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PERSONAL Computer NEWS

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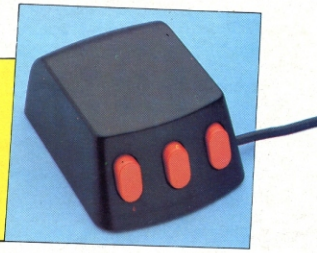

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Commodore 64
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MENU

COVER STORY

Enterprise at last 24

It's been a long time coming but the Enterprise is now in the shops. When it was announced in the distant past, it sounded like the ultimate machine — how does it stand up to the competition now? Find out in our full review of one of the first production models.

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With this add-on from AMS, the BBC becomes the first home computer to boast a mouse. But get a load of the software . . .

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We know the jokes are bad, we're resigned to it (geddit???).

MONITOR

French launch hitch for Stratos

Oric's plan to take the French market by storm with its Stratos computer has suffered a major setback as Oric moves to foreign manufacturing.

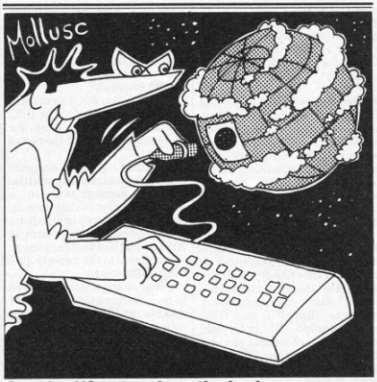
The 64K machine with 6502 processor, two ROM slots and two joystick ports was scheduled to make its début this month. But Oric has announced a change of tactics and the computer will now be available in March.

Bruce Everiss, managing director of Tansoft, said: 'It looks as though the Stratos will be manufactured in France and not the UK as originally planned.

'The French Government tends to support new technology more than the government over here. We've designed the Stratos around French requirements because that will be its initial market.'

But with only two months to get its act together, Oric still has to package the machine and produce a manual before it can go into full production. As for the UK, it's still unclear whether the Stratos will be available under another name. Everiss said: 'The first six months of this year are going to be tough.

'There's going to be a computer price war — and we're going to see what happens before we make any commitments in the UK.'



Simpler US network on the horizon

A system called the American People/Link (APL) network to be launched on April 1 could be worth investigating if you've ever looked enviously at US information services.

This new communications network is an online entertainment system pitched at home users. A spokesman from the company said: 'Our system is easy to use compared to others.

'The commands are simple and all you have to do is to be able to get online to Telenet.'

Telenet is one of the US communications services that is equivalent to Packet Switch-Stream (PSS) in the UK. PSS is a data transmission network.

The cost of using the APL service may look high but compared to CompuServe and The Source it's relatively cheap.

The equipment you'll need is a BABT-approved modem which will cost about £70. In addition you must pay a one-off fee of £25 to use PSS and off-peak dialling charges to the US will cost in the region of £6.90 an hour.

To subscribe to APL will cost $14.95 (refundable on a trial basis up to April if you don't like the service) and $2.95 to connect to Telenet.

Besides access to information the facilities of APL include a party line where you can talk to other people, a user directory and electronic mail.

For further information contact Jules Hillman, American People Link, American Home Network Inc, Arlington Ridge Office Centre, 3215 N Frontage Road, Suite 1505, Arlington Heights IL 6004, US.

MONITOR

IN BRIEF

The wait may be over for BBC users wanting to buy the IBM compatible Graduate add-on from Torch. The company says that it will be shipping the Graduate by next week. An added bonus is that it will come with a degree of IBM approval; Torch invited Big Blue to take a look at the machine to make sure that it didn't infringe IBM's copyright on the ROM code.

Legend's follow-up to Valhalla, The Great Space Race (TGSR), is now widely available in the shops. At £14.95 Commodore users will be able to buy this star of PCN's 'Why are we Waiting?' feature. Legend says TGSR is an extension of the computer movie aspect with animated characters.

Granada TV Rental has knocked down the BBC micro's £399 price-tag and is offering it for £378.95 (while stocks last). You also get a free data recorder and five software packages worth over £70.

Impex Software (01-900 0999) has become the first independent supplier of Plus/4 business software to win Commodore approval. Its Company Pac 1*2*3 is an accounting suite. The package comes on disk whereas Commodore's main thrust with the Plus/4 seems to be ROM applications.

Mac users can hook up to mainframes and minicomputers if they have any handy, now that Apple has launched its MacTerminal data communications software. IBM, ICL and DEC contacts are possible, but if your needs are more modest you can use it to get into BT Gold, electronic mail and telex services. It costs £99.

Listeners in the Chiltern Radio area are about to be bombarded with clues in a treasure hunt that will lead to the first prize of a BBC B. All you need is a road map of the area, and 'a little computer knowledge' — no spades, parrots or wooden legs required.

Tandy has updated the Model 100 lap-held portable with another Japanese-built system.

The new model, called the Model 200, was announced in the US last week.

The micro features a larger screen (16 lines as opposed to the eight lines on the Model 100), 24K memory as standard and expandable up to 72K. In the US the 4.5lb machine will sell for $999 which includes Multiplan spreadsheet software.

Big Three's plans spark launch fever

There is no shortage of rumours, gossip and wishful thinking about what's coming in 1985. Acorn, Commodore and Sinclair are all said to have upgraded old favourites ready for imminent launch.

Front runner in the hot rumour department is the BBC B Plus, otherwise known as the BBC C. Acorn flatly denies that there is any plan for a BBC C — which, of course, only helps to fan the flames.

In reality, there will be not one new machine but two. Apart from the Communicator (issue 93) the second machine, due out this month, is the previously announced Acorn Business Machine, based on the BBC board.

Harmless pleas for a look inside the ABC machines at the PCW Show back in September were met with a point-blank refusal.

What *is* known is that it will feature the ADFS double density disk filing system that has appeared in the Plus 3 add-on for the Electron.

And if Acorn felt it necessary to tamper with part of the BBC board to make it suitable for business use, why not the rest of it?

Informed gossip suggests that Acorn has reconfigured the memory arrangement in a manner similar to that done on the add-on memory boards from Aries and others. As a result, it will have 64K of usable memory — compared to the miserly 32K in the BBC board.

Other changes are rumoured to include extra sideways ROM sockets and a reduced chip count by use of custom made ULA chips.

A redesigned board to power the ABC range is one thing; a new Beeb is something else.

Acorn may have no plans to package the new board in a BBC box, but that doesn't stop others from suggesting that it would be a good marketing ploy. After all, a BBC B Plus selling at the current price of £399, with the existing BBC B priced somewhere nearer £200, could only be good news for everyone.

Don't expect too much from Acorn in this area, however. The BBC B is still a nice little earner at its current price, and Acorn does not see itself under any pressure to cut prices.

A more positive rumour is a 128K version of the Commodore 64. The product does exist in the US, and it is highly likely that it will make its first appearance at the Consumer Electronics Show in Las Vegas this week.

Of course, the machine that Commodore watchers are really waiting for is the Amiga 16-bitter with its 256 spectacular colours, but, this is unlikely to be seen in this country before the end of the year.

Development work is still incomplete, and Commodore UK is basing its plans this year on the launch of an IBM-compatible in the spring, followed by the Z8000 Unix machine in the summer; it is therefore improbable that the Amiga will arrive in time to fill Christmas stockings.

The same is the case with the portable Spectrum from Sinclair. Uncle Sir Clive has heavily hinted to anyone who cares to listen that he thinks it would be a good idea. It is suggested that it would incorporate a Sinclair flat-screen monitor, Microdrive(s) and integral modem, for around £250.

Suggestions that such a machine is very close to being unveiled may again be wishful thinking.

Original sins bring about Adam's fall

One of the micro world's most famous shooting stars has burnt up. Coleco has abandoned its Adam, and what remains of the orphaned machine is in the hands of a US retail outlet.

Coleco announced last week that it had sold-off its inventory of Adam systems and spares, and that it intends to return to full-time toymaking. Its UK distributor has followed suit, and the machine launched in a blaze of publicity in 1983 is now something of an embarrassment to all concerned.

The Adam was never officially launched in the UK and according to a spokesman for its distributor, CBS Toys, very few people bought an Adam here. 'I don't think they'll find it a major problem to obtain logistical support from other suppliers,' he said.

'We never put any muscle behind it,' the spokesman admitted. 'It was very low profile as far as we were concerned because the company felt that it should watch the market before it made any commitment.'

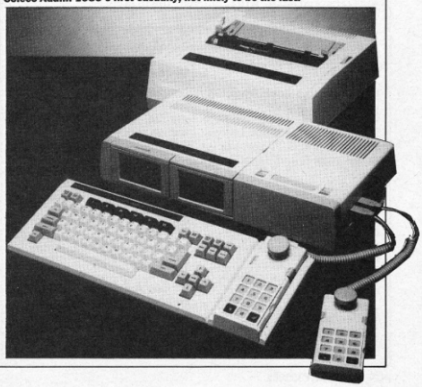
The reason for its caution was that the Adam was virtually out on its feet by the time it came to this country. After the first flush of enthusiasm based on its spec and Coleco's production promises, the project ran into snags.

Perhaps an 80K machine with daisywheel printer, high-speed tape drives, and 'professional' software for $600 was too good to be true. Certainly it didn't take long for the price to go up — to $700. But the production targets began to look over-ambitious, and the quality of both hardware and software was called into question at early demonstrations.

Reports from the US said that hundreds of early production models were returned as faulty, but Coleco itself claimed that the rate of complaints was less than ten per cent. Early in 1984 it received a pair of much-needed boosts — Honeywell took over responsibility for maintenance, and Digital Research implemented Personal CP/M on the machine. But as the year progressed, the machine wandered lost in the Commodore-dominated home micro market.

Coleco lost $35 million in the fourth quarter of 1983. Its figures for 1984 have not yet been published, but a loss for the year is expected, despite the continuing success of the Cabbage Patch dolls.

Coleco Adam: 1985's first casualty, not likely to be the last.



MONITOR

Atari gets tough over software rip-offs

There's never a dull moment at Atari since Jack Tramiel took over. It savages prices and snarls at the opposition, and now it's sinking its teeth into dodgy software.

Superior Software has agreed to stop selling Zany Kong Junior after Atari protested that it was too close to a well-known Atari original. The same company had earlier withdrawn Wonder Warlords, which bore a close resemblance to Joust.

A month ago Atari laid its course when it moved against MRM Software over Castle of Gems, which contained 'substantial similarities' to its own Crystal Castles (issue 89).

Both cases have been settled fairly amicably without any court action, and Atari's John Dean commented: 'We're not looking to put anybody out of business. It's the principle we're trying to expose, not the software house.'

But he confirmed that Atari was going to get tough on offenders. 'A blatant rip-off is inexcusable,' he said.

Dean dismissed the argument that high prices encourage piracy and said that something had to be done about copyright legislation in the UK. He added that Atari is becoming involved in joint ventures with software producers.

ACT tie-ups increase Apricot's appeal

ACT is continuing its rapid expansion with the takeover of a German distributor and a tie-up with Tandy.

The deal with Tandy involves setting up a new company, TA Computerworld, that will take over ACT's 20 Computerworld stores and the 49 Tandy computer centres. The new company will sell Tandy's range of computers as well as the Apricot micros from ACT.

In addition, Tandy will be selling parts of the Apricot range in 140 of its general retail shops along with 290 Tandy dealers and franchises.

The deal will boost sales of the Apricot in European countries where ACT has only a limited sales penetration.

Tandy's finance director, Andrew Barwood, says the company is 'still undecided about the rest of the range, but we are definitely interested in the F1'.

In a separate move, ACT has taken over Beaugrand Datentechnik, a German micro and office equipment company. It will market and provide full after sales support for ACT products.

With a wholly-owned subsidiary in France, the recently established Apricot Inc in the US and a jointly owned distributor in the Far East, ACT is now well on the way to making its presence felt around the world.

Commodore ads taken to tusk

Poor Commodore is in trouble over an advertising campaign again. Following its dishonourable mention from the Advertising Standards Authority last year, it has fallen foul of the RSPCA and the elephant liberation front.

Animal lovers around the country have protested against Commodore's use of Maureen the circus elephant in its TV advertising, and the Independent Broadcasting Authority has responded by banning the ads. This strong action turns out to be shutting the stable door after the elephant has bolted — Commodore had no plans to use it again anyway.

Dumbo Award

A clear winner — Commodore for the most photogenic abuse of an elephant.

Crystal ball: *PCN* three weeks ago.

The elephant controversy will come as no surprise to regular readers. Commodore won the coveted Dumbo Award (issue 92) in our Golden Turkey special supplement. If the other awards are as prophetic, Ericsson should look out for letters from the NSPCC.

To its credit, Commodore is taking the matter seriously. It argues that it checked with the RSPCA before it filmed the commercial, in which Maureen sat placidly on a stool. It had the script checked by the Independent Television Contractors Association. 'There is no way that we would consciously set out to offend public taste or subject an elephant to cruelty,' a spokesman said.

Nominate your own turkey awards

PCN's Christmas Turkeys received such a warm welcome — from readers, if not from manufacturers — that we've decided to keep it as a regular feature.

We'll continue to offer our opinions with the coveted award going to products we feel merit it. But we want your views, too. Just drop us a line, naming the product and manufacturer and outlining briefly why you think a turkey award is deserved, at *PCN* Turkeys, Personal Computer News, 62 Oxford Street, London W1A 2HG.

VIEW FROM THE US

Sour apples for computer tutors?

Educational computing is a hot topic here this winter, and it is prompting a questioning of such basic things as 'what is an education?' Reading, Riting and Rithmetic? Endless hours under the stern eye of the Beak? 'As Caeser subdues ancient Gaul'? Or Logo, domestic economics, breakdancing graphics, and micro-guided automobile repair?

Government estimates that there will be 1.5 million computer-related jobs by 1955 have helped set off a mad scramble in US universities, as students, who would much rather be studying Romantic Poetry or Petroleum Geology, force themselves into Computer Science classes. The crush in these courses recalls memories of the glut of Ph Ds in the mid 70s — will these computer-related jobs really be there in 10 years' time?

Progressive states like Minnesota and New York are placing computers in classrooms and sending (often unwilling) teachers off to computer courses. Computers are seen as the big status symbol of the moment for school administrators — it helps if people know what to do with them.

But the process by which schools computerise is haphazard and bedevilled with problems: some schools spent their whole budgets on hardware and forgot to buy software; in others, the computer room was no sooner set up than it was ransacked because no-one thought to provide security.

In some states there are such absurdities as one-day district seminars featuring 'Whip them up' lectures, where 100 teachers work out on two micros, and leave baffled at the end of the day with Aspirin, not computing, on the mind.

Even in those districts where the micros are on the desks, the struggle is to find something other than 'computer-literacy' drills to do with them. The integration of micros into school work is the new ideal, but the major problem, outside of a shortage of money to buy enough hardware, lies in the software field.

Of some 7,000 educational software currently available, more than half are concerned solely with computer literacy and skills. An on-going study by Educational Products Information Exchange of Long Island, NY, has evaluated 600 pieces of software. 'About 5 per cent of what we examined was first rate,' said Kenneth Komoski, executive director, 'and the rest is pretty depressing: pedestrian, simple, and easy to produce. Schools are paying $50 for what they could have gotten in a $5 work book.'

Another problem is computer phobia on the part of teachers. Enter such new names as the National Computer Training Institute, which offers a $195 45-hour course to train primary and secondary teachers in computer use. With 90 locations in place, and 200 planned by the end of the year, business is booming. NCTI also offers IBM a wedge into the education market, which has been Apple's preserve for the most part — 50 per cent of computers in US schools are Apples.

NCTI was turned down by Apple, and was happy to get Big Blue's support. Each NCTI centre will have 15 PC Jrs with 256K, colour monitors and printers, all on loan from IBM. Says Robert Wallace, IBM's manager of industry marketing: 'We have figures that suggest that for every child to be able to use a computer in schools for 20 minutes a day, the schools would need at least four million computers. The battle for the education market is far from over.' IBM currently holds eight per cent of it.

Computers are infinitely patient with slow learners and handicapped students. Some teachers have discovered that micros are great for teaching writing to students with learning disabilities who find handwriting next to impossible to master. Others have discovered that they can turn the brighter kids in their class loose on the computers while they concentrate their human efforts on those who need it most.

As for the college kids cramming Comp Sci, there appears to be no likelihood of a shortage of jobs for them when they emerge. But in the age of mass programming and increasing user-friendliness, those jobs will either be too demanding or extremely tedious. It seems doubtful that the computer work field will provide very many undemanding yet well-paid employment opportunities.

The obvious next stage in the scenario will be a vigorous boom in the games machines business, as the inadequacies of education are laid bare.

Chris Rowley

MONITOR

Enterprise moves in — and out of shops

The first batch of Enterprise 64 computers that trickled into a few retail shops over Christmas have been scooped up — leaving a lot of likely buyers disappointed.

Although Enterprise is reluctant to specify the number of machines distributed to shops (issue 93), the company says that all the machines sent out have been sold.

John Menzies in Scotland took on the Enterprise on a trial basis and so far has found a favourable response. A spokesman said: 'We're pleased with the initial interest shown in the Enterprise.

'However, we have to see what customer response is in the long term before we can make any sort of commitment.'

Another big retail chain, WH Smith, is also evaluating the Enterprise and it will decide at a later date whether to add the machine to its range.

Caroline Jones of Enterprise said: 'From the feedback we've had the Enterprise sold out within days of it appearing in a limited number of shops.'

'We also shipped some machines to Europe and they are said to be selling well over there. As you'd expect there'll be a shortage of the computers until we go into full production. By the end of February there should be enough supplies.'

● Boldly turn to page 24 to find a full Pro-Test of the Enterprise 64, which already promises to be the most controversial micro of the year — and of last year, and of the year before that.

CST puts pressure on QL Microdrives

After a long wait, a working model of a disk drive system for the QL will soon be in the shops.

CST will be marketing its interface through Computermate (0782-811711) at a price of £150 excluding drives. It is hoping to have it in the high street shops in the next few weeks.

The cheapest complete system will weigh in at £250 for a single-sided 40 track double density system, giving 200K of storage.

Since CST has not used the infamously unavailable 8271 disk controller, the system has the ability, via the 1770 controller, to interface to any of the standard Shugart disk drives — 3in, 3.5in, and 5.25in — automatically. It can be used with virtually all drives currently available for the BBC micro. It will run up to two drives giving a maximum of 1Mb of storage.

The system software is on ROM and gives a set of additional commands including random access files and wild card directories. The interface and ROM plug into the interface via a plug that looks remarkably like that on the BBC.

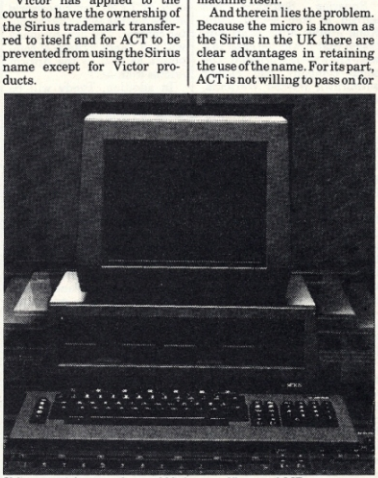
Battle warms over Sirius name rights

The previously profitable relationship between ACT and Victor Technologies has degenerated into a legal tussle over who owns the rights to the Sirius name.

Victor has applied to the courts to have the ownership of the Sirius trademark transferred to itself and for ACT to be prevented from using the Sirius name except for Victor products.

With ACT now promoting the Apricot in preference to the Sirius, sales had slumped to around 100 a month. Victor, newly rescued from bankruptcy, is clearly keen to revive sales in the UK and announced last month that it was to take over distribution of the machine itself.

And therein lies the problem. Because the micro is known as the Sirius in the UK there are clear advantages in retaining the use of the name. For its part, ACT is not willing to pass on for free a trademark that it has invested a lot of time and effort in promoting.



Sirius — at the centre of a squabble between Victor and ACT.

As *PCN* went to press the issue had not been resolved. Both companies say that matters are in the hands of their legal advisors. It looks, though, that an out-of-court settlement may be in the offing, saving both sides from the expense and embarassment of an unseemly courtroom battle.

ACT has filed a counter action preventing Victor from using the Sirius trademark.

ACT acquired the rights to the Sirius name from ICL and used it for the 16-bit micro that it imported from Victor in the US. Elsewhere in the world the machine was known as the Victor 9000.

It had an exclusive distribution agreement for the UK which expired on December 31.

COMPASS ROSE — Grid Systems, maker of stylish and sturdy portables that find homes in Defence establishments and Space Shuttle programmes, has released two new versions of its Compass, along with software for more down to earth users. The new systems have 25 line electroluminescent screens with 128 characters a line, and they will set you back anything up to £7,950. The software packages have familiar names — GridMaster, GridPaint and GridTask. GridPaint costs £350 and the other two £250 each. The machine and software are distributed in the UK by Thame Systems.

Loads of problems lead to product recall

If you've bought a copy of Fall Guy or a Powersoftware Electron Joystick Interface recently you may have to wait a while longer before it will work properly. Elite Systems, producer of Fall Guy, and Powersoftware are both calling in these products.

The problem with some early copies of Fall Guy for the Spectrum is in the loading process. A turbo-load used to deter copying is giving trouble — Elite suggests that you may get round it by re-adjusting the alignment of the cassette deck heads, but if the problems persist the company asks you to return the tape to be exchanged.

In the case of Powersoftware's joystick interface there are dark hints of monkey business at Acorn. A number of recent Acornsoft games, Powersoftware says, won't run with its Electron Joystick Interface and it puts this down to 'Acorn's adoption of a new loader program for its games'.

The company goes on: 'It would appear that the only joystick interface available at present that will work with Acorn's most recent games is its own.' Acorn denied this.

Powersoftware is offering a free upgrade service to users of its interface. For details contact 0384-370811.

HOMEFRONT

Coleco calls it quits on computerland

Ten green bottles standing on the wall . . . and what do you know, another green bottle has accidentally fallen.

Coleco is the latest casualty. It looks as if all the king's horses and all the king's men would have their work cut out putting the Adam together again. Coleco has abandoned the home computer market, selling its stock off to an optimistic retail chain and turning its attention to the low-tech business of toys.

In Coleco's case it seems that pride came before a fall. The Adam emerged in a blaze of publicity in mid-1983 and Coleco announced that it would have 500,000 on the streets by Christmas. In the event it shipped fewer than 100,000 and lost the sympathy of some important friends in the process.

The biggest boost the machine received in its short career came just after its first Christmas. Coleco signed a deal with Honeywell through which the big computer manufacturer would offer a national service network for Adam owners. Ironically, even this rebounded on the luckless Coleco by drawing attention to the question of reliability.

In quick succession the large retailer JC Penney cancelled its orders for Adams because the machine failed to meet its quality standards and Consumer Reports magazine refused to rate the Adam because, it said, none of the four early production models it had seen could be coaxed into action. Encouraging comments from Honeywell executives weren't enough to allay public suspicion.

The history of the Adam's fretful progress towards the shops was a story of nagging problems and increasingly weighty doubts. The machine promised much, but by the time it was delivered a large credibility gap had opened. The writing was on the wall before it arrived in the UK, and the Adam never made a significant impact here.

There are several strange features in this tale of failure. The Adam wasn't a straightforward home computer — with a built-in daisywheel and a pioneering form of high-speed drive, it offered very much more than the average box. But it wasn't a straightforward business computer either — there were question marks against the reliability and durability of the hardware and against the quality of some of the software. Nor, in its initial form, did it have CP/M.

On the face of it, the Adam fell between two stools. Perhaps it was before its time — as a home micro with the potential for serious applications it was a clear forerunner of such machines as the QL, the Plus/4, and other systems that will emerge during the year as the manufacturers try to persuade us that microcomputers have to develop beyond games to survive.

It was also comparable to the Amstrad, in that it tried to make a splash in a market that was new to the company with a product that offered most of the necessary features in one package.

So will Sinclair, Commodore and Amstrad read the news of the Adam's expulsion from the garden with the feeling that somebody's walking over their graves? It isn't likely. They will console themselves with the thought that Coleco wasn't equipped to enter the home micro market in the first place and that it made mistakes that old hands wouldn't make. They may even gloat at the fact that another loud-mouthed competitor has got his come-uppance.

But Coleco's last words on the Adam are relevant to all micro producers on both sides of the Atlantic. 'Rapidly changing consumer preferences, frequent technological developments, overproduction and significant and continuing price-cutting have created an unusually volatile business market which is likely to continue for the near future,' the company says. This mouthful means that times are hard for micro makers, and they're not going to get any easier for a while. Coleco, famous for the highly profitable Cabbage Patch Dolls, is turning to toys.

Toys are exactly what most of the present crop of micro manufacturers, the remaining green bottles on the wall, are trying to get away from. The image of the home micro as a toy is one that doesn't satisfy them. But the failure of the Coleco Adam shouldn't satisfy any of them, and it indicates that 1985 could be another difficult year. ***David Guest***

CHARTS

As featured on Radio 1's Saturday morning Chip Shop.

GAMES

TW	LW	TITLE	PUBLISHER	MACHINE	PRICE
1	2	Ghost Busters	Activision	SP,C64	£9.95
2	20	Airwolf	Elite	SP	£7.95
3	16	Match Day	Ocean	SP	£6.90
4	1	Knight Lore	Ultimate	SP	£9.95
5	5	3D Star Strike	Real Time	SP	£5.95
6	3	Elite	Acornsoft	AC	£15.00
7	6	Staff of Karnath	Ultimate	C64	£9.95
8	17	Select 1	Comp. Records	SP,C64	£12.49
9	13	HunchBack II	Ocean	SP,C64	£7.90
10	10	Doomdark's Rev.	Beyond	SP	£9.95
11	7	D T's Decathlon	Ocean	SP, C64	£6.90
12	9	Underwurld	Ultimate	SP	£9.95
13	4	Skooldaze	MicroSphere	SP	£6.95
14	—	Gift of the Gods	Ocean	SP	£9.95
15	8	Raid over Moscow	US Gold	C64	£9.95
16	12	Booty	Firebird	SP,C64	£2.50
17	—	American Football	Argus	SP, C64	£7.95
18	—	Beach-Head	US Gold	SP,C64	£9.95
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6	Dec Rainbow	£2,359
7	NCR Dec Mate V	£1,984
8	Apple III	£2,755
9	ACT Sirius	£2,525
10	Macintosh	£1,795

These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets during the week up to **January 3**. The games chart is updated every week. The prices quoted are for the no-frills model and include VAT. Information for the top-selling micros is culled from retailers and dealers throughout the country and is updated every month. PCN Charts are compiled exclusively for us by RAM/C, who can be contacted on 01-892 6596.

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Peripherals provide another option

I agree with Sir Clive (issue 91) that the British can beat the Japanese with their MSX compatibility. But it means producing new and better machines.

But what of people like myself who own Spectrums and can't afford to buy a new computer every time a better one is produced. Why not use the Spectrum as a basis, adding more peripherals to make it better and more up to date?

Come on, Sir Clive, give us a second processor with extra ROM plus a different language, or perhaps a music synthesiser.

Anthony Cleall,
Bognor Regis, W Sussex.

Great Space Race rides on reputation

I've just bought Legend's long awaited and much publicised game, The Great Space Race. I was so astonished I fired up Tasword straight away to tell you about it. It is incredibly bad!

I feel I have been conned out of £14.95 for a £5.00 game in a flashy box.

A year on from Valhalla, which was a reasonable game at the time, one expects something really special, not 39K of code, nearly 16K of which is Basic. (The break key is not protected).

I suppose it's my own fault for not waiting for the reviews in *PCN*. Anyway, Knight Lore makes anything look bad.

The manual with TGSR states that the game is incompatible with Microdrives and full size printers. This is nonsense. After BREAKing the program it can be directly saved to Microdrive, and my EP22 printer works once the oppropriate channel is opened.

We deserve better than this, which I see as a cynical conriding on the reputation of Valhalla.

I suppose no-one would like to buy the game off me?

R Pitman,
Worcester.

Freeing another link in the Vu-File chain

A somewhat belated reaction to Carl Lawrenson's article Vu-file unchained (issue 86).

He states that we are grabbing every spare byte here, when converting the Basic to Microdrive and sacrificing unnecessary 'frills'.

Not being an expert nor a user of Vu-File, I still think it is normal practice, when you are pressed for memory space, to use VAL "numerical expression" and SGN PI for 1, not PI for 0. If I remember correctly this will save three bytes each time.

For fun I typed in the changes to Mr Lawrenson's listing and recorded a saving of 70 bytes (from 251 to 181 bytes), but if it is substantial, you could save a lot of memory by going through the entire listing and changing it in this way, saving a few of the frills and perhaps even make room for another Microdrive?

A final nit-pick — in the article, the save name is given as "Vu-File"; in the No 2 listing as "Vu-FILE", which makes a difference of course.

Congratulations on an informative and readable magazine, by the way.

Joachim Smith,
Solna, Sweden.

Sharp PC 5000 gets its own user group

A few weeks ago (issue 88) you published a letter from a reader enquiring about a user group for the Sharp PC 5000.

Such a group is in the process of being formed, and interested PC 5000 users — or indeed any users of Sharp pocket computers — should contact Mr Roland Saam, 149 Gloucester Road, London SW7 4TH, who will be glad to help.

Your reader and other 5000 users may be interested to know that there is an undocumented command in the machine's GW Basic. LCOPY is fully supported by the built-in printer (used, incidentally, for this letter) in all three modes. Thus:

LCOPY 0 prints a screen dump over the full paper width
LCOPY 1 prints a dot for dot screen dump
LCOPY 2 prints the contents of the screen as text in the mode currently selected for printing.

Of these, LCOPY 1 needs a little more explanation. The PC 5000's screen has a horizontal resolution of 640 dots, while the printer produces 1,280 dots horizontally. Therefore a graphic printed with the LCOPY 1 command is effectively reproduced at half size.

The printer is in fact very versatile, and, although using a matrix technique is capable of very high resolution.

Pete Fletcher,
Hextable, Kent.

Source solution to Flex problem

I am quite surprised by the response you had to the letter from D W Abel on Flex. I am a user of Flex on Dragon 64s and also have an updated Dragon 32. I purchased my Flex from Compusense and I understand it has a number of programs available. I have also purchased DBasic, a program allowing you to program in Basic from it.

Other programs are available from the following sources:

Compusense
PO Box 169
Palmers Green
London, N13 5XA
Tel: 01-882 0681/6936

Sterling Micro Systems
241 Baker Street
London NW1
Tel: 01-486 7671

Micro Concepts
Cheltenham

Windrush
Worstead Laboratories
North Walsham
Norfolk
Tel: 0692-405189

A Flex system which also runs on a Dragon 32 can be obtained from Andtek, 41 Pebworth Road, Harrow, Middx. HA1 3UD. (01-422 4724). The gentleman also runs the 68 Micro Group which has Flex programs in its library.

Other information and programs can also be obtained from the US magazines, Rainbow and 68 Micro. If anyone has any further information about Flex an its availability, I would be interested in knowing.

L Peters,
London NW9.

Adding fuel to the reliability debate

I am writing to fuel the recent debate on micro reliability. Early in 1983 I bought a Commodore 64 (I paid £330!). It had to be returned twice but it is now functioning perfectly.

In January 1984 I supervised the purchase of another 64, which had to be replaced three times. The last one is still not 100 per cent right.

However, my company now uses 15 Commodore 64s, all bought in the last three months, and all perfect (although one of the transformers was defective). Our SX64 survives despite some brutal handling and all three disk drives continue to give satisfaction.

All in all, I have no complaints, when compared with a mere two years ago, about this pretty amazing equipment.

Stephen Rodgers,
London SE1.

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Strike the Wafadrive with White Lightning

Q Is it possible to SAVE*, LOAD* and RUN the White Lightning package to and from the Rotronics Wafadrive unit for the Spectrum?
R Bennett,
London SE13.

A No, it's not possible to use the White Lightning package with the Wafadrive in the way you suggest, and it's not really feasible to amend the program to make it possible (if anybody's done it we don't want to hear from them . . .)

There shouldn't be any problem using add-on keyboards, however, as the idea of these beasts is that they just replace the Spectrum's keyboard. On the other hand, we have encountered problems where something as inoffensive as a keyboard buffer can stop some software loading. We suspect this is because the software house has decided to check something really esoteric in the Spectrum's ROM.

So in principle you'll probably have no problems, but we can't guarantee it.

Flexible filing on the Spectrum

Q I run a small works, and wish to keep files on each individual job headed by the client's name and job number. I have tried to use my Spectrum for this purpose, with both Microl database and Sinclair Vu-File. In both cases I have the problem that there is only a screen for each job, and the information I need to keep requires more than one screen.
J Nathan,
London.

A Can we talk you out of doing what you want to do? Think in terms of manual filing systems. If you're using a card index you'll have minimum details on the card, while you can get more information on the files in a filing cabinet.

But what do you do if a single company file in a filing cabinet gets too bulky? You split it into a number of subheadings, right?

What you want to do seems analogous to this, and Vu-File, for example, can be set up so that you have one level of filing for the clients' names, and beneath that another level which deals with individual job numbers. Looking at this suggestion you may feel it's less convenient than what you want but, in fact, once you try it you'll find it's much more flexible.

The cost of logging on to Compunet

Q In issue 88 you reviewed the Commodore modem. Could you tell me the rough cost of logging on to Compunet, and is there a Compunet in Scotland?
C Walker,
Glasgow.

A Membership of Compunet is included in the cost of the modem so for the first year at least, you will pay only for the use you make of the system.

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Amstrad control code inputting

The enclosed program demonstrates the ability of the Amstrad CPC464 to accept control codes enclosed in strings which can then be printed to the screen.

This is particularly useful for multicolour block graphics where the graphics take up more than one text line. This way the cursor does not have to be moved between individual print statements, and colours can be changed within the string.

The program shows a galleon in three colours moving back and forth across the screen. It is printed as a single string and includes codes to move the cursor around; transparent print and alter colours.

David Muir,
Peverell, Plymouth.

```
10 MODE 1
20 INK 0,11:INK 1,1:INK 2,24:INK 3,6
30 CLS
40 SYMBOL 255,24,24,24,60,60,24,24,24
50 SYMBOL 254,0,0,24,24,60,60,24,24
60 SYMBOL 253,126,255,255,255,255,255,255,129
70 SYMBOL 252,0,0,126,255,255,255,255,129
80 SYMBOL 251,0,0,0,0,6
90 SYMBOL 250,0,0,102,102
100 SYMBOL 249,0,0,96,96
110 ship$=CHR$(15)+CHR$(2)+" "+CHR$(252)+CHR$(253)+CHR$(252)
+" "+CHR$(10)+STRING$(5,8)+" "+STRING$(3,253)+" "
120 ship$=ship$+CHR$(10)+STRING$(5,8)+CHR$(15)+CHR$(3)+"
"+CHR$(213)+CHR$(143)+C HR$(212)+" "+CHR$(15)+CHR$(1)+STRING$
(2,11)+STRING$(4,8)
130ship$=ship$+CHR$(22)+CHR$(1)+CHR$(254)+CHR$(255)+CHR$(254)
+CHR$(10)+STRIND$(3,8)+STRING$(3,255)+CHR$(10)+STRING$(3,8)
+CHR$(251)+CHR$(250)+CHR$(249)+CHR$(22)+CHR$(0)
140 FOR i=1 TO 36:LOCATE i,12:PRINT USING "&";ship$;i:
FOR pause=1 TO 40:NEXT:NEXT
150 FOR i=35 TO 2 STEP -1:LOCATE i,12:PRINT USING "&";ship$;i:
FOR pause =1 TO 40: NEXT:NEXT:GOTO 140
```

Recolouring tips for the QL

I have used the SQUARE and CIRC procs explained by Alan Turnbull (issue 88) as a basis for a demonstration of the power of the RECOL command. Once the filled picture has been drawn RECOL is first used (line 490) in the obvious way to cycle around all the colours.

A less obvious use (line 510) is to shift the colours down to the background colour so that the picture gradually disappears, leaving behind intricate shapes, where the original build-up had eaten into previous colours.

Peter Edwards,
Headington Quarry, Oxford.

```
100 REMark Dec '84/recol_demo
110 REMark Adapted by Peter Edwards
120 REMark Square,Circ by A. Turnbull
130 :
140 MODE 8:PAPER 0:CLS
150 REPeat main
160   FOR order=4 TO 6
170     SQUARE 74,50,48,order
180     recolour order
190     circ 80,50,32,order
200     recolour order
210   END FOR order
220 END REPeat main
230 :
240 DEFine PROCedure SQUARE(x,y,l,o)
250   IF o>0 THEN
260     INK o:FILL 1:LINE x-l/2,y-l/2 T
O x+l/2,y-l/2 TO x+l/2,y+l/2 TO x-l/2
,y+l/2 TO x-l/
2,y-l/2:FILL 0
270     SQUARE x-l/2,y-l/2,l DIV 2,o-1
280     SQUARE x+l/2,y-l/2,l DIV 2,o-1
290     SQUARE x+l/2,y+l/2,l DIV 2,o-1
300     SQUARE x-l/2,y+l/2,l DIV 2,o-1
310   END IF
320 END DEFine
330 :
340 :
350 DEFine PROCedure circ(x,y,r,o)
360   IF o>0 THEN
370     INK o:FILL 1:CIRCLE x,y,r:FILL
0
380     circ x+r/SQRT(2),y+r/SQRT(2),r
DIV 2,o-1
390     circ x-r/SQRT(2),y+r/SQRT(2),r
DIV 2,o-1
400     circ x-r/SQRT(2),y-r/SQRT(2),r
DIV 2,o-1
410     circ x+r/SQRT(2),y-r/SQRT(2),r
DIV 2,o-1
420   END IF
430 END DEFine
440 :
450 :
460 DEFine PROCedure recolour(limit)
470   FOR j=1 TO limit
480     FOR k=1 TO 7
490       RECOL 0,2,3,4,5,6,7,1
500     END FOR k
510     RECOL 0,0,1,2,3,4,5,6
520   END FOR j
530 END DEFine
```

Discovering the name of your Oric program

Here is a small routine for the Oric 1 which allows you to find out the name of an unlabelled program you may have just loaded.

It works by using the fast interrupts to print the contents of memory locations #49 onwards. The Oric 1 stores the file name at these locations.

```
PHA
TXA
PHA          Save the register
TYA          contents
PHA

LDA £#49
LDY £0       Print whatever is
LDX £2       at #49 onwards
JSR£F82F     on the status line
PLA
TAY
PLA          Restore the
TAX          register contents
PLA

JMP #EC03    Continues with
             interrupt
```

To load:

```
10 FOR I=#400 TO £415
20 READ D$: D=VAL("#"+D$):
   POKE I,D
30 NEXT I
40 DOKE #229,#400:END
50 DATA 48,8A,48,98,48
60 DATA A9,49,A0,00,A2,02,
   20,65,
   F8
70 DATA 68,A8,68,AA,68,4C,22,EE
```

To stop the routine:

DOKE #299, #EC03 (Oric 1)
DOKE #245,#EE22 (Atmos)

J Worsley,
Fareham, Hants.

Amstrad's full steam ahead command

Most people would agree that the Locomotive Basic on the Amstrad CPC 464 is very good. However, it is a shame that it does not supply a 'wait until key pressed' command.

Rather than using IF INKEY = THEN . . . or loops, I suggest that if you need such a command you should simply call #BB18.

Kevin Moss,
Worthing, W Sussex.

An Epson in Commodore clothing

How many Commodore home computer owners, when faced with buying a printer, have longed to own an Epson but been put off by the problems involved? Firstly, it's not easy to connect the two together. Secondly, even when connected, it may be necessary to load dirver software or the cartridge slot may be unusable. Finally Commodore-specific characteristics such as graphics and formatting commands will not be available.

Now Micro Control Systems have the solution. Just plug the Comprint circuit board inside the Epson, connect the cable supplied to the Serial I/O port on the Commodore computer and Hey Presto! The Comprint hods the Commodore into thinking it is working with a Commodore printer. All the features are there — total emulation. And it even provides a 2K buffer as well.

What's more all the additional features that have made Epson so successful, such as condensed print and other type styles, are accessible directly by the Commodore computer. For the business user the ability to use 15 inch paper (in the MX/RX/FX-100 range) and print a £ sign (or other Epson special characters) will prove invaluable.

So go on — spoil yourself. If you are the owner of a Commodore personal computer treat yourself to an Epson — and a Comprint of course!

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BARCLAYCARD VISA

GETTING THE HUMP

Dodge spears, crevasses and rolling barrels in this entertaining version of the Hunchback, written by Andy Charalambous.

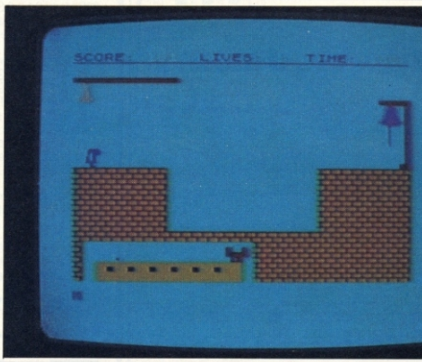
The Castle, for the Sinclair Spectrum is a version of the *Hunchback* arcade game, where you have to make your way through a number of screens to rescue Ezmarelda.

In the case of The Castle there are seven screens with varying difficulty levels. You play the part of the hunchback, and you must move along the castle walls, avoiding spears, crevasses and rolling barrels.

You start with three lives, and you're awarded one extra life for rescuing Ezmarelda. There's a time limit for each screen, and failure to complete the screen within this limit results in your losing a life.

A super bonus is awarded if you complete five screens without losing a life, but you'll have trouble doing this.

The game is written in Basic, but is quite fast enough to keep you busy — the animation of the hunchback is particularly worth watching.



Listing

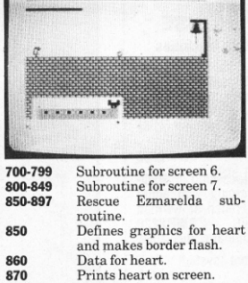
```
  2 CLS : PRINT AT 0,10; INK 2; PAPER 0;"THE CASTLE"
  3 RESTORE 10: FOR n=3 TO 21 STEP 4: READ q$
  4 FOR n=1 TO LEN q$-1: BEEP .0005,n+28: PRINT AT 9,0;q$(LEN q$-n TO LEN q$): NEXT n
  5 READ q$: FOR n=1 TO LEN q$: BEEP .0005,n+28: PRINT AT n+2,32-n;q$(1 TO n): NEXT n
  6 NEXT n
 10 DATA "HELP THE HUNCH BACK SAVE","EZMARELDA BY MOVEING ACROS S THE","SCREEN FROM LEFT TO RIGHT AND","RINGING THE BELL.THERE ARE SEVEN"
 11 DATA "SCREENS AND EZMARELDA IS LOCKED","AWAY IN THE SEVENTH IF FIVE ","SCREENS ARE COMPLETED WIMOUT","LOOSING A LIFE THEN A SUPER","BONUS IS AWARDED.USE 1 FOR LEFT","2 FOR RIGHT AND 0 TO JUMP."
 20 PRINT #1;AT 1,0; OVER 1; PAPER 0; INK 2;"  PRESS ANY KEY TO PLAY"
 25 PRINT AT 0,10; INK 6; PAPER 1; OVER 1;"■": FOR n=11 TO 19: PRINT AT 0,n; OVER 1; INK 6; PAPER 1;"■": AT 0,n-1; INK 2; PAPER 0;"■": NEXT n: PRINT AT 0,19; OVER 1; INK 2; PAPER 0;"■"
 30 IF INKEY$<>"" THEN GO TO 40
 40 GO TO 90
 50 PRINT AT 10,10;" GAME OVER ": FOR t=1 TO 200
 60 PRINT AT 4,5;" PRESS Y TO PLAY AGAIN ";AT 6,7;" OR N TO STOP."
 70 IF INKEY$="y" THEN GO TO 10
 0
 75 IF INKEY$="n" THEN STOP
 80 GO TO 70
 90 RESTORE 100: FOR a=144 TO 155: FOR n=0 TO 7: READ b: POKE USR CHR$ a+n,b: NEXT n: NEXT a
 100 DATA 0,0,3,7,7,6,4,4
 101 DATA 12,14,15,15,31,6,12,6
 110 DATA 0,0,184,244,254,124,124,96
 103 DATA 16,24,224,224,240,192,192,128
 104 DATA 12,12,12,14,31,1,1,1
 105 DATA 96,96,96,224,240,128,1,28,224
 106 DATA 0,0,29,47,127,62,62,6
 107 DATA 0,0,192,224,224,96,32,32
 108 DATA 48,112,240,240,120,96,48,96
 109 DATA 6,24,7,7,15,3,30,4
 110 DATA 6,6,6,7,15,1,1,7
 111 DATA 48,48,48,112,240,128,1,28,128
 150>OVER 0: PAPER 5: INK 1: BORDER 5: CLS
 199 GO TO 980
 200 BEEP .001,30: GO TO 210+l
 210 PRINT AT 10,y;"R ": LET l=1: GO TO 220
 211 PRINT AT 10,y;"S ": LET l=0
 230 LET y=y-1
 240 IF y=0 THEN PRINT AT 10,y+1;" ": LET y=29
 250 IF b=y AND j=10 OR b-1=y AND j=10 THEN BEEP .1,10: BEEP .1,0: LET l=l-1: GO TO 910
 299 RETURN
 300 PLOT OVER 1;128,167
 310 DRAU OVER 1;l,-90
 320 LET l=l+y: IF l<=-42 THEN LET y=0
 325 PLOT 128,167: DRAU l,-90
 330 IF l>=42 THEN LET y=-6
 340 IF b=INT ((128+l+1)/8)-1 THEN LET b=b+INT (y/8): PRINT AT j,b-2;" ": AT j-1,b-2;" ": RETURN
 350 IF ATTR (j+1,b)<>50 AND ATTR (j+1,b+1)<>50 AND j=10 THEN GO TO 420
 370 RETURN
 410 IF ATTR (j+1,b)<>50 AND ATTR (j+1,b+1)<>50 AND j=10 THEN GO TO 420
 415 RETURN
 420 FOR n=10 TO 16: PRINT AT n,b;"BD";AT n-1,b,"AC";AT n-2,b;" ": BEEP .1,n: NEXT n: LET l=l+1: GO TO 910
 499 RETURN
 500 LET t=((INT (RND*3))+8)*6
 520 PRINT AT 9,l; INK 2;"O";AT 10,l;"R";AT 11,l;"S";AT 12,l;"T";AT 13,l;"U"
 525>IF b+1<l THEN FOR n=10 TO 0 STEP -1: BEEP .005,n: NEXT n: LET l=l+1: GO TO 910
 530 BEEP .005,30: PRINT AT 9,l;" ";AT 10,l;" ";AT 11,l; INK 2;"N";AT 12,l;"O";AT 13,l;"P"
 599 GO TO 400
 640 LET y=y-1: PRINT AT 7,y; INK INT y/8;"M "
 650 IF j-1=7 AND b=y OR j-1=7 AND b+1=y THEN GO TO 420
 660 IF y=1 THEN PRINT AT 7,y;" ": LET y=29
 699 GO TO 500
 700 LET y=y+1: PRINT AT 10,y;"M"
 705 IF j=10 AND b=y+1 OR j=10 A ND b=y THEN GO TO 420
 710 IF y=28 THEN PRINT AT 10,y+1;" ": LET y=0
 799 GO TO 500
 800 IF b=24 THEN GO TO 850
 805>LET y=y+1: PRINT AT 10,y;"M"
 810 IF j=10 AND b=y+1 OR j=10 A ND b=y THEN GO TO 420
 815 IF y=24 THEN PRINT AT 10,y+1;" ": LET y=0
 820 LET l=l-1: PRINT AT 7,l;"U "
 825 IF j-1=7 AND b<l OR j-1=7 A ND b+1>l THEN GO TO 420
 830 IF l=1 THEN PRINT AT 7,l;" ": LET l=24
 835 LET x=x-1: PRINT AT 9,x;"S "
 840 IF j<>8 AND b=x OR j<>8 AND b+1=x THEN GO TO 420
 845 IF x=1 THEN PRINT AT 9,x;" ": LET x=24
 849 GO TO 410
 850 RESTORE 860: FOR a=157 TO 160: FOR n=0 TO 7: READ b: BORDER
 850>RESTORE 860: FOR a=157 TO 160: FOR n=0 TO 7: READ b: BORDER n: BEEP .001,30: POKE USR CHR$ a+n,b: NEXT n: NEXT a
 860 DATA 60,126,255,255,255,255,127,63,60,126,255,255,255,255,254,252,31,7,3,1,0,0,0,248,224,192,128,128,0,0,0
 870 BORDER 5: FOR n=0 TO 10: FOR n=7 TO 2 STEP -1: PRINT AT 7,2 5; INK n;"NO";AT 8,25;"PO"
 880 NEXT n: NEXT n
 890 FOR n=0 TO 1: RESTORE 895: FOR n=0 TO 3: READ a: READ b: BEEP a,b: NEXT n: NEXT n
 895 DATA .1,12,.1,8,.1,7,.1,6
 896 FOR n=12 TO 14: BEEP .1,n: PAUSE 6: NEXT n
 897 LET sb=sb+2: LET li=li+1: LET wa=2: GO TO 911
 900 LET s<>0: LET li=3: LET wa=2
 905>LET wa=2
 910 LET sb=-2: IF li=0 THEN GO TO 80
 911 IF sb=0 THEN GO SUB 9000
 912 RESTORE 913: FOR a=156 TO 160: FOR n=0 TO 7: READ b: POKE USR CHR$ a+n,b: NEXT n: NEXT a: GO SUB wa*1000
 913 DATA 255,16,16,16,255,1,1,1
 920 DATA 3,4,13,11,11,11,11,23,23,23,47,95,191,223,63,1,192,224,240,240,240,240,248,248,248,252,254,255,255,252,128
 930 PRINT AT 0,0;"SCORE: LIVES: TIME:
 931 PLOT 0,167: DRAU 254,0
 935 PRINT AT 0,7; INK 7;s<>;AT 0,19;li
 940 IF wa=8 THEN GO TO 945
 941 PRINT AT 10,31; INK 2;"■"
 942>FOR n=5 TO 9: PRINT AT n,31; INK 2;"■": NEXT n: PRINT AT 4,29; INK 2;"■"
 943 IF wa<5 THEN PRINT AT 5,29; INK INT (RND*5);"NP";AT 6,29;"O P": PLOT 240,119: DRAU 0,-14
 944 IF wa<5 THEN PRINT AT 2,0;
```

Variables used

h	Jump variable. When h=0 the Hunchback jumps up, when it's 1 he goes down.
q$	Instructions.
t	Time left.
sb	Number of screens cleared without losing a life.
Li	Lives left.
Sc	Score.
p	Direction Hunchback is facing in.
j,b	Coordinates of Hunchback.
x,y	Coordinates of obstacles.
Wa	Screen.
1	Position of rope (screen 2).
No	Horizontal position of guard with spear up.

Program notes

2-30	Prints instructions.
50-80	End of game routine.
90	Set up UDGs.
100-111	Data for graphics.
150	Sets up screen attributes.
200-299	Subroutine for screen 1.
300-370	Subroutine for screen 2.
410-415	Subroutine for screen 3.
420	Fall routine.
500-599	Subroutine for screen 4.
640-699	Subroutine for screen 5.



700-799	Subroutine for screen 6.
800-849	Subroutine for screen 7.
850-897	Rescue Ezmarelda subroutine.
850	Defines graphics for hearer and makes border flash.
860	Data for heart.
870	Prints heart on screen.
890-896	Play tune.
897	Awards extra life, extra bell towards super bonus and restarts game from screen 1.
905-910	Set up variables.
911	Checks to see if super bonus has been won.
912-920	Set up more graphics and goes to subroutine to draw current screen.

930-935	Print score, lives left.
942-944	Print bell.
945	Sets up variables.
946-947	Draw castle on lower part of screen and shows position of Hunchback.
950	Prints Hunchback on left hand side of screen.
1000-1999	Main loop.
1100	Checks if key 1 has been pressed, and moves Hunchback to the left.
1110	Checks for key 2, and moves to the right.
1200	Checks if key 0 has been pressed, and if so jumps.
1400	Checks to see if Hunchback has reached the bell, and if so, increases score by the amount of time left.
1450	Time countdown routine.
1500-1511	Animate Hunchback's legs and arms.
2000-8999	Set up screens.
2000-2999	Screen 1.
3000-3999	Screen 2.
4000-4999	Screen 4.
6020-6999	Screen 5.
7000-7999	Screen 6.
8000-8999	Screen 7.
9000-9020	Award super bonus.

```
INK 2;"                ": FOR n=0 TO 5
b STEP 2: PRINT AT 3,n; INK 7;"N
P";AT 4,n;"OO": NEXT n
  945 LET t=200: LET h=3: LET j=1
0: LET p=1: LET b=1
  946 PRINT AT 16,1;"
  s s";AT 19,1;"                ";"
;AT 20,1;"                ";AT 2
1,1;"                "
  947 PRINT AT 19,ws+2-2; OVER 1;
";"
  950 BEEP .5,10: PRINT AT 10,b-1
;" BD";AT 9,b-1;" AC"
  1000 GO SUB ws+100

  1100:IF IN 63486=254 AND b>1 THE
N LET b=b-1: PRINT AT j,b;"JI ";
AT j-1,b;"GH ": LET p=0
  1110 IF IN 63486=253 AND b<29 TH
EN: LET b=b+1: PRINT AT j,b-1;" B
D";AT j-1,b-1;" AC": LET p=1
  1200 IF IN 61438=254 AND h=3 THE
N BEEP .01,10: LET h=0
  1210 GO TO 1220+(h*3)
  1220 LET j=j-1: PRINT AT j+1,b,"
  "

  1221 IF j=8 THEN LET h=1
  1222 GO TO 1230
  1223 LET j=j+1: PRINT AT j-2,b;"
  ": IF j=10 THEN LET h=3
  1400 IF b=29 THEN LET h=0 TO 2:
BEEP .2,20: BEEP .2,15: NEXT n:
LET t=t+(300-t): LET sb=sb+2:
LET wa=wa+1: GO TO 911

  1450:LET t=t-1: PRINT AT 0,28; I
NK 7;t;" ": IF t=-1 THEN BEEP .1
,10: BEEP .1,0: LET li=li-1: GO
TO 910
  1500 GO TO 1510+p
  1510 PRINT AT j,b-1;" KL ";AT j-
1,b-1;" GH ": GO TO 1520
  1511 PRINT AT j,b-1;" EF ";AT j-
1,b-1;" AC "
  1999 GO TO 1000
  2000 CLS : FOR n=11 TO 21: PRINT
AT n,0; INK 2; PAPER 6;"MMMMMMM
MMMMMMMMMMMMMMMMMMMMMM": NEXT
n
  2030 RESTORE 2040: FOR z=0 TO 7:
READ r: POKE USR "r"+z,r: NEXT
z
  2031 FOR z=0 TO 7: READ s: POKE
USR "s"+z,s: NEXT z
  2040 DATA 60,126,255,240,15,255,
126,60,44,110,239,239,247,247,11
8,52

  2050:LET l=1: LET y=29
  2999 RETURN
  3000 LET l=50: LET y=-8
  3010 CLS : FOR n=11 TO 21: PRINT
AT n,0; INK 2; PAPER 6;"MMMMMMM
MMMMMMMMMMMMMMMMMMMMMM": NEXT
n
  3020 FOR n=11 TO 16: PRINT AT n,
9; INK 1; PAPER 5;"
  ": NEXT n
  3040 PLOT 128,167: DRAU l,-90
  3999 RETURN
  4000 CLS : FOR n=11 TO 21: PRINT
AT n,0; INK 2; PAPER 6;"MMMMMMM
MMMMMMMMMMMMMMMMMMMMMM": NEXT
n
  4010 FOR n=5 TO 25 STEP 8: FOR n
=11 TO 16: PRINT AT n,m; INK 1;
PAPER 5;"  ": NEXT n: NEXT m
  4998 RETURN

  5000:CLS : PRINT AT 5,29; INK IN
T (RND*5);"NP";AT 6,29;"OO": PLO
T 240,119: DRAU 0,-14
  5002 PRINT AT 2,0; INK 2;"
                ": FOR n=0 TO 5 STEP 2: PRI
NT AT 3,n; INK 7;"NP";AT 4,n;"OO
": NEXT n
  5005 RESTORE 5010: FOR a=157 TO
162: FOR n=0 TO 7: READ b: POKE
USR CHR$ a+n,b: NEXT n: NEXT a
  5010 DATA 33,115,171,39,38,34,34
,34,33,47,63,63,63,60,63,127,119
,39,47,47,63,33,35,47
  5011 DATA 192,224,224,240,176,16
0,160,32,192,248,252,124,124,28,
124,124,116,112,248,248,252,192,
224,248
  5030 FOR n=11 TO 21: PRINT AT n,
0; INK 2; PAPER 6;"MMMMMMMMMMMMM
MMMMMMMMMMMMMMMMMM": NEXT n
  5040 GO SUB 4010

  5050:FOR n=6 TO 25 STEP 8: PRINT
AT 11,n; INK 2;"NO": NEXT n
  5051 FOR n=6 TO 25 STEP 8: PRINT
AT 12,n; INK 2;"OR": NEXT n
  5053 FOR n=6 TO 25 STEP 8: PRINT
AT 13,n; INK 2;"PS": NEXT n
  5054 FOR n=6 TO 25 STEP 8: FOR n
=14 TO 16: PRINT AT n,n; INK 2;
PAPER 6;"MM": NEXT n: NEXT m
  5070 RESTORE 5080: FOR a=160 TO
164: FOR n=0 TO 7: READ b: POKE
USR CHR$ a+n,b: NEXT n: NEXT a
  5080 DATA 32,112,168,32,32,32,32
,32,32,32,32,32,32,32,32,32
  5081 DATA 33,35,35,39,54,114,114
,58,57,47,47,47,7,4,7,7,7,7,15,1
5,31,3,15
  5090 RESTORE 5100: FOR n=0 TO 7:
READ m: POKE USR "m"+n,m: NEXT
n
  5100 DATA 60,66,189,189,189,189,
66,60

  5110:IF wa>6 THEN RESTORE 5120:
FOR n=0 TO 7: READ m: POKE USR "
m"+n,m: NEXT n
  5120 DATA 0,0,194,127,194,0,0,0
  5999 RETURN
  6020 LET y=29
  6999 GO TO 5000
  7000 LET y=25
  7999 GO TO 5000
  8000 CLS : FOR n=8 TO 10: PRINT
AT n,27; INK 2;"  ": NEXT n
  8005 PRINT AT 2,0; INK 2;"
                ": FOR n=0 TO sb STEP 2: PRINT
AT 3,n; INK 7;"NP";AT 4,n;"OO":
NEXT n
  8010 RESTORE 8020: FOR a=157 TO
160: FOR n=0 TO 7: READ b: POKE
USR CHR$ a+n,b: NEXT n: NEXT a
  8020 DATA 227,227,227,255,255,12
6,126,126,199,199,199,255,255,12
8,126,90
  8030:DATA 248,254,254,254,254,25
4,255,255,31,127,127,127,127,127
,255,255
  8040 PRINT AT 7,26; INK 2;"PO";A
T 7,30;"PO";AT 8,26;"NO";AT 8,30
;"NO"
  8045 FOR n=208 TO 254 STEP 46: O
VER 1: INK 2: PLOT n,112: DRAU 0
,7: PLOT n+1,112: DRAU 0,7: NEXT
n
  8050 INK 1: OVER 0: RESTORE 8060
: FOR a=157 TO 159: FOR n=0 TO 7
: READ b: POKE USR CHR$ a+n,b: N
EXT n: NEXT a
  8060 DATA 255,153,153,255,153,15
9,255,153,0,131,25,25,127,153,1
53,0,126,248,152,152,254,153,153
  8070 PRINT AT 10,26; INK 0; PAPE
R 2;"  ";AT 9,28;"OP"
  8080 RESTORE 8090: FOR a=157 TO
160: FOR n=0 TO 7: READ b: POKE
USR CHR$ a+n,b: NEXT n: NEXT a

  8090:DATA 5,7,15,28,28,62,51,44,
160,224,240,56,56,124,76,52,60,2
8,30,63,63,55,115,123,60,56,120,
252,252,236,206,222,60
  8100 PRINT AT 8,26;"PO";AT 7,26;
"NO"
  8110 FOR n=-2 TO 1: INK 1: PLOT
232,128: DRAU n,-8: NEXT n
  8120 FOR n=11 TO 21: PRINT AT n,
0; INK 2; PAPER 6;"MMMMMMMMMMMMM
MMMMMMMMMMMMMMMMMM": NEXT n
  8130 GO SUB 4010
  8140 GO SUB 5110
  8150 LET x=15: LET l=24: LET y=2
2
  8200 RESTORE 8210: FOR n=0 TO 7:
READ u: POKE USR "U"+n,u: NEXT
n
  8210 DATA 60,66,189,189,189,189,
66,60

  8300:RESTORE 8310: FOR n=0 TO 7:
READ s: POKE USR "s"+n,s: NEXT
n
  8310 DATA 52,62,145,31,248,137,7
4,44
  8999 RETURN
  9000 FOR n=1 TO 50: BEEP .008,n:
BEEP .003,n-1: PRINT AT 6,1; IN
K INT 5-(n/10);"SUPER BONUS": NE
XT n
  9010 FOR n=0 TO 6 STEP 2: PRINT
AT 3,n; " ";AT 4,n;" ": BEEP .1
,n: LET sc=sc+100: PRINT AT 0,7;
sc: NEXT n
  9020 LET sb=-2: RETURN
```

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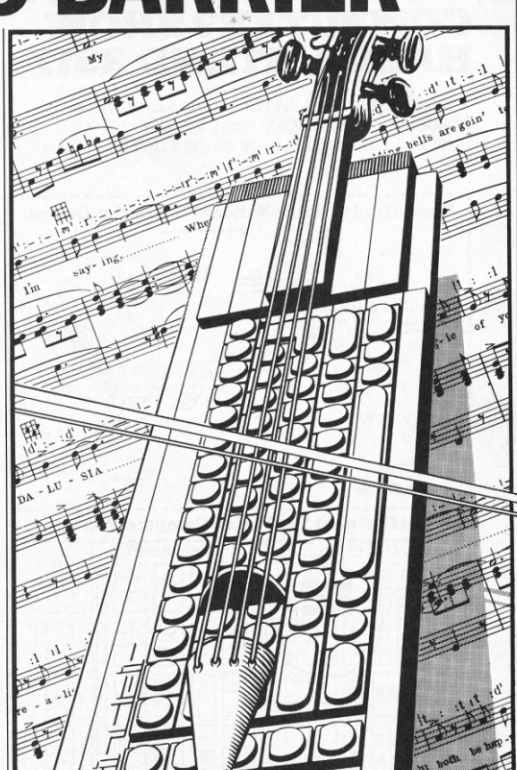

The Sinclair QL has brought a new level of computing power within reach of its owners; however, the sound capabilities are a different matter. Compared with even the Vic 20 (of fond memory), the QL sound system looks archaic and crude — a single channel, no volume control and a piezo-electric transducer.

To make matters worse, the controlling commands from Basic are clumsy and unpredictable, and the process of extracting useful sounds is largely a matter of trial and error. However, all is not lost and we will try to illustrate here that it is possible to produce some exciting sounds on the QL, assisted by two programs — *Sound Explorer* and *Music Maker*.

As the QL user manual implies, the only way to learn about the workings of the system is to experiment. The problem is that the BEEP command, the only sound command on the QL, can be followed by up to eight parameters which results in experimentation being a tedious and unsatisfactory process. What is more, most parameters are not truly independent, so changing one alters the effect of others. The answer is provided by Program 1, which I have called a Sound Explorer.

It starts by setting all the BEEP parameters to 1 and produces the resulting sound. All the parameters may then be changed by pressing the appropriate keys while the screen displays the current values and the 'loudspeaker' emits the corresponding noise. The program can be used to see how changes in specific parameters affect the overall sound and for developing specific sounds — when you find one you like, simply make a note of the parameters.

In one sense the range of sounds is almost infinite, although all the sounds I have found so far are of similar type — rather non-musical and very electronic sounding. Nevertheless, if you can bear the noise a half-hour's experimentation will produce some surprising sounds, and there is always the 'peace' facility within the program.

BEEP parameters

Duration is the first parameter of BEEP which allegedly defines the duration of the sound in units of 72 microseconds. This commendable precision did not seem to apply to my machine although it is quite true that a duration value of 10000 gave the expected duration of approximately 0.72 seconds; however, higher or lower values did not change the actual duration in proportion, a situation made worse by the necessity to start again with a value of −32768 once positive values up to 32767 have been exhausted. (If this sounds complicated it's because it is.) Incidentally, a duration value of 32767 gave about 1.9 seconds of sound on my computer compared to the expected 2.36 seconds.

There is, of course, another way of controlling the duration of a note which seems more reliable, but it has the disadvantage of stopping further program execution while the note is sounding. The method is to BEEP with duration 0, which paradoxically gives indefinite sound, to BEEP the required time, and then to PAUSE with no parameters which

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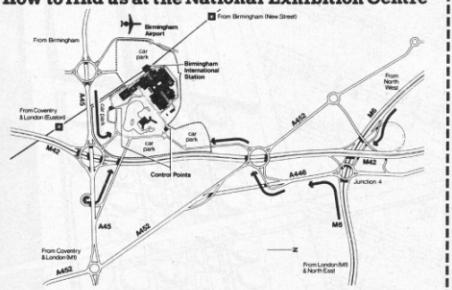

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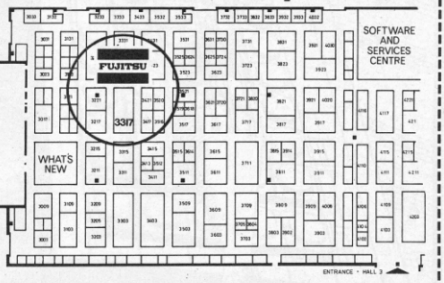

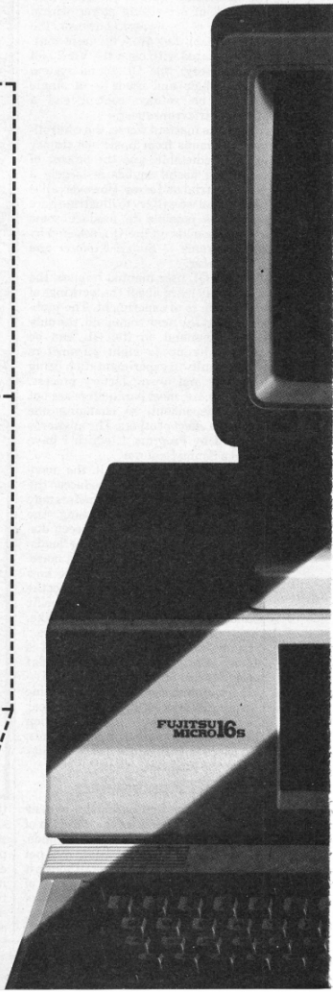

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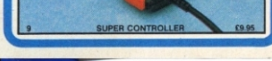
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kills the sound.

A further problem with duration values is illustrated by this short program:

```
10 REPeat loop
20 BEEP 0,10
30 PAUSE 25
40 BEEP —1,10
50 PAUSE 25
60 END REPeat loop
```

You will see that the program should give a continuous high pitched tone, pitch 10, but actually sounds like an out of tune police siren. This illustrates the fact that BEEPing duration 0 affects the specified pitch — all other values for duration give the correct tone. All in all the duration parameter could do with more development.

The second and third parameters of BEEP are pitch1, the main pitch and pitch2, the secondary pitch. The sound will move between these levels if encouraged by grade_x and grad_y, the fourth and fifth parameters. The pitches can take values between 0 and 255, 0 being the highest frequency. Values higher than 255 can be used, but the pitch produced seems to be pitch MOD 255. The range of notes produced is quite wide, but the lower notes are rather unmusical.

Values of 160 downwards produce notes which can be used in music generation and according to my tuning fork the 'C' at 256Hz is approximated by pitch value 33 (assuming avoidance of the pitch varying properties of duration 0). Other approximations are given in program 2, which is a modest attempt to allow playing of short tunes over a range of one octave.

One final point on pitch — it is possible to produce subjectively higher tones than that produced by a pitch value of zero by using appropriate values for other parameters. The sound explorer will let you find out how — try all of the parameters being changed, and PROCEDURE parameter, which uses values passed from the main program, displays the actual value of the parameter. This method was chosen rather than a complete reprint of parameter values to maximise speed around the loop. As PROCEDURE parameter is widely used in the program, it is suggested it is given a shorter name when typing in, for example 'p'.

The program is largely self-explanatory in use. The seven parameters pitch1, pitch2, grade_x, grad_y, wraps, fuzzy and random are increased by one by pressing the keys 'q-w-e-r-t-y-u', and decreased by one by the keys 'a-s-d-f-g-h-j' (note lower case). In addition the parameters which have a large of values — pitch1, pitch2, grad_x and wraps have a fast forward and rewind in the keys 1-2-3-5, z-x-c-b.

Reference to the keyboard will show that the keys are logically and conveniently arranged. The only other key necessary is 'F1', which in the interests of sanity of the user, mutes the sound.

Program notes

QL Sound Explorer (the first listing given below) works by setting up a loop in which key presses are detected and the appropriate changes made to the selected BEEP parameters. The loop (lines 210 to 490) is entered after introductory formalities have been completed, and consists of an INKEY instruction (line 230) to wait for a key press, and a SELECT ON instruction (line 240) to take the appropriate action.

Although the method of actually displaying changes to the parameters appears rather lengthily coded the idea has been to 'hide' as many instructions as possible behind the ON instruction, thus speeding program execution. PROCedure instructions simply display instructions if required.

The spaces in the text (lines 520 to 540) have been carefully arranged to give a neat display — ignore them at your peril!

PROCedure keys is responsible for the on screen caption of the keys to be used to change the various parameters, and PROCedure headings displays the names

Listing

```
100 REMark ******************
110 REMark QL SOUND EXPLORER
120 REMark ******************
130 REMark (c) November 1984,  James Lucy
140 MODE 8:WINDOW 448,200,32,16:BORDER 10,0,7:PAPER 4:INK 0
150 CLS:CSIZE 3,1:UNDER 1:AT 0,5:PRINT"QL SOUND EXPLORER":UNDER 0:CSIZE 2,0:INK 2
160 AT 4,0:PRINT"Do you require instructions? (y/n)"
170 a$=INKEY$(-1):CLS 3:IF a$="y"OR a$="Y" :instructions
180
d=0:pl=1:p2=1:gx=1:gy=1:w=1:f=1:r=1:REMark SET INITIAL VALUES FOR BEEP PARAMETERS
190 headings:keys:AT 17,7:PRINT"Press 'F1' for peace"
200 parameter 4,p1:parameter 6,p2:parameter 8,gx:parameter 10,gy:parameter 12,w:parameter 14,f:parameter 16,r
210 REPeat soundloop
220 BEEP d,p1,p2,gx,gy,w,f,r
230 a=CODE(INKEY$(-1))
240 SELect ON a
250 ON a = 232:BEEP :AT 17,5:PRINT "Press any key to continue":PAUSE:CLS 3:AT 17,7:PRINT "Press 'F1' for peace"
260 ON a=113: p1=p1+1:parameter 4,p1:IF p1>255 :p1=255:parameter 4,p1
270 ON a=49:p1=p1+10:parameter 4,p1:IF p1>255:p1=255:parameter 4,p1
280 ON a=97:p1=p1-1:parameter 4,p1:IF p1<0:p1=0:parameter 4,p1
290 ON a=122:p1=p1-10:parameter 4,p1:IF p1<0:p1=0:parameter 4,p1
300 ON a=119:  p2=p2+1:parameter 6,p2:IF p2>255:p2=255:parameter 6,p2
310 ON a=50:p2=p2+10:parameter 6,p2:IF p2>255:p2=255:parameter 6,p2
320 ON a=115 : p2=p2-1:parameter 6,p2:IF p2<0 :p2=0:parameter 6,p2
330 ON a=120:p2=p2-10:parameter 6,p2:IF p2<0:p2=0:parameter 6,p2
340 ON a=101:gx=gx+1:parameter 8,gx:IF gx>15:gx=15:parameter 8,gx
350 ON a=51:gx=gx+50:parameter 8,gx:IF gx>15:gx=15:parameter 8,gx
360 ON a=100 : gx=gx-1:parameter 8,gx:IF gx<-32768 : gx=-32768:parameter 8,gx
370 ON a=99:gx=gx-50:parameter 8,gx:IF gx<-32768:gx=-32768:parameter 8,gx
380 ON a=114:gy=gy+1:parameter 10,gy:IF gy>7:gy=7:parameter 10,gy
390 ON a=102 : gy=gy-1:parameter 10,gy:IF gy<-8:gy=-8:parameter 10,gy
400 ON a=116:w=w+1:parameter 12,w:IF w>32767:w=32767:parameter 12,w
410 ON a=53:w=w+50:parameter 12,w:IF w>32767:w=32767:parameter 12,w
420 ON a=103:w=w-1:parameter 12,w:IF w<0:w=0:parameter 12,w
430 ON a=98:w=w-50:parameter 12,w:IF w<0:w=0:parameter 12,w
440 ON a=121 : f=f+1:parameter 14,f:IF f>15 :f=15:parameter 14,f
450 ON a=104:f=f-1:parameter 14,f:IF f<0:f=0:parameter 14,f
460 ON a=117:r=r+1:parameter 16,r:IF r>15:r=15:parameter 16,r
470 ON a=106:r=r-1:parameter 16,r:IF r<0 THEN r=0:parameter 16,r
480 END SELect
490 END REPeat soundloop
500 REMark ********************
510 DEFine PROCedure instructions
520 AT 3,0:PRINT "The  sound  command BEEP  can be followed by up to eight parameters which are duration,pitch1,pitch2,grad_x,grad_y,wraps,fuzziness and random."
530 PRINT "This program allows you to change the parameters (except duration) while hearing the  sound produced.The parameters  will be displayed on the screen."
540 PRINT "To increase the parameters use the block of  keys  QWERTYU  and to decrease  ASDFGHJ.  To  stop press'F1'."
550 FLASH 1:PRINT"        Press any key to continue":FLASH 0:PAUSE
560 CURSOR 0,8:CLS 2
570 END DEFine
580 REMark ********************
590 DEFine PROCedure keys
600 INK 3:AT 2,15:UNDER 1:PRINT"up keys down keys":UNDER 0
610 AT 4,18:PRINT "1,q        a,z"
620 AT 6,18:PRINT "2,w        s,x"
630 AT 8,18:PRINT "3,e        d,c"
640 AT 10,18:PRINT"r          f"
650 AT 12,18:PRINT"5,t        g,b"
660 AT 14,18:PRINT"y          h"
670 AT 16,18:PRINT"u          j"
680 INK 2
690 END DEFine keys
700 REMark ******************
710 DEFine PROCedure headings
720 AT 4,2:PRINT"Pitch1 = "
730 AT 6,2:PRINT"Pitch2 = "
740 AT 8,2:PRINT "Grad_x = "
750 AT 10,2:PRINT "Grad_y = "
760 AT 12,2:PRINT "Wraps  = "
770 AT 14,2:PRINT "Fuzzy  = "
780 AT 16,2:PRINT "Random = "
790 END DEFine headings
800 REMark ******************
810 DEFine PROCedure parameter (LINE,value)
820 AT LINE,11:PRINT"      ":AT LINE,11:PRINT value
830 END DEFine parameter
840 REMark ******************
```

parameters = 0 except grade_x = -1.

Grad_x and grad_y are the fourth and fifth parameters of the BEEP command. The idea is that the pitch moves in steps of size grad_y between pitch1 and pitch2, the rate of this movement being controlled by grad_x. That is the theory but in practice it proved difficult to see the parameters working as expected. Experimentation with the sound explorer is the best policy here.

Wraps, Fuzziness, and Random are the sixth, seventh and eighth parameters. Wraps is mysteriously named in that it is difficult to see how the sound wraps or what it wraps round. The effect on the sound is quite dramatic in most cases and seems to be a kind of repeating sound at the end of each movement between pitch1 and pitch2. Lower values of wraps give more comprehensible results.

Fuzziness and Random serve to further modify the sound and to further complicate the situation. Neither is very predictable and they appear to have very little effect until they near their maximum values, when both tend to produce 'noise' rather than tones.

If you have followed this article so far and have tried the sound explorer, you hopefully will have discovered that sound on the QL can be interesting, it can also be infuriatingly convoluted and perverse, in which respect it is quite in keeping with the whole computer.

Program notes

QL Music Maker is intended to work on a TV set, but better graphics could be obtained on a monitor in Mode 4. It allows the playing and display in conventional musical notation of a short tune and is intended to be a demonstration of the (rather limited) musical capabilities of the QL. The program can play along quite nicely with someone trying to learn the descant recorder, and would make a useful training aid — one of the more difficult aspects of learning an instrument is knowing how the music should sound.

The program works by loading arrays with pitch and duration in the loader loop (lines 220-520). It passes the pitch and duration values to PROCdrawnote, which draws the appropriate note in the next available position; PROCdrawnote also calls PROCstave, which draws the five line stave when required. For program brevity bar lines and a time signature have been omitted, but could be included by adding an INPUT statement and a counting device in the PROCdrawnote.

Once the arrays have been loaded and terminated using pitch 'z', they are played using the FOR-END FOR at lines 560 to 620. As the notes are played a white marker line is drawn under the note being sounded. As this marker is drawn and erased in the time between notes the drawing time required can make the music staccato. If this is unacceptable, delete the drawing instructions in lines 550 to 620. The sound is produced by the BEEP command at line 590 — note the use of duration — 1 rather than the expected zero to avoid the pitch distorting effects mentioned elsewhere.

As a final point on this program it would be quite easy to make it a good deal more sophisticated by increasing the range of notes, including rests and providing room for a greater tune length, however, because the notes are approximations, people with perfect pitch had better try a Commodore 64.

The program requests input of a note and a duration. The 'enter' key should be pressed after each note and each duration. A pitch other than 'a-b-c-d-e-f-g' will be ignored. The duration can be 0.5, 1, 1.5, 2, 3 or 4 where a value of 1 gives a crotchet. Other numerical values will be ignored but a letter will give an error. No harm results — simply type 'continue'.

When 45 notes have been entered, the program will ask you to hit any key to play the tune. If only a short tune is required terminate the input with note 'z', pitch '1'. Type Ctrl-Space' to escape the program.

Listing

```
100 REMark ***************
110 REMark QL MUSIC MAKER
120 REMark ***************
130 REMark (c) December 1984, James Lucy
140 MODE 8:WINDOW 448,200,32,16:BORDER
10,0,7:PAPER 4:INK 0
150 CLS:CSIZE 3,1:UNDER 1:AT 0,5:PRINT
"QL MUSIC MAKER":UNDER 0:CSIZE 2,0:INK 2
160 PRINT:PRINT"Do you require
instructions? (y/n)"
170 i$=INKEY$(-1):IF i$="y" OR
i$="Y":instructions:ELSE CLS 3
180 DIM note$(50): DIM duration(50)
190 DIM pitch(50):DIM length(50)
200 a=0:position=70:across=0
210 stave position
220 REPeat loader
230 a=a+1
240 IF a=46:a=45:EXIT loader
250 AT 17,5;PRINT"(Press 'ENTER'
between)"
260 AT 16,5;INPUT "note, duration?
"note$(a),duration(a):CLS 3:CLS 2
270 IF note$(a) INSTR "abcdefgz"
280 ELSE GO TO 260
290 END IF
300 IF note$(a)="c" :pitch(a)=11:h=10
310 IF note$(a)="d" :pitch(a)=28:h=-2
320 IF note$(a)="e" :pitch(a)=24:h=0
330 IF note$(a)="f" :pitch(a)=22:h=2
340 IF note$(a)="g" :pitch(a)=19:h=4
350 IF note$(a)="a" :pitch(a)=15:h=6
360 IF note$(a)="b" :pitch(a)=12:h=8
370 IF note$(a)="z" :a=a-1:EXIT loader
380 d=duration(a)
390 SELect ON d
400 ON d=.5:length(a)=6.25
410 ON d=1:length(a)=12.5
420 ON d=1.5:length(a)=18.75
430 ON d=2:length(a)=25
440 ON d=3:length(a)=37.5
450 ON d=4:length(a)=50
460 ON d=REMAINDER :GO TO 260
470 END SELect
480 drawnote h,d
490 BEEP -1,pitch (a)
500 PAUSE length(a)
510 BEEP
520 END REPeat loader
530 AT 17,5:CLS 3: PRINT "Press any
key to play"
540 PAUSE
550 across=0:position=70
560 FOR b=1 TO a
570 across=across+10:IF
across=160:across=10:position=position—
25
580 INK 7:LINE across,position-5 TO
across+2,position-5
590 BEEP -1,pitch(b)
600 PAUSE length(b)
610 BEEP:INK 4:LINE_R TO -3,0
620 END FOR b
630 INK 2

640 AT 17,3:CLS 3:PRINT "Press any key
to play again"
650 PAUSE
660 GO TO 550
670 REMark ***************
680 DEFine PROCedure stave (position)
690 LOCal a
700 FOR a=0 TO 16 STEP 4:LINE
0,position+a TO 170,position+a:END FOR a
710 END DEFine stave
720 REMark ***************
730 DEFine PROCedure drawnote (h,d)
740 across = across+10:IF
across=160:across=10:position=position—
25:stave position
750 SELect ON d
760 ON d=1:FILL 1:CIRCLE
across,position+h,2:FILL 0:LINE
across+2,position+h TO
across+2,position+h+12
770 ON d=2:CIRCLE
across,position+h,2:LINE
across+2,position+h TO
across+2,position+h+12
780 ON d=3:CIRCLE
across,position+h,2:LINE
across+2,position+h TO
across+2,position+h+12:FILL 1:CIRCLE
across +5,position+1+h,1:FILL 0
790 ON d=4:CIRCLE across,position+h,2
800 ON d=1.5:FILL 1:CIRCLE
across,position+h,2:FILL 0:LINE
across+2,position+h TO
across+2,position+h+12:FILL 1:CIRCLE
across+5,position+1+h,1:FILL 0
810 ON d=.5:FILL 1:CIRCLE
across,position+h,2:FILL 0:LINE
across+2,position+h TO
across+2,position+h+12:LINE_R TO 3,-3
820 END SELect
830 END DEFine
840 REMark ***************
850 DEFine PROCedure instructions
860 AT 3,0:PRINT "This program will
accept up to 45 notes and display them
on a stave. The notes range over an
octave and are in ascending order
d-e-f-g-a-b-c. A time value of 1 gives a
crotchet. Other notes are in
proportion. Press 'ENTER' after
selecting the note and again after the
duration. To terminate type note 'z',
duration 1."
870 AT 17,5;PRINT"Press any key to
continue":PAUSE:CURSOR 0,7:CLS 2
880 END DEFine instructions
890 REMark ***************
```

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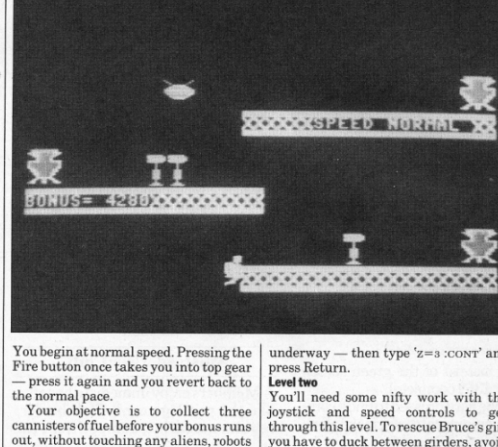


Don your jetpack and tackle the robots in the search for your fair lady in this game from Andy Clarke for you to key in to your Commodore 64.

Bruce for the Commodore 64 presents you with a few tricky problems. You are Bruce, equipped with a jet-pack and searching through robot-infested caverns. Your goal, Bruce, is to find your girl — we assume she's called Sheila . . .

In order to play the game you'll need a joystick in port one.

Playing the game

Level one

At this level you have five lives to play with and can move in eight directions. You begin at normal speed. Pressing the Fire button once takes you into top gear — press it again and you revert back to the normal pace.

Your objective is to collect three cannisters of fuel before your bonus runs out, without touching any aliens, robots or electrified girders. You get 1000 points per cannister but if you lose a life you forfeit the cannisters you're carrying.

To get on to level two without going through the first section you can cheat by pressing Run/Stop while level one is underway — then type 'z=3 :cont' and press Return.

Level two

You'll need some nifty work with the joystick and speed controls to get through this level. To rescue Bruce's girl, you have to duck between girders, avoid aliens and get three fuel pods and the sword.

Moving in only four directions it's advisable to go for the sword first — once you've got it you're invincible. When the sword, three aliens and three fuel pods have been taken the game ends.

Program notes

0-5	Read in data. Colour the screen
8	Gosub sound routines and titles
10	Sets variables
12-22	Set up game. Sprites etc
24-30	Check position limits of our man, Bruce
32-38	Joystick input routine
58-60	Read collisions
62	If all fuel is collected then add remaining bonus to score
66	Prints bonus and decreases it by 20
68	Checks if bonus has run out
70	Continues main program loop. (Level 1)
100-102	Screen messages for speed
120-146	Game over routine
200-216	Set up sprites for the game
220-230	Move the baddies and check limits
250-256	Colour fuel sprites and position
280-282	Alter sprite pictures of robots — makes them 'turn'
300-326	Graphics for first screen
350-396	Routine to display Bruce name sprites
400-490	Sound routines

Listing

```
0 PRINT"{CLEAR}{YELLOW}":POKE53280,0:GOS
UB490
1 TO10:READB:NEXT
2 FORW=1TO10:READB:NEXT
4 FORS=230TO251:FORT=0TO62:READQ:POKES%6
4+T,Q:NEXT:NEXT
5 S=252:FORT=0TO62:POKES%64+T,0:NEXT
8 GOSUB350:GOSUB300:GOSUB380:GOSUB490
10 GOSUB490:FL=5:SC=0
12 PRINT"{HOME}LEVEL 1    LIVES =";FL:FOR
K=1TO1000:NEXT:PRINT"{HOME}
                    "
13 IFFL=0THEN120
14 POKEV+21,0:GOSUB430:GOSUB490:GOSUB200
:O=5:GOSUB260:BO=5000
16 POKEV+23,0:POKEV+29,0:POKEV,30:POKEV+
1,230
18 POKEV+39,2:POKEV+38,12:POKEV+37,7
20 POKEV+21,255:POKE2040,230:POKEV+28,25
5:Z=0:GOSUB1002
22 Y1=230:X1=30:SP=7:MSB=0:G=1:DS=0
24 IFMSB=1ANDX1>=64THENX1=64:GOTO28
25 IFMSB=0ANDX1>=255THENX1=X1-255:POKEV+
16,(PEEK(V+16)+1):MSB=1:GOTO28
26 IFMSB=0ANDX1<=25THENX1=25:GOTO28
27 IFMSB=1ANDX1<=0THENX1=X1+255:POKEV+16
,(PEEK(V+16)-1):MSB=0:GOTO28
28 IFY1>=230THENY1=230:GOTO30
29 IFY1<=50THENY1=50
30 POKEV,X1:POKEV+1,Y1:GOSUB220:POKEV+30
,0:POKEV+31,0
32 JS=255-PEEK(56321)
34 IFJS=0THENGOSUB620:GOTO58
36 IFJS=16THENGOSUB616
38 ONJSGOSUB600,602,99,604,606,608,99,61
0,612,614
58 CO=PEEK(V+30):GOTO500
60 SMA=PEEK(V+31):IF((SMAAND1)=1)THENFL=
FL-1:GOSUB450:GOTO12
62 IFZ=3THENPOKEV+21,1:SC=SC+BO:GOTO98
66 PRINT"{HOME}{DOWN}{DOWN}{DOWN}{DOWN}{
DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{CYAN
}BONUS=";BO;"{LEFT}{YELLOW}{5 V}":BO=BO-
20
68 IFBO<0THENFL=FL-1:GOSUB450:GOTO12
70 GOTO24
98 GOTO1000
99 RETURN
100 PRINT"{HOME}{DOWN}{DOWN}{DOWN}{DOWN}
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGH
T}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RI
GHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}I
RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}
{RIGHT}{RIGHT}{RIGHT}C 3}SPEED {GREEN}THRUST
":RETURN
102 PRINT"{HOME}{DOWN}{DOWN}{DOWN}{DOWN}
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGH
T}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RI
GHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}I
RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}
{RIGHT}{RIGHT}C 3}SPEED {6 JNORMAL ":
RETURN
120 POKEV+21,0:PRINT"{CLEAR}"
122 PRINT"{DOWN}{DOWN}{DOWN}{DOWN}{RIGHT
}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIG
HT}{RIGHT}{RIGHT}{RIGHT}{WHITE}ALL LIVES LOST"
124 FORT=1TO10
126 PRINT"{HOME}{DOWN}{DOWN}{DOWN}{DOWN}
{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOW
N}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RI
GHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}I
WHITE}GAME OVER"
128 FORS=1TO200:NEXTS
130 PRINT"{HOME}{DOWN}{DOWN}{DOWN}{DOWN}
{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOW
N}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RI
GHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}I
WHITE}
                    "
131 FORS=1TO200:NEXTS
132 NEXTT
134 PRINT"{CLEAR}{DOWN}{DOWN}{DOWN}{DOWN
}{DOWN}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGH
T}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{YE
LLOW}SCORE :{WHITE}";SC
136 PRINT"{DOWN}{DOWN}{RIGHT}{RIGHT}{RIG
HT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGH
```

500-514	Check for a significant collision
600-624	These lines are GOSUBed depending on what the joystick input is — from lines 32-38
1000-1006	Titles for Level 2
1010-1046	Screen graphics for Level 2
1048	Gosub tune and set and variables
1049-1056	Set sprite pointers
1058-1074	Set up sprites
1076-1088	Get joystick input
1090-1092	Check for collisions
1094-1099	Check for end of game
1200-1210	Move the aliens
1300-1310	Check for Bruce passing right × position and POKEV+16 with appropriate value
1500-1512	Check for significant collisions with or without the sword
1550	Print score and lives
1900-1912	Check for collisions if Bruce has the sword
2000-2016	Win message
2018-2034	Bruce rescues the girl!
2036-2046	Another go?
20000	Data for ditty
30000	Sprite data — REMMED. Note: Some lines are the same.

Listing (cont)

```
206 POKE2047,237:BS=245
208 X2=50:X3=175:X4=170:X5=50
210 POKEV+3,104:POKEV+5,104:POKEV+9,56
212 POKEV+7,152:POKEV+2,X2:POKEV+8,X5
214 POKEV+4,X3:POKEV+6,X4:GOSUB400
216 RETURN
220 X2=X2+Q:X3=X3-Q:X4=X4+Q:X5=X5+Q:GOSU
B200
222 IFX4)255THENX4=X4-255:POKEV+16,(PEEK
(V+16)+B)
224 IFX4<0THENX4=X4+255:POKEV+16,(PEEK(V
+16)-B)
226 IFX2<50ORX2>175THENQ=-Q
228 POKEV+2,X2:POKEV+4,X3:POKEV+6,X4:POK
EV+8,X5
230 FORT=2041TO2043:POKET,BS:NEXT:RETURN
250 POKEV+10,64:POKEV+16,96:POKEV+11,54
252 POKEV+12,64:POKEV+13,150
254 POKEV+14,25:POKEV+15,102
256 POKEV+44,2:POKEV+45,2:POKEV+46,2:RET
URN
280 SD=BS-240:GOSUB470:BS=BS+1:IFBS=248T
HENBS=245
282 RETURN
300 A=40:B=400:LF=54272:POKE53281,0:T=0
302 FORK=1203TO1223:T=T+5:GOSUB410
304 POKEK,B6:POKEK+LF,7
306 POKEK+A,226:POKEK+A+LF,10
308 POKEK-A,98:POKEK-A+LF,10
310 POKEK+B,B6:POKEK+LF+B,7
312 POKEK+A+B,226:POKEK+A+LF+B,10
314 POKEK-A+B,98:POKEK-A+LF+B,10
316 NEXT
318 FORK=1424TO1444:T=T+5:GOSUB410
320 POKEK,B6:POKEK+LF,7
322 POKEK+A,226:POKEK+A+LF,10
324 POKEK-A,98:POKEK-A+LF,10
326 NEXT:RETURN
350 V=53248:POKEV+21,0:POKEV+33,14
352 POKEV+100:POKEV+2,140:POKEV+4,194
354 POKEV+1,0:POKEV+3,0:POKEV+5,0
356 POKEV+39,2:POKEV+40,2:POKEV+41,2
358 POKEV+28,7:POKEV+23,7:POKEV+29,7
360 POKEV+37,3:POKEV+38,1:POKEV+21,7
362 FORT=2040TO2200:GOSUB410
364 POKEV+1,T:POKEV+3,T:POKEV+5,T+2
366 NEXT:RETURN
380 C1=PEEK(V+39):C2=PEEK(V+40)
382 C3=PEEK(V+41):C4=PEEK(V+37)
384 C5=PEEK(V+38)
386 FORT=0TO40:POKEV+38,T:POKEV+37,T+5
388 GOSUB410:FORD=1TO100:NEXT:NEXT
390 POKEV+39,C1:POKEV+40,C2
392 POKEV+41,C3:POKEV+37,C4
394 POKEV+38,C5
396 RETURN
400 V0=54296:AT=54277:SU=54278
402 WA=54276:HF=54273:LF=54272
404 POKEAT,32:POKESU,255:POKEV0,15
406 POKEWA,23:POKEHF+14,5:RETURN
410 POKEHF,T:RETURN
415 POKEHF,W:RETURN
420 REM****PLAYS TUNE
430 POKEHF+14,0:POKEAT,32:POKESU,255
432 POKELF+3,9:POKEWA,65:POKEV0,15:RESTO
RE
434 READA:IFA=-1THENRETURN
436 POKEHF,A:FORB=1TO150:NEXT
438 GOTO434
439 REM*****CAPTURE FUEL
440 GOSUB404
442 POKEVO,143:POKEHF+14,20
444 FORT=0TO200STEP2:POKEHF,T:NEXT
446 POKEHF,0:POKEHF+14,0:RETURN
449 REM*****LOSE LIFE
450 GOSUB404
452 POKEVO,143:POKEHF+14,20
454 FORT=200TO0STEP-2:POKEHF,T:POKEV+39,
T:NEXT:POKEV+39,2
456 FORT=YI1TO230STEP.5:POKEV+1,T:POKEHF,
T:POKEV+39,T:NEXT:POKEV+39,2
457 POKEV+21,0
458 GOSUB490:RETURN
459 REM*****LOSE LIFE LEVEL 2
460 GOSUB404
462 POKEVO,143:POKEHF+14,20
464 FORT=200TO0STEP-2:POKEHF,T:POKEV+39,
T:NEXT:POKEV+39,2
466 FORT=YI1TO218STEP.5:POKEV+1,T:POKEHF,
T:POKEV+39,T:NEXT:POKEV+39,2
467 POKEV+21,0
468 GOSUB490:RETURN
469 REM*****ROBOT NOISE
470 POKEWA,23:POKEHF+14,5:POKEHF,SD:RETU
RN
480 FORC=54272TO54296:POKEC,0:NEXT:RETUR
N
500 IF((COAND33)=33)THENSC=SC+1000:POKEV
+21,(PEEK(V+21)-32):GOSUB440:GOTO510
502 IF((COAND65)=65)THENSC=SC+1000:POKEV
+21,(PEEK(V+21)-64):GOSUB440:GOTO510
504 IF((COAND129)=129)THENSC=SC+1000:POK
EV+21,(PEEK(V+21)-128):GOSUB440:GOTO510
506 IF((COAND1)=1)THENFL=FL-1:GOSUB450:G
OTO12
508 GOTO60
510 IFQ<0THENQ=Q-2
512 IFQ>0THENQ=Q+2
514 Z=Z+1:GOTO60
600 POKE2040,234:YI=YI-SP:PS=0:RETURN
602 POKE2040,235:YI=YI+SP:PS=0:RETURN
604 POKE2040,233:X1=X1-SP:PS=2:RETURN
606 POKE2040,233:X1=X1-SP:YI=YI-SP:PS=2:
RETURN
608 POKE2040,233:X1=X1-SP:YI=YI+SP:PS=2:
RETURN
610 POKE2040,231:X1=X1+SP:PS=1:RETURN
612 POKE2040,231:X1=X1+SP:YI=YI-SP:PS=1:
RETURN
614 POKE2040,231:X1=X1+SP:YI=YI+SP:PS=1:
RETURN
616 IFSP=7THENSP=15:GOSUB100:RETURN
618 IFSP=15THENSP=7:GOSUB102:RETURN
620 IFPS=1THENPOKE2040,230:RETURN
622 IFPS=2THENPOKE2040,232:RETURN
624 RETURN
1000 GOSUB490:POKEV+21,0:POKEV,0:POKEV+1
,210
1002 PRINT"{CLEAR}{WHITE}{DOWN}{DOWN}{DO
WN}{DOWN}{DOWN}{DOWN}{DOWN}{RIGHT}{RIGHT
}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIG
HT}LEVEL 2"
1004 PRINT"{DOWN}{RIGHT}{RIGHT}{RIGHT}{R
IGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{c 6}LI
VES :{c 3}";FL
1006 FORT=1TO2200:NEXT
1010 LF=54272:PRINT"{CLEAR}":W=10:GOSUB4
00:POKEWA,21:POKEHF+14,20
1012 FORT=106TO1944STEP40:W=W+3:GOSUB41
5
1014 POKET,235:POKET+LF,2:NEXT
1016 FORT=1103TO1983STEP40:W=W-3:GOSUB41
5
1018 POKET,243:POKET+LF,2:NEXT
1020 FORT=1025TO1062:W=W+3:GOSUB415
1022 POKET,242:POKET+LF,2:NEXT
1024 FORT=1985TO2022:W=W-3:GOSUB415
1026 POKET,241:POKET+LF,2:NEXT
1028 POKE1024,240:POKE1024+LF,2:W=W+20:G
OSUB415
1030 POKE1984,237:POKE1984+LF,2:W=W-20:G
OSUB415
1032 POKE2023,253:POKE2023+LF,2:W=W+20:G
OSUB415
1034 POKE1063,238:POKE1063+LF,2:W=W-20:G
OSUB415
1036 A=1186:FORK=1TO5:B=A:W=5
1038 FORD=1TO4:FORT=BTOB+4:W=W+2:GOSUB41
5
1040 POKET,B6:POKET+LF,7
1042 POKET-40,11:POKET-40+LF,10
1044 POKET+40,119:POKET+40+LF,10
1046 NEXT:B=B+10:NEXT:A=A+160:NEXT
1048 GOSUB490:GOSUB400:GOSUB430:SW=0:Z=0
:DA=0
1049 GOSUB1550:IFFL=0THEN120
1050 POKE2040,230:POKE2041,241:V=53248
1052 POKE2042,241:POKE2043,241:POKEV+43,
6:SP=2:PS=2
1054 POKE2044,236:POKE2045,236
1056 POKE2046,236:POKE2047,243
1058 YI=218:T2=60:Y3=210:X1=248
1060 POKEV+2,88:POKEV+4,168:POKEV+6,248
1062 POKEV+8,30:POKEV+9,90:MSB=0
1064 POKEV+10,46:POKEV+11,122
1066 POKEV+12,126:POKEV+13,186:POKEV+14,
30
1068 POKEV+15,60:POKEV+16,144:Q=3:POKEV+
21,255
1070 GOSUB1200:GOSUB1300:POKEV+1,YI:POKE
V,X1
1072 POKEV+3,Y2:POKEV+5,Y3
1074 POKEV+7,Y2:POKEV+30,0:POKEV+31,0
1076 JS=PEEK(56321)
1078 IFJS=247THENGOSUB610
1080 IFJS=251THENGOSUB604
1082 IFJS=254THENGOSUB600
1084 IFJS=253THENGOSUB602
1086 IFJS=239ANDSP=2THENSP=10:PRINT"{HOM
E}{DOWN}{DOWN}{DOWN}{DOWN}{RIGHT}{RIGHT}
{c 3}HIGH":GOTO1090
1088 IFJS=239ANDSP=10THENSP=2:PRINT"{HOM
E}{DOWN}{DOWN}{DOWN}{DOWN}{RIGHT}{RIGHT}
{c 6}NORM"
1090 CO=PEEK(V+30):GOTO1500
1092 IF(PEEK(V+31)AND1)=1THENGOSUB460:FL
=FL-1:GOTO1048
1094 IFZ=3ANDDA=3THENPRINT"{CLEAR}":POKE
V+21,0:POKEHF,0:POKEHF+14,0:GOTO2000
1099 GOTO1070
1200 Y2=Y2+Q:Y3=Y3-Q:POKEV+40,Y2:POKEV+4
1,Y3:POKEV+42,Y2
1202 IFY2>210THENY2=210:Y3=60:Q=-Q
1204 IFY2<60THENY2=60:Y3=210:Q=-Q
1206 SD=BS-240:GOSUB470:BS=BS+1:IFBS=248
THENBS=245
1210 RETURN
1300 IFMSB=0ANDX1>255THENX1=X1-255:POKEV
+16,(PEEK(V+16)+1):MSB=1:RETURN
1302 IFMSB=1ANDX1<@THENX1=X1+255:POKEV+1
6,(PEEK(V+16)-1):MSB=0:RETURN
1310 RETURN
1500 IF((COAND33)=33)THENSC=SC+1000:POKE
V+21,(PEEK(V+21)-32):Z=Z+1:GOTO1512
1501 IF((COAND17)=17)THENSC=SC+1000:POKE
V+21,(PEEK(V+21)-16):Z=Z+1:GOTO1512
1502 IF((COAND65)=65)THENSC=SC+1000:POKE
V+21,(PEEK(V+21)-64):Z=Z+1:GOTO1512
1504 IF((COAND129)=129)THENSC=SC+1000:PO
KEV+21,(PEEK(V+21)-128):SW=1:GOTO1512
1506 IF((COAND1)=1)ANDSW=0THENFL=FL-1:GO
SUB440:GOTO1048
1508 IF((COAND1)=1)ANDSW=1THENGOSUB1900:
GOSUB1550
1510 GOTO1092
1512 GOSUB440:POKEV+30,0:POKEV+31,0:GOSU
B1550:GOTO1092
1550 PRINT"{HOME}{RIGHT}{RIGHT}{RIGHT}{R
IGHT}{RIGHT}{RIGHT}{YELLOW}SCORE:{WHITE}
";SC;"{YELLOW}LIVES{WHITE}";FL:RETURN
1900 IF((COAND3)=3)THENDS=2041:DA=DA+1
1902 IF((COAND5)=5)THENDS=2042:DA=DA+1
1904 IF((COAND9)=9)THENDS=2043:DA=DA+1
1906 K=24B:GOSUB400:SC=SC+1000
1908 POKEDS,K:K=K+1:IFK=253THENRETURN
1910 FORT=1TO50:GOSUB410:NEXT
1912 GOTO1900
2000 PRINT"{CLEAR}":PRINT"{DOWN}{RIGHT}{
RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT
}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{YELLOW}SCO
RE{WHITE}";SC
2002 FORT=1TO5
2004 PRINT"{HOME}{DOWN}{DOWN}{DOWN}{DOWN
}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{RIGHT}{R
IGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{WHITE}CONGR
ATULATIONS
                "
2006 FORD=1TO300:NEXTD
2008 PRINT"{HOME}{DOWN}{DOWN}{DOWN}{DOWN
}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{RIGHT}{R
IGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}
                "
2010 FORD=1TO300:NEXTD,T
2012 PRINT"{CLEAR}{HOME}{DOWN}{DOWN}{DOW
N}{DOWN}{RIGHT}{RIGHT}{YELLOW}NOW {WHITE
}BRUCE{YELLOW} CAN RESCUE HIS GIRL."
2014 FORT=1TO1000:NEXT
2016 FORD=1TO"{CLEAR}"
2018 POKEV,0:POKEV+1,0
2020 POKE2040,235:POKE2041,244:POKE2042,
242
2022 POKEV+2,50:POKEV+3,200
2024 POKEV+4,50:POKEV+5,210:POKEV+23,2
2026 POKEV+21,7:POKEV,150:GOSUB400
2028 FORT=1TO210:POKEV+1,T:GOSUB410:NEXT
:POKE2040,233
2030 FORT=150TO60STEP-1:POKEV,T:GOSUB410
:NEXT
2032 POKEV+21,5:GOSUB490
2034 GOSUB400:GOSUB430:GOSUB490
```

A year after its initial 'launch' the Enterprise micro is at last ready to hit the streets. Stuart Cooke finds out how ready it is to face the final frontier.

LATE STARTER

A company called Elan originally launched the Enterprise in 1983. At the time it was thought to be the greatest thing to happen to home computing since the invention of the microchip. Unfortunately, the machine didn't materialise when promised and only now, after the company has changed its name three times and the projected price of the computer been increased, is it set to materialise in high street shops.

At the original price of £199 the Enterprise completely wiped the opposition away. However, now that most other manufacturers have lowered their prices, the shouts of joy from eager customers and praise from the computer press have been replaced by a sullen silence and the odd comment of "Why are we still waiting?"

First impressions

Well, it's certainly different. With its black case, red, green and blue keys and

extremely futuristic styling the Enterprise looks as though it ought to be under the control of a Wookie on the flight deck of the Millenium Falcon rather than on the dining table of a computer buff.

One of the first things you notice about this machine is the built-in joystick that is situated at the right-hand side of the keyboard. It's a pity that more machines don't have this feature as it certainly is a great plus. Games programs can make use of it without having to give a keyboard option, business and professional programs can use it to move the cursor around the screen. It simply makes life much easier.

Eight function keys are situated at the top of the keyboard. This may not seem to be many but when you realise that they can be used together with the Shift, Control and Alt keys, there are actually 32 available. The only problem with this is remembering which key is assigned to which function.

To make like a little easier there is an area above the keys for an overlay. Unfortunately, the overlay supplied with the machine only has two of the functions on each key marked as there simply isn't enough room for the others.

Moving around the rear of the machine reveals the sockets that connect to the outside world and none of them are standard. Obviously, if you want to cut down the cost of a product you cut down on the number of sockets on the rear. Sinclair did this by making the Spectrum's connector the edge of the circuit board — Enterprise has adopted the same method. Numerous sockets are available at the rear but these are all edge connectors.

Sockets are provided for two controllers (joysticks?), printer and video. The cassette sockets are of the 3.5mm type found on personal stereos. If you connect

ENTERPRISE
SIXTY FOUR

27▶

your headphones or hi-fi to the one marked 'out' the sound from the Enterprise will be replayed in glorious stereo.

Both the left and right-hand sides of the machine have connectors. On the right is the expansion bus which will be used to connect the Enterprise to disk drives, etc when they appear. Judging by the amount of time it took for the machine to make an appearance we could be waiting a very long time. Around the left-hand side of the machine is the cartridge slot. The machine has no Basic built in and a cartridge is supplied for insertion into this socket. When (or if) any other languages become available you will be able to insert them instead of the Basic, thereby saving valuable RAM.

Examining the keyboard more closely shows it is exactly the same type as the much criticised keyboard on the Sinclair QL. Unlike the QL keyboard, this one is actually quite good to use, even if the first touch does make you cringe. Though the keys have a spongy feel, there is an option to have a click sound eminate from the built-in loud speaker (and headphones if connected) so that you can tell when you have pressed a key. This facility makes it much easier to touch type.

The joystick to the right of the keyboard works on the same membrane principle as the keyboard. When you move the joystick to the left it pushes down on the rubber mat. However, the joystick has no feel to it and is rather reminiscent of the old Atari type, the ones you couldn't tell if you had made a contact with. But with this model, whenever you move the joystick a click emanates from the speaker.

First impression of the Basic is that it is extremely long-winded. Most versions of Basic now use abbreviations for their command words. Enterprise, however, has gone back a few years and just as with Cobol, everything has to be typed out in full — CLS has been replaced with CLEAR SCREEN. This does have one good thing going for it — programs are extremely readable. There is no mention of abbreviations in the manual. Even the Commodore and BBC whose Basics aren't anywhere near as long-winded allow abbreviations of the keywords to be entered, so why not the Enterprise?

Documentation

This certainly falls a long way short of perfection. A quick glance through the 229 pages is enough to put even the most hardened computer buff off using it. My feeling is that it is written for people with a master's degrees in astro physics rather than a computer novice.

Yes, the manual does attempt to teach you how to use the machine, it just doesn't do it very well. The information is in there somewhere but finding it is another matter. For example, the section that deals with graphics could do with a table that tells you the number of colours and the resolution of each mode. Instead this information is buried within the text.

Anyone who wishes to use the Enterprise with machine code can simply forget it. A grand total of three pages is given over to this subject and all this does is explain how to reserve memory for your program and how to call your routine. No doubt some bright spark will make quite a bit of money by producing a beginner's guide to machine code on the Enterprise. To be a little fairer to Enterprise, there is a section at the back of the book that lists all the available commands and their functions. If you can already program on another computer it is probably advisable to read this section rather than the front of the manual, only moving further back if something is not clear.

For a machine that has a large array of connectors there is one great omission — a description of the connectors. Nowhere in the manual could I find how to connect a printer, external joystick or monitor. Nice one Enterprise, everyone will have to buy their leads from you.

A word processor is supplied on ROM and a chapter is included which explains its functions. The following chapter describes the function keys that can be used with it. But if you aren't given the pin out for the printer connector, what are you going to use the word processor for?

In use

For a start, the power supply produces a very loud buzzing sound. I can only hope that this was the transformer supplied with my machine and is not going to be a common problem.

Power up greets you with the name Enterprise flashing in multi-colour characters on the screen. Unfortunately, on my Fidelity portable TV which works perfectly well with every other computer the colour promptly disappeared never to return. The TV still works with other computers in colour. A second TV proved to work perfectly with the computer and the picture and colours are extremely clear.

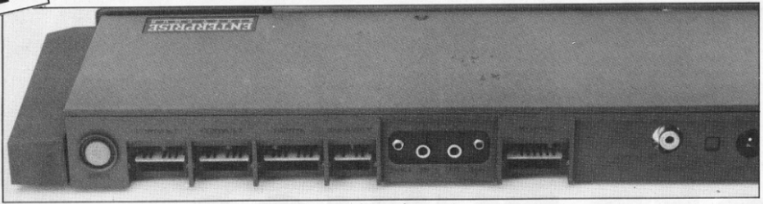
Enterprise boasts 256 different colours on the machine. Obviously it is not possible to get every colour totally different and most of them are simply different shades of blue, red etc. This is extremely useful when producing games and pictures because by using the shading carefully you can create the illusion of depth.

A demonstration cassette is supplied with the machine and this will probably be the first thing that new owners look at. According to the description there should have been numerous sound, graphic and program examples on it. In fact I could only load a couple of the programs and the only way I could hear anything on the second side of the cassette was to replace the cassette in my hi-fi and then turn the volume up full. Somewhere along the line something went wrong with the duplication. How many people are going to get duff tapes this year?

My first reaction to the non-functioning cassette was to assume that it was caused by a bad cassette interface. Saving and loading my own programs on to cassette soon proved this to be untrue as it worked very well. One extremely nice touch is the level meter which appears at the top of the screen when loading. This consists of a green and red block. When the green block is lit the ▶

The Basic plugs in to the cartridge slot. The second connector is the expansion bus where the peripherals plug in.

HARDWARE PRO-TEST: ENTERPRISE



All of the sockets have more standard connectors and no pin out is given in the annual.

load is going okay, if the red block is lit your cassette volume needs to be adjusted. The manual says that an occasional flash of the red bar is all right; in fact I found this to be the best level for loading programs.

One feature that has been hyped up about the Enterprise is the provision of no fewer than four sound voices and a stereo sound facility. I was surprised to find that no sound is output through the TV speaker, instead a speaker is built into the machine. This gives a sound quality more reminiscent of the beeper on the Spectrum than a four channel synthesizer.

The only way to get decent sound out of it is to plug the output into your hi-fi. Here, again, I got into problems. The stereo sound output is present on the cassette output socket. This means that if you wish to save programs and listen to the sound you will have to keep swapping the plugs at the rear of the machine.

Unlike some other versions of Basic the one on the Enterprise does have commands to control sound output from the machine. As previously mentioned, the Basic is long-winded and the sound statement takes the form:

SOUND PITCH no., LEFT leftvol,RIGHT rightvol,DURATION length, ENVELOPE number, SOURCE voiceno, SYNC voice

Though it would have made more sense if it could be abbreviated, it does make a change to have a Basic that gives a statement for all available functions without having to rely on pokes.

Commands to control the graphics are also in abundance. There are separate commands for setting the graphics mode, choosing the colours you wish to use and plotting a range of different shapes. Logo style commands are present for those wanting to draw lines. These are PLOT ANGLE, PLOT FORWARD, PLOT BACK, PLOT RIGHT and PLOT LEFT. These are extremely useful for drawing axes and graphs. PLOT PAINT is used to fill in areas of the screen while the RGB commands allow you to select which quantities of red, green and blue a specific colour number is going to be made of. This command has strange parameters as full red, green and blue is RGB (1,1,1) and if you want to use any less the numbers should be less than one. Surely it would have been easier to work in hundreds so that you could build up a colour of say 30 per cent red, 30 per cent green and 40 per cent blue.

Probably the greatest omission on the graphics side of the machine is sprites. A machine with such stunning graphic facilities should have come with at least eight sprites to make games programming much easier.

The Enterprise is actually a nice machine for programming on. Line syntax is checked whenever a key is pressed so you don't have to wait until a program is run before you find you've made an error. Correction of a line is made very simple by the inclusion of a full screen editor under control of the joystick. If an error is present on a line you simply zip the cursor up to the offending error, insert or delete using the keys to the top right of the keyboard and then hit Return. Unfortunately, you have to press Return to correct the line and if you don't the changes will not be made. If the corrections were made to the line stored in memory while you were editing, it would be a lot easier to use. It is quite easy to forget to press the Return key if you are correcting a number of lines.

The joystick is also used for editing a document when you enter the word processor. Entry to this is made by typing the word TEXT, but this erases any programs that are held in memory. On entry the word processor is in 40-column mode. This is easy to read and is probably the only way to use the program on a TV set. One of the function keys will switch the program into 80-column mode. This isn't very clear on a TV but no doubt will be readable on a monitor.

Most of the functions that you would expect from a basic word processor are there. Nearly all of the commands are available from the function keys. To make life easier for you the names of the commands given to each key are at the top and bottom of the screen. Once you get used to using the word processor you can remove these so that you can see more text.

There are a couple of major gripes about the program. The first may seem a little trivial but is actually most important when producing documents — there is no provision for putting headers and footers on each page of printed text. The second problem concerns switching between 40 and 80 columns of text. Since it is hard to read 40 columns on a TV set it would make sense to input the text in 40 columns and then switch to 80 columns so that you could see what your document would look like on paper. Unfortunately switching between display modes erases all of the stored text.

One area where the Enterprise wins over some of its competitors is its structured programming statements. These include procedures, IF . . . THEN . . . ELSE loops, etc. They are a great plus for anyone who would like to move up to a higher level language at a later date and, together with the very long Basic statements, should make a program as easy to understand and follow.

Verdict

A year ago the Enterprise would have stood out as a market leader. Today, with Sinclair, Acorn and Commodore and perhaps MSX all becoming household names, it will probably have a much harder time making an impact. Even so it's not a bad machine. The Basic, for all its length, is extremely good and should prove easy to use especially for the beginner.

However, if the Enterprise is going to be a first computer I would wait until someone produced a beginner's introduction, which no doubt they will. I don't think I'd save up to treat myself to an Enterprise, but if I had the spare cash it would be well worth considering.

SPECIFICATIONS

Price	£249.95
Processor	Z80
RAM	64K
ROM	32K
Storage	Cassette
Display	Max text 84×56, max graphics 672×512, number of colours 256
Interfaces	2 controllers, printer, video, cassette, cartridge
Keyboard	69 keys plus joystick
Distributors	Retail

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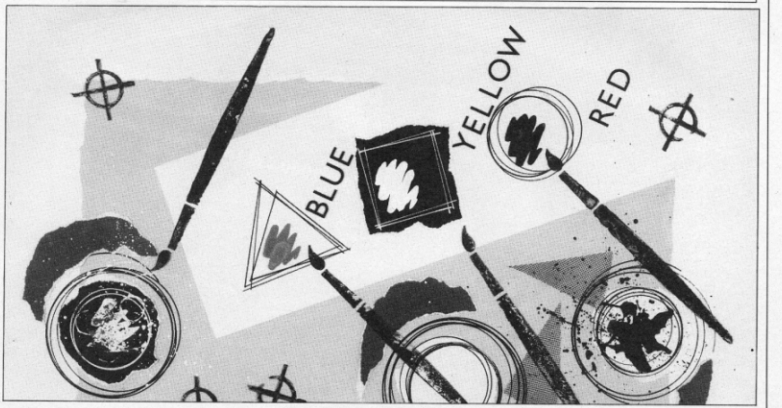


Oric 1 and Atmos micros have two modes of screen display, a text mode of 40 columns by 28 lines and a high-resolution mode (HIRES). This high-resolution display allows access to 48,000 pixels, 240 pixels by 200 pixels, with each pixel individually addressable from Basic. In addition, a text window of 40 columns by three lines is displayed at the bottom.

This respectable resolution is well supported by a comprehensive list of Basic commands. However, there is one function missing, a PAINT command. This article attempts to fill that gap by supplying a machine code routine that will paint an enclosed shape in the foreground colour.

First, the high-resolution cursor is positioned within the shape to be painted using the CURSET command in Oric's Basic. The routine then interrogates each pixel to the left of the cursor position until the shape boundary is reached, colouring each pixel with the foreground colour as it moves. The exercise is repeated for each pixel to the right of the cursor position until the right hand boundary is reached.

One line of the shape has now been painted with the foreground colour. This process is repeated until the whole shape is coloured.

Routine creation

Listing 1 is the Basic loader to create the machine code. Type this in and save it on cassette. Once saved, you can run the program.

The first screen asks for the start address for the routine. An address for

Listing 1

```
1 CLS
2 PAPER#1:INK3
3 POKE#26A,2
4 PRINT
5 PRINTSPC(8)CHR$(138)+"PAINT ROUTINE FO
R ORIC 1"
6 PRINTSPC(8)CHR$(138)+"PAINT ROUTINE FO
R ORIC 1"
7 PRINT:PRINT
8 PRINTSPC(12)CHR$(138)+"AND ORIC ATMOS"
9 PRINTSPC(12)CHR$(138)+"AND ORIC ATMOS"
10 PLOT4,20,"Suggest 38725 for 48k and 5
9937"
12 PLOT11,21,"for 16k machines"
13 PRINT:PRINT:PRINT:PRINT
14 PRINT"enter start address"
15 PRINT"of routine":INPUT"     ";ADDR
16 CHECK=0
17 WAIT50
18 CLS
19 PLOT4,10,"PROGRAM BEING CREATED -PLEA
SE WAIT"
20 FOR LOOP=0 TO 186
21 READ CODE$
22 CODE=VAL("&"+CODE$)
23 POKE ADDR+LOOP,CODE
24 CHECK=CHECK+CODE
25 NEXT
26 DOKE ADDR+9,ADDR
27 DOKE ADDR+50,ADDR+87
28 DOKE ADDR+69,ADDR+87
29 IF CHECK<>17099 THEN 200ELSE CLS:END
30 PRINT"Your version of the PAINT routi
ne has"
31 PRINT"now been created. It is suggest
ed that"
32 PRINT"you SAVE the routine before run
ning."
33 PRINT:PRINT:PRINT
34 PRINT"To SAVE at 1200 baud type:-":PR
INT
35 PRINT" "CHR$(133)"CSAVE "CHR$(34)"
PAINT"CHR$(34)",A"ADDR",E"ADDR+186
36 PRINT:PRINT:PRINT
37 PRINT"To SAVE at 300 baud type:-":PRI
NT
38 PRINT" "CHR$(133)"CSAVE "CHR$(34)"
PAINT"CHR$(34)",SA"ADDR",E"ADDR+186
39 PRINT:PRINT:PRINT
40 PRINT"To USE the routine type:-":PRIN
T
41 PRINT" "CHR$(134)"CALL"ADDR+6:PRINT
42 PRINT"Please read the instructions fi
rst."
43 END
100 DATA 20,10,08,84,02,81
101 DATA A6,0E,BD,A8,41,85,38,A5,10,85,3
9,A5,11,85,3A,A8
102 DATA 88,B1,39,25,38,F0,14,18,A5,10,6
9,28,85,39,A5,11
103 DATA 69,00,85,3A,B1,39,25,38,F0,14,6
0,20,00,00,38,A5
104 DATA 39,E9,28,85,39,A5,3A,E9,00,85,3
A,18,90,D3,20,00
105 DATA 00,18,A5,39,69,28,85,39,A5,3A,6
9,00,85,3A,18,90
106 DATA D3,A5,38,85,35,A5,39,85,36,A5,3
A,85,37,81,36,25
107 DATA 35,D0,21,B1,36,05,35,91,36,06,3
5,A5,35,C9,21,90
108 DATA EC,A5,36,E9,01,85,36,A5,37,E9,0
0,85,37,A9,01,85
109 DATA 35,18,90,D9,A5,38,85,35,A5,39,8
5,36,A5,3A,85,37
110 DATA 46,35,D0,11,18,A5,36,69,01,85,3
6,A5,37,69,00,85
111 DATA 37,A9,20,85,35,81,36,25,35,D0,0
9,81,36,85,35,91
112 DATA 36,18,90,DC,60
200 CLS
201 PLOT2,5,"An error has occurred."
202 PRINT
203 PRINT
204 PRINT "Please check the program agai
nst the listing supplied."
205 PRINT
206 PRINT
207 PRINT"Press any key to list DATA sta
tements"
208 GET A$
209 POKE #26A,3
210 LIST 100-112
220 REM type ? instead of PRINT in lines
 35 & 38
230 REM for £ type hash
```

Listing 2

```
5 HIMEM#1000
10 HIRES
20 INK3
30 CURSET45,100,0
40 CIRCLE38,1
50 CIRCLE13,1
60 CURMOV50,38,0
70 DRAW60,0,1:DRAW0,-60,1:DRAW-60,0,1:DR
AW0,60,1
80 CURMOV80,0,1
90 DRAW60,0,1:DRAW-30,-52,1:DRAW-30,52,1
100 REPEAT
110 READX,Y
130 UNTILX=285
140 DATA44,98,26,98,45,80,45,119,124,99,
196,117,205,89
```

Listing 3

```
150 GOSUB500
160 END
500 X=120:Y=100:POKE775,15
510 REPEAT
520 CURSETX-2,Y-3,3
530 CHAR43,0,2
540 GETA$:A=ASC(A$)-7
545 IFA$=" "THENPRINT"CURSET"X","Y",0"
550 ONAGOSUB600,700,800,900
560 CHAR43,0,2
570 UNTILA$=CHR$(13)
580 POKE775,39
590 RETURN
600 X=X-1:IFX<3THENX=3
610 RETURN
700 X=X+1:IFX>256THENX=256
710 RETURN
800 Y=Y+1:IFY>195THENY=195
810 RETURN
900 Y=Y-1:IFY<4THENY=4
910 RETURN
```

Listing 4

```
60 HIRES
70 PAPER4:INK2
80 POKE£26A,10
150 CURSET119,40,3
160 REPEAT
170 READ A,B
190 DRAWA,B,1
200 UNTILA=-.1
210 DATA1,7,-9,5,3,2,-5,4,5,1,6,-4,12,5,
-6,14,-7,3,5,0,-6,5,1,2,6,-2,8,7
220 DATA4,16,5,2,11,13,-1,2,-8,-3,8,7,-2
,7,2,1,2,-5,9,1,1,9,-12,16,1,2,1,-2
230 DATA3,2,3,-2,3,2,-8,8,-2,-2,-4,4,-6,
-3,-11,1,-11,3,-4,-3,-5,3,1,3,-7,1
240 DATA-3,-2,-7,4,-1,2,-3,1,-1,-2,-3,1,
-1,-3,6,-2,1,-3,4,-1,3,-7,5,-2,9,-1
250 DATA5,-7,-9,5,-6,-4,-2,2,-1,-2,-3,-2
,-7,4,-2,-4,2,-2,13,-7,1,-10,-5,1
260 DATA0,-3,5,-5,10,-1,1,-5,-2,-2,3,-4,
-4,1,-4,-9,4,-6,-7,3,-3,1,-1,2
270 DATA-5,-2,-3,1,-1,-4,5,-7,-1,-7,-1,-
5,3,-1,-2,-3,-4,3,-2,-2,-1,-4,-2,0
280 DATA-3,11,-3,2,2,-8,2,-9,5,-1,1,-2,-
3,1,-4,-3,4,-1,-1,-3,3,-1,1,-5
290 DATA-3,-1,1,-4,6,-2,-1,-4,4,1,1,-3,5
,-2,3,2,8,-3,3,4,-.1,0
300 REPEAT
305 READZX,ZY
310 CURSETZX,ZY,0:CALL<<ROUTINE ADDRESS>
>
320 UNTILZX=96ANDZY=171
330 DATA104,50,102,101,105,39,116,39,120
,57,97,43,94,76,87,75,86,78,85,82,96
340 DATA101,102,101,127,138,156,134,160,
158,124,84,91,65,115,111,151,120,155
350 DATA157,155,163,149,165,122,167,107,
167,93,174,92,150,103,150,111,150
360 DATA92,66,102,130,96,171
```

both the 48K and 16K models has been suggested which will place the code at the top of user RAM when in HIRES mode. It is possible, however, to use any address in RAM as long as it isn't overwritten by other functions.

Enter the address and press Return. The program will now create the machine code routine.

When the code has been created the program will terminate, displaying both the slow and fast speed instructions to save the routine. Also displayed is the CALL address to allow use of the routine. Make a note of this information and save the machine code.

In use

Type in Listing 2 and run it. The program will draw a circle, a square and a triangle in high-resolution mode. Note that the dots in each shape show where the cursor is positioned before the routine is called.

To paint the square type:

CURSET 124,99,0: CALL <routine address>

Both instructions must be on the same line. Now paint the circle using:

CURSET 45,80,0:CALL <routine address>

The other circle is only partially painted because the inner circle forms an obstruction to the routine and creates a shadow.

To get around this problem it is necessary to paint the object from more than one cursor position:

CURSET 45,119,0: CALL <routine address>
CURSET 26,98,0: CALL <routine address>
CURSET 64,98,0: CALL <routine address>

To paint in the triangle use:

CURSET 196,117,0: CALL <routine address>

This demonstrates the other consideration of the routine. It will only 'paint' until it finds a boundary line immediately above or below the cursor position. So take care when you choose the position.

To complete the rest of the triangle type:

CURSET 205,89,0: CALL <routine address>

Routine aids

The program in Listing 3 assists in locating the cursor position within an object. Append this to Listing 2 and run.

The cursor will appear as a cross in the middle of the screen. Using the cursor keys, position the centre of the cross at the required location and press the Space key.

The CURSET instruction to obtain this position will now be displayed at the bottom of the screen.

If a printer is attached to your machine, changing the PRINT statement in line 545 to an LPRINT will cause the CURSET instruction to be printed.

To obtain a demonstration, type in Listing 4, entering your own routine address in line 310.

Save this to cassette. With the machine code routine loaded, run this program to see an example of the full capabilities of the routine.

IN A BBC CON-TEXT

One picture may be worth a 1,000 words, but these text-only adventures for the Beeb prove that words can still pack a punch, says Mike Gerrard.

The current paucity of Beeb adventures is due to a delusion suffered by software houses that the programs must have graphics, which the machine's memory won't stretch to. Luckily, these three games prove words can be more evocative than pictures.

Horror house

In *Castle Dracula* it appears Transylvania is still not safe and it's up to you to enter the castle and serve the Count a lightly grilled stake. The storyline creaks like an old staircase, but the humour remedies that: not by accident is the empty bottle in the maid's room, and guess why they call it a Whine Cellar? And how did Nicholas Parsons get in here?

I was never quite sure what was going to happen next. At one point a suit of armour blocks your progress — after much fetching, carrying and experimenting I moved it; unfortunately it then began to clank resolutely after me. Then another wretched creature joined in, throwing things at me.

Later I made it to the safety of the kitchens, where I spotted some garlic. Even experienced adventurers know about such things. Hang on, what's this? The smell's too much for me and I'm undead! 'Fangs for playing.'

With a well-designed screen layout, and quick responses, *Castle Dracula* shows a nice line in horror — and that's only the jokes.

Wish upon a star

The best of the trio is Acornsoft's *The Seventh Star*. I began by the wreckage of a spacecraft, from where with just a bucket, crowbar and a micro I hoped to return to Earth. Heading north I was soon outside a large city, where a sentry asked my name. Playing safe I said Tony Bridge, but the sentry let me through anyway and gave me a number. I then arrived at a marketplace, where the BBC's sound was effectively used to create the impression of a bustling alien population.

With one or two items I'd collected on the way I obtained a large wad of money, and then I found a gadget shop where I could choose from three items on display: a new battery pack, an electronic scanner and a briefcase. Feeling I was sure to need all three, I bought the scanner, whereupon the shop owner relieved me of some money. The inventory showed I now had a smaller wad of money . . . just enough to buy a briefcase, in fact.

After a fierce encounter with an old lady in a charity shop, who showed remarkably little charity to me, I had to begin again. Next time, I roamed the city till I found a grating that took me to some slimy passages. Here I met a robot who was obviously related fairly closely to Marvin the Paranoid Android, but he couldn't help me move the rubbish from which came some moans.

After a while we found ourselves, via a different route, back in the city, and outside a phone box. In I went and tried the inevitable: 'phone home'. It can't have been that inevitable as it asked me what to do with the phone, whereupon I told it, only to be struck by a huge thunderbolt from the heavens, so that was the end of that little escapade.

I'd only scored 6 points out of 100, too. No sense of humour, some adventure writers. Washing my mouth out I returned to the fray.

The Seventh Star is the latest in a fine series of adventures from Acornsoft, well-written, and with not a picture to be seen. But once you get stuck in you don't really miss it.

Terse law

Last and least of the three is the Electron adventure, where the text has taken a turn for the terse. It does, however, offer some mind-bending puzzles: like how do you take a key into a location where you're not allowed to take anything? The adventure is *The Staff of Law* from Potter Programs. 'You have been summoned to the land of Arda, as the chosen one by the Lord Moram,' you're told. The Despiser has taken the Staff of Law and corrupted its power. Only the chosen one can wrest the Staff of Law from the Despiser, and so restore peace and harmony to the land of Arda. Are you up to the task?

Well, not on a screen like this — yellow text on a red background? Enough to give you the screaming ab-dabs, so switching to black and white I find I'm in a hallowed chamber in the company of a stone slab and an exit north. Fixed descriptions are at the top of the screen, with commands and responses scrolling through several closely-packed lines of lower case at the bottom. All in all, not the best adventure layout I've ever seen.

Moving the slab revealed steps that led to a fire chamber where you find a 'beater', with which you beat something out of the courtyard via a drawbridge that's down (well we all have days like that) explore the countryside, a cave, a riverbank and a fairground.

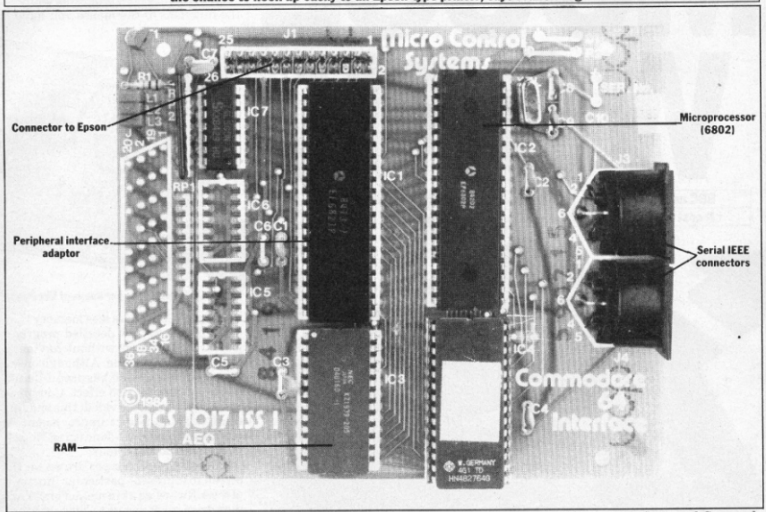
There's little sense of atmosphere: the fairground, for example, seems to exist simply because the author decided a tent pole would come in handy somewhere.

There are, however, some tough teasers, and I'm stuck over an ingenious poser involving a platform which you can raise by tugging at a rope attached to a pulley. You can get off the platform half-way up and step into a chamber where there's a locked door. Now you've got a key with you, but you have to put it down on the platform in order to pull at the rope. If you pick up the key when you reach the chamber, that means dropping the rope and down you plunge. With nothing to tie the rope to, I'm well and truly stuck.

PERIPHERALS PRO-TEST: COMPRINT

PRINT CONNECTION

The Comprint interface, with its built-in software, gives Commodore owners the chance to hook up easily to an Epson-type printer, says Francis Jago.



The Comprint package, which allows Commodore owners to plug in an Epson printer, is something of a novelty as it has the necessary software built-in.

Features

The package consists of a circuit board which plugs into the same slot as an Epson expansion interface. The board is then screwed firmly into place and is ready for use. The software is on one 2764 8K EPROM, as in the BBC, and with the cable provided, it plugs in easily.

With the board installed, you must set the printer's dip switches, depending on whether you are using an RX, FX or MX printer. The controlling software uses the four printer operation commands — OPEN, CMD, PRINT, and CLOSE, all followed by a logical file number. All data sent to the printer after one of these four commands is easily controlled by secondary addresses. These are numbers which set such features as lines per page and the definition of programmable characters.

One of the best features of the software is the complete control you have over formatting the printed output. This includes left and right justification, as well as the positioning of decimal points.

Another nice feature is the way the software provides complete emulation of a normal Commodore printer, such as the MPS 801 or 802. This means that the Epson can print all Commodore graphics and, using the screen dump from Simons Basic, produce higher quality dumps than from a normal Commodore printer (the print quality of which is not as precise as an Epson).

In use

It is impressively easy to produce all the available print types, such as enhanced and programmable characters, in any combination. The software uses CHR$(N) to send commands to the printer, with n as a number varying from 1 to 254.

To define a character on the printer you should lay out an 8×8 matrix, or 11 × 9 if using an FX80. Next, adding up the binary value for the dots in each column, these are used as data in the program to define the character. Being able to put multiple programmable characters on one line makes detailed drawings on a small scale possible.

When using the printer with a word processor, the 2K buffer speeds up the process appreciably. Although the special characters included in the software are specifically limited to maintain compatability with the usual Commodore printers, they are still comprehensive enough to include facilities, such as paging and carriage returns, without line feeds.

The manual supplied with the Comprint contains all the information necessary to program any Epson printer. It produces a finished article better than is usually associated with a Commodore machine.

Verdict

Overall, the Comprint interface, with its built-in high-quality software, presents excellent value for money, and a worthy purchase for any Commodore 64 or Vic 20 owner who doesn't want to buy a Commodore printer. The software is well-written, concise, and takes up no basic RAM from the computer; in fact, it beats its rivals on several counts.

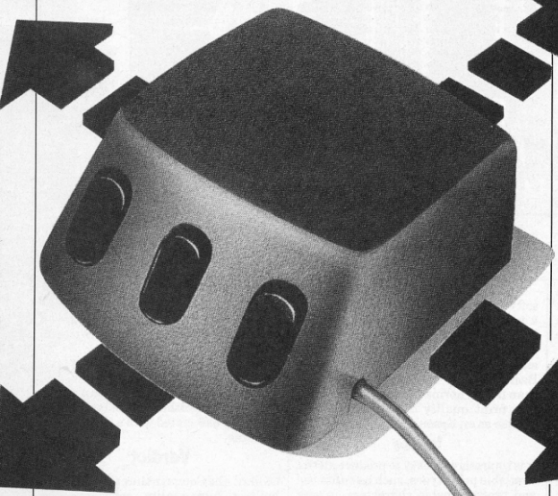
REPORT CARD: 1 TO 5

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

Name Comprint **Price** £61.99 **Distributor** Mail order, Micro Control Systems (0773-769011).

MOUSE WORK

BBC users shouldn't be slow to nibble the bait offered by AMS's mouse. It cost less than £100 and is well worth every penny, says Francis Jago.



Using a mouse as a keyboard alternative to make computers more user friendly is not a new idea. Apple's Lisa was the first and the smaller, cheaper Macintosh is the most famous implementation of mouse technology. These systems, however, are much too expensive for most home micro users. Now all this has changed, because for under £100 Advance Memory Systems is offering a mouse for the BBC Micro.

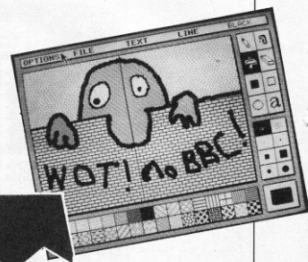
Features

The AMX Mouse package consists of the mouse, two manuals, two software packages and one 8K EPROM. Because of the popularity of EPROM software for the Beeb, most serious users will already have fitted a ROM board in their machines. Unfortunately, the EPROM in this package needs to be inserted into the highest priority socket, and this generally entails moving the Basic ROM one slot to the left.

Once the ROM has been fitted, you need only plug the mouse into the user port, load the software and you're away. The software is available in three formats — 3in and 5.25in disk and cassette.

The mouse itself is a small black box with three red buttons on the sloped front. Each button can be programmed to control a variety of functions such as Return, Copy, Delete and the cursor keys. You can incorporate these controls in your own programs using the *BUTTONS command. In fact, incorporating any of the mouse features in your own programs is made remarkably easy by the provision of several *commands in the ROM.

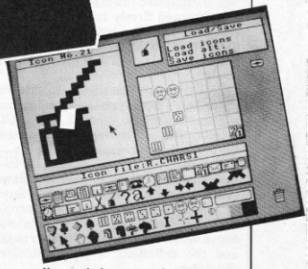
To write your own programs using all the functions of the mouse you have to use Mode 4. This uses less memory than other modes so that detailed programs can still be written without having to resort to machine code. Although only a two colour mode, AMS has used different shades of grey to good effect. Combined with the 64 icons provided, this shading constitutes a distinct improvement on what could have been done using Mode 1, despite the lack of colour.



AMX Art is a mirror image of MacPaint.

Icons are small shapes drawn on the screen to represent particular functions of the software, *eg* a bin means 'erase' or a disk drive gives access to 'disk utilities'. When the mouse is moved so that the cursor is positioned over an icon, pressing the execute button on the mouse selects that particular function.

Once you are in Mode 4, the first command to use is *DESK which clears the screen and replaces the black background with a dark grey formed of black dots on a white screen. You can then start to create menus and title screens suitable for your particular



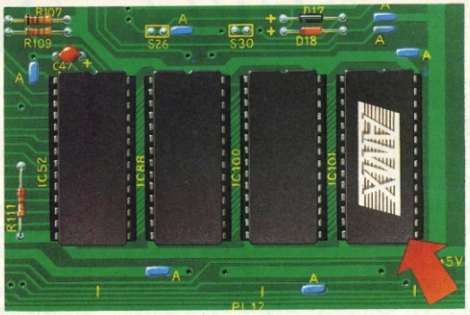
You can design your own icons, too.

program. A menu is easily created using the *WINDOW command, and once defined it remains on the screen as a separate window.

Altogether there are 15 *commands on the ROM as well as some detailed information on the icons. These commands include *BREAK which has the same effect as pressing the Break key, and the more complicated *POINTER ON/OFF which combines with the *BREAK function to enable and disable the mouse.

Verdict

In my view the AMX Mouse is the leading contender for the title of Peripheral of the Year. In all fields except perhaps cosmetics, the device is superb. The software on ROM makes programming it extremely easy, even for the novice. At £89.95 it is a bargain.



Part of the impressive AMS mouse software comes on an 8K EPROM, which occupies the highest priority slot on the ROM board — this generally entails shifting the Basic ROM one slot to the left (see above).

Software

One of the most impressive aspects of the AMX system is the supplied software — not so much because of what it does, but the promises it holds for future programs.

In addition to the hardware, you receive two programs: AMX Art and Icon Designer. As its name suggests, the latter is a utility program that allows you to design icons for use in your own programs.

You can work on two sets of 31 icons using the mouse as a graphic pointer. The screen display shows both sets of graphics, with a large window containing the icon currently available for work.

You can select any icon from the two sets, then drag it to the working window where you can erase or paint individual pixels. A smaller window shows the design in actual size. Once you are satisfied with the design, pick it up and drag it back to the main set.

A final, useful feature, is a multiple-icon window which allows you to put several icons together to see how they look as a single 'mega-icon'.

Still more impressive is AMX Art. A single glance shows its heritage — apart from the fact that the screen has been mirrored, it looks identical to Apple's Mac Paint on the Macintosh. All of the old favourites are here including pull-down menus, windows, a box of tools, and a box of textures for painting.

Operation is very close to Mac Paint too. Using the mouse, you can select a tool from the toolbox, move to the blank area and begin drawing. You can select a variety of brushes, spray paint cans, erasers, rubber-banding, boxes and circles.

You can also add text in a variety of styles. Although you are limited to one typeface, you can select bold, italics and underline modes in any combination.

Sadly, some of the Macintosh's more advanced features are missing. For instance, there are no zoom or cut and paste facilities.

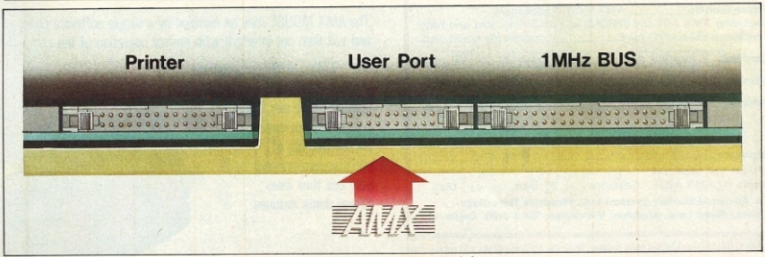
Nevertheless, this is an exceptionally good piece of software. Print options for producing hard copy of your design are comprehensive, and the whole thing runs at lightning speed. Given an 8-bit processor and the BBC's memory limitations, AMX Art is impossible to criticise.

Peter Worlock

REPORT CARD: 1 TO 5

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

Name AMX Mouse **Price** £89.95
Distributor Mail order from Advanced Memory Systems 0925-602690/62907.



Mouse hole: the Advanced Memory Systems mouse connects into the BBC's user port, as arrowed above.

AMX ART

AMX MOUSE

The AMX MOUSE is an advanced opto-mechanical device which brings to the B.B.C. micro facilities hitherto only available on more expensive machines. It enables you to use advanced features such as ICONS, WINDOWS, and POINTERS in your own programs.

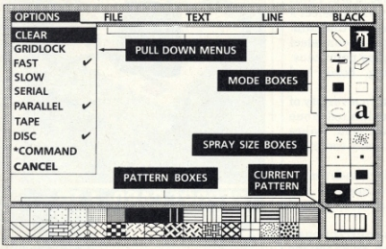
The AMX MOUSE can be used with ordinary programs to replace the cursor keys and with the AMX software it turns the B.B.C. micro into a far more user-friendly device, enabling beginners to quickly learn to use the computer for a wide range of purposes, including COMPUTER AIDED DESIGN, Word Processing, and a host of business uses – to say nothing of its inclusion in games software.

A further range of software will be released in 1985. Starting with "DESK TOP MANAGER".

THE AMX MOUSE PACKAGE

The AMX MOUSE – an advanced three buttoned mouse which simply plugs into the B.B.C. user port drawing its power from the computer.

AMX ART GRAPHICS PROGRAM



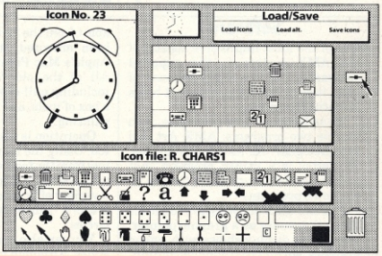
The AMX ROM – contains fast machine code routines for creating on screen windows, icons, and pointers and enables to MOUSE buttons to be programmed for use with commerial software such as Wordwise and VIEW.

A MANUAL describes how to operate the MOUSE and the ROM routines which are available in both basic and machine code programs.

AMX ART – a superb computer aided drawing program on both tape cassette and a 5¼" floppy disc with its own manual. It is suitable for a wide range of uses including preparation of illustrations, architectural and engineering detail drawings, teachers' worksheets, and just creating your own pictures. It soon becomes addictive.

AMX ART includes full use of on screen menu boxes, icons, and pull down menus so that beginners find it very easy to learn and gain confidence in the use of the B.B.C. Micro.

An ICON DESIGNER program which enables you to create and store icons for use in your own programs.



ICON DESIGN PROGRAM

TECHNICAL REQUIREMENTS

The AMX MOUSE can be used with any B.B.C. Model B computer fitted with the Operation System 1.2 and is compatible with the second processor and disc or tape filing systems.

The AMX MOUSE is adjustable for sensitivity via software control and three buttons can be programmed to simulate 24 different key codes.

The AMX MOUSE may be disabled by a simple software command and will then not interfere with normal operation of the computer.

The AMX ART programme enables users to print out screen displays using any Epsom compatible dot-matrix printer. Owners of non-standard printers may use their own screen dump routines.

'Wordwise' is a wordprocessing program by Computer Concepts.
'View' is a word processing program by Acornsoft Ltd.

Please send No._____ **AMX MOUSE** package/s (including **AMX ART** and EPROM) at **£89.95** inc. VAT and P&P. I enclose a cheque/PO for £_____ or debit my credit card.

Card No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ ☐ Visa ☐ Access

Name _____

Address _____

_____

Signature _____ Date _____

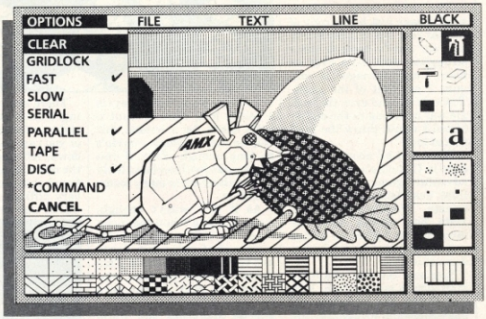
(Please tick choice of media for AMX ART) ☐ Cassette ☐ 3" Disc ☐ 5¼" Disc

To: Advanced Memory Systems Ltd., Woodside Technology Centre, Green Lane, Appleton, Warrington, WA4 5NG, England.

If not available from one of our main dealers, fill in the coupon and we will send you an AMX MOUSE with AMX ART with our full no quibble money back guarantee. OR phone 0925 602690/62907 for instant Access or Visa orders.

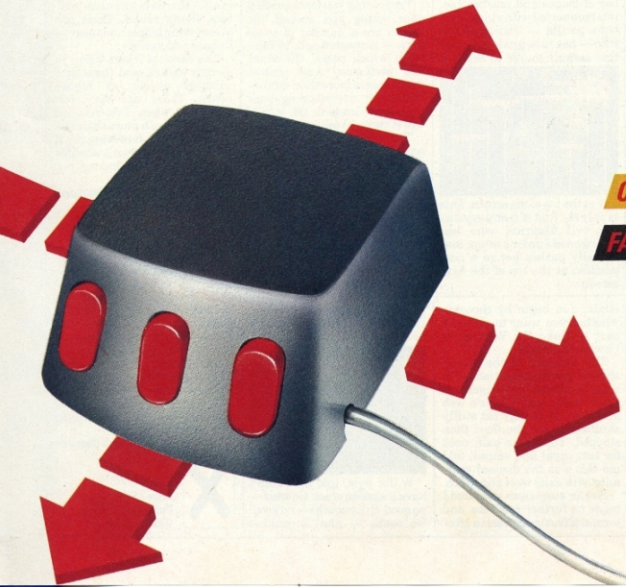
AMX MOUSE

POINTS THE WAY



FOR THE BBC MICRO MODEL B

with AMX ART GRAPHICS PROGRAM



ICON SOFTWARE

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GAMEPLAY

SPECTRUM

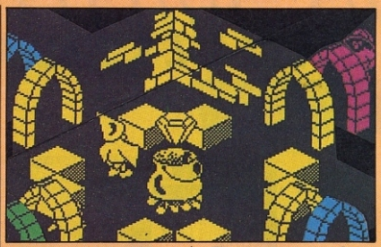
KNIGHT LORE

Ultimate has done it again, it's managed to reduce me to a writhing wreck. Why do I succumb to such provation? I have just had a copy of *Knight Lore* fall into my hands and am totally hooked. After struggling with it for over an hour, I only managed to conquer 7 per cent of the game. Towards the end even the budgie was cowering in the corner afraid I would throw the joystick at him.

What is it all about? *Knight Lore* is Ultimate's new arcade adventure game and it's brilliant, even better than its last release, *Underwurlde*. Ultimate has always been my favourite for Spectrum games and the company hasn't let me down this time.

You play the part of a little man with a big problem. He's had a curse placed on him and has 40 days and 40 nights to find the wizard and a cure or he becomes a permanent werewolf. Not a nice thought.

It isn't even a nice place that he has to hunt for him, but a dark, evil castle, full of all sorts of nasties.



You may think that 40 days is a pretty long time to hunt a little castle for a wizard, but believe me, 40 years wouldn't be long enough. Even if you could make five lives last a little longer, there are so many rooms to look in.

As if that wasn't enough, every evening when the moon rises the little man performs some sort of weird rain dance and turns into a werewolf. This doesn't prevent you from continuing on your journey once you have calmed down but if a ghoolie approches you while you are quivering he will kill you — extremely unfair. One thing that makes the game more fun is that you always start off somewhere different, so you do see different rooms each time you play.

There are two ways of moving. You can either rotate left or right and then move forwards or you can move up the screen, down, left and right by using the directional control option. I found this much easier as it's very difficult trying to decide which way to rotate. There is

also a joystick option.

The graphics in this game are excellent; some of the best I have seen on any machine. You can tell what the werewolf is supposed to be without having to hunt through the instructions to find out what that indescribable blob is, unlike some other games.

The rooms are extremely well depicted and animation is superb. Collapsing floors fall smoothly away from beneath your feet and gates open and close very realistically.

I can't tell you how many different screens there are because the sequence changes all the time and there are always new ones appearing.

As you travel through the castle there are different objects you can pick up, such as boots and goblets. But beware, if an object has a skull on it, one touch will kill you. There are also a few statues around which seem to kill you if you touch them.

There is always some problem to solve — objects are scattered around that you can't move past and you must discover a way of going over or under them. At the same time there may also be sentries following you or spiked balls dropping on your head.

Never mind a turkey or Christmas pud this year; just buy a copy of *Knight Lore* and you'll keep the whole family quiet for days I promise you.

Susan Cooke

Price £9.95
Publisher Ultimate 0530-411485

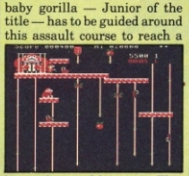
BBC

ZANY KONG JUNIOR

I suppose one of the major confessions of my life is never having successfully completed the third screen of *Killer Gorilla*. This was partly my own ineptitude and partly the fault of the designer of the game who, in my humble opinion, made it far too hard after comparatively simple first and second screens.

Although a different game, and from a different supplier, *Zany Kong Junior* falls into a similar trap.

The game loads with no trouble, and presents the first screen which consists of a number of ledges and mushrooms, interconnected with vines. The baby gorilla — Junior of the title — has to be guided around this assault course to reach a



key at the top of the screen. This is only the first of many keys, as the evil Maurice, who has imprisoned Junior's mum, continually pushes her to a new position at the top of the next screen.

Preventing you from guiding your young ape around the screen are a number of snappers — demented sets of false teeth which patrol the vines and platforms. Any contact with these, a more than minimal fall, or overstepping your time limit leads to the loss of one of three lives.

The whole game gets a bit hairy, with a lot of unpredictable snappers on the screen at once. However well you time your swings and leaps, you're all too likely to be snapped from behind when you least expect it. There is a touchingly accurate frightened gorilla sprite which appears when this happens.

If you do complete the first screen, the second has aardvark birds, otherwise known as parrots, flying round. There are also moving ledges and trampolines to add variety.

The cassette insert warns of electric spikes, and these presumably appear at higher levels. There are very few occasions when I've reached screen two with more than one life remaining, however, so I'll have to take Superior's word for it. Good fun, well animated, but a trifle too tough.

Simon Williams

Rating 6/10
Price £7.95
Publisher Superior Software 0532-459453

COMMODORE

CATACOMBS

Want to make an enemy for life? Give them *Catacombs* — it'll have them biting the carpet within minutes.

This text and graphics adventure has a fussy vocabulary, an unsympathetic command analyser, slowish and unhelpful responses and a job-lot of idiosyncracies.

The plot has you searching catacombs with your companion for ingredients to a magical elixir. You begin by choosing whether you want to play the part of Duke the Warrior or Oswich the Witch.

The top half of the screen showed the first location, with such mind bending images as a brick wall, door, spider's web and lamp. A mangy cat stiffly shuffled across the floor then stopped. The lower half, used for text input and output, told me this was the disused entrance with exits west and south.

Not an auspicious start and I made no further progress, and terminal frustration set in after 20 minutes. Almost everything I tried was met with immensely helpful 'That's no good'.

W (for west) told me I didn't have a wooden cross. Go west — no good. S (for south) — no good. Go south — aha! I couldn't because the door was sealed. Right, attack door. (It's not here.) At least that made a change from you know what. D received the mind-boggling 'None of you has a dead rat'. There's nothing like a good adventure for mental stimulation — *Catacombs* is nothing like a good adventure.

Bob Chappell

Rating 3/10
Price £7.95.
Publisher Anirog 0322-92513

GAMEPLAY

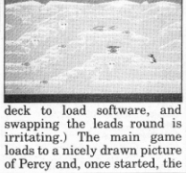
BBC

THE PERILS OF PERCIVAL PENGUIN

There've been a number of variations on the platform game, but few have as original a scenario as this one.

Percy the Penguin is attempting to reach the sea to replenish his stock of sprats. On the way he has to avoid the attentions of seals, skuas, crabs, octopi and other assorted wildlife — Richard Attenborough, eat your heart out! A number of pots of radioactive waste have been buried in the ice fields and these will play havoc with a penguin's metabolism.

The game loads to display a set of instructions and indicate the keys to use. (I wish software houses would record across both channels of the cassette. I can't be the only player to use a stereo



deck to load software, and swapping the leads round is irritating.) The main game loads to a nicely drawn picture of Percy and, once started, the scenario is displayed. This consists of a number of white icefloes interspersed with blue pools, blue fish and black seals. You avoid the pools and the seals and jump on the fish for extra energy.

Your energy level is displayed at the top of the screen and declines with each step or jump you take. If it drops too low, your maximum jump distance is affected. The sun provides a time element as it slowly slides across the sky before sinking over the horizon.

If you fall in any of the pools or off the bottom of the screen (and it takes a lot of skill to avoid this) the scene below is not nearly so wholesome. Apart from all the animals and nuclear waste, icicles with evil eyes detach themselves from ledges overhead as you pass. The ledges are in the same place each time around, but there are hidden barriers and slides to catch the unwary Percy. The music is persistent but may be tuned down.

Everything about this one is up to scratch, and yet I didn't really enjoy playing it. It lacks variety of scene and is rather too tough.

Simon Williams

Rating 6/10
Price £8.00
Publisher Willowsoft
0934-834056

SPECTRUM

SKY RANGER

Fancy flying round fairly featureless architecture? Well, until you've mastered that you won't get far in this game.

You are the city's sole guardian, seeking out and destroying Watchers. The city presents itself as miles upon miles of wire frame skyscrapers and you're free to fly down low along the avenues, or up high dodging the tower tops.

There are plenty of instruments to help you. Altimeter, fuel gauge, speedo, etc are ranged along the bottom of the screen, with the level, your score and any high-score up the left.

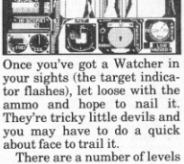
The key instrument is the radar, a green circle with a swinging compass above. One gripe is that the dots which show your targets are so small that it's easy to miss them. Once spotted however, it's foot down, climb to the city's upper limits and away in pursuit.

The view from the vid-screen is very well done. The buildings zoom past as you seek your victim and it's just too bad if you cannon into a wall during a tricky manouevre.

That's a life lost but, worse still, when you regain control of your craft, you'll find a nasty crack running down your vid-screen.

More cracks are added for every life lost, so by the time you've mastered the controls, you can't see where you're going or spot the watchers.

As you speed up the beat of your craft's blades gets faster.



Once you've got a Watcher in your sights (the target indicator flashes), let loose with the ammo and hope to nail it. They're tricky little devils and you may have to do a quick about face to trail it.

There are a number of levels to the game and, needless to say, it gets a lot harder. You can refuel at any of five stations, each of which you can visit once only during each game.

Sky Ranger's a pretty good game, but there's really not much to it. Once you've mastered the controls it's just a question of tracking, chasing and blasting. The graphics are good, but not brilliant, and the idea is not particularly original or demanding enough to make you come back to the game.

I'm afraid that, good as it is, *Sky Ranger* just didn't grab me.

Bryan Skinner

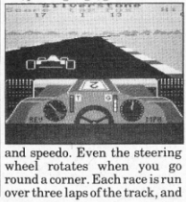
Rating 7/10
Price £5.95
Publisher Microsphere
01-883 9411

BBC

3D GRAND PRIX

Since the success of Atari's *Pole Position* in the arcades, there's been a rekindling of interest in car racing games on a number of home computers. This latest effort for the BBC micro goes one better than most of the others simply by incorporating bends.

The program loads using Software Invasion's peculiar technique of loading from block FF down — presumably all part of a protection system. You are put at the wheel of a Formula 1 racing car, fitted with rev counter, petrol gauge, gear indicator



and speedo. Even the steering wheel rotates when you go round a corner. Each race is run over three laps of the track, and there are a variety of these based on existing international circuits. To try all of them you have to finish in the first four on the previous race.

By revving up well before the start lights change to green and slipping quickly through the gears, you can usually get into the first bend in second position. Then it's just a question of finding a suitable spot to overtake number one. This you can do only by pulling half off the track, and you have to watch out for trackside hoardings, which can make a mess of your front end and cost you a place. Once in pole position you can follow the tail-enders for the rest of the race, although you occasionally get a nasty surprise in the third lap when the second-placed man sneaks through.

There are one or two inconsistencies in the program, but *3D Grand Prix* is a lot of fun.

Simon Williams

Rating 8/10
Price £9.95
Publisher Software Invasion, 50 Elborough St., London SW18 5ND

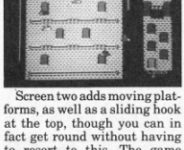
COMMODORE 64

HUNCHBACK II

For those of you who ran like the clappers to your local software shop for a copy of *Hunchback*, here's a new load of bells to keep you hunched over your screens for a little longer. Not that there's anything wrong with the sound, graphics and general fun, but if you can reach fourth of five screens in an initial session, it doesn't bode well for months of games playing.

You need a joystick to control the Incredible Hump as he leaps and runs around the platforms that make up each screen, ringing all the little bells in sight. The first screen has just four platforms, with nine little bells on each (rung by running over them), and you move from platform to platform by leaping and grabbing (you hope) one of the ropes that moves up and down either side. When you ring the last little bell you move on to the next screen.

Like the first, this has birds flying from side to side — the inlay card claims bats, but that ain't what they look like. Some birds come at you at head height, others aim straight for the knees if you don't jump.



Screen two adds moving platforms, as well as a sliding hook at the top, though you can in fact get round without having to resort to this. The game is said to get more difficult, but screen three is one of the easiest, or so it seemed. On screen four I did come to grief, though, with cannon-balls bouncing around the place — I couldn't get to the bells for the balls, so to speak.

Hunchback II is an excellent display of programming skill, but it should have been tougher and generally zappier all round.

Mike Gerrard

Rating 6/10
Price £7.95
Publisher Ocean
Ocean Software
061-832 6633

Amstrad

Amstrad owners: send for list of local Amstrad users to meet and swap programs. 50p (p&p). Tel: 092 684 2981. Or write to The Paddocks, Lowsonford, Solihull, W. Midlands.

Amstrad Software. Manic Miner, Roland in Time, Punchy Electro, Freddy, Haunted Lodges, Harrier Attack, Character Generator, Program Copier etc. Tel: Mar on Washford 40599 after 6pm.

Amstrad Software: Spannerman, Roland In Time, £4.50 each. Tel: 021-453 8876.

Amstrad CPC 464 colour monitor + 2 games, £290. Also Oric + software, £90. Tel: Gosport 520204.

Amstrad CPC464, green screen. Three months old. Hardly used. Excellent condition. £175 ono. Write Paul O'Neil, Northbank, Beacon Street Penrith, Cumbria.

Amstrad or **CPC464** + colour monitor and two games. Also articles and magazines, £290. Also Oric-1 + software + quartz case. Tel: Gosport 520204.

Amstrad Software for sale. Original Harrier attack, Code Name Mat, Colossal Adventure Return to Eden, £5 each. Tel: Steve 01-672 2509.

Amstrad Games. Hunchback Electro Freddy, Oh Mummy. Swap for any level 9. Arnold or Roland software, £5 each, all £12. Stephen Rae, 190 North Gower Street, London NW1.

Acorn

BBC 'B' eight months old, excellent condition, complete with graphics ROM, software books and leads. Worth £490, only £350. Tel: Banchory (03302) 3307.

BBC Software to sell or swap. (Originals). Large selection, under ½ price. Tel: Welwyn 4053 or write Sean Kerrigan, 23 Heathbrow Road, Oaklands, Welwyn, Herts AL6 0QG.

BBC Hard (Icon), £5, and Hobbit, £12. Both unwanted gifts and have never been used. Tel: (0449) 721835.

BBC Z80, second processor plus software pack. Also Opus dual 5 d/drive 40/80 track. Both two months old, selling for only £595. Tel: Brighton 363556.

Wanted BBC B O.S.1.2 FDFS if possible. Please Tel: John on 0642-484785 (north east England).

Wanted: a Speakjet Speech synthesisor for the BBC Micro. Please Tel: Welwyn 4053 or write to Sean, 23 Heathbrow Road, Oaklands, Welwyn, Herts. AL6 0QG.

Selling Electron A/D converter, flash-gun, sunlamp, darkroom exposure meter telescope, vintage records, Spectrum 16 Port, racing bicycle. Sell or swap for Psion. Tel: 0408-21870.

Acorn Electron, £60 worth of software, leads and dust cover. Total cost £270, sell for £190 ono. Tel: 0233 21457.

Electron Games for sale, Elke, unwanted gift. £10. Twin Kingdom Valley, £4.50, Cylon Attack, £4. Tel: 061-368 6935.

BBC disk drive 80S 40TK, 100K, (200K double density). Opus case with PSU and space for second drive, sell £150. Tel: 06285 2306 (evenings).

BBC B with Wordwise, graphics ROM, lots of software, books, joystick. All for £300, Microvitec 14in colour monitor, £150. Tel: Simon on 0732-833106.

BBC Originals for sale. Arcade Action, Philosophers, Quest, Arcadians, £5 each. Also games to swap including Donkey Kong and Donkey Kong Jnr from Atarisoft. Tel: Steve on 07073-34513.

BBC B 1984 and Acorn joysticks, £335. Prism modem 1000 and ROM, unused, £65. Software worth £130, only £45. Tel: 01-204 6285 after 5pm.

BBC B 1.02OS with Data recorder books and software mostly adventures (Hobbit, five Level 9's etc), £295. Tel: Roy on 0902-332076.

BBC B six months old. Best offer over £250. Tel: 0604-30719.

Commodore

Wanted. I will pay good prices for your C64 software. Send price list etc to Andy Moore, 4 The Rooley, Huyton, Liverpool 36 5XJ.

CBM64 software swap. Sell over 40 titles: Hobbit, £5. Level 9 Adventures, Manic Miner, Beachhead Games, Designer Quill. All £5. Tel: Taylor on 07712-3214.

CBM 1541 disk drive with software. Absolutely perfect condition. Unused. £185. Also Microdrive + 1/F1 + cartridges in similar condition, £80. BBC matrix printer, £60. Tel: 01-863 5113.

Exchange Commodore Printer model 4023. Business model, unwanted gift, new. Will exchange for Commodore 64 disk drive. Tel: 01-890 0934.

CBM 64 Owner wants to swap software. Have many good titles. Wants to buy joystick and mag'books. Send list to Jonny Mikalsen, Box 124, 5460 Husnes, Norway.

Vic-20 + cassette recorder + super expander + 3 carts (Jupiter Lander, Jelly Monst, Adventureland) + 3 tapes (Arcadia, Catcha, Panic) + joystick + 5 blank tapes. £99. Gary Bennett, 25 Brandon Rd, S.E., Leicester.

Vic-20 16K, switchable, tape recorder, joysticks, over £300 worth of software (50 tapes) + about 100 mags. Only £120 ovno. Tel: Southend (0702) 72238.

Vic 20 + 16K switchable, lots of S/W with Commodore tape deck + manuals, excellent condition, ideal Xmas gift, £135 ono. Tel: Steve on 061-740 1040. After 5pm.

Commodore 64 Software Sale: Football Manager, Chinese Juggler, etc. Also Pixstick lightpen with paintbox program + 3 games for £25. Tel: 0823 74410 ask for Steve!!

Commodore 64 Software. Swap Lazy Jones, Star Commando, UGH! Music 64, Gridtrap, Skramble, Kong Galaxy, Hunchback and more. Steve, 2 Ashcroft, Cheadle Hill, Stretford, Manchester M32 0HG.

CBM 64 swaps. Jammin', Metro Blitz, Bath Time, Exchange for Chuckie Egg, Sheep in Space, Aneipital. Tel: Southampton 0703 847168.

Pet 3032, lots of programs, C2N cassette recorder, manual and books etc. Perfect condition, looks new! Guarantee until spring 1985. Bargain at £195! Tel: 0244 675717.

CBM 64 + 1525 Printer/Plotter + C2N cassette + joystick + 5 books (including CBM 64 reference guide). Games: Skrambile, Snooker, Qbert (cost new £400+). Will sell — £330 ono. Tel: Birmingham 378 3137.

CBM 64 Easyscript 'O' Level History, Revelation Pyramid, Flight Path 737, Cosmic Cruiser, all as new. £40 the lot. Tel: 051-423 5493 after 7pm.

CBM 64 Cassette Recorder software + Commodore 64 Exposed book + mags in folders. Teach yourself computing in various computer languages. Worth £100, will take £60 ono. Quick sale. Tel: 01-743 3619.

Commodore 64 disk software for sale. High flyer, deadline, Jumpman, Zork I, Fort Apocalypse, Dungeonquest. Cost £115, sell for £70 ono. Tel: Andrew on 061-868 7526.

Programs — Exchange CBM 64 disk. Have over 1,000 programs, will send complete list in return for yours if extensive. Erik Nilsson, PL5281, S-44193 Alingsas, Sweden.

Wanted CBM 64 software tapes — intro to basic — games — what have you — books etc for beginner. Write Moffat, 42 Pennine Rd, Woodley, Stockport, Cheshire SK6 1JS.

Vic-20 + tape unit. Forch language Gof cartridges. 8K + three slot motherboard, tapes, mags etc. Bargain at £100 ono. Tel: Stephen on Halesworth 2689.

Oric

48K Oric-1 Software for sale. All originals which include Hunchback, Quack a Jack, Xeaon II, Zorgon. Over 16 titles. Will sell £1 each or £14 the lot. Tel: (021) 426 4398.

Printer/plotter Oric MCP40 Printer (unused) £85 ono. Oric software, Tansoft CAD (£7), Author (£10). Various graphics, character generator and database software. Tel: Walsall 26969.

Oric software swaps Dinky Kong, Killer Caverns, Oric Flight, Quark Flight, Simulator, Multigames One, Home Finance, Teach Yourself Basic. Tel: after 7pm Lancing 762361.

Oric Basic V1.1 PROM for your Oric-1. I use a customised EPROM and offer you the V1.1 PROM for £10. Contact: A. Borg, Sonnegg Str, 84 8006 Zurich, Switzerland.

Oric 1 48K plus quality professional keyboard, with books and original software. £105 the lot or will split. Tel: Leicester 0533 303586 eves.

Wanted Oric 1 software. Buy or swap, Oric books, will pay half price, also copies of Oric Owner required. Tel: Stephen, Wigton 0965 42247.

Oric 48K, 7 games, cassette recorder, Quickshot joystick + Interface, 2 books, Excellent condition, worth £200+. Bargain £100 or swap for Spectrum 48K. Tel: Michael 01-671 2135, 6.30pm.

Oric 1 48K VGC. Hobbit, Galaxians, Ice Giant, M.A.R.K., Trek, Probe 3 Fantasy, Toad, Ultra Chess. All original. Offers? Sensible offers loads any game at 2400. Tel: 804 9858.

48K Oric-1 with six games including, Xenon 1, H. Attack, Flight. Worth £215 approx. Sell for £120 ono. Includes cassette lead. Contact Ian on 0628 31706.

Oric 1 48K, cassette recorder, games, including Hobbit, Hunchback, books and mags. £100 ono or swap for Commodore 1520 printer plotter. Tel: Bedford 0234 261 361.

Oric software for sale. Selling all my originals, over 50 at near half price as have sold my Oric. Please ring! Tel: 01-485 8393.

Oric 48K, 7 games, cassette recorder, joystick & interface, 2 books, excellent condition. Total value £200+. Bargain £100 or swap for 48K Spectrum. Tel: Michael 01-671 2135, 4-9pm.

Spectrum

Spectrum software £100s worth including Sabre Wulf, Beaky, Games Designer, Scrabble, Kempston conversion tapes. All originals £49 the lot ono. Tel: Peter 01-422 7583 evenings.

Spectrum 16K. DK'Tronics keyboard Microdrive Interface 1, Zxprinter Interface II, 4 × Microdrive cartridges, quickshot II £150, software books, courses magic Sell for £280. Tel: Sandwich (0304) 613424.

Spectrum software Atic Atac, Penetrator Pimania Groucho, and many more — all originals £3 each. Tel: 061-773 3213.

Spectrum software all Ultimate incl. Sabre Wulf, Kokotoni Wilf, Pyjamarama, Manic Miner, Stonkers + others (originals). Sell or swap. All half price. Tel: (027979) 2227.

Spectrum games to swap or sell. Valhalla £5, Kong Galaxians, Pogo, Atic Atac, Fred, £2.50 each. Tel: Nigel on 01-643 8226.

Spectrum 48K, plus £200 worth original software, other extras, £165, or the £200 of software only £90. Latest games included. Tel: Rochdale 353915.

ZX-printer, good condition, plus five rolls of paper, £25 ono. Tel: Ash Green 873 185 evenings or weekends and ask for Mark.

Spectrum 48K one year old. Cassette recorder, sound box, Fuller FD42 keyboard, Tasword Two program + many games £150 ono. Tel: David Guildford (0483) 576233.

Spectrum 48K good as new over £80 worth of software, Kempston Interface with Quickshot 1 joystick and data recorder. Price £140 ono. Tel: Lanreath (0503) 20398.

48K Spectrum + Com-Com joystick interface + Quickshot II + tape deck + over £600 worth of software + mags. £190 ono or swap for Commodore 64 with C2N cassette recorder. Tel: Halifax 67827.

Wanted Spectrum 48K — £70 offered, working order. Also some peripherals. Tel: Dave on 051-424 5558.

48K Spectrum, 100% reliable, cassette recorder, Currah Speech, £100 software, £50 books, mags etc. Boxed with 1 months guarantee. Perfect condition £140 ono. Tel: 01-863 5113.

48K Spectrum ZX printer, interface 1, microdrive, five cartridges, tape recorder, RS232 printer interface board and cable, case, £120 worth software, £200. Tel: Keith on 091 264 3439 after 6pm.

Spectrum programmable joystick interface, made by Stonechip, boxed and with instructions, must sell, yours for only £16. Tel: Fyfield 291 after 5.

ZX Spectrum, over 60, all Ultra originals, includes Ultimate, Quicksilva, Imagine etc, all as new, offers over £60 for all. Tel: Reading (0734) 712255 evenings.

Eighteen Spectrum software tapes £3 each. All originals, also The Hobbit, Games Designer, £7 each. Pyston £5. Magazines and books. Tel: 021-474 6043.

Wanted 16K ZX81 and printer. Have to be in perfect condition, will pay up to £75. Ask for Richard. Tel: 24025 (West Yorkshire).

Spectrum, only six months old, two 48K RAM packs and dust cover. All manuals and leads supplied. Quick sale £120. Tel: 01-891 0496.

ZX81 16K+ £200 software. Boxed, manuals, leads, magazines 2600 ono. QS sound and characters boards £30 ono. ZX printer £20, J. Millott, 50 Sydenham Road, Croydon, Surrey.

ZX81 16K ROM with manuals. Hardly used £25. Tel: 01-733 7188 after 5pm.

Spectrum software: Scrabble £8. Games Designer £7. Match Point £4. JSW, Visions Snooker, Trashman, Bugaboo £3.50. Jetpac, Cookie, CDS Pool £6. Tel: 021 453 8876.

Spectrum 48K only six months old VGC. Some software, cassette recorder £250 ono. Tel: 01-590 4849. Write T. Holloway 32B Belgrave Road, London.

Spectrum 48K ZX printer, data recorder, transform keyboard (needs repair) software, books, magazines, £150. Ferguson 14in 586 4797 £100 ono.

Spectrum 48K + Turbo interface with ROM cartridge port + Quickshot 2 joystick + £50 original games. All worth over £200 with original boxes. £150 ono. Tel: 031 337 0200 after 4pm.

Spectrum Software Sabre Wulf £5. Lords of Midnight £5. Jet Set Willy £2.50. Atic Atac £2.50, or swap any for Amstrad software. Tel: 0294 56010.

Spectrum 48K in good condition, complete with power supply, manual and leads. £90. Must collect. Tel: 01-994 4172 evenings.

Spectrum 48K, in good condition, complete with power supply, manual and leads. £90. Must collect. Tel: 01-994 4172 evenings.

48K Spectrum, Interface 1, microdrive, manuals, books, magazines, cartridges and tapes. Software includes Hobbit, Finance Manager, £165. Tel: Bill on Stamford Bridge 0759 72005 evenings.

Spectrum software for sale £90 ono. £185 worth of software. 27 titles including Pyjamarama, Jasper, JSW, Atic Atac, and many more. Tel: (evenings) Chetan 01-805 9196.

Spectrum Software half price including Knightlore Underwurlde, Sherlock, Lords of Midnight, Pyjamarama, Cyclone, Strangeloop, Avalon, Zombie Zombie, Alien Symposium, joystick interface £5. Tel: after 7pm 0723 667608.

Spectrum Games to swap. Travel with Trashman, Chequered Flag, Chess. Exchange for Matchpoint, Trashman, Micro Olympics. Write to Andrew Watton, 73 Whitehorse Hill, Chislehurst, Kent.

Spectrum Pyjamarama swap for American Football or Battlecars. Also Valalla and Wild Bunch for Eureka (other games considered). Tel: Sandback 79564.

Spectrum 48K Software for sale. All originals, half list price, including Manic Miner, Sabre Wulf, Cyrus Cuess, etc. Tel: Holywell 0352 712444.

Sinclair Interface 1, 2 Microdrives, 8 cartridges, manual + all leads. As new (boxed). Worth £155, sell for £100. Tel: Romford 42574.

PCN Billboard

Sinclair

For sale: lightpen, interface II, Quickshot joystick, one for ZX Spectrum, will sell for £25. Tel: Whitley Bridge (0977) 661 453 after 6pm.

Spectrum 48K with software and mags (over £200), joystick interface, (needs attention) and tape recorder. Tel: Andy on 051-430 7608, may swap for Atari 800XL.

QL, brand new, full guarantee, used twice, works perfectly, JM ROM, £350 ono. Tel: 01-968 6742.

Spectrum keyboard, £20. Dragon joystick, £5. Recorder compatable, £15 or exchange for Spectrum 32K RAMpack, printer, Microdrive, Currah speech or other. Tel: 021-743 6982 (Solihull).

Spectrum games, Yartzee, Armeggedon, Othello, Gulpman, Megapede and many more, £5 each, any 5 for £20. Write to Mandy Shack, 89 Cobbold Road, Leytonstone, London E11.

ZX Spectrum, joystick and interface, Currah Microspeech, paid £43 originals. Supply leads, manuals, 25 magazines — £200. Tel: Stevenage 355874, evenings.

Spectrum 48K software, includes Scope, Jumbly, Mugsy and others. Value £40, sell £12 ono. David Waite, 108C Camberwell Rd., Camberwell, London SE5 0EE.

ZX printer with 1 roll, 4 months old — £50. Spectrum DKTronics programmable joystick interface, 3 months old — £15. Buyer collects. Tel: Rickmansworth 771655.

TX81 16K software: Computacalc, assembler, Pimania, machine code test tool. All original — £2.50 each plus 2 free games. Also ROM disassembly books totalling £5. Tel: 01-267 5034.

Z80 programmer requires work — owns Spectrum/Microdrive, working knowledge of 6502. Write to Garry Knight, 30A Stanton House, Thames Street, London SE10 9DJ.

Wanted: out of order ZX Spectrum for spares and experiments. Up to £25. Also for sale Cheetah Sweet Talker, hardly used — £20 ono. Tel: 01-888 0839.

Spectrum software, sell or swap Starstrike, Official Zaxxon, Popeye, Son of Blagger, High Noon, etc. Tel: Mark on Bedford (0234) 214677, evenings.

Spectrum software: Jasper, Dark Star — £4; Tir Na Nog — £6; Codename Mat Skooldaze — £3.50; Survival Millionaire — £3. Many more. Tel: Michael on 01-340 2630.

Spectrum 48K: brand new, unwanted present, with some software. Bargain for Christmas — £100. Tel: 01-636 9636, daytime.

48K Spectrum, interface I, Microdrive, Alphacom printer, programmable joystick interface, all boxed. Also Quickshot Two, books, software, magazines, microdrive cartridges, etc — £325. Tel: 041-771 8638.

Spectrum 48K for sale with ZX printer, little used, perfect condition — £90. Tel: 01-789 3393.

48K ZX Spectrum with over £500 worth of software plus 18in colour television and m/c book — £300 ono. P. Monk, 2 Knights Close, Pembury, Tunbridge Wells, Kent TN2 4EL.

Spectrum software for sale: Kong, Zzoom, Chess, Tranz-Am. All as new — £3.25 each or £10.50 for all. Peter Wilson, 84 Birchwood Rd., Marton, Middlesbrough, Cleveland.

Spectrum 48K originals, Kaleidoscope, Death Alley, Meany Monster, Alien Armada, Night Raider — £3.50 each, £15 set. R. G. Jones, 4 St. James Court, Wricklemarsh Road, London SE3 0NE or 01-856 8773.

Micro Command speech recognition unit for Spectrum, brand new, cost £50, sell for £30. Includes instructions and demo tape. Tel: 01-472 7600, Mr Riches.

Original software for Spectrum. For list call Tony on 061-881 3651.

Spectrum 48K, ZX printer, data recorder, Transform keyboard (needs repair), books, magazines, software, £150. Ferguson TX TV, computer stand — £150. Tel: 01-886 4797.

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TRS 80 Level II. Complete package cassette, VDU carrying cases, extra books, games etc. As new, cost over £500. £195 for quick sale. Tel: 01-672 8862.

Tandy CGP 115 4 colours printer, £85 + interface. Grosvenor, Kempston 15, £25. Whole lot for £105 ono free postage. Boursaux. D., 9 Rue Mathurin-Regnier, 75015 Paris/France. Tel: (1) 667 3582 (office).

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Tandy TP-10 Thermal printer, suitable TRS-80 C/W handbook and spare paper, £50 ono. Brand new, unused. Tel: Ron on 0256-69941 (day time), 073583-304 (evenings).

Video Genie 16K with software, £300, new, £70 ono. Tel: 01-958 9596.

TI 99/4A computer extended Basic joy sticks and leads, Basic tutor books, assorted cartridges and cassettes. Tel: Basingstoke 477468.

TI 99/4A extended Basic speech syn. 6 games modules incl. Parsec, Dual Leads, dust cover, Basic course, boxed with manuals £150. Tel: Teesside 0642 761625.

TI 99/4A with cassette player, speech syntheniser, joysticks, 2 cartridges, 3 cassettes, Introduction to Basic, £140 ono. Tel: 01-521 9444 after 6pm.

TRS-80 Model I, 48K, twin disk, monitor, cassette recorder, high-resolution graphics, numeric keypad. Books and software incuding w/p, assembler, utilities, £600. Tel: 0384 288602.

Tandy TRS-80, colour computer, 16K extended Basic, excellent condition, £175 worth of software, two joysticks, ten American mags, only £185. Tel: 0695 422073 (Lancs).

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TRS-80 Model I, 48K, disk drive, word-processing, database, spreadsheet, 30 disks, printer, cable. New computer, must sell, £350 ono. Tel: David Allen on 01-251 6222 (work) or 01-803 8834 (home).

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99'ER magazines for sale, dedicated to the TI99/4A microcomputer. Loads of programs in basic and extended basic. £2 per copy. Tel: 01-904 7884 evenings/weekends.

TI994/A Speech Synthesiser £25. Double Atari joystick adapter £5. Original programs in Basic and extended Basic £2.50 for program. Tel: 01-904 7884 evenings/weekends.

Others

Epson HX20, cassette, case, card index, five tapes, book, as new, £295 or swap best printer with RS232 interface. Tel: Bolton 45681.

Software for sale or swap for Commodore and BBC. All originals, all half price. Tel: 0472 74584 or send list to Martin, 157 Crosby Road, Grimsby, South Humberside.

Exchange Ibanez Roadster electric guitar, great sound, with case and leads, with Shure 588SA microphone, for Acorn Electron and accessories. Tel: 0475 23982 (Greenock).

Swap semi-professional cassette deck (cost £450) and amplifier (cost £140), both unused, for computer plus extras worth £250 or more. Sell £300 ono. Tel: Deepak on 01-863 5113.

Swap JVC video recorder worth £600 for worthy computer plus vdu. Must be in good condition. Tel: Paul on 01-882 4454 evenings, anytime weekend.

Acetronic video game with 22 cartridges, very little use, cost £300, sell for only £100. C. Vodden, 9A Whipton Village Road, Exeter EX4 8AW.

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CGL MS with Computone cassette recorder, 20K RAM, as new in boxes, £60 the lot. Tel: Harlow (0279) 32688.

Christmas Bargain! Intellivision console complete with five cassettes, hardly used, £85 ono. Tel: O. Abbassi on 01-486 8914.

Swap Gem electric organ (cost £600), in superb condition, for computer + extras worth £250 (CBM64 or Amstrad preferred). Sell £250 ono. Tel: 01-863 5113, ask for Deepak.

Newbrain, Sanyo monitor, books: technical manual, Newbrain Dissected, Getting more from Software, Othello, Brainzap, plus others. Listings, scrapbook. Tel: 021-476 2430 after 6pm.

Epson HX-20 with cassette drive, tapes, label holder, paper and sticky labels, 16K RAM, 16K ROM, extended Microsoft Basic, £475 ono. Tel: 01-894 1151.

Swap Atea turntable stereo 880 (cost £320) with three years guarantee for Amstrad or CBM64 + C2N. Cash adjustment possible. Tel: 01-863 5113 ask for Deepak.

Historic documents. Nine copies of Personal Computer World, Vols. 1 and 2 (#1978). Offers, or exchange for ZX81 printer or hardware. Tel: 0602 251920 evenings.

CGL Sord M5 with data recorder, Basic I and G, tennis cartridge, two joypads, one tape, great machine, only £110 ono. Tel: Steve on 021-352 0395 after 6.30pm.

Peripherals

Sony Trinitron 14in RGB colour monitor for use only with BBC micro, £140, as new. Tel: Newton Abbot 3256 after 6pm please.

Wanted: Epson printer or similar to run with a Sharp MZ80K computer. Tel: Jason on Maidstone 51955.

400K single drive + DD LVL interface, £250, Watford ROM board, £15, dot-matrix printer DMP100, £130. Tel: 0225 27066 evenings.

Printer for Beeb or any RS232 interface micro with handshake. Tally 1602 line printer dot-matrix, 120 cps on stand, £300 ono. Tel: P. Knight on 0732 62227.

Epson MX-80 type 3 printer plus Epson parallel interface for Apple (free), £150 ono. Tel: Anthony on 01-578 7704 after 7pm.

Currah Micro-Speech. Complete with manual, tape. Duplicated gift, new and boxed, £20. Also original microdrive business and games cartridges as sold with Sinclair kit. Tel: Tyneside 2656523.

Seikosha GP100A printer, plus Kempston Centronics interface for Spectrum (fits other computers including BBC with correct cable), hardly used, £120. Tel: 0753 22784 (Slough).

Commodore traction printer 1422 exchanged for any Dragon printer, MCP40 or one to use with a Dragon 32. Tel: 051-420 6424.

Disk drive (5¼in) and interface for Spectrum computer, very good condition, supplied with two disks. Cost new £245, sell for £149. Tel: Amersham 6047.

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DESKTOP ASSAULT

Geof Wheelwright evaluates Quantec's desktop package.

In all the brouhaha caused by the development and launch of integrated software over the past few months, integrating software looked like it was going to be lost in the shuffle.

But the recent appearance of several new integrating packages could be the start of a reversal. Although these won't be on the scale of the now dubious-looking Microsoft windows or Digital's popular concurrent DOS OEM, they will have an impact.

One of the packages leading this new assault is Quantec's *QED* (Quantec Executive Desktop), a concurrent integrating package which includes a diary, daybook, event file, address book, telephone list, calendar, text processing facility, form design option, as well as project planning and calculator functions. But in the concurrent version of *QED* (selling for £295), all those are subsidiary to the main task of integrating your existing software.

Although QED includes a diary, calendar, project planning, address books and event files, it is better as an integrating package than for its individual applications.

First impressions

An 'integrating' package is first and foremost a tool for allowing you to combine and mix-and-match standalone software. Second, it's a way of giving you lots of little extras that might not ordinarily be worth putting on a computer (such as a desk diary and an address book). But if it doesn't handle the former properly, the attractions of the latter become somewhat trivial.

Taking an installed version of *QED* (with my preconceived notions about intergrating software firmly in place), I booted up the program and waited. After setting the time and date (something you should only have to do once as you would theoretically only have to boot up *QED* once a day), I was presented with something purporting to be a desktop representation. Unlike a Framework or Macintosh-style electronic desktop, *QED* presents itself as a series of 'pages' — each containing a possible *QED* function. These are arranged in a pyramid shape up to the middle of the screen and down the other side, with time management, addresses, deskfile, project planner, filing system and calculator among the default configuration.

Features

At the extreme right-hand side of the screen is the box in which you can configure your options to hook up to outside programs — the default configuration is for *Lotus 1-2-3*, but this is easily changed.

The problem with *QED* is that you like it most when you're not using it. The best features of this package are not the ability to find addresses and diary entries quickly, but — for example — the ability to switch with a few keystrokes from *Wordstar* to *Crosstalk* to *dBase* (providing you've got enough RAM and disk space for all that — but that's an issue we'll get to later.

In use

I'm not sure that there's any great use in being able to move into a diary or address file at a keystroke without being able to see the things at the same time. There seems to be something wrong with not being able to 'see' something you want to access immediately. Although there's probably not much time difference between looking up an address in a cardfile and getting it out of *QED*'s address book, the difference is in how quickly you *think* you can get at it in a hurry.

A better option would have been to offer windows in which the address and diary files could be accessed. This sort of window is possible in Ashton-Tate's *Framework* or Lotus' *Symphony* (although it probably isn't practical in *Symphony* because you have to have all the information you want in a single 'worksheet' whereas *Framework* lets you load separate files).

The applications within *QED* are quite serviceable, although if they are to run alongside other applications, you'll need to consider getting extra RAM. *QED* will need at least 128K for itself, on top of whatever requirements your standalone packages have. This is very much a package your IBM compatible can grow into.

And that's no bad thing. RAM prices are dropping and the option of using the best standalone packages with *QED* becomes more realistic as they tumble.

Verdict

There are two versions of *QED*, a £195 version which isn't concurrent and a £295 version which is. I recommend the latter. The limitations of the cheaper version indicate problems with the idea of having useful desktop applications outside the framework of the Big Three applications (word processing, database and spreadsheet).

Get *QED* for its integrating abilities, but not for the individual applications within it.

REPORT CARD: 1 TO 5

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

Name QED **Price** £195 or £295
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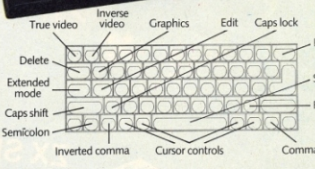

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Current Spectrum Software
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Spectrum Programs on Microdrive

All the above are available on Microdrive cartridges at a price of £4.50 for one cartridge + the price of each program as shown above. E.G., a cartridge with Tradewind and Morse Tutor would be £13.50. As a bonus, Gavin Monk's Indexed Loader is included free with each cartridge.

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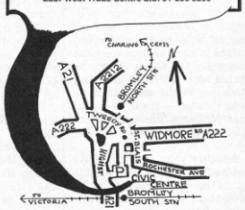

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QUIT

The famous jousting knight Sir Clive Sinclair is about to receive another major honour: Madame Tussauds, the wax dummy specialist, has prepared a waxwork model of computing's most celebrated knight to go on show some time this year. Sir Clive, it can be exclusively revealed, is being modelled at the same time as Joan Collins — it's to be hoped that Madame Tussauds' modellers don't mix the pair of them up . . .

Another year opens, but old habits die hard, and Microsoft is up to its tricks again in its promotion of Microsoft Networks. Eleven major manufactures have signed up for Microsoft Networks, it trumpets in a press hand-out issued just before Christmas. You may remember the launch of MS-Windows in late 1983, when Microsoft conjured-up a list of about 384 major manufacturers who had all signed up to use the miraculous new software.

With a name like windows, we should all have seen through it, but the first signs looked good, and the product was actually glimpsed in action on an Olivetti M24.

But the months dragged on, and MS-Windows was seen no more.

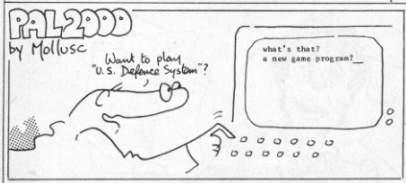
Meanwhile, radical changes are in the wind in the Soviet Union, (according to a report in the International Herald Tribune). Brushing the snow off his boots, Anatoli Alexandrov, president of the Academy of Sciences, reckons that training in computers must become a national priority.

The main micro in Russia is apparently called the Agat, and it is modelled on the Apple II. The Agat, if reported production figures are reliable, must be a collector's item in Russia — they're turning the machines out at a rate of 'tens a year'.

'Consumers do not see any need for personal computers,' says another worthy from the Academy of Sciences, 'and producers do not produce them.'

In the decadent West one answer to low demand has been to make computers more and more 'user friendly'; in Russia the problem is rather more complicated. Information technology is all very well, but can a society that controls information as a matter of policy afford it? The answer, according to the US newspaper, is to make Soviet society more 'computer friendly'.

For the benefit of all those of you who've often wondered what a hard disk looks like, here's a picture to set your minds at rest. It comes by courtesy of the kind gentlemen at Seagate, bless their little cotton socks, and you'll be surprised to note its close resemblance to an ordinary record player of the cheapest sort (a handle to crank the turntable up wouldn't be out of place). Is this the technology we shell out thousands of pounds for?



SYNTAX ERROR

Spectrum expanders who read with a hot flush of anticipation our review on the XK system building package should note that the all-important RAM packs are being produced by Spectrum Electronics, c/o Micro Computer Systems of Luton, 110 Leagrave Road, Luton, Beds.

We had a slight glitch in the 3D drawing program for the BBC in issue 92, where two lines were missed out. These should read:

```
2930ENDPROC
2940DEFPROC left (points%)
```

NEXT WEEK

C3 PTO
Robots have landed on the cover — turn inside for a look at the latest DIY models from Fischer-Technik and Colne Robotics.

Sideways glance
We compare two approaches to sideways ROMs on the BBC: the piggy-back technique and the slot-machine method.

Spectrum tools
Forget the Christmas Black and Deckers; get stuck into some software craftsmanship with this bunch of utilities.

QLity street
This batch of gift-wrapped tools for your QL is guaranteed to grow on you.

Sparkling 64
Put a twinkle in your Commodore 64's eye with our sprite graphics listing.

Amstrad scroll
Sideways scrolling on the CPC464 is on offer.

The Beeb has landed
We present a souped-up 'moon lander' game.

PCN DATELINES

Event	Dates	Venue	Organisers
CADCAM Intl Show	Jan 8-10	NEC, Birmingham	EMAP Intl Exhibitions, 01-837 3699
What is artificial intelligence? Ten weekly meetings.	From Jan 15	City University, London	B Zanditon, 01-253 4399 ext 3268/9
Which Computer?	Jan 15-18	NEC, Birmingham	Clapp & Poliak 01-891 5051
High Technology & Computers Education	Jan 23-26	Barbican, London	Computer Marketplace Exhibitions, 01-930 1612
Computer Exhbn — Computer Thai	January 23-26	Bangkok, Thailand	Conf & Exhbn Management Services, 61/5 Langsuan Soi 2, Ploenduit Road, Bangkok 10500
Intl Microcomputer Fair	Jan 29-Feb 3	Frankfurt, Germany	Collins & Endres, 01-734 0543
Apricot & Sirius Computer Show	Feb 5-7	Kensington Town Hall, London	Paradox Group, 01-241 2354
Intl trade show for home comps, software, etc — LET	Feb 17-19	Olympia, London	Turret-Wheatland, 0923-777000
Intl Computer Graphics User	Feb 19-21	Barbican, London	Mountbuild, 01-486 1951 Show and Conference.
MEXCOM	Feb 25-28	Mexico City, Mexico	AESI Ltd, 01-379 7628

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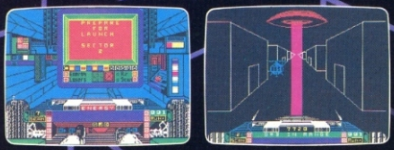

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