit.

The action takes place on the undeveloped planet of Irata. Space settlers arrive by inter-galactic cruiser and stake their claims to plots of land. In the second phase of the game, each coloniser has to decide what he will produce. There are three options: a) to grow food, b) to go

mining for Smithore or c) to produce energy.

Now, as with all good simulations, the different phases of the game are interactive. If, for example, you've selected a riverside plot of land, your best bet is to opt for growing food. Similarly, the outfitting and installing your M.U.L.E., is a little tedious to describe here. However, it is perhaps significant that this part of the game usually ends in the pub at the centre of town.

After the production cycle, any surplus products are auctioned off. Here, the action is really fast and furious. With up to four players able to buy or sell simultaneously (two on joysticks, two on the keyboard), the computer gets red hot.

Random events such as planetquakes or pest attacks

THE FUZION OF
MIND AND MACHINE

POPULAR Computing WEEKLY

It's the best selling

Confuzion hits UK

IBM has pulled out of the UZ home computer market, only one week before Atari launches the first of its new 128K machines.

IBM has surprised the American home computer market by announcing last week that it is to produce

its keyboard, much criticized at launch. It is thought that margins were too slim on the PC Jr to justify continuing production.

C128, positioned to compete directly in the UZ with the PC Jr and Apple IIc, will now only have the Apple model to contend with.

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Fixgen alone £5.50 (yearly updates available)



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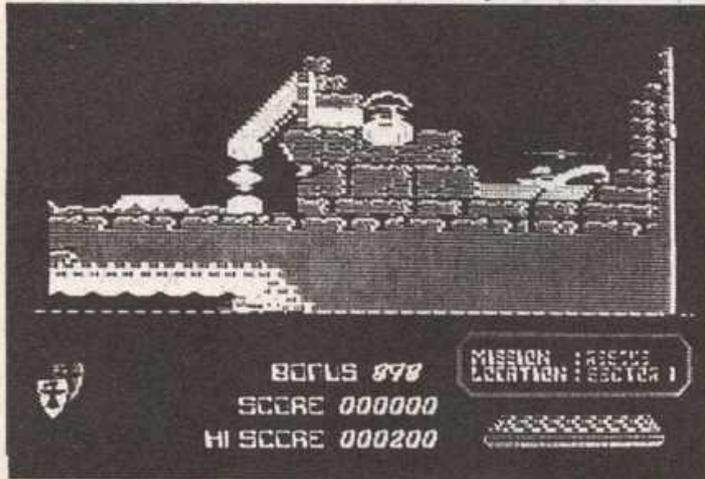
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Or order by telephoning 01-794 4033.
Money back-guarantee. Allow 28 days for delivery.
Mail to: Practical Programs Ltd., 7 Downside Crescent, London NW3 2AN.

FAST PACE WEIGHT LOSS

Air attack

Program *Airwolf Micro*
Commodore 64 **Price** £7.95
Supplier Elite Systems Ltd.,
55 Bradford St., Walsall WS1
3QD



Stringfellow Hawke is a former Vietnam chopper pilot and the only man in the free world trained to fly the billion-dollar jet-helicopter *Airwolf*. This is a highly sophisticated combat helicopter capable of supersonic speeds, with a weaponry system way ahead of its time. You take the role of Stringfellow Hawke as he pilots the *Airwolf* on a hazardous mission to rescue a team of brilliant scientists.

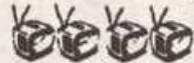
If you haven't made the connection yet, *Airwolf* was a hit television series that was broadcast recently. Along with games like *The Dukes of Hazard* and *The Fall Guy*, Elite continue their policy of releasing games based on television programmes.

The scientists are imprisoned in a huge, underground terrorist base. You have to manoeuvre round the fortress picking up the five stranded hostages on the way. Life is far from easy. The base is full of defence systems which have to be negotiated or destroyed - sometimes a

bit of tricky flying is required, or maybe you have to shoot an exit through a wall. Not only is the action fast, but strategy is needed to work out how to solve what seem impossible problems.

I thought the background graphics and the animation of the helicopter were great. Control of the helicopter is good but not, perhaps, so good as in *Choplifter*. The action might be a bit difficult for novice games-players, as pinpoint accuracy is required. Having said that, *Airwolf* is very playable. A great game, and I think I'll watch the television series with added interest.

Tom Hussey



Magicke

Program *Mighty Magus*
Price £6.95 **Micro** Spectrum
48K **Supplier** Quicksilver,
Carlton Lodge, 16 Carlton
Crescent, Southampton,
Hampshire SO1 2EJ

The most notable thing about this game is its revelation of a hitherto arcane corner of magicke - the bouncing mage! Sadly the wizardly sprite only leaps and bounds so athletically because this is nothing more than a multi-level platform

game, attempting adventure overtones, with floors containing booby trapped tiles, ranging from teleports to trapdoors, which cause the otherwise sedate warlock to behave more like an outcast from *Track and Field*.

Scattered around the dungeon, in the quest to reach the bottom and slay the dragon, are piles of dirt and chests, which when searched are likely to contain magical bonuses, or even armour - though there's also a nasty skull about. Inevitably there are also wandering monsters to fight, zap with a wizardly blast or even jump on.

Pop up

Program *Bodyworks Price*
£14.95 **Micro** Spectrum 48K
Supplier Genesis Productions,
30 Great Portland St.,
London W1N 5AD.

Dr Jonathan Miller pops up almost as much as his highly popular anatomical books. Here's his name again, on a computer program now. What a glossy package too, with booklet, full colour wall chart and seven programs on two tapes.

Starting with cells it proceeds through circulation, respiration, the nervous system, digestion and muscle

control, illustrating its text with animated diagrams and often concluding with a simulation, probably the best being one where you have to control hand, upper and lower arm muscles to press buttons.

Oddly enough, the package lacks real blood and guts. In every case I was surprised that the four minutes *Load* offered so little. In several cases the animation of the illustrations seemed extraneous and didn't really enlighten me as to what was really happening. One for the Sunday supplement set who buy their micros from Habitat.

John Minson



Blood and guts

Program *Fantastic Voyage*
Price £6.95 **Micro** Spectrum
48K **Supplier** Quicksilver Ltd.,
Carlton Lodge, 16 Carlton
Crescent, Southampton,
Hampshire SO1 2EJ

Scene: The Control Centre.

"We have a task for you. A famous scientist lies dying. You'll be miniaturised and injected into his body so that you can save him."

"That sounds like a bum mission."

"Only if you take the wrong turning at the stomach."

"But isn't this the plot of an old movie?"

"That's right. It starred Raquel Welch..."

"You mean I get to meet a Raquel Welch sprite?"

"Sorry. Cutbacks meant we couldn't afford the extra pixels."

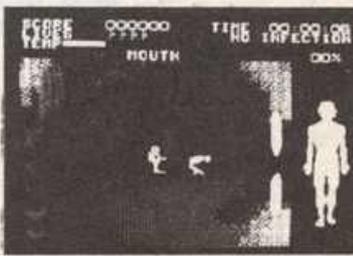
"So what do I get?"

"A midget sub - only it comes in kit form. Like I said - cutbacks. You must find the pieces and assemble them in

the brain. There's only an hour to do it and en route are viruses, growths and cholesterol blockages to be laseder."

"It sounds pretty bloody!"

"Internal organs are - and soft too. You'll soon forget they're just platforms and the body's merely a vast maze. You'll have some idea of where you are if you look to the right, but beware - if an infection breaks out you'll have to move fast to destroy it and few routes are direct.



You'll also have momentum problems while swimming, and if you lose enough energy you turn invisible!"

"Tricky! But it looks good and sounds good."

John Minson



Though it at least avoids being a *JSW* clone and contains some smooth scrolling and animation, I thought *Mighty Magus* to be lacklustre. There's too little challenge in jumping the tiles, too little excitement in finding the hidden objects; hiding places may need searching twice so you press the 'S' key

twice - big deal! The dungeon is randomly constructed and only proves how good a properly thought out play area is. It's all proficient (colour/monochrome monitor choice; save 'Hi-Score' table) but hardly mighty.

John Minson



Spitfire

40



CHOCKS AWAY!

THE BEST THING SINCE THE REAL THING

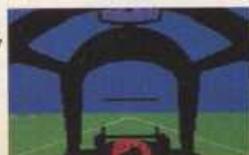
A Spitfire flight simulation set in 1940. Ground features and realistic air combat.

Spitfire⁴⁰ is available from W H Smith, Boots, Spectrum *spectrum* and good software stores everywhere.



MIRRORSOFT

MIRRORSOFT, Mirror Group Newspapers Ltd



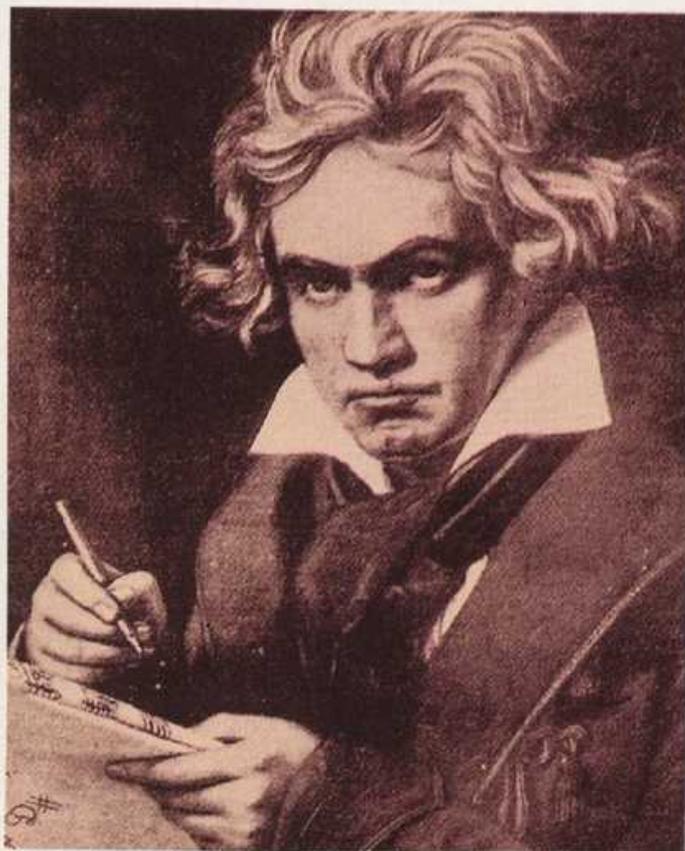
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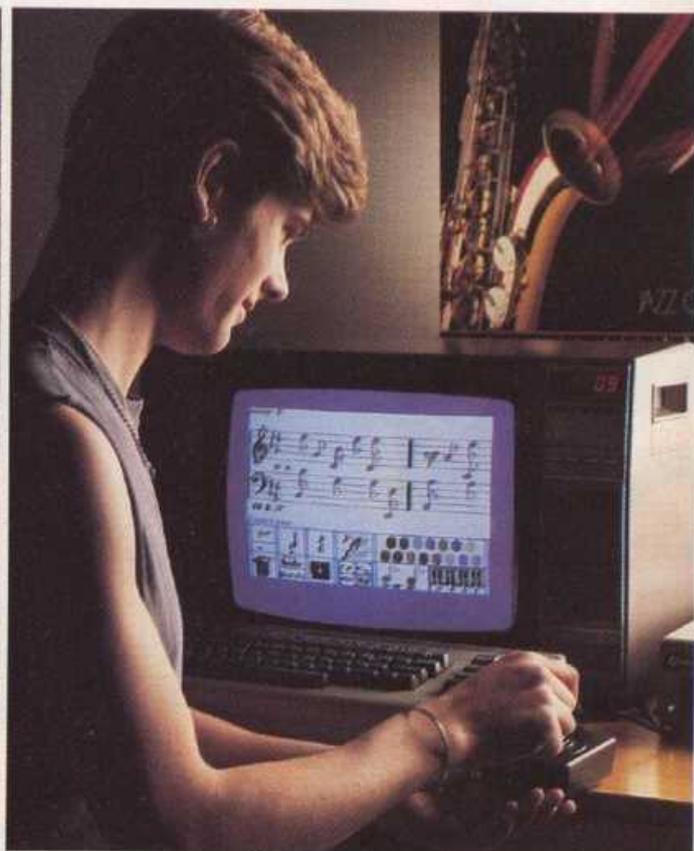
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Note by note, you can build a melody from the music in your head. And see it on your TV screen as well as hear it.

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If, musically, you're a beginner, don't worry. Music Studio



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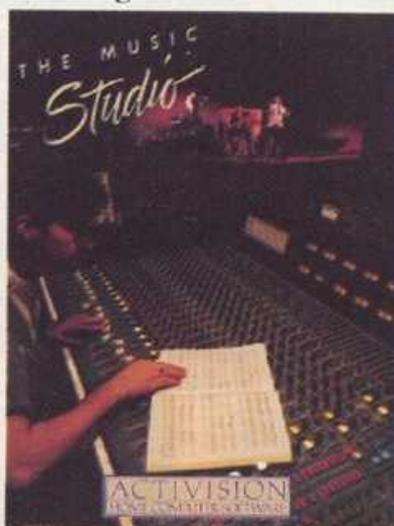
will help you create your own sounds, step by step, with no previous knowledge of music whatsoever.

There's even a menu of fifteen assorted melodies, ranging from Ravel to Joplin, for you to experiment with. (Try scoring Mapleleaf Rag for Keyboard and Steam Train. It takes two seconds with Music Studio!)

If you are a musician, you'll wonder how you ever lived without the Music Studio.

If you're not a musician, you soon will be.

£14.99 for the cassette and £19.99 for the disk from all good software stores.



ACTIVISION
HOME COMPUTER SOFTWARE™

Heading to come

Hardware Medic Disc System Micro QL Price range £249.96-£959.90 Supplier Medic Datasystems, 76 Grainger Close, Basingstoke, Hants.

Hardware Quest Executive Disc System Micro QL Price range £295.00-£1537.00 Supplier Quest International Computers, School Lance, Chandlers Ford, Hants.

When Sinclair first launched the QL, a computer with 128K of memory and two fast tape drives seemed great value for money, but since then, problems have appeared due to the speed at which the microdrives work and the amount of memory needed by the more powerful programs available. To get over this a number of company have already launched extra Ram boards and disc drives. Now two more companies, Quest Automation and Medic Datasystems, have produced their own systems for potential QL-upgraders.

Medic first appeared taking orders at the last ZX Microfair in February. Since then very little has been seen it will take them at least a couple of weeks more to come up with the finished product. The reason for this delay is that when the original board was designed by an outside firm they got the information on the connector horribly wrong. This wasn't noticed until after the first production run and a number of boards had been built and plugged in. This has caused a delay in delivery dates and a number of damaged ICs.

The main products soon to be available from Medic are shown in Table 1. To go

program the function keys, multi-task the Psion programs and a routine to compress files. A disc Doctor is planned to be available shortly after the launch.

The review system was a pre-production version of the full package of 512K of Ram and dual 3.5 inch drives which give 720K of storage space each, when formatted. Fully working copies of the switching software and compression soft-

paper sleeves for protection and labels are used to write-protect the discs, the 3.5 inch discs come in a rigid plastic with a cover which slides across to protect the read/write slot and a small switch which you slide back to write-protect it. The only disadvantage at the moment is the cost of the discs which are about £5 against £2 for 5.25 inch discs, but this price should drop as more manufacturers start to use 3.5 inch

Table 1 Medic System

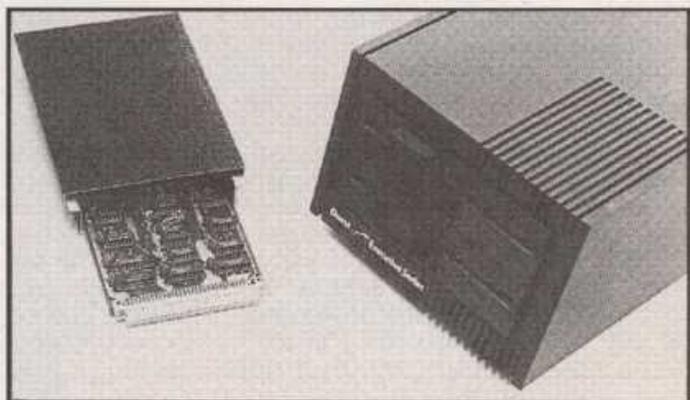
Product	Price
64K Ram board	£99.95
128K Ram board	£129.95
256K Ram board	£169.95
512K Ram board (has to be powered from disk drive)	£259.95
Eprom experimentation card without Eprom	£24.95
Modem (available May)	£79.95
1 x 720K 3.5 inch disc drive + interface	£249.96
2 x 720K 3.5 inch disc drive + interface	£399.96

ware were also supplied.

The main circuit board holds the Ram, together with the disc interface and a parallel interface, so if you don't buy the full system at once it will be possible to upgrade it when needed. Note, if you want more than 256K extra memory you will also need the disc system as the QL alone is unable to supply the power needed. The board itself is able to control up to four disc units, and is designed to take a number of other products from Medic, one of which under development, is a modem planned to cost under £80. A

drives.

When using the disc drive system from Superbasic you simply use 'Up' instead of 'mdv'. This is the same as the name used by CST for their disc drives, so software written for one system should work on the other without any changes needed. Un-



Medic main board and disc unit

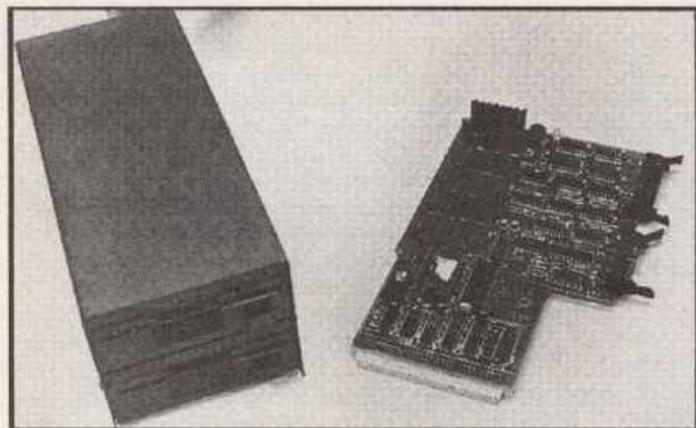
nice touch on the board is a light emitting diode which shows if the memory on the Medic board is being accessed or not, which may be of some use if a program crashes.

The parallel port is a full bi-directional port controlled from QDOS by using the name 'par'. You may also

like CST though, Medic only plan to add a small number of additional commands for Basic in Rom. Instead it plans to use the spare Rom memory for other programs and supply extra Basic commands on disc, allowing more control over multi-tasking programs and files.

The Psion switching software (which is held in Rom) allows you to load up to four of the Psion (version 2) programs into memory depending on the amount of Ram you have and then allows you to move between them at will. Even when I had all four programs loaded and running, each had about 50K to store information in and it took under half a second to move between programs. There is only one limitation, the fact that only one copy of Quill may be loaded in at any one time.

If you set up a Ram disc before loading the software you may move information between the program without ever having to use the microdrives or discs for temporary storage. Such a system gives many of the benefits of the Xchange package found on the ICL One per Desk and other much larger computers. If you



Quest's disc unit and memory board

with these there are a number of packages available, priced between £299.95 for 1 disc drive and 64K of Ram to £595.95 for 2 disc drives and 512K of Ram. To go with the disc drive system there is of free software, which includes a program to transfer the Psion software to disc, Ram disc software, disc copying software and software for job control. The Rom also has built-in software which allows you to

set up an area of Ram to become an internal printer buffer. Information is sent to the parallel port via the buffer, so a file can be transferred to the buffer for printing and your program can continue running while it is printed.

The discs are 3.5 inch drives as standard, and while the interface will take 5.25 inch drives, Medic only plans to sell the 3.5 inch drives, because they are more compact. While 5.25 inch discs come in

Hardware Review

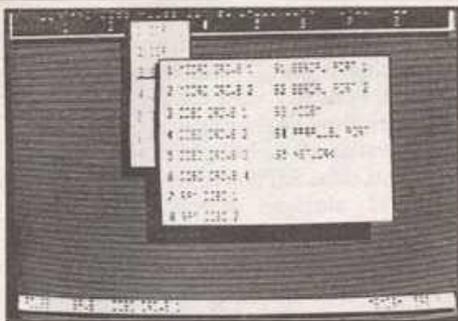
only own the old versions of the Psion programs this system would certainly make it worth while buying the newer versions for £50.

The Rom also holds two other programs. The first allows you to define the function keys and get back the last line entered, allowing you to correct errors in lines which have been entered but not accepted by Superbasic. The last program in Rom takes a file and compresses by up to 50%. This allows you to back-up files in such a way to cut down on the space needed.

Quest first announced its products in November, but since then they have changed the design of their boards and the prices have been increased to those shown in Table 2. Out of this range I have tested a final production version of the 256K Ram board, a 2 x 400K disc drive, the CP/M software and the Ram disc software.

The first problem with the disc system is that the QDOS software is supplied on a microdrive cartridge, so before you can use the disc drive you have to load in the software. When loaded this software takes up part of the QL's memory, meaning that some large programs may not be able to run without extra memory. This is seen when using Quill (version 2) which has to use microdrive two to store text in the same way as Quill (version 1) had to.

The name given to the disc drives from QDOS is 'fdv' unlike the 'flp' command used by Medic and CST. The format command is also different as you have to specify what size storage the disc will be formatted to and it is loaded in to memory from tape when needed. When I tried to format a disc in one of the 400K drives as a 800K disc it worked according to the



The Mac style user interface provided by the Medic system

microdrive to now access the Ram disc. The advantage of such software is the speed at which information is transferred between the disc and other programs. The disadvantage of this system is that the information will be lost if the computer crashes, so information has to be backed up systematically to tape or disc. To use the software you 'exec-w' it in memory, and then use 'format' to set up the disc's size, and even its name which starts out as 'rdv' may be changed. It is possible to set a Ram disc up under the name of 'mdv'. This causes all programs which previously accessed a

Table 3 Comparison of system timings (seconds)

	Medic 720K disc	Quest 400K disc	Microdrive 100K tape
Saving 32K of code	6s	19s	10s
Loading 32K of code	3.1s	3.5s	7.3s
Booting in Quill	9s	39s	18s

microdrive to now access the Ram disc.

The CP/M 68K software from Quest is the company's answer to making the QL a business machine. Quest's advert says that CP/M is the "world's most widely used operating system". This may be true but it is the version of CP/M for Z80 computers known as CP/M 2.2 which has sold in such

be booted from a microdrive tape. You then have seven commands at your disposal, allowing you control over the files held on tape or disc, but very little else. Out of the many files supplied there is an Assembler, a C Compiler and a text file which tells you that CP/M is now available on 68010 computers of little use as the QL has a 68008 CPU. CP/M is also available on microdrives at a cost of £99.50 but an additional OS-card is needed. This card performs some of the tasks carried out by the disc interface and fits into the main expansion port.

Overall, I would say that Quest have suffered from trying to be first on to the market place (and being second to CST, incidentally) and now have a system which is over priced and over sized. Both their boards are 247mm x 97mm and the disc drive is 140mm x 395mm x 188mm. Medic on the other hand has made a single board a bit bigger than Quest's but capable of holding the whole system. Medic's dual disc drive is also far more compact, measuring only 95mm x 265mm x 105mm.

There is also a difference in terms of speed between the two systems: Table 3 shows the outcome of a number of tests made on the discs. It takes so long to load Quill when using the Quest system because you have to load the discs operating system from microdrive first. The Medic system on the other hand automatically boots from disc instead of from microdrive.

Placing the CP/M operating system on the QL, as Quest has done, I feel is a step in the wrong direction. While QDOS is able to run a number of jobs at once, CP/M can only handle one program at once. Programs written for the QL are also able to make use of the machine's hi-res/colour screen - good examples of this are the latest programs from Sinclair. CP/M programs on the other hand have to stick to a format which all CP/M computers can handle and so are text based with no colour or hi-res graphics.

In straight terms of cost, the full Medic system would be £595.95; certainly extremely price competitive. The equivalent system from Quest (without a parallel port) would be £1,477.

However, the Medic system is unlikely to be ready for a number of weeks - perhaps the wise buyer would do well to wait for its release before parting with any hard earned cash.

If you must buy a system now, you could try looking at the CST system (*Popular Computing Weekly* January 31) ... but Medic should be well worth the wait.

Roger Thomas

Table 2 Quest system

Product	Price
64K Ram board	£115.00
128K Ram board	£185.00
256K Ram board	£349.00
512K Ram board (needs power supply)	£579.00
1 x 200K 5.25 inch disc drive + interface	£295.00
1 x 400K 5.25 inch disc drive + interface	£419.00
1 x 800K 5.25 inch disc drive + interface	£499.00
2 x 200K 5.25 inch disc drive + interface	£469.00
2 x 400K 5.25 inch disc drive + interface	£579.00
2 x 800K 5.25 inch disc drive + interface	£695.00
CP/M - 68K on Floppy Disc	£59.50
Power supply	£64.50
Expansion Console	£139.00

software, but naturally it was impossible to use this space.

If you plan to add extra memory at the same time as the disc interface you will also need to buy a power supply and the expansion console also serves as a monitor stand/wrist-rest and is made out of black aluminium. If you only want a monitor stand/wrist-rest only, the box may be bought separately for £69.50.

To go with the Ram board, Quest sells Ram disc software which sets up areas of

great numbers. Software for CP/M 68K is rather less in evidence - most of what I found can be bought to run under QDOS at cheaper prices, or is supplied free of charge as one of the Psion programs. To try and improve software support you can read data from discs used with CP/M 86 on the IBM PC, but even fewer people use this version as there are much better operating systems available such as MS-DOS or PC-DOS.

To use this version of CP/M, it has first to

NOW an expansion system as versatile as the QL



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MEDIC takes up where others leave off. Why narrow down your choices? The Q.L. was intended as a versatile computer capable of fulfilling many roles. With our system cartridge, the choice is yours. As well as a disc interface including parallel port you can have any one of the following: memory upto 512K, modem, Eprom card (192K) experimental card including front interface. You can upgrade to any level in line with your needs. Our disc interface affords full Psion, versions 1 and 2, compatibility.

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Telephone: 0256 460748

Please send me further details on your products.

I wish to order the following: (please tick required items)

Individual Products

- 64K Memory £99.95
- 128K Memory £129.95
- 256K Memory £169.95
- 512K Memory† £259.95
- Eprom card socketed (192K - excluding Eproms) experimentation card with front interface £24.95
- Dust Cover that doubles up as a stand £14.95
- Modem* £79.95

†Can only be powered if Medic disc system connected

*Delivery beginning April

Packages

- 1 Megabyte disc drive (cased, inc. PSU) disc interface and parallel interface, with cables £249.96
 - 2 1 Megabyte disc drives, (cased, inc. PSU) disc interface parallel interface, with cable £399.95
 - 1 megabyte disc drive, memory inc., disc interface and parallel interface.
- | | |
|---------------------------------------|----------------------------------|
| 1 disc drive | 2 disc drives |
| <input type="checkbox"/> 64K £299.95 | <input type="checkbox"/> £449.95 |
| <input type="checkbox"/> 128K £329.95 | <input type="checkbox"/> £479.95 |
| <input type="checkbox"/> 256K £359.95 | <input type="checkbox"/> £509.95 |
| <input type="checkbox"/> 512K £449.95 | <input type="checkbox"/> £595.95 |

To order products please make cheques/P.O.'s payable to MEDIC DATASYSTEMS LTD. Allow 28 days for delivery. All prices include VAT. Please add £5 p&p.

NAME _____

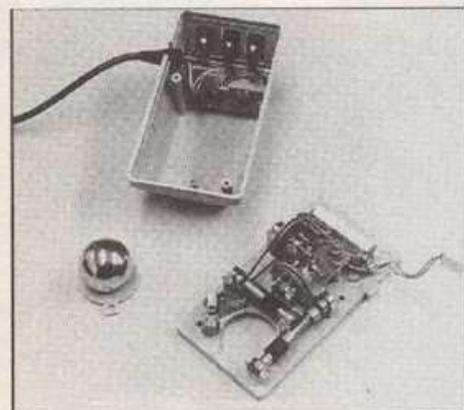
ADDRESS _____

Signed _____

Man or mouse?

Hardware Magic Mouse Price £59.95 Micro Commodore 64 Supplier SMC Supplies, 11 Western Parade, Great North Road, Barnet, Herts (01-441 1282).

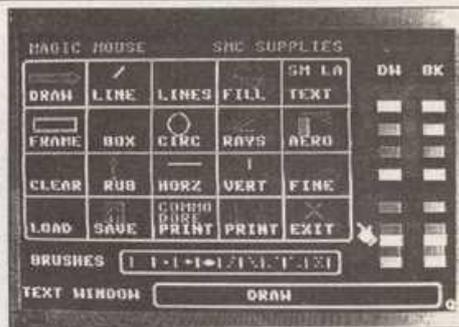
A mouse for the C64. I must admit that I was rather looking forward to road-testing the first C64 mouse. The potential for good graphics on this machine has always been apparent, but the system software makes no concession to the budding artist. A mouse, with suitable software, should transform the C64. But not this mouse.



They tell me that I was given a pre-production prototype mouse, well-used by the developers and other reviewers before me. It is possible that the software was also a pre-production version. The instructions were certainly pre-production drafts. However, even making due allowances, I found it very difficult to get very excited about the Magic Mouse.

The package includes the mouse itself, a manual, and software on tape or disc. Fast-loaders are used for both tape and disc software which do a very good job of cutting down the thumb-fiddling time. Four main programs are included in the software; a high-resolution drawing program, a sprite designer, an almost identical icon designer (these are really just user-defined graphic characters to use with other software, but who am I to be pedantic), and a mouse controller program (which was not supplied with the review mouse, but which is intended to allow the mouse to be used with other programs).

In principal, the high-resolution drawing program was just the sort of thing that I have been looking for. Unfortunately, the final result is not as impressive as it should be. In my opinion the program is rather cumbersome to use and slow, although the lack of speed can to some extent be attributed to the problem of mixing high-resolution lines and low-



resolution C64 colour.

A full-page menu gives the usual options for a variety of line-types, spray-can effects, text entry, colour-control, and so on, but although this gives a full screen to draw on I found it nowhere near as easy to use as the pull-down (or pop-up?) menus provided by most other mouse systems.

The sprite and icon designer software is useful and does all that it should. Here again, though, I thought that the software lacked polish. Sprites and icons can be saved to disc or tape (although you don't get the choice, it depends which medium you are using with the mouse) for inclusion in other programs.

SMC are intending to produce mice for the BBC, the QL, and the Amstrad. My advice is try it before you buy it.

John Cochrane

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Cricket's Revenge

Your mission - to boldly jump where no cricket has jumped before
- on CBM 64 by Jolyon West

You are one of the last surviving crickets, the rest having been exterminated by Farmer Jones.

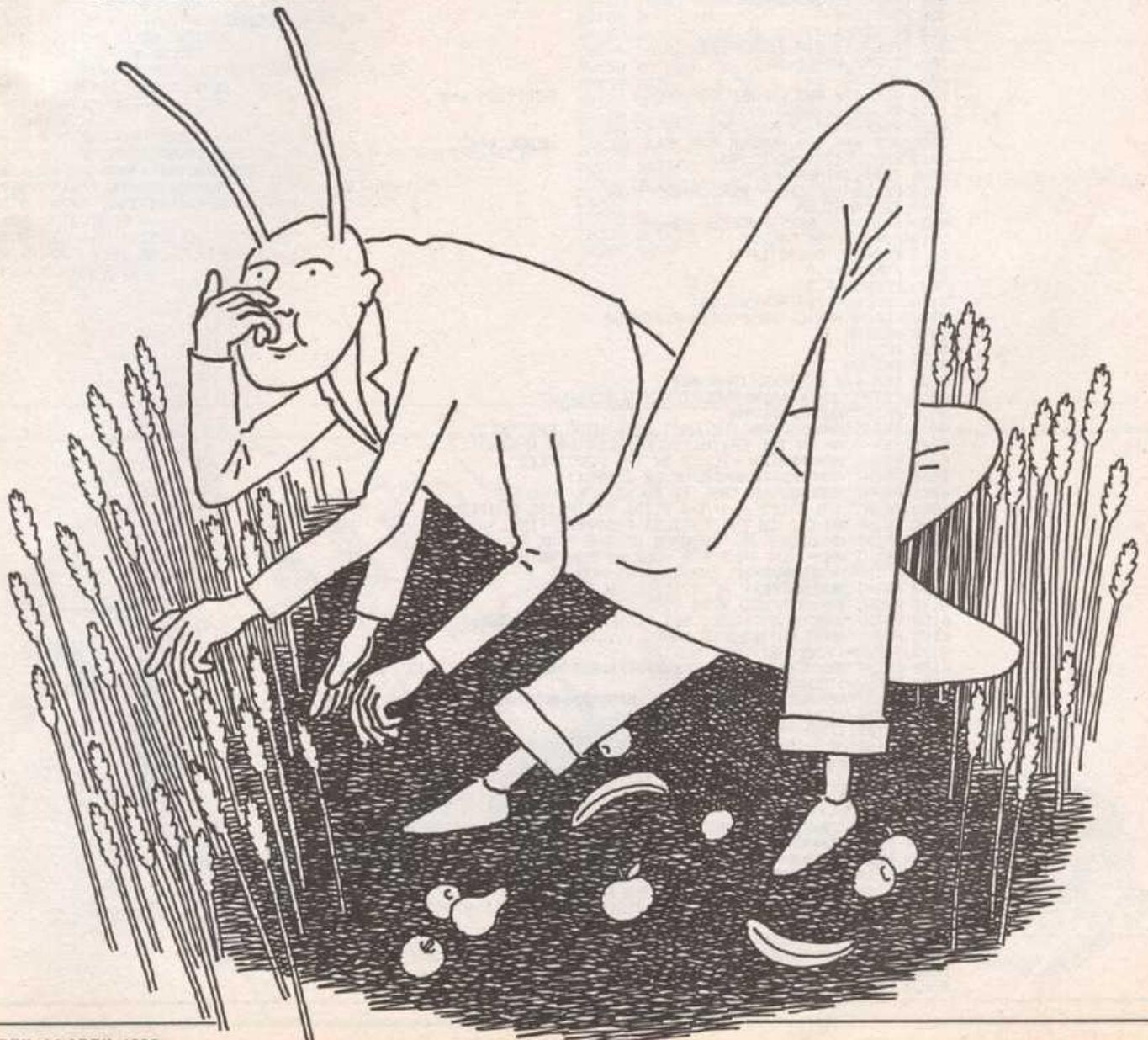
You must gain your revenge on him by escaping through his crops while collecting his prize fruit - but things are not as easy as they seem, as if you take too long he may return.

You move from left to right using a joystick in Port Two, collecting the fruits between the rows of crops (when you move off the top of the screen you appear on the bottom). Note that the gap in the crops will only appear after you collect the fruit.

Program Notes

20 Screen and border white

50	Switches to new character set	300	Checks for passing to next column
60	Sets sound to highest volume	310-340	Prints cricket on screen
80-130	Sets variables	350-370	Makes chirpy sound
170	Resets internal clock	380	Prints space over cricket
210-220	Prints current time and best time	400	Returns to beginning of loop
230	Checks game completion	2000-2030	Prints random position for fruit
240	Checks time taken	3000-3040	Prints position for hole in crops
250	Returns value from joystick	5000-5090	Prints crops on screen
260	Moves cricket down screen	6000-6230	Prints instructions
270	Moves cricket up screen	10000-10100	High score routine
280-290	Checks for cricket off screen	12000-12480	Extermination of cricket
		13000-13230	Searches keyboard
		20000-20260	Hi-res character data



Star Game

```
1 REM *****
2 REM *****
3 REM ***** CRICKET'S REVENGE *****
4 REM *****
5 REM ***** BY *****
6 REM *****
7 REM ***** JOLYON WEST *****
8 REM *****
9 REM *****
10 REM *****
11 REM
12 POKES3281,1:POKE53288,1
13 PRINT"*****PLEASE WAIT WHILE USER-DEFINED",,"CHARACTERS ARE SET UP."
14 GOTO20000
15 POKES3272,(PEEK(53272)AND240)OR14
16 POKES4296,15
17 HS="000000":CC=0
18 REM *** INITIALIZATION ***
19 SM=1104:CM=55376:SC=54272:HG=64:HH=65:C1=66:C2=67:FR=68:E1=69:E2=70:E3=71
100 E4=72:E5=73:F1=74:F2=75:FF=76:SP=32:RE=2:BL=6:BR=9:GR=13
110 DE=0:MC=0:EX=0:JU=0:FLASH=0:CO=0:RO=0:CH=1:RH=0:CF=0:RF=0:CU=0:RN=0
120 JO=0:BD=0:AS="":JUNK$="":T$="STILL":S$="000000":N=RND(-1)
130 T=INT(RND(0)*30)+1
140 GOSUB6000
150 GOSUB5000
160 GOSUB2000
170 TI$="000000"
180 REM *** MAIN LOOP ***
190 PRINT"***** TIME:- ";MID$(TI$,3,2);";";RIGHT$(TI$,2);
200 PRINT"***** BEST TIME:- ";MID$(HS$,3,2);";";RIGHT$(HS$,2);
210 IFCO>36THENGOTO10000
220 IFVAL(TI$)>100+TTHENGOTO12000
230 JO=PEEK(56328)
240 IFJO=125THENRO=RO+40
250 IFJO=126THENRO=RO-40
260 IFSM+RO+CO>SM+880+CO THENRO=0
270 IFSM+RO+CO<SM+CO THENRO=880
280 IFJO=119ANDPEEK(SM+RO+CH)=HHANDPEEK(SM+RF+CF)=SP THENCO=CO+2:CF=CF+2:GOSUB2000
290
300 POKESM+RO+CO,C1:POKECM+RO+CO,BL
310 FORDE=1TO10:NEXTDE
320 POKESM+RO+CO,C2:POKECM+RO+CO,BL
330 FORDE=1TO10:NEXTDE
340 POKESC+4,0
350 POKESC+4,33
360 POKESC+1,217:POKESC,189
370 POKESM+RO+CO,SP
380 GOTO2000
390 REM *** RND NUMBER FOR FRUIT POSITION ***
400 RF=INT(22*RND(0))*40
410 POKESM+RF+CF,FR:POKECM+RF+CF,RE
420 REM *** RND NUMBER FOR HOLE IN HEDGE ***
430 RH=INT(22*RND(0))*40
440 IFBB<>0 THENCH=CH+2
450 POKESM+RH+CH,HH:POKECM+RH+CH,GR
460 BB=1:RETURN
470 REM *** CREATE SCREEN ***
480 FORCU=1TO37STEP2
490 FORRW=0TO880STEP40
500 POKESC+4,0
510 POKESC+4,33
520 POKESC+1,96:POKESC,254
530 POKESM+RW+CU,HG:POKECM+RW+CU,GR
540 NEXTRW
550 NEXTCU
560 RETURN
570 REM *** INSTRUCTIONS ***
580 PRINT"*****CRICKET'S REVENGE"
590 PRINT"*****"
600 PRINT"*****YOU ARE THE LAST REMAINING CRICKET"
610 PRINT"*****ON THE EARTH. YOUR ANCESTORS HAVING"
620 PRINT"*****BEEN KILLED BY THE MERCILESS"
630 PRINT"*****FARMER JONES!"
640 PRINT"*****YOUR TASK IS TO ESCAPE THROUGH"
650 PRINT"*****HIS CROPS (-) AND STEAL HIS PRIZE FRUIT"
660 PRINT"*****IN (-) IN THE FASTEST POSSIBLE TIME."
670 PRINT"*****SPEED IS THE NAME OF THE GAME AS"
680 PRINT"*****IF YOU TAKE TOO LONG HE MAY RETURN "
690 PRINT"*****AND EXTERMINATE YOU."
700 PRINT"*****USE A JOYSTICK IN PORT 2"
710 PRINT"*****TO MOVE YOUR CRICKET"
720 PRINT"*****THE SCENE IS SET WITH FARMER JONES"
730 PRINT"*****PLANTING HIS CROPS.....GOOD LUCK!"
740 FORJU=1TO10:GETJUNK$:NEXTJU
750 PRINT"*****HOLD ANY KEY DOWN"
760 FORDE=1TO300:NEXTDE
770 PRINT"*****HOLD ANY KEY DOWN"
780 FORDE=1TO300:NEXTDE
790 GETA$:IFA$="":THEN610
800 PRINT"J":RETURN
810 REM *** HIGH SCORE ROUTINE ***
820 IFCC=0 THENHS$="100000":CC=1
830 S$=TI$
840 IFS<CHS$ THENHS$=S$:T$="NOW"
850 PRINT"*****CONGRATULATIONS!"
860 PRINT"*****YOU'VE COLLECTED ALL THE FRUIT"
870 PRINT"*****AND EVADED FARMER JONES"
880 PRINT"*****IN A TIME OF ";MID$(S$,3,2);";";RIGHT$(S$,2);
890 PRINT"*****THE RECORD IS ";T$
900 PRINT"*****";MID$(HS$,3,2);";";RIGHT$(HS$,2);
910 GOTO10000
920 REM *** EXTERMINATION OF CRICKET ***
930 PRINT"*****HARD LUCK...YOU HAVE TAKEN"
940 PRINT"*****TOO LONG!!"
950 PRINT"*****FARMER JONES IS ABOUT TO RETURN"
```

```

12030 PRINT"#####FARMER JONES IS ABOUT TO RETURN"
12040 PRINT"#####BITO EXTERMINATE YOU!"
12050 FORFLASH=0TO15
12060 POKES3280,FLASH:POKES3281,15-FLASH
12070 FORDE=0TO50:NEXTDE
12080 NEXTFLASH
12090 POKES3280,1:POKES3281,1
12100 FORDE=1TO2000:NEXTDE
12110 PRINT"J";
12120 FORMC=0TO18STEP2
12130 POKESM+439-MC,F1:POKECM+439-MC,BR
12140 POKESM+435-MC,C2:POKECM+435-MC,BL
12150 FORDE=1TO100:NEXTDE
12160 POKESM+439-MC,SP:POKESM+435-MC,SP
12170 POKESM+439-MC-1,F2:POKECM+439-MC-1,BR
12180 POKESM+435-MC-1,C2:POKECM+435-MC-1,BL
12190 FORDE=1TO100:NEXTDE
12200 POKESM+439-MC-1,SP:POKESM+435-MC-1,SP
12210 NEXTMC
12220 POKESM+416,C2:POKECM+416,BL
12230 POKESM+420,FF:POKECM+420,BR
12240 FORDE=1TO500:NEXTDE
12250 PRINT"#####JAARRRHH!!!"
12260 POKESC+4,0:POKESC+5,0:POKESC+6,0
12270 POKESC+5,15:POKESC+6,0
12280 POKESC+4,129
12290 POKESC+1,17:POKESC,37
12300 FOREX=E1TOE5
12310 POKESM+416,EX:POKECM+416,BL
12320 FORDE=1TO200:NEXTDE
12330 NEXTEX
12340 POKESM+416,SP
12350 FORMC=0TO18STEP2
12360 POKESM+420-MC,F1:POKECM+420-MC,BR
12370 FORDE=1TO100:NEXTDE
12380 POKESM+420-MC,SP
12390 POKESM+420-MC-1,F2:POKECM+420-MC-1,BR
12400 FORDE=1TO100:NEXTDE
12410 POKESM+420-MC-1,SP
12420 NEXTMC
12430 POKESC+4,0:POKESC+5,0:POKESC+6,0
12440 PRINT"#####YOU HAVE BEEN EXTERMINATED BY"
12450 PRINT"#####FARMER JONES"
12460 PRINT"#####BUT YOU WILL RETURN AS"
12470 PRINT"#####ANOTHER CRICKET!"
12480 GOTO13000
13000 REM *** PRESS ANY KEY ***
13010 FORJU=1TO10:GETJUNK#:NEXTJU
13020 FORMC=0TO12
13030 POKESM+653+MC,C2:POKECM+653+MC,BL
13040 FORDE=1TO20:NEXTDE
13050 POKESM+653+MC,SP
13060 POKESC+4,0:POKESC+4,33
13070 POKESC+1,217:POKESC,189
13080 PRINT"#####HOLD ANY KEY DOWN"
13090 NEXTMC
13100 GETA$:IFA$=""THEN13130
13110 PRINT"J"
13120 GOTO80
13130 FORMC=0TO12
13140 POKESM+665-MC,C2:POKECM+665-MC,BL
13150 FORDE=1TO20:NEXTDE
13160 POKESM+665-MC,SP
13170 POKESC+4,0:POKESC+4,33
13180 POKESC+1,217:POKESC,189
13190 PRINT"#####HOLD ANY KEY DOWN"
13200 NEXTMC
13210 GETA$:IFA$=""THEN13020
13220 PRINT"J"
13230 GOTO80
20000 REM *** HI-RES CHARACTERS ***
20010 POKE52,56:POKE56,56:CLR
20020 POKE56334,PEEK(56334)AND254
20030 POKE1,PEEK(1)AND251
20040 FORI=0TO2047
20050 POKEI+14336,PEEK(53248+I)
20060 NEXTI
20070 POKE1,PEEK(1)OR4
20080 POKE56334,PEEK(56334)OR1
20090 READCN:IFCN<0THEN50
20100 FORI=0TO7:READCD
20110 POKE14336+8*CN+I,CD:NEXTI
20120 GOTO20090
20130 DATA64,126,60,126,126,126,60,126,60
20140 DATA65,126,42,0,0,0,0,42,126
20150 DATA66,102,60,90,153,255,60,102,195
20160 DATA67,36,36,60,126,219,255,60,195
20170 DATA68,48,48,80,144,136,102,255,102
20180 DATA69,129,219,126,106,86,126,219,129
20190 DATA70,0,102,126,44,52,126,102,0
20200 DATA71,36,0,60,86,60,24,0,66
20210 DATA72,0,0,24,60,24,0,0,0
20220 DATA73,0,66,102,54,0,102,99,193
20230 DATA74,24,60,24,56,56,24,24,56
20240 DATA75,24,60,217,62,24,59,44,192
20250 DATA76,12,30,252,44,28,12,12,28
20260 DATA-1

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Rom for improvement

Yet another QL Rom. . . this time JS. . . Andy Pennell checks it out.

As revealed first in *Popular* the latest QLS now being shipped have a new Rom, called JS. It has numerous improvements over the previous version, JM, which divided into two sections - Super Basic and QDOS.

Apart from a few minor bug fixes, the main addition has been in error handling. The command *When Error*, which used to give a not implemented report, now allows trapping of most of the errors caused from Basic. You place your error handler between the *When* statement and a terminating *End When*, though be very careful - if you cause an error within your error handler, the QL will normally lock up! When your extra routine has finished, the QL goes back to what it was doing when the error stopped it, but as there is no *Resume* command there seems no way of saying where exactly you wish to return to. There are two functions, *Ernum* and *Erlin*, which return the line and error numbers respectively, and a command *Report* which prints the appropriate error message on any particular channel. There are also 20 extra functions which can be used in your error handler.

These extra functions, along with the other additions to SuperBasic, are shown in Table 1. The *Tra* command is not *Trace* as you may have read elsewhere, but is a way of accessing RS232 translate tables of QDOS, explained later. The other extra feature is a general *When* command, that allows any action to be taken when an expression reaches a particular value, for example *When x < 0:Print 'x is negative': End When* will

cause the message to be printed whenever *x* becomes a negative value. The reason for the presence of the keyword *Becomes* in the very early Roms is now apparent.

Various bugs in SuperBasic have been fixed, including the notorious *Call* bug, though many have not. There is now an official bug-list available from Sinclair, detailing mainly Basic bugs, and which Roms they occur in.

Having dealt with SuperBasic, let's now have a look at the new, improved version of QDOS, which is version number 1.10 in JS. Microdrive handling has been generally tidied up, and quite a few bugs fixed, though again there are many that have remained. Most of the changes are internal to allow foreign language Roms to be easily created, by moving all the language dependent features to the top section of the Rom. The most useful feature is the *Translate* ability on the RS232 ports - it is now possible to convert any character into any other, or any sequence of up to three characters, so that some of the stranger foreign letters can be printed by translating into any necessary control codes.

The translation also works on incoming data, which seems less useful. To handle this, there is an additional manger trap in

QDOS, which sets the translate table to be used, and also where the text for the system error messages are to be found. It is this trap which is accessible from the SuperBasic *TRA* command.

There are several new QDOS system variables in Ram, mainly for the translations, as well as eight extra ones for SuperBasic to keep track of the new *When* processing. Another vector has been added to the Rom, and points to another 'unofficial' SuperBasic entry point. The channel definition blocks for windows now have an extra parameter, that will allow windows to be created in memory, and not just on the screen, which could make a WIMP like environment easier to program.

QDOS bug fixes include the *MT.Mode* trap, that no longer has the habit of setting some windows to black ink and black paper, and the "look for peripherals" routine now recognises more than one peripheral. Unfortunately it is too good, as it recognises anything in the Rom slot twice.

It has been a long time since the last QL Rom, and this is a little disappointing given the wait. Although Basic now has error handling, it would be nice if QDOS had been given default drive names and numbers.

Table 1 - Extra SuperBASIC keywords

WHEN ERROR	error handling
WHEN <expression>	exception handling
REPORT <channel>	print current error message
TRA	set translate table and error messages
ERNUM	last error number
ERLIN	line of last error
ERR_NC, ERR_NJ, ERR_OM, ERR_OR, ERR_BO, ERR_NO, ERR_NO, ERR_NF, ERR_EX, ERR_IU, ERR_EF, ERR_EF, ERR_DF, ERR_BN, ERR_TE, ERR_FE, ERR_BP, ERR_FE, ERR_XP, ERR_OV, ERR_NI, ERR_RO, ERR_BL	
	all are functions returning 1 if ERNUM corresponds to the appropriate error



Index-linked

Part Three of the Tracer Project for the BBC B by Calvin Woodings

If you have been following our series you will now have the first two parts of our superfast index creation and search program on disc and will be waiting (patiently?! for the remaining part of the main program so that you can start creating your first index. Well here it is, and whilst it's not too long, it is complex, so type carefully. As before, avoid typing the Rems and the blank lines and keep unnecessary spaces down to a minimum. Remember to load the first part of the Tracer from last week before starting.

Program Notes

Line 440 - PROCrc is the procedure which keeps track of the number of records in the index and hence the remaining space. The "y" in the print statement should not be taken literally; as before, it means enter the yellow teletext code by pressing <Shift f3>. W% is the total index length in bytes, so W%DUV40 is the number of 40 byte records. J% is the total available memory.

Line 450 - If W% became equal to J% at Line 440 the index would be full, and this line tells you about it. The "f" stands for the teletext flash character obtained by entering <Shift f8>. *FX229,0 resets normal escape action. (If you filled the index whilst in 'EDIT' mode, the escape key would be disabled)

Line 480 - starts the Add Records procedure. It makes sure an index name is present, checks that the index isn't full, sets up the screen heading, sets the line pointer to 6, and D% to the last byte in the index (see also Line 150). The repeat loop only ends when the index is full.

Line 490 - prints the last line in the index immediately under the index header to remind you what you typed in last. If W%=0, the index is empty so it doesn't bother.

Line 500 - prints the index heading, prints the record check, positions the cursor on line L%, clears the string buffer at P%, and uses a For-Next loop to get in each field. (Himem-47) is the address where the number of fields in each record was stored by the New Index routine. (Himem+39+N%) is the address where the length of field N% is stored, and this is used to control the number of characters taken in by the input routine FNin. (\$S%=\$S%+ etc), pads out each field with spaces to the field length, and terminates it with a teletext colour code which sets up the colour of the next field. Finally, the fields are added to \$P%, the cursor is moved across the screen to the correct position for the next field, and the teletext colour code is echoed on the screen.

Line 510 - starts by loading the record onto the end of the index in memory. The screen line pointer and the total record count is increased by one, and the inner loop is terminated if the record was printed on the 18th (last) screen line or if the last record filled the index.

Line 520 - commences the Display routine by setting up the screen as usual, and checking to see if there is an index present. N% is loaded with the address of the start of the last record in the index, and L% with the screen line on which the display should start. In case you are wondering, the display runs backwards so that the last record entered is the first to be displayed, and the rather complicated formula for L% calculates where the last line should be printed on the screen. This is to allow the first line of the index, which may be printed several pages later, to appear at the top of the last screen.

Line 530 - contains a pair of loops which control the printing out to the screen and provide access to the edit routine. T% and F% are temporary stores for L% and N% in case the same screen has to be redisplayed

after editing. The inner loop prints out a screen full of records and sets D% to the address of the first screen character in case the editor is called. The outer loop terminates when N% has been reduced to the index start address and all the records have been printed.

Line 540 - The edit procedure is called every time a screen is displayed, and A% is the variable which collects any keys pressed. If the last key-in was either Ctrl I (ASCII 9) or Ctrl D (ASCII 4) then a line has been added or removed, and the screen must be redisplayed with the cursor in the same position as when the last key-in was made. Otherwise, the edit-cursor is set to Line 6 (C%=6) and the option to edit printed up. If the option is declined, the display-cursor (L%) is set for line 18, N% reloaded from F% (see Line 530), and the display routine re-entered.

Line 550 - updates the record count displayed at the foot of the screen, and prints up some helpful hints. Remember, the unexpected "g" and "y" refer to the teletext colour codes. *FX4,1 makes the cursor keys return ASCII codes so that the edit routine can use them.

Line 560 - disables the escape key.

Line 570 - creates a solid white cursor, sets its horizontal position (B%) to 0, positions it on the screen at V%, C%, and waits for a key-in.

Line 580 - alters the cursor position variables according to which cursor key is pressed, and makes sure you are able to move it out of the display area., (139 is up, 138 is down, 137 is right, and 136 is left.)

Line 590 - G% points to the address in the index Ram which corresponds to the character at the cursor on the screen. A% is 4 if Ctrl D was pressed, and if there is something to delete (W%>0), the loop takes a record out of Ram, and moves all the records below it up 40 bytes. The record count (W%) is reduced, and a return character (&D) marks the new end of the index.

Line 600 - inserts 40 empty bytes into the correct position in index Ram when Ctrl I is pressed, and there is room in Ram for the new record. The logic is analogous to that of Line 590, with the complication that the colour codes which act as field delimiters are insert-

```

10 REM TRACER: A SUPERFAST INDEX CREATION AND SEARCH PROGRAM
20 REM BY C.R.WOODINGS (C)1985
30
40 REM MAIN PROGRAM LAST PART
50
60 REM*****
65
66 REM The 'y' in Lines 440,550,640 are yellow Teletext codes <SHIFT f3>
67 REM The 'f' in Line 450 is the flashing Teletext code <SHIFT f8>
68 REM The 'g' in Line 550 is the green Teletext code <SHIFT f2>
435
440 DEFPROCrc PROCPr(23,"y"+STR$(W%DIV40)+" Records in Index: "+STR$(J%-W%)DI
V40)+" Spaces Left":IF J%>W% ENDPROC
450 PROCPr(20,"fINDEX FULL!"):PROCco(21):*FX229,0
460 ENDPROC
465
480 DEFPROCad PROCfn:IF W%<J% REPEAT:PROct("Adding to "+$fx+" Index"):L%=6:D%=
HIMEM+48+W% ELSE PROCrc:ENDPROC
490 IF W%>0 PRINTTAB(0,5)$(D%-I%);
500 REPEAT:PROCh:PROCrc:VDU31,0,L%,$P%=" ",FOR N%=1 TO?(HIMEM+47):$S%=FNin(?(HI
MEM+39+N%),31,97):$S%=$S%+STRING$(?(HIMEM+39+N%)-LEN$S%,"")+CHR$(128+N%):$P%=$P
%+$S%:VDU31,LEN$P%-1,L%,128+N%:NEXT
510 $P%=LEFT$( $P%,39):$(W%+HIMEM+48)=$P%:L%=L%+1:W%=W%+I%:UNTIL L%>18 OR W%>=J
%:L%=L%-1:UNTIL W%>=J%:PROCrc:ENDPROC
515

```

ed automatically to prevent silly mistakes on keying in records. This is what the expression $G\%?(?(\text{Himem} + 39 + M\%)) = 128 + M\%$ does.

Line 610 - If the key-in was a printable ASCII code, and the cursor was not in the last column of the display area, ($B\% = 39$ is only accessible to the delete key, ASCII 127) and furthermore, if the cursor is not position over one of the field delimiters, ($?(\text{G}\% + B\%)$ would be > 127 when this happens) then the key-in is printed on the screen, and added to the index in Ram.

Line 620 - If the key-in was $<Delete>$, and you're not trying to delete a field delimiter, then this line deletes a character from the

screen and inserts a space ($\&20$) in Ram.

Line 630 - Leaves the edit routine when $<Return>$, $<Ctrl I>$ or $<Ctrl D>$ is pressed. the cursor keys are reset to normal function.

Line 640 - Returns to a normal size cursor, clears the help messages, gives the *Escape* prompt, and resets *Escape* to normal function.

Now, save the whole program as *Tracer* on the same disc as the new index routine *New*, and make a backup straight away before you run it.

Finally **Build* the *!Boot* program as listed at the end of the main program, and having transferred it to disc by pressing *Escape* in

the usual way, type in $*OPT4,3<Return>$ so that it runs on $<Shift-Break>$. (See your DFS manual if in any doubt about this)

Now try it! If there were no mistakes in typing you can start your first index right away.

Next week we'll give some general hints on using the program and provide a machine code print routine so that you can dump your searches to printers.

A 40 track disc with the complete set of *Tracer* programs is available for £12 (inclusive) from the author at 12 Copewood Ave, Nuneaton, Warwicks CV11 4TQ.

```

520 DEFPROCd1 PROCfn:PROCT("Display/Edit "+$f%+" Index"):IF W%=0 PROCpr(12,"IN
DEX EMPTY"):PROCco(21):ENDPROC ELSE PROCCh:N%=HIMEM+48+W%-I%:L%=(W%-I%)MOD520/I%+
6
530 REPEAT:T%=L%:F%=N%:REPEAT:PRINTTAB(0,T%)$F%:T%=T%-1:F%=F%-I%:UNTIL T%<6:D%
=F%-F%-(T%-6)*I%:PROCedit:UNTIL N%<HIMEM+48:N%=N%+I%:ENDPROC
535
540 DEFPROCedit:IF (A%<>9 AND A%<>4) C%=6:IF NOT FNyn(20,"Edit Page")L%=18:N%=
F%:ENDPROC
550 PROCrc:PROCpr(20,"gUse cursor keys: <RETURN> to finish"):PROCpr(21,"yCTRL-
D deletes record: CTRL-I inserts"):FX4,1
560 *FX229,1
570 VDU23,0,10,96,0,0,0,0:B%=0:REPEAT:VDU31,B%,C%:A%=GET:*FX15,1
580 IF (A%=139 AND C%>6) C%=C%-1 ELSE IF (A%=138 AND C%<18) C%=C%+1 ELSE IF(A%
=136 AND B%>0) B%=B%-1 ELSE IF (A%=137 AND B%<39) B%=B%+1
585
590 G%=D%+I%*(C%-6):IF (A%=4 AND W%>0)FOR M%=0 TO (W%+HIMEM+48-G%-I%) STEP I%:$
(G%+M%)=$(G%+M%+I%):NEXT:W%=W%-I%:?(HIMEM+W%+48)=&D
595
600 IF (A%=9 AND J%>W%) FOR M%=(W%+HIMEM+48-G%)TO 0 STEP -I%:$ (G%+M%+I%)=$(G%+M
%):NEXT:$ (G%+M%+I%)=STRING$(39," "):FOR M%=1 TO (?(HIMEM+47)-1):G%?(?(HIMEM+39+M
%))=128+M%:G%=G%+(HIMEM+39+M%)+1:NEXT:W%=W%+I%:GOTO630
605
610 IF A%>30 AND A%<127 AND B%<39 IF ?(G%+B%)<127 G%=G%+B%:PRINTCHR$A%:;?G%=A%
:IF B%<38 B%=B%+1
615
620 IF A%=127 IF ?(G%+B%-1)<127 B%=B%-1:PRINTCHR$A%:G%=G%+B%:?G%=&20:IF B%<0 B
%<0
630 UNTIL A%=13 OR A%=4 OR A%=9:PROCT("Display/Edit"):PROCCh:*FX4,0
640 VDU23,0,10,114,0,0,0,0:PRINTTAB(0,20)SPC79:PROCpr(21,"y<ESC> for Menu"):FX
229,0
650 ENDPROC

```

```

0 REM !BOOT LISTING
1 ?&CA0=&D
2 *KEY0CLS:PAGE=&1100|MLO."TRACER"|M:RUN|M
3 *FX138,0,128

```

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Memory check

Ever wondered how lines of Basic were stored in memory?
H Hipple explains.

If you would like to know what happens to a program listing after it has been entered into memory, and would also appreciate a better presentation of a listing when checking it line by line, then this listing aid should help you. The information on which the program is based is contained in Chapter 24 of the Spectrum Manual (page 122).

The facilities provided are: (a) Stepping mode, (b) Block listing mode and (c) Address listing.

The *Stepping Mode* provides a means of stepping through a program from a chosen line, showing the line address and number of bytes in the line, and jumping forwards or backwards to other lines.

The *Block Listing Mode* allows a block of lines to be listed either to screen or to a printer, with line addresses and line byte usage.

Finally, *Address Listing* allows a complete listing, without text and to either screen or to a printer, of all the line addresses and line bytes, and of the total bytes used. This total will include those used by the listing program (1489 bytes).

The listing program uses Lines 9950 to 9987 and should be *Merged* in with the main program to be listed, and is accessed by entering *GO TO 9950*. A prompt is then given 'step' or 'block', giving a choice of *Step* or *Block* modes.

In *Step* mode you are asked for the start line for stepping through. If you want the first line, an entry of "0" will suffice, when the line has been listed, the prompt is *Quit, Jump* or *Step* (any key other than 'j' or 'q' will *Step On*).

In *Block* mode there is a choice of using screen or printer, and then the first and last lines of the block are entered. After quitting *Step* mode and at the end of a *Block* listing, there is a choice of stopping or either screening or printing a list of line addresses and bytes.

The program works by starting at the address vectored by the systems variable *Prog*, from *Peek 23635 + 256*Peek 23636*. It then takes the first two bytes and converts them to the line number by *Peek (byte 2) + 256*Peek (byte 3) + 256*Peek (byte 4)* give the number of text bytes *A/US* one for Enter, the total line bytes is this value *A/US* four. Using this information, the program can step to the next line address, and also identify the limits of the line text, for screening.

As the line search always starts at the beginning of the *Prog* area, the delay in screening the first line depends on how far into the program it lies. Any attempt to list past Line 9999 will be blocked by Line 9965, as listing past this goes into

the 'unknown territory' of the top end of Ram.

In order to reduce to a minimum the

bytes taken by the listing program, use has been made of assigning variables to the values zero, one and two and using the variables instead, and, for example, using *GOTO Val "9987"* instead of *GOTO 9987*, as this saves three bytes each time, (as the number is stored as a string variable instead of as a floating point number). The result of this has been to reduce a 1800 byte program down to less than 1500 bytes.

```

9950 REM stepread by H Hipple
9951 LET o=VAL "0": LET i=VAL "1": LET u=VAL "2": LET v=VAL "9986": LET ll=VAL "
9974": LET k=VAL "256": DEF FN a(z)=PEEK (z+i)+k*PEEK z: DEF FN b(z)=PEEK z+k*PE
EK (z+i): DEF FN c(z)=FN b(z+u)+VAL "4"
9952 LET pg=FN b(VAL "23635"): CLS : PRINT fi;"STEP READ": PAUSE VAL "50"
9953 LET a=pg: GO SUB ll: CLS
9954 LET ch=o: PRINT fi; FLASH i;"step or block?": PAUSE o: IF INKEY$="b" THEN
LET ch=i
9955 IF ch=o THEN INPUT "Start Line? ";st: LET nd=st: GO TO VAL "9959"
9956 GO SUB v
9957 INPUT "Start Line? ";st: IF st<ln THEN LET st=ln
9958 INPUT "End Line? ";nd: IF nd<st THEN PRINT "Entry error": PAUSE VAL "50":
CLS : GO TO VAL "9957"
9959 IF ch=o AND st<ln THEN LET st=ln
9960 PRINT FLASH i;"SEARCHING": GO SUB ll
9961 IF st<ln THEN LET a=pg: GO SUB ll: GO TO VAL "9961"
9962 IF st>ln THEN LET a=nx: GO SUB ll: GO TO VAL "9962"
9963 CLS
9964 IF ch=i AND ln>nd+VAL "1" THEN GO TO VAL "9977"
9965 IF ln>VAL "9999" THEN PRINT ""Program end": STOP
9966 IF ch=i THEN PRINT : PRINT
9967 IF ch=o THEN CLS : CLOSE fu: PRINT AT VAL "4",o;
9968 LET ao=a: PRINT INK i;"Address ";ao;" " INK u;ln; LET a=a+VAL "4"
9969 IF PEEK a=VAL "14" THEN LET a=a+VAL "6"
9970 IF PEEK a=VAL "13" THEN GO TO VAL "9972"
9971 PRINT ;CHR$ PEEK a;
9972 LET a=a+i: IF a>nx THEN PRINT INK i;"FN c(ao);" bytes": LET a=nx: GO T
O VAL "9975"
9973 GO TO VAL "9969"
9974 LET ln=FN a(a): LET nx=a+FN c(a): RETURN
9975 IF ch=i THEN GO SUB ll: GO TO VAL "9964"
9976 PRINT fi;"quit listing, jump or step on": PAUSE o: IF INKEY$("<")"q" AND INKEY
$("<")"j" THEN GO SUB ll: GO TO VAL "9964"
9977 IF INKEY$="j" THEN INPUT "New Line? ";st: GO TO VAL "9961"
9978 CLOSE fu: CLS : PRINT fi;"List addresses y/n ?": PAUSE o: IF INKEY$="n" THE
N GO TO VAL "9984"
9979 IF INKEY$="r" THEN GO TO VAL "9950"
9980 GO SUB v
9981 CLS : LET a=pg: LET sm=o: LET no=FN c(a): PRINT "LINE";TAB VAL "7";"ADDRESS
";TAB VAL "16";"BYTES";FN a(a);TAB VAL "7";a;TAB VAL "16";no: LET a=a+no: LET
sm=sm+no
9982 IF PEEK (a-i)=VAL "13" AND FN a(a)>VAL "9999" THEN PRINT "Total Bytes ";sm
: GO TO VAL "9984"
9983 IF PEEK (a-i)=VAL "13" THEN LET no=FN c(a): PRINT FN a(a);TAB VAL "7";a;TA
B VAL "16";no: LET a=a+no: LET sm=sm+no: GO TO VAL "9982"
9984 CLOSE fu: PRINT fi;"stop or rerun? ": PAUSE o: CLS : IF INKEY$="s" THEN ST
OP
9985 GO TO VAL "9950"
9986 CLS : PRINT fi;"Hard Copy y/n?": PAUSE o: IF INKEY$="y" THEN OPEN fu,"p"
9987 RETURN

```

At your command

Part 2 of a machine code monitor by **Brian Cadge**

The monitor itself is written as a collection of subroutines, to do things like encode and decode a set of hex characters to and from their binary value. Any of the general routines could easily be incorporated into your own programs. The breakpoint facility is provided by using the *RST 30* instruction, which is the only *RST* which the operating system doesn't use. Many

Rom calls are made throughout the program to print characters, change modes, access the cassette, read the keyboard, etc. These are all fully explained in the Amsoft firmware manual.

It is very simple to add new commands of your own to the monitor software. The command name table currently ends in Line 2890 of the assembly language listing. To add a new command, insert the

command word, followed by a zero byte. The value 255 is used to signal the end of the word list. The start address of the command routine must be added to the addresses in Lines 2900 to 2920. All command subroutines end with a *JP LOOP* instruction, to return to the command prompt.

Do not use the *RET* as this will return to Basic. The *HELP* command will automatically include any new commands in its list.

The assembly language listing should be quite easily understood by anyone who writes Z80 code. However, it isn't necessary to understand it to use the program.

```

1230 LD BC,22
1240 OR A
1250 SBC HL,BC
1260 LD (BYTTL),HL
1270 POP HL
1280 JR BCLP
1290 CLSOT: CALL #BC8F
1300 JR NC,ERROR1
1310 RET
1320 OVALN: LD B,22
1330 UNDLN: CALL LNPRT
1340 CALL DATCS
1350 LD A,0
1360 LD (ESCP),A
1370 HXCL: LD A,(HL)
1380 CALL HEXST
1390 LD A,(HXHI)
1400 CALL CASO
1410 LD A,(HXLW)
1420 CALL CASO
1430 INC HL
1440 LD A,B
1450 CP 1
1460 JR NZ,COMA
1470 LD A,13
1480 JR OTCH
1490 COMA: LD A,44
1500 OTCH: CALL CASO
1510 DJNZ HXCL
1520 CALL LNINC
1530 RET
1540 CASO: CALL #BC95
1550 RET C
1560 LD A,255
1570 LD (ESCP),A
1580 RET
1590 ERROR1: CALL #BC92
1600 LD HL,ESCMS
1610 CALL MESPT
1620 RET
1630 ESCMS: DEFB 13,10,24
1640 DEFM "ESCAPE!"
1650 DEFB 24,7,13,10,10,0
1660 MESPT: LD A,(HL)
1670 OR A
1680 RET Z
1690 CALL #BB5A
1700 INC HL
1710 JR MESPT
1720 KBDIN: CALL #BB7B
1730 CALL #BB81
1740 LD HL,TXBUF
1750 LD B,0
1760 WTKY: CALL #BB86
1770 CP 127
1780 JR Z,DEL
1790 CP #FC
1800 JR Z,KYESC
1810 PRCH: CALL #BB5A
1820 CP 13
1830 JR Z,KYEOF
1840 LD (HL),A
1850 INC HL
1860 INC B
1870 JR WTKY
1880 DEL: LD A,B
1890 OR A
1900 JR Z,WTKY
1910 LD A,B
1920 CALL #BB5A
1930 LD A,16
1940 CALL #BB5A
1950 DEC B
1960 DEC HL
1970 JR WTKY
1980 KYEOF: LD A,0
1990 LD (HL),A
2000 LD A,10
2010 CALL #BB5A
2020 CALL #BB84
2030 RET
2040 KYESC: LD A,42
2050 LD (HL),A
2060 INC HL
2070 LD A,13
2080 JR PRCH
2090 HXTOD4: CP "A"
2100 JR C,CHDIG
2110 SUB 55
2120 RET
2130 CHDIG: SUB 40
2140 RET
2150 HXTOD8: LD A,(IX+0)
2160 CALL HXTOD4
2170 SLA A
2180 SLA A
2190 SLA A
2200 SLA A
2210 LD B,A
2220 LD A,(IX+1)
2230 CALL HXTOD4
2240 OR B
2250 RET
2260 HXTOD6: LD IX,TXBUF
2270 CALL HXTOD8
2280 LD H,A
2290 INC IX
2300 INC IX
2310 CALL HXTOD8
2320 LD L,A
2330 RET
2340 DECOD: LD DE,CMD8
2350 LD IX,DEADS
2360 CMLP: LD HL,TXBUF
2370 CKLP: LD A,(DE)
2380 CP (HL)
2390 JR Z,SASO
2400 NXC: LD A,(DE)
2410 CP 255
2420 JR Z,E0FCM
2430 INC DE
2440 OR A
2450 JR NZ,NXC
2460 INC IX
2470 INC IX
2480 JR CMLP
2490 SASO: OR A
2500 JR Z,GOTIT
2510 INC DE
2520 INC HL
2530 JR CKLP
2540 E0FCM: LD HL,UNKCM
2550 RET
2560 GOTIT: LD L,(IX+0)
2570 LD H,(IX+1)
2580 RET
2590 CMDS: DEFM "BYE"
2600 DEFB 0
2610 DEFM "WRITE"
2620 DEFB 0
2630 DEFM "LIST"
2640 DEFB 0
2650 DEFM "START"
2660 DEFB 0
2670 DEFM "STOP"
2680 DEFB 0
2690 DEFM "READ"
2700 DEFB 0
2710 DEFM "FAST"
2720 DEFB 0
2730 DEFM "SLOW"
2740 DEFB 0
2750 DEFM "WIDTH"
2760 DEFB 0
2770 DEFM "HELP"
2780 DEFB 0
2790 DEFM "INPUT"
2800 DEFB 0
2810 DEFM "REGS"
2820 DEFB 0
2830 DEFM "CALL"
2840 DEFB 0
2850 DEFM "BREAK"
2860 DEFB 0
2870 DEFM "JUMP"
2880 DEFB 0
2890 DEFB 255,255
2900 DEADS: DEFW BASIC,DATA,LIST,
MOTON,MOTOFF,CREAD,FAST
DEFW SLOW,WIDTH,HELP,EN
TER,REGDP,CALL
DEFW BREAK,JUMP
2910
2920 ASKST: LD HL,STMS
2930 CALL MESPT
2940 CALL KBDIN
2950 CALL HXTOD6
2960 LD (STADR),HL
2970 RET
2980 ASKLEN: LD HL,LNMS
3000 CALL MESPT
3010 CALL KBDIN
3020 CALL HXTOD6
3030 LD (LENCOD),HL
3040 RET
3050 STMS: DEFM "Start address: #"
3060 DEFB 0
3070 LNMS: DEFM "Length: #"
3080 DEFB 0
3090 UNKCM: LD HL,UKMES
3100 CALL MESPT
3110 JP LOOP
3120 UKMES: DEFM "What?"
3130 DEFB 7,13,10,0
3140
3150 BASIC: LD HL,RTMES
3160 CALL MESPT
3170 RET
3180 RTMES: DEFM "End of Monitor..."
3190 DEFB 13,10,0
3200
3210 DATA: CALL ASKST
3220 CALL ASKLEN
3230 LD HL,CKMES
3240 CALL MESPT
3250 LD HL,(STADR)
3260 CALL HXPR6
3270 LD HL,CKMES2
3280 CALL MESPT
3290 LD HL,(LENCOD)
3300 CALL HXPR6
3310 LD HL,CKMES3
3320 CALL MESPT
3330 CALL KBDIN

```

3340	LD	A,<TXBUF>	4300	LD	<ROMST>,A	5260	CALL	LFEED
3350	OR	32	4310	GLIST	CALL	#BC11	6JNZ	RGLP
3360	CP	"y"	4320		LD	<MODE>,A	JP	LOOP
3370	JR	Z,CVOK	4330	GLOP	CALL	#BB6C	LD	<REGVL+12>,SP
3380	JP	LOOP	4340		LD	B,24	LD	<REGVL+2>,BC
3390	CVOK	LD	4350	GLNP1	LD	HL,<STADRS>	LD	<REGVL+4>,DE
3400	LD	<DADRS>,HL	4360		CALL	HMPR6	LD	<REGVL+6>,HL
3410	LD	HL,<LENCOD>	4370		LD	A,32	LD	<REGVL+8>,IX
3420	LD	<BYTLT>,HL	4380		CALL	#BB5A	LD	<REGVL+10>,IY
3430	CALL	BASSV	4390		CALL	#BB5A	PUSH	AF
3440	JP	LOOP	4400		PUSH	BC	POP	HL
3450	CKMES	DEFM "DATA-ISE from #"	4410		LD	B,11	LD	<REGVL>,HL
3460	DEFB	0	4420		LD	A,<MODE>	LD	HL,<REGVL+12>
3470	CKMES2	DEFM " for #"	4430		CP	1	INC	HL
3480	DEFB	0	4440		JR	Z,LNL11	INC	HL
3490	CKMES3	DEFB 13,10	4450		LD	B,24	LD	<REGVL+12>,HL
3500	DEFM	"Is this correct <Y/N>?"	4460	LNL11	LD	A,<ROMST>	RET	
	DEFB	0	4470		OR	A	CALL	ASKST
3510			4480		JR	NZ,ALLRM	LD	A,<TXBUF>
3520	MOTON	CALL	4490		CALL	#B906	CP	42
3530		JP	4500		PUSH	AF	JR	Z,ABORT
3540	MOTOFF	CALL	4510		CALL	#B900	CALL	GOSB
3550		JP	4520	GETBY	PUSH	AF	CALL	SAVRG
3560	FAST	LD	4530		LD	A,<HL>	JP	LOOP
3570		LD	4540		LD	<BYTE>,A	LD	HL,<STADRS>
3580	STSP	CALL	4550		POP	AF	JP	<HL>
3590		JP	4560		CALL	#B90C	RET	
3600	SLOW	LD	4570		POP	AF	LD	HL,BRKMS
3610		LD	4580		CALL	#B90C	CALL	MESPT
3620		JR	4590		JR	GOTBY	CALL	KBDIN
3630	CREAD	LD	4600	ALLRM	CALL	#B909	CALL	HXTOD6
3640		LD	4610		PUSH	AF	LD	A,<HL>
3650		CALL	4620		CALL	#B903	LD	<BRKBY>,A
3660		JR	4630		JR	GETBY	LD	A,#F7
3670		CALL	4640	GOTBY	LD	A,<BYTE>	LD	<HL>,A
3680		JP	4650		CALL	HEXPR	LD	<BRKADR>,HL
3690	NOERR1	LD	4660		INC	HL	JP	LOOP
3700		LD	4670		LD	<STADRS>,HL	CALL	SAVRG
3710		PUSH	4680		LD	A,32	POP	HL
3720		LD	4690		CALL	#BB5A	LD	HL,<BRKADR>
3730		CALL	4700		DJNZ	LNL11	LD	A,<BRKBY>
3740		POP	4710		CALL	LFEED	LD	<HL>,A
3750		AND	4720		POP	BC	LD	HL,RESMS
3760		ADD	4730		DJNZ	GLNP1	CALL	MESPT
3770		CALL	4740		CALL	#BB06	JP	REGDP
3780		LD	4750		CP	#FC	DEFM	"At Adrs #"
3790		CALL	4760		JR	NZ,GLOP	DEFB	0
3800		LD	4770		JP	LOOP	DEFB	7,13,10,10,24
3810		LD	4780	RNORM	DEFM	"List ROM (1) on	DEFM	"*BREAKPOINT*"
3820		CALL	4790		RAM (2) ?"	DEFB	DEFB	24,10,10,13,0
3830		LD	4800		DEFB	0	CALL	ASKST
3840		CALL	4810	HELP	LD	HL,CMDS	LD	A,<TXBUF>
3850		LD	4820	HLPL	CALL	LFEED	CP	"*"
3860		LD	4830		LD	A,<HL>	JR	NZ,NOAB
3870		CALL	4840		CP	255	JP	LOOP
3880		LD	4850		JR	Z,EOCMD	LD	HL,<STADRS>
3890		CALL	4860		CALL	MESPT	JP	<HL>
3900		LD	4870		INC	HL	LD	A,">"
3910		LD	4880		CALL	LFEED	CALL	#BB5A
3920		CALL	4890	EOCMD	JR	HLPL	CALL	KBDIN
3930		LD	4900		CALL	LFEED	LD	A,<TXBUF>
3940		CALL	4910	ENTER	JP	LOOP	OR	A
3950		CALL	4920		CALL	ASKST	JR	Z,LOOP
3960		JP	4930		LD	HL,ENISM	CALL	DECOD
3970	TYPMS	DEFB 13,10,10	4940	INPLP	CALL	MESPT	JP	<HL>
3980		DEFM "File type "	4950		LD	HL,<STADRS>	5910	RGMS
3990		DEFB 0	4960		CALL	HMPR6	DEFM	"AF "
4000	SRTMS	DEFB 13,10	4970		LD	HL,IEGMS	DEFB	0
4010		DEFM "Start Adrs #"	4980		CALL	MESPT	DEFM	"BC "
4020		DEFB 0	4990		CALL	KBDIN	DEFB	0
4030	LENMS	DEFB 13,10	5000		LD	A,<TXBUF>	DEFM	"DE "
4040		DEFM "Length #"	5010		CP	"*"	DEFB	0
4050		DEFB 0	5020		JR	Z,INPFN	DEFM	"HL "
4060	ENTMS	DEFB 13,10	5030		LD	IX,TXBUF	DEFB	0
4070		DEFM "Entry Adrs #"	5040		CALL	HXTOD6	DEFM	"IX "
4080		DEFB 0	5050		LD	HL,<STADRS>	DEFB	0
4090	OKMS	DEFB 13,10	5060		LD	<HL>,A	DEFM	"IY "
4100		DEFM "OK"	5070		INC	HL	DEFB	0
4110		DEFB 13,10,0	5080		LD	<STADRS>,HL	DEFM	"SP "
4120	WIDTH	CALL	5090	INPFN	JR	INPLP	DEFB	0
4130		JR	5100	ENISM	JP	LOOP	DEFM	"MON-DATA"
4140		LD	5110		DEFM	"Hit ESC to finish"	DEFM	" DATA "
4150	STMOD	CALL	5120	IEGMS	DEFB	13,10,0	DEFS	4
4160		JP	5130		DEFM	" = #"	DEFB	0
4170	GOSB	LD	5140	REGDP	DEFB	0	DEFB	0
4180		JR	5150		LD	B,7	DEFB	2048
4190	LIST	CALL	5160		LD	HL,RGMS	DEFW	10
4200		LD	5170	RGLP	LD	IX,REGVL	DEFW	0
4210		CALL	5180		CALL	MESPT	DEFB	80
4220		CALL	5190		INC	HL	DEFW	0
4230		LD	5200		PUSH	HL	DEFW	0
4240		CP	5210		LD	H,<IX+1>	DEFB	0
4250		JR	5220		LD	L,<IX+0>	DEFB	1
4260		LD	5230		CALL	HMPR6	DEFB	0
4270		LD	5240		POP	HL	DEFB	14
4280		JR	5250		INC	IX	DEFW	35000
4290	LRAM	LD			INC	IX	DEFB	0

We are always actively seeking programs for publication - either for Open Forum, the machine pages or Star Game. When sending in a program for consideration, a clear program listing should be sent, together with, wherever possible, a saved copy on cassette. Documentation - usually not more than 1000 words - should start with a general description of the program, what it does, and then some detail of how the program itself is constructed. We pay very competitive rates, according to the length and nature of the program and the quality of the accompanying documentation.

One Liner

on QL

The one-liner is an excellent way for you to get to know your Sinclair QL and develop a meaningful relationship in

only seconds of typing. The ten one-liners enclosed utilize the *Circle* command and all are single loops.

Before trying them out type: *Window 512,256,0,0:Mode 0:Paper 0*

This sets the output window so it takes up the whole screen and sets high-

resolution mode. Then just type one of the following lines and a full screen pattern will be created.

If you change some of the parameters of the circle command in any of the one-liners you can create totally new patterns.

```
CLS:FOR I=1 TO 130:CIRCLE 75,50,I,I/14,I/15:NEXT I
CLS:FOR I=0 TO 150:INK I&&7:CIRCLE 75,50,I/2,1.5,0:NEXT I
CLS:FOR I=0 TO 314:CIRCLE SIN(I/25)*60+74,COS(I/50)*30+50,10:NEXT I
CLS:FOR I=0 TO 62:CIRCLE I*1.8+15,SIN(I/10)*30+50,10,2,COS(I/10)*2:NEXT I
CLS:FOR I=0 TO 31:CIRCLE 75,I*3,SIN(I/10)*10,6,0:NEXT I
CLS:FOR I=0 TO 280:CIRCLE ABS(140-I),SIN(I/15)*30+50,10:NEXT I
CLS:FOR I=0 TO 99:CIRCLE 75,I-20,TAN(I/70)*10,I/50,0:NEXT I
CLS:FOR I=0 TO 90:CIRCLE 75,50,I,I/50,I/15:NEXT I
CLS:FOR I=0 TO 13 STEP .1:INK I+2:CIRCLE 75,50,15,9,I:NEXT I
CLS:FOR I=0 TO 2*PI STEP .1:CIRCLE 30*I,50,15,9,I:NEXT I
```

One Liner
by S Armstrong

The Music Box



Musician's art

Just to demonstrate the unbiased nature of this column, this week I'd like to mention three books brought out by Sunshine Books, whose associate company is also responsible for *Popular*.

Ian Waugh's *Making Music on the BBC Micro* (£6.95) has been out for a year or so now. I have found it a useful - if patchy - volume, full of handy programming tips and ideas. In computer music, there is nothing quite so valuable as good ideas - which makes Waugh's book worth having, if you're a BBC owner.

The main problem with this book - as with the other two

I'll deal with - is that it is, as I've suggested, somewhat variable. It doesn't pretend to be definitive and, like most computer books, seems to have been written in some haste. These are not necessarily major faults, but one does still long for a truly comprehensive text.

Waugh's follow-up book - *Commodore 64 Music* (£6.95) - is aimed, obviously enough, at the Commodore owner. Here, I think, the author was faced with a new problem. As computers go, the Commodore is so versatile musically that it's difficult to know where to begin and what to include. Waugh struggles gamely with the wealth of possibilities, but somehow seems to pull less out of the hat than he did with the more restricted BBC. Worth having, though, for his chapter on the computer as composer alone.

Published at the same time as Waugh's Commodore book is Mark Jenkins' *Electronic Music on the Commodore 64* (£6.95). This is altogether another kettle of fish

from an author who worked on *Electronic Soundmaker and Computer Music* and is now technical editor of *Melody Maker*. Jenkin's knowledge of electronic music is extensive and is well displayed in his book. In some ways, however, the very depth and breadth of the author's knowledge is the book's major shortcoming. In parts, it reads not so much as a book, but as a consumer manual and the problem with consumer manuals is that they date quite quickly - especially in such a rapidly developing field as computer music.

You'll be able to find information in *Electric Music on the Commodore 64* on a stunning range of available software and hardware of all descriptions. Wonderful reference material for the beginner, but - I'm afraid - with very little depth. There are a number of Basic programs included, but nothing really startling or that takes the computer musician's art very far.

As with Waugh's books, the requisite 'What is sound?' and 'What is music?' sections

are there and, as usual, they smack just a little too much of padding.

I must confess to this sin myself. My own book (*Micro Music*, published by Papermac (£5.95) in April), also includes the sections mentioned above and, in truth, the temptation to include this sort of stuff was all but overwhelming. I leave it up to readers to determine which book has coped best with the difficulties of writing practical texts on computer music, merely mentioning that *Micro Music* contains programs and information for the Commodore 64 and BBC.

Gary Herman

The Music Box is a weekly column with news, reviews and readers comments on all aspects of micros and music.

Any readers with experience of computer music making or companies with new product news are invited to write to drop a line explaining what they're doing to: Gary Herman, The Music Box, 12-13 Little Newport Street, London WC2R 3LD.

Link to Giant Mainframes and network to thousands of Micro users via your 'phone with free Modems and Comms software in the British Telecom Modem competition.

British Telecom is offering 1000 free gift packs to plug direct into your home 'phone line.

British
TELECOM

MODEM COMPETITION

1000 FREE MODEMS

500 for Spectrum/Spectrum +
350 for BBC Model B
150 for Commodore 64

And if you haven't got a square-type BT phone socket, British Telecom will arrange to alter your installation at no charge!

HOW TO ENTER

(Monday 22nd April to Sunday 5th May 6pm to midnight)

For the 5 questions 'phone

01-627 3000 or
021-449 9944 or
031-225 8999

To get the Tiebreaker Sentence 'phone

01-627 1199 or
0532 455030 or
0632 324444

Complete the entry form using your skill and judgement, and send it off in the next post.

RULES OF THE BRITISH TELECOM MODEM COMPETITION

- 1) The dial-in is available from 6pm Monday 22nd April to midnight Sunday 5th May 1985, when the competition closes.
- 2) Entries must be postmarked the next working day after the questions and tiebreaker were obtained.
- 3) Entries can only be made on the official entry forms and become the property of British Telecommunications plc.
- 4) The competition is open only to residents of the United Kingdom over the age of 18 years. Employees of the Network Marketing Unit of British Telecommunications plc and PARKER REDMILE LTD, and their dependants are excluded. Only one winning entry per household.
- 5) Entries not reaching the competition address before midnight on Thursday 9th May 1985 will not be considered.
- 6) A list of winners will be provided at the competition address. Please send an SAE if you wish to receive it.
- 7) The winners will be picked as follows from entries received on time and properly completed -
The entries for each type of prize pack with all correct answers to the 5 questions and with the tiebreaker sentences judged most apt and humorous by the competition organisers will be chosen, subject to the stock of appropriate prize packs.
- 8) The decision of the competition organisers is final and no correspondence will be entered into. Winners will be notified automatically.
- 9) British Telecommunications plc offers winners requesting BT 'phone socket conversion on entry forms to waive the charge normally made for such work.
- 10) Details of how to get on Prestel/Micronet 800/Telecom Gold will be sent to winners. Subscriptions not included in prize.

OFFICIAL ENTRY FORM

A. Your answers:

- Q1
Q2
Q3
Q4
Q5

B. Tiebreaker Sentence complete (25 words or less in total):

"....."
"....."

C. If I win, I would like the prize pack for the

- SPECTRUM/SPECTRUM +
 BBC MODEL B (Tick Choice)
 COMMODORE 64

D. My home telephone line (* Delete as appropriate)

- (a) already has a square-type BT 'phone socket * or
(b) would need converting to square-type BT 'phone socket *

If (b), the person renting the line from British Telecom must fill in this declaration -
If this is a winning entry, I agree to ask British Telecom to convert my line to square-type BT 'phone socket at a convenient date before 1st July 1985. My line is on Residential rental, is not a coinbox and is not shared service.
I understand British Telecom will not charge for doing the work.

Name (Block Capitals)

Telephone number

Signature

Date 1985

E. I have read the rules of the British Telecom Modem competition and agree to abide by them. I am over 18 years old.

Signature of entrant

Date 1985

Name (Block Capitals)

Address

Postcode

POST IMMEDIATELY TO:-

British Telecom Modem Competition
PO BOX 73
MITCHAM
SURREY
CR4 2XU

(Postage stamp required)

WINNERS WILL BE NOTIFIED AUTOMATICALLY

Open Forum

Address Tags

on Commodore 64

The program itself is mainly constructed using strings and variables to carry the information eventually to be outputted to the printer.

Because the program works with only

Basic commands and no pokes, peeks or other 64 configurations it should work perfectly on the Vic-20 as well as the 64.

You are first asked what colour you want which is entered in number form (variable A). The actual address is then entered in but in word form. The shift is used for capitals and the printer is also set in lower case.

Lastly you are asked how many times you would like the entered address to be printed (*tim* for times and *pri* for print).

I often use this program when I have a lot of addresses to type out, as I have appalling handwriting. It is set in the 20 characters per line mode which I think is sufficient.

```
1 OPEN4,6:OPEN3,6,3:OPEN2,
  6,2:OPEN6,6,6
2 PRINT#6,1:PRINT#2,0:PRINT#3,3
3 POKE53272,22:PRINT#4," LETTERS"
4 PRINT"☐"
5 PRINT" PLEASE TYPE IN IN
  NUMBER FORMS ONLY"
6 PRINT" UNLESS INSTRUCTED"
7 PRINT"☐☐☐ COLOUR OF PRINTING ON
  ADDRESS TAGS
8 PRINT"☐ 0 - BLACK WRITING"
9 PRINT" 1 - BLUE WRITING"
10 PRINT" 2 - GREEN WRITING"
11 PRINT" 3 - RED WRITING"
12 INPUT"☐ COLOUR REQUIRED:";A
13 IFA=<0 OR A>3THENPRINT"MISTAKE!!!
  TYPE AGAIN":GOTO12
14 PRINT#2,A
15 PRINT"☐"
16 REM
17 PRINT"          ☐ ADDRESS "
18 PRINT"☐☐☐ ONLY 40 LETTERS PER
  LINE PLEASE"
19 PRINT"☐ *** 6 LINES TO COMPLETE
  ADDRESS ***"
20 PRINT"☐ USE RETURN FOR NEW LINE"
21 PRINT"☐ HOLD DOWN RETURN☐
  FOR CAPITALS"
22 INPUT"☐☐ LINE 1:";A$
23 INPUT"LINE 2:";B$
24 INPUT"LINE 3:";C$
25 INPUT"LINE 4:";D$
26 INPUT"LINE 5:";E$
27 INPUT"LINE 6:";F$
28 PRINT"☐"
29 PRINT"☐☐☐ *** HOW MANY TIMES TO
  BE PRINTED ***"
30 PRINT"☐☐☐☐☐"
40 INPUT"TYPE IN HOW MANY ";T
41 PRINT#3,1
50 FORPRI=1TOT
51 PRINT#4,A$
52 PRINT#4,B$
53 PRINT#4,C$
54 PRINT#4,D$
55 PRINT#4,E$
56 PRINT#4,F$
57 PRINT#4,PRINT#4,PRINT#4,
  PRINT#4:PRINT#4
58 NEXTPRI
59 PRINT"☐"
60 PRINT " THIS IS WHAT SHOULD BE
  ON THE TAGS NOW"
61 PRINT"☐☐☐"
62 PRINTA$
63 PRINTB$
64 PRINTC$
65 PRINTD$
66 PRINTE$
67 PRINTF$
```

Address Tags
by M Williams

Book Ends



Book *The Art of Microcomputer Graphics* Price £14.95 Micro BBC/Electron Supplier Addison-Wesley Publishing Company.

volume.

It is well balanced, explaining the mathematics of pattern generation before providing programs which utilise the formulae: many of the listings make great use of procedures, encouraging structuring.

In addition to wire framing and 3-D rotation more unusual topics such as tessellation (repeated shapes which fit together), anamorphic distortion and symmetry are dealt with.

In fact, the potential of this book is only limited by the reader's interest in CAD and their own imagination.

John Minson



Book *Logo on the Sinclair Spectrum* Price £6.95 Micro Spectrum Supplier Papermac, 4 Little Essex Street, London WC2R 3LF

ing, mathematical operations, input, sound and finally debugging.

While it is also seen primarily as an educational language, this book is aimed not at children but at parents, teachers and older experimenters. Its style is matter-of-fact but clear, and there are many practical examples, including the development of a couple of slightly longer projects. There's also a comprehensive index.

It should provide a useful adjunct to the Sinclair Logo manual for the newcomer, but at just over 100 pages it's rather slim for its price.

John Minson

This large and practical volume concentrates on Computer Aided Design (CAD), combining theory with listings to enable the BBC or Electron user to delve deep into the micro's artistic possibilities. Black and white and colour illustrations make it an attractive

Logo is probably the most misunderstood computer language; most people think of it as synonymous with turtle graphics and nothing more. Here though is a guide to Sinclair Logo that develops it from the ubiquitous pattern drawing through list process-

Arcade Avenue



High scorers

There's a lot to do this week so let's not waste time. From David Ratledge of Nazeing comes a letter full of tips on how to get through *Raid Over Moscow* for the Commodore 64 which he finished with a score of 152 500 and 6 commandoes remaining on the beginner level. "Space Station - take off and go to the right of the doors. Face to the right and begin to edge forward. Occasionally press the fire button to stop you crashing and face your plane towards the doors as you slowly travel right. When in front of them, open and push forward on the joystick to fly out. *Attack Run* - do not use the height controls, stay low and fly under the bridge. To fly through the obstacles fire a missile and if it goes to the centre of the gates you will get through without crashing. *Missile Silos* - the small silos can be easily blown up by using the feature that makes your plane turn blue when you are in line with them. *Defense Centre* - keep moving to give you less chance of being shot. Shoot the doors before you kill the soldiers. *Reactor Room* - follow the robot with the dot on the wall. Try to catch any discs that miss it. Fire as soon as the robot begins to inject the coolant." Thanks David, that should help out some people in trouble.

Another packed letter comes from Gordon McCabe who has finished *Rally Driver* by Hill MacGibbon back on 16th Feb, winning the last stage in 13:32 minutes. Gordon says - "always keep at around 40mph on twisty bits of road. When cornering, approach on the inside with your wheel nearly off the road. When you enter the apex of the corner turn the wheel hard! Then slowly accelerate out of the corner. Always have a friend to act as navigator to tell you when a time control is coming up etc.

On the B812 stage 1 there is a very difficult right turn with a windmill on the inside. You need to charge into the apex, then brake hard and slowly accelerate out otherwise you will always crash. Try and go round the edge of animals and spectators as blowing your horn wastes time". Gordon gives loads more tips about the routes that you need to take, and the precise techniques they need and invites anyone stuck to write to him at 8 Clivedale Rd, Woodley, Reading, Berks.

Here's an amazing thing from Greg Holmes of Barrow in Furness - "whilst hacking around in the Spectrum version of *Alligata's Son of Bagger* I came across this message at address 25500 from its modest author Elliot Gay". Enclosed was a print out which is too long to reproduce here but it begins "Welcome to all hackers. I'm Elliot, author of this megabrilliant program. I'm glad you've decided to look inside" and gives a history of Mr Gay's life. Weird. Greg also discovered this routine - "Merge basic loader, delete lines 70,80,81,82 and 90. Type in at line 45 *Poke* 27278,0. When loaded and the credits have finished you will then be presented with a menu that allows you to start on any of the 12 levels and also infinite lives". It seems that Elliot has thought of everything a hacker may need. Greg also gives us these *Pokes* - *Gilligan's Gold* unlimited lives *Poke* 52881,0; *Poke* 52882,0; *Poke* 52883,0; *Knight Lore* *Poke* 49759,n where n is the number of objects you wish to collect to finish.

Michael Kohut of Leeds has written in to confirm that there really are two versions of *Monty Mole*, and the one with the headerless block of code is making it difficult to enter our infinite lives *Pokes*. Can anyone find a way of getting them in?

Paul Allen of Sudbury has written with some sophisticated tips for *Zombie Zombie* which he has finished with a high score of 1773. "When the zombies are walking together along a wall land on top and they will split up. When you're after 4 or 5 split them and pen them singly or in pairs by dropping bricks around them, at least two bricks high. They always turn left when they hit a wall so you don't have to drop many to make them go in circles. When there are one or two walking around freely, deal with those then go back to the pen and collect another one. My high score with *Ant Attack* is 46,418. A couple of weeks ago I loaded this up and to my surprise there was a doorway next to the low wall where you enter the city. I've had this game nearly a year and this has never happened before. I can't wait for Sandy White's next game.

"My recommended games are *Ant Attack* and *Zombie Zombie*, *Wheelie*, *Skool Daze*, *Pyjamarama*, *Trashman*, *JSW* and *Manic Miner*. I've just started playing the brilliant *Skool Daze* but it's hard and I can't seem to hit the shields on the second floor by jumping on one of my mates. Can anyone help? Finally my *Zzoom* high score is 160,500.

All the way from Mother-

well in Scotland comes a letter from Douglas Smith who wants some *Pokes* for the Vic 20 game *Perils of Willy*. "My highest score is 40,680 and I have reached the 16th screen. If you want to toggle the music on and off use F3 and F5. Here is my tip for people still struggling on the sixth screen - if you walk to the right until you are below the green platform then jump up, jump to the left and you will land on the bottom of the conveyor belt, then jump again and you will get the musical note below the falling platform."

To finish off this week here are some high scores - from Gary Burrows of Halewood, *Kokotini Wilf* finished with 62 items, *Monty Mole* finished with 3392, *Molar Maul* level 12, *Cookie* 26275 and *Hungary Horace* 8950. Also from Liverpool Kevin Griffiths has finished *Wilf* as well, scored 2555 on *Monty Mole* and 170,000 on *Manic Miner*. Whilst on the subject of *Wilf* perhaps one of you two has some tips for Robin Heighway of Tamworth in Arden.

The latest to finish *Pyjamarama* are Carolyn and Robert Hinds of Chester who have scored 91%, 4843 paces, and 87%, 4813 paces, respectively. Like many people they have pointed out that finishing this game does not spoil their enjoyment of it. They also want some *Pokes* for *Skool Daze*. Kevan Watson of Forres in Scotland has also finished with 97%, 4145 paces, has completed *Beach Head* with a score of 'over 100,000' and *Antic Atac* with 96%. Well done all of you.

Tony Kendle

We are searching for the top UK computer games player - the best there is!

The very best of Britain's game players will get to fight it out on a number of top secret new games - scheduled for release in the autumn.

Here's how it works

Study the table below and look at the column for the machine you have - these are the games you'll need to master. Send your high scores in on the form below, making sure that your scores are authenticated by a responsible individual signing the form. Any score achieved using technical short-cuts - such as infinite lives *Pokes* - will not be accepted.

Between now and September Tony Kendle will be keeping you up to date on the *Arcade Avenue* page with just who has the scores to beat. Then, in September, the top three scorers on each machine will battle it out for a place in the final and the chance to be the first to play our 'top secret' games.

	Commodore	BBC	Spectrum	Amstrad
Game 1	Suicide Express	Elite	Technician Ted	Sorcery
Game 2	Beach Head	Jet Pac	3D Star Strike	Splat!
Game 3	Shoot the Rapids	Chuckie Egg	Cyclone	Manic Miner

Game Wizard Entry Form

Micro

Game 1 score:

Game 2 score:

Game 3 score:

Name

Address

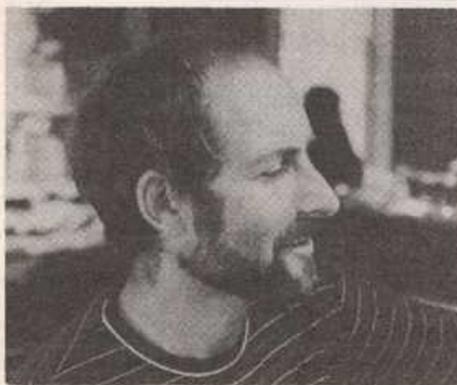
.....

Your signature

Witness's signature

.....

Tony Bridge's Adventure Corner



Spine-tingling

Adventures – well, any new program, I guess – don't come along too often for the Vic 20, and there are still fewer software houses still committed to producing these programs in any quantity. Harddata of London is one source of software for Vic-ers, and they have just released a new adventure. Called *Heart of Darkness* and priced at £5.95, it is for the 16K machine and written by J Wilmott. It's of the standard two-word command type, and according to the leaflet supplied with the tape, 'tends to be more realistic than your average Dungeons and Dragons type of game. . .'. Apparently, the author's realism consists of locations which become no-go areas once visited.

But I mustn't pre-judge *Heart of Darkness* – being introduced to the wonderful world of computers via the Sinclair route, I haven't had the privilege of access to a Vic, so this adventure must remain a closed book to me for the moment. However, I will pass the tape along to one for the more enlightened colleagues: let's hope that a critique will be forthcoming. Harddata, 18 Vicarage land, East Ham, London E6 4AB.

Many moons ago, SCR Adventures sent a tape of their latest effort to the Grand Elf. Called *Castle Blackstar*, it was a text-only adventure and had rather too many inconsistencies in the programming for it to stand out among the other adventures of the time. But in the past few weeks, one or two Corner readers, particularly Hugh Walker of Guildford, have been championing the cause of

Castle Blackstar, and this has persuaded me to have another look at the game. Another reason is that it has been re-ramped and tidied up, and the marketing taken over by CDS Micro Systems, who have re-released the adventure at £6.95.

Hugh Walker and the other readers are all very discerning adventurers, and if a program passes their scrutiny, it must be worth a spin. Thanks to a few hints, as well as the solution for Hugh, I have now been able to progress somewhat further than my first bungled attempts.

You have been sent on a quest, by Lady Artemis (the daughter of Zeus in Greek mythology) to recover the Power Orb and return it to her. Artemis' prowess with a Bow and Arrow may give you a little pointer to the way into the Castle – once in, you will become immersed in a game fairly steeped with atmosphere.

The character set has been re-designed so that, on the Spectrum, it now looks like a BBC set (what does the BBC version look like?) and the screen layout is very neat. The game is rather complex, and would seem more suitable for the experienced adventurer, but they will be assured of a tough series of puzzles. A feature that was unique at the time of its first release (though not now – *Artic's Curse of the Seven Faces* has a similar facility) is the 'Freeze' command. This enables the faint-hearted or cautious adventurer to save his present position to a *Ram* buffer, thus by-passing all that fiddling about with the cassette machine.

Castle Blackstar has been converted from the Spectrum to a wide range of other machines, including the Amstrad, BBC, CBM64, Dragon 32/64 and MSX. CDS Micro Systems, Silver House, Silver Street, Doncaster, South Yorks, DN1 1HL.

But back to business – this week I want to look at a graphic adventure that will become a classic. Another game, *Out of the Shadows*, will I'm afraid, have to wait for a week or two for a mention, although I think that it is wonderful. But I've just been playing *Alien* from Argus Press Software, and feel that I should pass on the good news. One of APS' Mind Game series, *Alien* is, of course, based on the film of the same name. This film is one of the best science-fiction whodunnits (or, more precisely, Whowillgetdun) ever

made, and one of the few genuinely disturbing films.

The packaging is excellent, from the well-illustrated box to the marvellous booklet, which features a run-down of 'the story so far. . .'. If you have seen the movie, you will be well-acquainted with the claustrophobic atmosphere on board the factory starship *Nostromo*, host to several humans, one extremely human-like robot, one elusive cat, and the eponymous Alien.

The program is entirely joystick-driven, via a series of menus. Thus, from a menu, a character (Dallas, Ash, Ripley, Brett, Kane, Lambert or Parker) is selected by moving the joystick up or down until the particular name is highlighted. Now, another menu is presented, from which you may select to move to another location, pick up an item present at the location, or drop an item. Other special actions may be possible, like Use Flame-thrower, Remove Grill and so on.

APS couldn't resist dragging in the obligatory 'unique programming technique'. In this case, it's PCS (Personality Control System). What this means is that you can order Ripley to proceed to the laboratory and then immediately switch to Ash, knowing that Ripley is now on her way. Also, the various characters have different personalities, and their feelings change throughout the course of the game as they become more or less confident/terrified.

As overall commander, you may order the characters to do whatever you wish, but the over-riding objective is to win the game – and this can be done in one of two ways. Either kill the Alien or find Jones, the Cat and take him to the rescue pod after scuppering the *Nostromo*. Leaving with Jones and nobody left alive on the ship wins the game (although you may not get 100% for doing it this way!).

Sound plays an important part in *Alien*, with the monster itself making a bit of a racket when emerging from the duct system and the *Beep* of your tracker indicating an important discovery. I have a theory that computers age in the same way as dogs, ie, one computer year equals seven human years.

The screen display is at all times very well presented, with a recognisable thumbnail sketch of the character you have selected, and floor plans of the level you are currently concerned with. And program response is instantaneous – sometimes to disadvantage, as I found when selecting an option and leaving my finger on the button a nano-second too long. But this isn't too much of a problem, and in fact adds to the suspense in a way.

The film turned the screw very ably and wound up the tension – and so does the program. I've never been terrified by a computer program yet, but the first sight of the Alien, looking at its next meal and slowly twitching its tail and picking its teeth was enough to send shivers down my spine!

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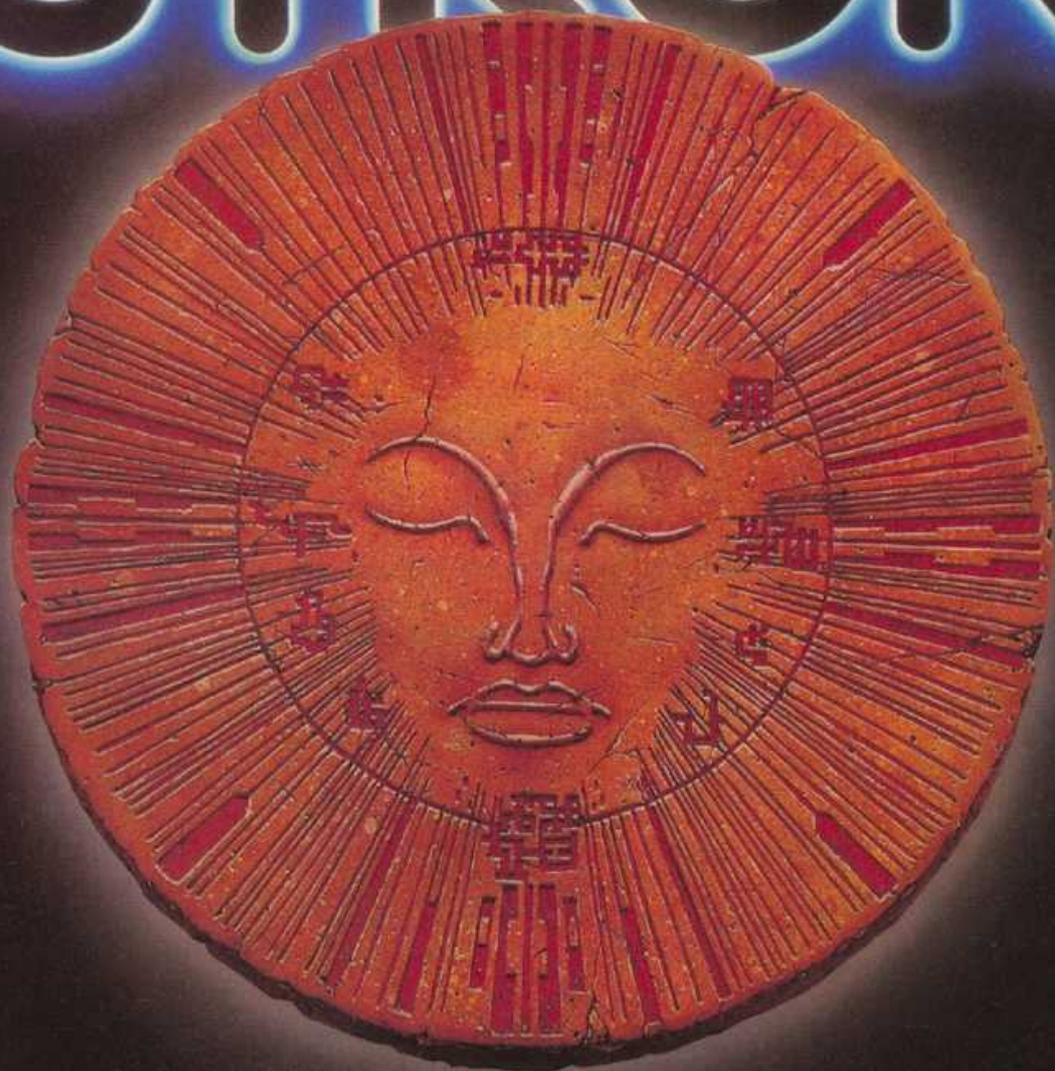
Remember – the system only works if those adventurers who have solved the puzzles get in touch. Every week is Save An Adventurer Today (SAAT) week!

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Strange effects

P Winston, of Chippenham, writes:

Q I have a 48K Spectrum, and I have noticed that if you give a high value as the third parameter to the *Draw* statement that strange effects result (not just a single line). Are these effects known and what causes them?

A The effect you have noticed (spinning stars, circles, squares, etc), is caused by a bug in the Spectrum *Draw Rom* routine.

It is quite a well known bug, which because of its spectacular results, I call it the 'fast star effect'. Some interesting values to try are:

- 599 Turning star
- 499 Turning triangle
- 399 Turning square
- 299 Turning hexagon
- 799 Rotating straight line
- 750 Result is a multi-pointed star.

Demonstration program

G Toth, of London, writes:

Q I own a Vic 20 with a 64k Ram expansion. 32k for software usage, the other half of the Ram for a filing system. My problem is, the demonstration program for reading and writing data is not working. The program is as follows:

```
10 Open 1,200,1
20 Print#1,"ABC":
   Print#1,"PQR"
30 Close 1
40 Open 1,200,1
50 Input#1,a$: Print a$
60 If st 0 Then 50
70 Close 1
80 End
```

The output should be:

```
RUN
ABC
PQR
READY
```

Instead of this I get the message *Devise Not Present* referring to line 20. Always the same answer. Please put me right if you can.

A The message you are getting means that the *Input Open* statement has not had the desired effect. I presume that the device number of 200 is required by the particular application you are using as it is non-standard. If the use of this device is to enable you to store data in the extra 32k then the error you are getting would indicate a problem with the expansion Ram.

If you change line 10 to read *Open 1,1,1* and line 40 to read *Open 1,1,0* then you should be able to read and write to cassette quite successfully.

Users request

J Townshend, of Manchester, writes:

Q I am writing a program on my Spectrum+ and I wish the output from the program to appear on the printer at the *Users request*, as well as on the screen.

I can obviously do this by lots of tests in my program, but are there any quicker methods, or *Pokes* that I could use?

A The easy answer to your question is... Yes!!!

Open #2,&P&, will cause everything sent to the screen to be automatically printed. To turn off this effect use *Close #2*.

Oric questions

Oric user, of Gwent, writes:

Q I know that you do not often get questions from Oric-1 owners but there are still some of us left! My questions are these:

A) What location holds

the address of top of memory?

B) What are the addresses for the X and Y coordinates of the cursor?

A You are correct in saying that I do not get many queries from Oric users; however, the answers to your questions are as follows, A) decimal 166, and B) X coordinate = 537, Y coordinate = 538.

As to your comment about the number of Oric users, I might as well point out that Oric sell a lot of machines in Europe, especially France.

Blank screens

D Rate, of Belfast, writes:

Q I heard some time ago that there was a method of increasing the speed of CBM 64 Basic programs. I know that it is something to do with filling the screen with blanks, but when I tried that it did not work.

Do you know of this method, or have I got it all wrong?

A *Poke 53265, Peek (53265)* and 259, is I think what you are referring to. This *Poke* has the effect of setting the Screen colour to the Border colour. When set in this way, CBM 64 Basic runs about 5% faster.

The screen contents are not destroyed by this *Poke*. To return the screen to normal use *Poke 53265, Peek (53265)* or 16.

Legal permission

Paul Burgin, of Sheffield, writes:

Q My friend and I are just adding the finishing touches to a screen designer for a popular arcade game. We hope to have finished it soon, and when we do we are hoping to sell it.

Could you tell us what legal permission we will need from the company that produced the original game. Will we need to pay them royalties? Also we are hoping to sell it under the name of 'Hyper-Soft'. Will this be legal or is there another company operating under this name?

A They say that imitation is the sincerest form of flattery, and as your software will need the customer to have already obtained the base game, I doubt that you would have any problem. Having said that, it would only be courteous to ask their permission to use the name of their game in any adverts you might place. As far as the company name is concerned if you used the name Hyper-Soft (Sheffield) then there is virtually no chance of you being confused with any company that might already be using this name.

Hi-res to printer

P Ellis of Gloucester, writes:

Q I own a Dragon 32 and a Seikosha printer. Can you tell me how to Copy from the high resolution screen to the printer. I cannot get anything.

A After some research and a few late nights, I have come up with the following program (it is not the fastest in the world but it does work!).

```
10 PMODE 4,1: SCREEN(1,0)
20 PRINT#-2,CHR$(8)
30 FOR x = 0 TO 191 STEP 7
40 FOR y = 0 TO 255
50 S = PPOINT(y,x) +
   PPOINT(y,x+1)*2 + PPOINT
   (y,x-2)*4 + PPOINT
   (y,x-3)*8 + PPOINT
   (y,x-4)*16 + PPOINT
   (y,x-5)*32 + PPOINT
   (y,x-6)*64 + 128
60 PRINT#-2,CHR$(s)
70 NEXT y
80 PRINT#-2,CHR$(13)
90 NEXT x
100 PRINT#-2,CHR$(150)
```

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Phil Rogers and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW, 12-13 Little Newport Street, London WC2R 3LD*

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Magazines Sinclair Users. Your Spectrum, Nos. 4, 5, 10. Big K No. 1 and some C&VG's, 1 x ZX Computing £4.00 the lot will not split. Tel: Sudbury 75289.

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ZX Spectrum 48K as new boxed £70. Tel: Didcot (0235) 814815 after 5pm.

Spectrum 48K fuller FDS keyboard, Microdine + spare cartridge, Interface I, programmable joystick interface Quickshot II, data recorder, Currah speech unit, Light pen, 16 original games + books. £225 o.n.o. Tel: 01-771 3448 after 8pm.

Spectrum 48K excellent condition dead cheap, no thrills £75. Tel: 01-249 6665 after 6pm Mr Freedman.

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Original Spectrum software: Hurg, Jet Set Willy, Chequered Flag, Ghostbusters, Pinball Wizard, Blue Thunder, Booty, Cassette 50, Warlords, Rifle Range, Wheelie, Winged Warlords, Revers I, Caterpillar, Androids, Galaxy Attack: Half price: Phil Piper (0272) 777593.

Spectrum Devs Ex Machina £8, Goto Jail £2.50 Pi-balled £2.50 all in excellent condition Phone Andy on 0532-657038.

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Spectrum originals, crazy prices, Zip-zap, Stonker £2.00 each, Gnasher, Electron £1.50 each, Pedro, Pool, Dinky Digger and Xanagrams all £4.00 each, Mr P Collins 325a Hatton Road, Bedford, Middlesex TW14 9QS.

Spectrum 48K for sale, complete with leads, instruction manual and tape. £85 o.n.o. Tel: 01-348 3924 and ask for Graham.

Spectrum original games for sale. Eureka £10, Ket Trilogy £9, Jewels of Babylon £3, Lords of Midnight (unboxed) £5, Doomsdarks Revenge £6, Bullseye £1, Special Operation £2.50, Golf £2.50. Tel: 0382 454881, Andrew Kerr.

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Spectrum software all original, Cyrus is Chess, Vu-calc, Flight Simulation, 3D Strategy, Supercode II, Arctus etc. cost over £50, sell £18. Phone 01-527 5493.

Spectrum software for sale. Trans-express (all programs) £5. Jumping Jack, Auto Sonics, Orbiter, Ground Attack £2.50 each, Frogger, Time Bandits, Nightflite £2 each. Tel: Lianeli 772132 (evenings or weekends).

Sinclair RS-232-C lead for Spectrum cost £14.95. Never been used £5.50 including postage. Phone 0226 282645.

Spectrum software for sale. Many titles, all original £2 to £3 each. Phone 0226 282645.

Gemini Business software for Spectrum 48K. Cashbook and final accounts on three cassettes plus manual. Cost £95 will accept £30. Phone 0226 282645.

Spectrum hardware manual £3 Spectrum ROM Disassembly £5 Spectrum Machine Code Sinclair £4 Spectrum Interface Projects £3 Simple Interfacing Projects £3 Spectrum Tape Copier + Controller Board £10. Tel: 061-432 4538 evenings.

48K Spectrum Microdrive with cartridges, DK'Tronics keyboard, Fox programmable joystick interface, TAC2 joystick, cassette player, software and books. All in excellent condition, £200. Tel: Nuneaton 0203 346648 after 6pm.

48K Spectrum ZX printer with 10 rolls of paper. Programmable joystick interface. Over 200 games, mags £190 o.n.o. Tel: 061-980 7086.

ADVENTURE

HELPLINE

Pirate's Cove on Vic20. How do I get through the force field and do I need the mirror? If so how? R Elcome, 100 Victoria Road West, Hebburn, Tyne and Wear.

Tower of Dispair on Spectrum. How do I get past the angel of death at the inn and cross the bridge? R Elcome, 100 Victoria Road West, Hebburn, Tyne and Wear.

Hobbit on Spectrum. How do you kill the dragon and get out of the goblin's dungeon? Ben Dewhurst, 410 North Road, Yate, Bristol BS17.

Jewels of Babylon on Amstrad. How do you deal with the smooth rock, the lion and the crocodile? What use are any of the objects except the watch? Michael Fox, 6 Lawson Close, Albridge, Walsall.

Adventureland on Vic20. How do I awake and kill the dragon? What do I do when I'm in the chasm? S Macgown, 47 Hallgarth Circle, Kendal, Cumbria LA9.

Espionage Island on Spectrum. I cannot find the combination for the safe. Can anyone help? What use is the flight operator? Mark Robertson, 4 Churchtown Close, Dublin 14, Ireland.

Perseus and Andromeda on Commodore 64. How do I fly - I've got the helmet, shield, discus and sandals? Peter Dent, 11 Stavordale Street West, Seaham, Co Durham.

Colossal Adventure on Spectrum. How do you move the grill covering the machinery? Robert Wands, 50 Tennyson Drive, Tollcross, Glasgow G31. (041-881 9317).

Message From Andromeda on Spectrum. It was alright until I got to the square! How do I get past the rooms that surround it - I keep trying to get past the guard but always fail? Paul Grajner, 211 Long Lane, Wheatley, Halifax, W Yorks.

Planet of Death on Spectrum. I have got the spaceship and flown over to the hanger. What do I do next? Nigel Clarkson, 49 St Bedes Close, Crossgate Moor, Durham DH1 4AA.

Zkul on QL. How do you get past the pedestal with the black cup? How do you get the Cossak? How do you speak with the dwarves? What do you say to them? Martin Davidson, 47 Clodeshal Road, Birmingham B9 4KS.

Message From Andromeda on Amstrad. What do you do with the glowing sphere in the crystal chamber? S Turner, 1 Church Gate Cottages, Udimore, nr Rye, East Sussex TN31 6BA (Brede 882506).

Spiderman on Spectrum. I only need Electro's gem but I cannot defeat him or start presses. I have the biogem. Michael Burton, 169 Highfield Lane, Newbold, Chesterfield, Derbyshire.

Snowball on Commodore 64. After going up from the winch room I can only wander around. Please help! Jason Dore, 3 Park Drive, Wickford, Essex (Wickford 62482).

Pirate's Cove on Vic20. Help! Can anyone tell me how to get off Pirate's Island and what is best to take with me? Neal Todd, 19 Langholm Avenue, Warminster, Wilts BA12 8EW (Warminster 213712).

The Count on Vic20. I'm in the coffin on the third day. How do I kill the count? Mark Weatherill, Linslade, Leighton Buzzard, Beds (0525-370438).

Fantasia Diamond on Amstrad. What does 'The key is inside' mean? What does 'Music is the key' mean? How do I open the trapdoor? How do I open the chest in the Secret Room? Lee Maddem, 249 St Wilfrid's Avenue, Leeds L28 3PX.

CHEAPEST SOFTWARE

SPECTRUM	RRP	Our Price	COMMODORE	RRP	Our PRICE
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Alien 8	9.95	6.90	Gremlins	9.95	7.40
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PD382

THE
FUZION
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AND MACHINE
CONFUZION

- Vic 20**
- 1 (2) Micky the Brickie (Firebird)
 - 1 (1) Wizard and Princess (Mel. House)
 - 3 (—) Perils of Willy (Software Projects)
 - 4 (3) Doodlebug (Mastertronic)
 - 5 (—) Tank Commander (Thorn/EMI)
 - 6 (4) Psycho Shopper (Mastertronic)
 - 7 (—) Flight 015 (Craig Comm)
 - 8 (7) Vegas Jackpot (Mastertronic)
 - 9 (5) Phantom Attack (Mastertronic)
 - 10 (—) Duck Shoot (Mastertronic)
- (Compiled by Websters Software)

- Commodore 64**
- 1 (—) Soft-Aid (Micro Dealer)
 - 2 (—) BMX Racers (Mastertronic)
 - 3 (2) Chiller (Mastertronic)
 - 4 (1) Booty (Firebird)
 - 5 (—) Mini Office (Database Pub.)
 - 6 (7) D. T. Decathlon (Ocean)
 - 7 (—) Shoot the Rapids (New Generation)
 - 8 (—) Airwolf (Elite)
 - 9 (—) Impossible Mission (CBS)
 - 10 (—) Blockbusters (Macsen)
- (Compiled by Websters Software)

- Spectrum**
- 1 (—) Soft-Aid (Micro Dealer)
 - 2 (5) Booty (Firebird)
 - 3 (9) Raid over Moscow (US Gold)
 - 4 (8) Bruce Lee (US Gold)
 - 5 (—) D. T. Decathlon (Ocean)
 - 6 (4) Moon Cresta (Incentive)
 - 7 (1) Everyone's a Wally (Microgen)
 - 8 (—) Dukes of Hazzard (Elite)
 - 9 (—) Skool Daze (Microsphere)
 - 10 (6) Finders Keepers (Mastertronic)
- (Compiled by Websters Software)

- BBC B**
- 1 (—) Football Manager (Addictive)
 - 2 (—) Snooker (Visions)
 - 3 (—) Mini Office (Database Pub.)
 - 4 (—) Mr EE (Micropower)
 - 5 (—) Challenger (Mastertronic)
 - 6 (4) Castle Quest (Micropower)
 - 7 (2) Scrabble (Leisure Genius)
 - 8 (—) Castle Quest (Disc) (Micropower)
 - 9 (8) Ultron (CSM)
 - 10 (7) Manic Miner (Software Projects)
- (Compiled by Websters Software)

- ATARI**
- 1 (1) Smash Hits Vol. 1 (English Soft)
 - 2 (7) Attack of Mutant Camels (Llamasoft)
 - 3 (4) F15/Strike Eagle (Centrossoft)
 - 4 (2) Computer War (Atari)
 - 5 (3) Sub Commander (Thorn/EMI)
 - 6 (6) Encounter (Hi-Tech)
 - 7 (5) Colossus Chess (English)
 - 8 (—) Solo Flight (Centrossoft)
 - 9 (—) Space Shuttle (Microdeal)
 - 10 (—) Defender (Atari)
- (Compiled by Websters Software)

- C.16**
- 1 (2) Roller Kong (Melbourne House)
 - 2 (1) Games Tape 2 (Melbourne House)
 - 3 (4) Stellar War/Blitz (CBM)
 - 4 (7) Vegas Jackpot (Melbourne House)
 - 5 (—) Wizard & the Princess (Mel. House)
 - 6 (—) Classic Adventure (Mel. House)
 - 7 (7) Games Tape 1 (Melbourne House)
 - 8 (5) Berks (CRL)
 - 9 (8) Flight 015 (Craig Communications)
 - 10 (1) Williamsburg Adv. (Microdeal)
- (Compiled by Websters Software)

- Amstrad**
- 1 (2) Sorcery (Virgin)
 - 2 (—) World Cup (Artic)
 - 3 (—) Ghostbusters (Activision)
 - 4 (3) Fighter Pilot (Digital Intervention)
 - 5 (—) Jet Set Willy (Software Projects)
 - 8 (7) Mini Office (Database Pubs)
 - 7 (6) Flight Path 737 (Anirog)
 - 8 (—) Jewels of Babylon (Inter. Micro)
 - 9 (—) Snooker (Steve Davies) (CDS)
 - 10 (—) Football Manager (Addictive)
- (Compiled by Websters Software)

Event	Dates	Venue	Admission	Organisers
London Festival of Computing	April 9-20	Various:	Various:	London Festival of Computing 01-240 8206
Communication Aids for the Handicapped International Conference 85	April 17-19	Sheffield Polytechnic College	Residential: £98 Half-day session: £5	E. Hudson 0742 865274
Apple 85	May 9-10 10.00am-6.00pm May 11 10.00am-4.00pm	Novotel London W6	Free in advance from organisers	Database Publications 061-456 8383
Electron & BBC Micro User Show	May 9-11 10.00am-6.00pm	New Horticultural Halls London SW1	£3.00 adults £2.00 children	Database Publications 061-456 8383
6th Commodore Computer Show	May 12 10.00am-4.00pm			
	June 7-8 10.00am - 6.00pm	Novotel London W6	£2.00 adults £1.50 children	D + CS Marketing Ltd 01-630 6165
	June 9 10.00am - 5.00pm			

Readers' Chart No 20

1	(8)	Soft Aid (<i>Spectrum/C64</i>)	Various Artists
2	(2)	Knight Lore (<i>Spectrum</i>)	Ultimate
3	(1)	Alien 8 (<i>Spectrum</i>)	Ultimate
4	(7)	Sorcery (<i>C64/Amstrad</i>)	Virgin
5	(4)	Everyone's a Wally (<i>Spectrum/C64</i>)	Mikro-Gen
6	(9)	Football Manager (<i>Spectrum/C64/BBC/Electron/Oric/Atmos/Dragon/Vic/ZX81</i>)	Addictive Games
7	(-)	Jet Set Willy (<i>Spectrum/C64/Amstrad</i>)	Software Projects
8	(-)	Impossible Mission (<i>C64</i>)	Epyx/CBS
9	(-)	Underwurlde (<i>Spectrum</i>)	Ultimate
10	(-)	Moon Cresta (<i>Spectrum/C64</i>)	Incentive

Winning phrase No 20: "Di, in flairs - oh no!" from Humphrey Dunn of Shrewsbury who receives £25. Others who came close were "8 figs killed Tonto" from M Beresford of Nottingham, "Roland flies a kite" from Stephen Riley of Glasgow and "Is Reagan old?" from Adrian Bold of Thame.

Now voting on week 22 - £25 to win

Each week *Popular* is compiling its own special software top ten chart - compiled by YOU.

And each week we will send £25 to the person who sends in, with their chart votes, the most original (witty, neat or clever - but never rude) phrase or sentence made up from the letters (you don't have to use them all) in the titles of the top three programs in this week's chart, published above.

You can still vote in the chart without making up a slogan - but you won't be in with a chance of winning the prize.

All you have to do is fill in the form below (or copy it out if you don't want to damage your magazine) and send it off to: Top 10, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP.

Voting for Week 22 closes at 2pm on Wednesday April 24 1985. Entries received after that time will not be eligible for inclusion in that week's voting. The judges decision is final. Only one entry per individual per week will be allowed.

Name	My top 3: Voting Week 22
Address	1.....
.....	2.....
.....	3.....
My phrase is:	

New Releases

INSTANT LINE

At last! A piece of independent QL software that makes the QL look like a powerful machine instead of a ZX81 - *Graphiql* is a goody.

Although it is short on proper colours, the use of shading effects and the hi-resolution detail make the QL an obvious choice for drawing packages. *Graphiql* is from Talent whose previous QL offerings - text adventures like *West* and *Zkul* - were also a cut above average.

The first thing you notice is that the program loads in a few seconds, considerably faster than a Spectrum program, unlike other QL efforts. It is very sophisticated indeed, way beyond the usual move the cursor, fill in the box efforts.

You can control precise details like the shape of the cursor and the number of pixels moved in each step. Details of the current state of colours chosen, pixel position and so on can be instantly displayed using a help op-

tion. Obviously you get rubber banding (a kind of instant line drawing you can quickly change) and area filling - but in the latter you can choose a variety of texture styles. You can also design shapes and copy them repeatedly, rotate them about various axis, and put text on screen.

Talent have even designed a simple Superbasic/machine code hybrid program that helps you to customise the print-out routines so that they will work on your own printer.

The manual is excellent, the packaging which includes a demo microdrive impressive. If I have a worry it is the way the commands work - you have to type 'blind' the two or three letter instruction without seeing what you are typing. Nevertheless, it's an excellent program. Maybe things are looking up for the machine.

Program *Graphiql*

Price £34.95

Micro QL

Supplier Talent

Curran Building
101 St James Road
Glasgow G4 0NS

VAST PARODY

Whilst we all wait, in vain perhaps, for Melbourne House to produce the multi cassette mega edition of the adventure game version of *Lord of the Rings*, we might take some solace in an excellent and vast parody called *Bored of the Rings*.

All the old favourites are there - Frodo, Spam, etc - their characters cruelly mutated into a bunch of cowardly wimps. Frodo gets to take the

ring because he's the only one foolish enough to accept it and so on.

I suspect that parts of the parody are direct steals from the book *Bored of the Rings* put out a while ago by National Lampoon.

The adventure extends over three vast parts and is a parody not only in text but pictures - with the help of the mighty Quill and illustrator. The text has been redesigned to look suitably elven (very pretty too) and some of the pictures are direct steals from that Melbourne House effort.

Language analysis is quite sophisticated - there are several other characters to whom you can communicate using the form "Gandalf, how are you, my old mucker?" and you may get some response.

Some of the humour is fairly juvenile, but some is pretty funny too. Similarly, although the packaging looks a bit cheap the actual game is very professional.

Personally I would rather spend months unravelling the silliness of *Bored* than days on a self important 'serious' epic.

Program *Bored of the Rings*

Price £5.95 (£8.95 microdrives)

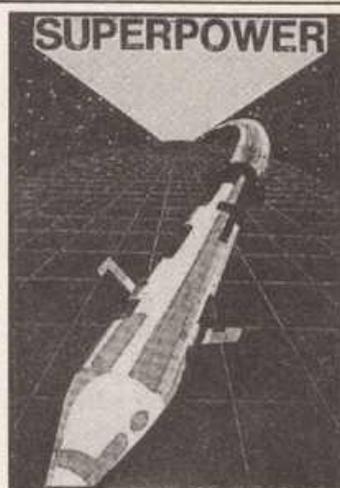
Micro Spectrum

Supplier Delta 4 Software

The Shieling
New Road
Swanmore
Hants SO3 9PE

OLD-FASHIONED

Remember the days when you loaded your Spectrum



with the immortal phrase *Load"" Code?* Well, you can wallow in nostalgia with *Superpower*.

Unfortunately, the loading routine isn't all that's old fashioned. The game concept and mechanics are painfully slow and badly thought out - perhaps 18 months ago Howard Marketing might have had something, but not today.

There are far better implementations of two player wargames around from CCS and Lothlorien, for example - although I for one can't see the appeal of waiting half an hour for your opponent to finish with the Spectrum before you can even get to look at the map.

The whole point of a micro should be to provide an opponent who plays a challenging game, not a computerised board.

Program *Superpower*

Price £4.95

Micro Spectrum 48K

Supplier Howard Marketing

PO Box 21
Felixtowe
Suffolk IP11 7LJ

GRAPHIQL



This Week

Program	Type	Micro	Price	Supplier	Program	Type	Micro	Price	Supplier
Digger Barnes	Arc	Amstrad	£6.95	Cable	Bored of the Rings	Ad	Spectrum	£5.95	Delta 4
Cribbage	S	Amstrad	£6.50	Gamma	Archon	Arc	Spectrum	£10.95	Ariolasoft
Bug Eyes	Arc	BBC	£7.95	Icon	Chuckie Egg 2	Arc	Spectrum	£6.90	A + F
Drain Mania	Arc	BBC	£7.95	Icon	Gold mines Goriotocla	Arc	Spectrum	£3.00	Electrosoft
Blogger goes to Holl	Arc	Commodore 64	£9.95	Alligata	Hard Hat Mack	Arc	Spectrum	£8.95	Ariolasoft
Theatre Europe	S	Commodore 64	£9.95	PSS	One on One	Arc	Spectrum	£8.95	Ariolasoft
Sprite Editor	Ut	MSX	£6.95	Cable	Merit Chemistry	Ed	Spectrum	£5.95	Merit
Graphical	Ut	QL	£34.95	Talent	Arnhem	S	Spectrum	£8.95	Cases Computer
QDoctor	Ut	QL	£17.19	Ariolasoft	Gold Simulations	S	Spectrum	£4.00	Watsoft
					Gyron	S	Spectrum	£9.95	Firebird

New Releases

SUPERNATURAL

The Evil Dead - the game - attracted itself something of a cult following, not unlike the film on which it was based. Not a trace of video nasty in the latest Palace offering however; this time they have plumped for the straight supernatural in *Cauldron*.

You control a broom-stick riding hag who must fly around the place collecting coloured keys to enter dungeons (six in all) wherein you find items for a brew which will save the world from the 'Great Pumpkin'.

The graphics are excellent... comparable to *Sorcery* on the Amstrad certainly and the action is fast, but tricky, as you avoid ghosts, pumpkins, molten lava and bats in pursuit of your quest. For once, the blurb on the cassette box approaches reality: "sets a new standard in graphic realism" says Palace. Well, as near as makes no difference on the 64, I say.

Great fun to be had here I suspect, and although it's not exactly breaking new ground



as far as game concept goes, it certainly looks pretty on the telly.

Program *Cauldron*
Price £7.95
Micro *Commodore 64*
Supplier *Palace Software*
 275 Pentonville Rd
 London N1

EXTRA FRILLS

Slowly QL software trundles on given an extra lurch of effort by the considerable drop in Microdrive prices. *QL Sketchpad* is an attempt to implement a fairly simple but functional graphic drawing program on the machine.

There are all the basic functions you'd expect. A neat line draw (from joystick if you have one), rectangles, circles, arcs, ellipses, triangles, different colour fills. Extra frills include changing the rate of movement of the cursor and putting text onto the screen.

As I said, it's fairly basic, and on the version I received a couple of basic functions like Fill were not yet implemented (the company will update your microdrive for nothing though) but it appears to work, is well designed and the manual looks good. For a mere £14.95 you can get a program that does approximately the same things, although not quite as much, as one on the Spectrum costing £5.95.

Program *Sketchpad*
Price £14.95
Micro *QL*
Supplier *Sigma Research*
 231 Coldhams
 Lane
 Cambridge

Pick of the week

ABSTRACT

Gyron looks fairly stunning, graphically there is little to rival it in the entire world of Spectrum programs and yet at first it is a little off putting - it looks like you need an IQ of around 2,000 to play it.

But no. Prod a few controls or waggle the joystick and you discover that actually the game can be played. It isn't all clever graphics - it's only winning that's awfully difficult, but then that's probably why Firebird are giving away a Porsche 924 to whoever cracks it first.

It's pretty hard to say what exactly *Gyron* is about, the game is abstract in the extreme - it looks like a maze game with 3D graphics, but then parts of it look like diagrams from geometry text books.

Picture this, an open topped 3D maze, a little like *Hunt the Wumpus* except that it scrolls very smoothly indeed. Using the joystick you move around within the walls of the maze. Parts of this maze are protected by towers whose firepower can drain your energy, these jut up above the maze area and are only vulnerable to your firepower on one side. There's another problem, the towers have a bizarre relationship with one another such that blasting one may make it simply relocate to another area where it is even more lethal.

Worse still, there are giant, rover like, spheres between the walls that are very dangerous indeed. The spheres



work to a logical routine and you can work out the pattern if you're clever enough. There is a problem in that the pattern repeats every 15 billion years.

Gyron is as complicated as you want it to be; side A *Atrium* is easier and simpler than the full game on side B called *Necropolis* - it's possible to get somewhere with the game after a couple of goes. After that you need brains and planning. Its virtues are similar to Legend's *Komplex* in some ways; it looks utterly original, is compulsive and I find the abstract qualities a blessed relief from animated sprites.

Program *Gyron*
Price £8.95
Micro *Spectrum*
Supplier *Firebird*
 Wellington House
 Upper
 St Martins Lane
 London WC2 9DL

This Week

Overlords	S	Spectrum	£6.95	Lothlorien	Microdrive Controller	Ut	Spectrum	£7.95	SD Micro System
Bank Account	Ut	Spectrum	£5.00	SD Micro System	Pagepro System	Ut	Spectrum	£4.50	SD Micro System
Calorie Controller	Ut	Spectrum	£5.00	SD Micro System	Personal Filing	Ut	Spectrum	£5.00	SD Micro System
Flexi Filer	Ut	Spectrum	£6.95	SD Micro System					
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Home Budget	Ut	Spectrum	£5.75	SD Micro System					
Home Computing Pack	Ut	Spectrum	£5.00	SD Micro System					
IQ Test	Ut	Spectrum	£5.75	SD Micro System					

Key: Ad - adventure. S - strategy-simulation
 Arc - arcade. Ut - Utility
 Ed - education.

ON THE SET

Blogger of 'not at all like *Manic Miner* really - honest' fame has taken some big steps in the direction of originality with *Blogger goes to Hollywood* (ZTT get those lawyers at the ready.)

Actually the game doesn't have much to do with the well known Trevor Horn backing musicians, but there is a plot connection with Hollywood.

You are *Blogger* - thief - and what you're after is nothing less than the latest Steven Spielberg epic (spot the hilarious parody).

Getting your hands on the film involves running around 12 different film sets looking for stray props - each of these has a connection with various characters also running around - famous names from movieland. Hit the right character with the right prop and eventually when you've done all 12 the way into the 13th opens and after a lot more effort you get the film.

The sound and graphics are what make the game though - you get a high-angle Zaxxon-like view of the film



sets below giving the look of 3D - the various other monsters are also much better characterised than usual, the music is, it seems, around a dozen or so famous movie tunes tacked together into a brainbusting melange.

The skills of the game is really a figuring out the connection between prop and character whilst dodging nasties with the standard arcade skills. Personally I think the game isn't really original enough since it costs £9.95 and is obviously intended to be something special. Nevertheless it's a goodie.

Program *Blogger goes to Hollywood*

Price £9.95

Micro *Commodore 64*

Supplier *Alligata
1 Orange Street
Sheffield S1 4DW*

TRADE-OFF

Alcatraz II (The Doomsday Mission) is another cheapie from Scorpio Gamesworld continuing the exploits of Alcatraz Harry after his previous escape from 'The Rock'. You are placed outside the prison walls (amongst thick jungle - a bit like *Sabre Wulf*) mysteriously in possession of secret documents about a plot to destroy the world.

Your task is to make your way through the jungle (partly via helicopter) to the coast, where a ship is waiting. On the way you must collect items (food, diamonds and tobacco) to trade with other convicts you meet, in exchange for information about the destination and course, etc, of said ship - so you can deliver the documents to the

deliver the documents to the correct people. The graphics aren't outstanding - but OK considering the price.

Not a classic, but a thoroughly adequate pocket-money arcade adventure.

Program *Alcatraz II*

Price £1.99

Micro *Spectrum 48K*

Supplier *Scorpio
Gamesworld
307-313 Corn
Exchange Building
Manchester 4*

COMPLEX

Chuckie Egg 2 is now released, a 120 screen follow-up to the original game which featured the platform and ladders orientated adventures of an everyday egg collector with a funny hat. Even when it came out several eons ago the game was in some respects old hat, but the graphics of the very unthreatening but determined (and fatal) ducks made the game. That and an excellent sense of timing made the game.

Chuckie Egg 2 retains, first of all, the little yellow egg collector, and the theme is collecting the parts of Easter eggs. The basic idea of dodge and collect is here, too, but then that's true of every multi screen arcade game since *Manic Miner*. *Chuckie Egg 2* is technically cleverer and the 120 screens are quite different from one another, some of the graphics are bigger (although the egg collector remains diminutive) and the tasks are more complex - you need to collect different objects, in the right order, just to get through some of the screens.



Credit must be given to A + F for creating a game with 120 genuinely different screens - it makes the game addictive if only to see what lies beyond the current screen. On the other hand, I think the game has less character than the original - putting in a vast array of different sprites seems to me to only make the game like all the other multiscreen epics.

Program *Chuckie Egg 2*

Price £6.95

Micro *Spectrum*

Supplier *A + F Software
Canalside
Industrial Estate
Woodbine St East
Rochdale
Lancashire*

Compiled by Graham Taylor

New Releases is designed to let people know what software is coming on the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

This Week

A + F, Canal Side Industrial Estate, Woodbine Street East, Rochdale, OL16 5LB, 0706 341111. **Alligata**, 1 Orange Street, Sheffield, S1 4DW, 0742 755796. **Ariolasoft**, Retail. **Cable**, Cape House, 52 Limbury Road, Luton, Beds LU3 2PL, 0582 591493. **Cases Computer**, 14 Langford Way, Blackheath, London SE3 7TL, 01 858 0763. **Delta 4**, The Shieling, New Road, Swanmore, Hants SO3 9PE, 04893 5800. **Electrosoft**, 54 Beccles Rd, Bradwell, Gt Yarmouth, NR31 8HF. **Firebird**, Wellington House, Upper St Martin's Lane, London WC2H 9DL, 01 379 6755. **Gamma**, 12

Milverton Road, London NW6 7AS, 01-459 2652. **Icon**, 65 High Street, Gosforth, Tyne and Wear, NE3 4AA, 091 2846966. **Lothlorien**, 56a Park Lane, Poynton, Cheshire, SK12 1AE, 0625 876642. **Merit**, Merit House, Cranbourne Road, Potters Bar, Herts EN6 3JY, 0707 57211. **PSS**, 452 Stoney Stanton Road, Coventry, CV6 5DG, 0203 667556. **SD Micro System**, PO Box 24, Hitchin, Herts SG4 0AE. **Talent**, Curran Building, 101 St James Road, Glasgow G4 0NS, 041 552 2128. **Watsoft**, 49 Abbotsview, Haddington, East Lothian.



On the horizon

The main problem when evaluating any new program, is that of limited horizons.

The first word processor I used was *Apple Writer* on the Apple II, and it was marvellous - at first. After a time, however, I began to find it limiting, yet *Apple Writer* was very easy to use.

The *Wordwise* word processor for the BBC computer is also easy to use, and I selected it for that reason. But *Wordwise* is very limited compared with what I consider to be the best version - Acornsoft's *View*. Many people who bought *Wordwise* now wish they had purchased the initially more difficult to learn *View*.

View is more difficult to learn because there is far more to learn, and far more one can do. Now *View* looks pretty limited in comparison with my present word processor, *Perfect Writer* on my Advance 88. With *View* one has to buy special printer drivers for features such as underlining - with *Perfect Writer* one is able to configure the system exactly as wished without any extra cash investment. *View* is more flexible than *Wordwise*, but *Perfect Writer* is inherently the most flexible of the lot.

When considering which piece of software to buy one should think to the future. For example, there are soon to be four or five different versions of Logo for the BBC micro. Having used Logo within varying teaching environments, I fear that arguments about the utility of Logo will be restricted to primary schools. Though Logo is a fine language for teaching programming and mathematics to primary children and its future seems secure, I believe that, ultimately, Logo will be of greater use in the secondary and tertiary sectors.

For example, using Logo, I have developed systems for analysing differential equations, and an interpreter for the 'fifth generation'

computer language Prolog. Neither of these applications is directed towards primary education.

I believe that when a Logo is evaluated seven points are of particular importance if the version is to be of any widespread utility. The points are given in no significant order.

- 1) Can characters be displayed on the graphic screen? For many Logos such display is not possible - strange as it seems
- 2) Is the version designed for easy interface to devices (other than the obligatory turtle)? In some versions of Logo there is no provision for a single joystick, and, though there are equivalents to *Peek and Poke*, there are in some cases no equivalents to the Z80 *In and Out*.
- 3) Is it possible to use Local variables within procedures? Many versions of Logo have no provision for such variables, which is a great drawback for development work.
- 4) How accurate is the arithmetic, and what are the restrictions on number for input to (for example) turtle graphics routines? Some Logos restrict numbers for input angles and distances.
- 5) Given the nature of Logo as a list processing language, how effective are the language routines to handle recursion? Some Logos are so restricted in this respect that many standard programming examples are of little use.
- 6) The biggest problem with Logo is syntactical. Due to Logo's inherently illogical prefix form, so how are such confusions treated? Though the prefix form is easily understood in *FD 50 RT 90* most Logo systems cannot cope with the structurally equivalent *SAVE "FILENAME RT 90* because Logo assumes that *RT 90* is the list of procedures to save under the name *Filename*.
- 7) For effective programming a *Trace* facility is desirable - unfortunately trace facilities are rather uncommon.

Recent claims and counter claims about Logo have been concerned particularly with Logos for the BBC B computer, but it is worth pointing out that Logos on two low-cost micro-computers satisfy (to varying extents) all the above criteria - apart from syntax.

These are Terrapin Logo for the Commodore 64 and Dr Logo on the Amstrad.

Boris Allan

Aliquot divisors

Puzzle No 154

The aliquot divisors of a number are all those whole numbers which divide into it exactly, including 1 but *excluding* the number itself.

So if I take the number 1981, I find that it has aliquot divisors of 1, 7, and 283. If I add these numbers together I get a total of 291, and so I take this new number and find *its* divisors. These are 1, 3, and 97 which make a total of 101. As this number is prime, and remembering what is meant by aliquot divisors, it has only one divisor, 1. In this way, the number 1981 has reduced to 1 in just three steps.

Taking the numbers 1980 to 1990 inclusive, can you find the number of steps needed in each case to reduce each set of aliquot divisors to 1? This should be quite easy except for just one of the values which seems to extend without limit!

(Note that when calculating the divisors, *all* whole number divisors should be counted and not just *prime* divisors.)

Solution to Puzzle 149

Only six players scored runs. To make a total of 100, these scores must have been 16, 16, 17, 17, 17, and 17 runs.

```
10 DIM S(7)
20 DATA 0,16,17,23,24,39,40
30 FOR N=1 TO 7:READ S(N):NEXT N
40 FOR A=1 TO 7
50 FOR B=1 TO 7
60 FOR C=1 TO 7
70 FOR D=1 TO 7
80 FOR E=1 TO 7
90 FOR F=1 TO 7
100 LET T=S(A)+S(B)+S(C)+S(D)+S(E)+S(F)
110 IF T=100 THEN PRINT S(A);S(B);S(C);S(D);S(E);S(F)
120 NEXT F,E,D,C,B,A
130 END
```

The problem involves finding which of the possible scores given, can be combined to make a total of 100.

The program places these scores into an array (A), and sums all possible combinations of the scores by means of the six *For?Next* loops. If the total so achieved equals 100 then the individual scores are printed out.

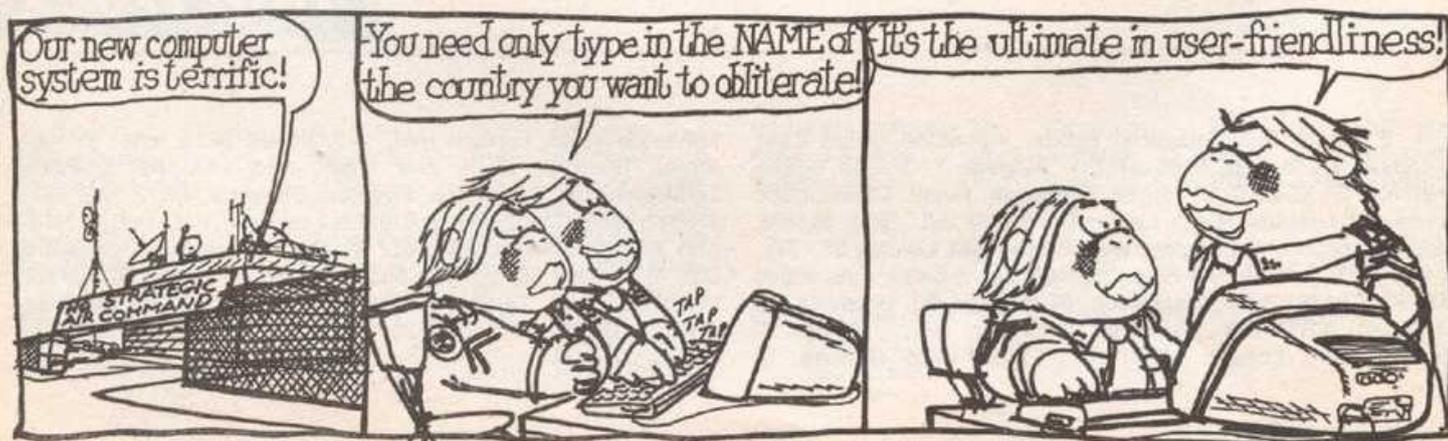
Winner of Puzzle 149

The winner, despite a typographical error in the printed data, is Iain Sibley of Furnace Green, Crawley, West Sussex, who receives £10.

Rules

The closing date for Puzzle No 154 is May 13.

The Hackers



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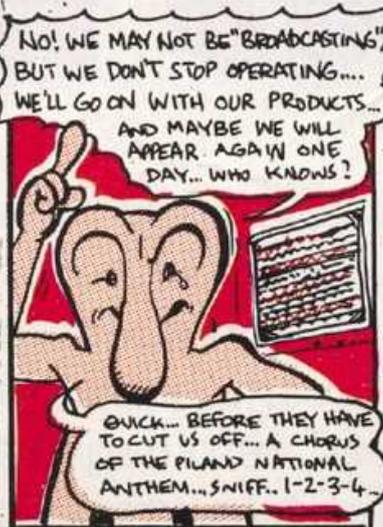
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