

PERSONAL

Computer

NEWS

52
ACTION-PACKED PAGES
ONLY 40p



ENTERPRISE ARRIVES...



IBM + QED, OK
Desktop management
made easy

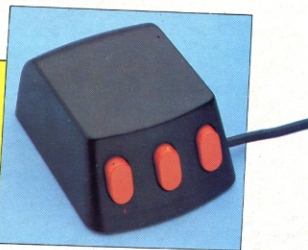
ORIC FILLED
Machine code
graphics utility

QL SOUNDS OFF
Invaluable utility
for music & effects

PLUS ...
Programs for 64,
and Spectrum

*... Was it worth
the wait?*

MOUSE TRAPPED
Peripheral of the Year
for the BBC Micro?



AUTOMAN



BUG-BYTE 

Commodore 64
Officially Licensed from



Mulberry House, Canning Place, Liverpool L1 8JB Tel: 051-709 7071



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.



OUTPUT

SPECTRUM Castle **12**

Everybody's favourite, ugly hero is back in this version of Hunchback for the Spectrum. Could be a real bell-ringer.

QL Collection **15**

This batch of routines and utilities could make life easier for the QL Basic programmer.

64 in Space **22**

Don your jetpack and do battle with a number of alien miscreants in this animated game.

ORIC Paintbox **30**

Machine code routines to spruce up your graphics — and you don't need a paint brush to get you going.

PERIPHERALS

COMMODORE compatibility **33**

The Comprint interface links your Commodore 64 to an Epson printer. The slot-in device offers all the gizmos and gadgets you'd expect — for less cash.

BBC catches a mouse **34**

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

SOFTWARE

IBM under new management **42**

QED checked out — will it put your life in order?

REGULARS

Monitor **1** **Microwaves** **10**

Oric distances itself from UK, page 1; Hot gossip on Acorn, Commodore and Sinclair, page 2; Atari takes on the Lilliputians, page 3; ACT spreads its wings, page 4; and Home Front, page 5.

PCN Charts **5**

See who scored in the Christmas contest.

Random Access **7**

Your opinions and a chance to earn £15.

Routine Enquiries **9**

Whatever your problem, we can help. Just ask...

Shortcuts and sanity savers from the most intelligent readers in the business. (That means you.)

Dungeon **32**

Once more we free the resident troll to bring you the latest adventure news. Read it by lamplight.

Gameplay **38**

Go ahead... kill something.

Billboard **40**

So Santa didn't bring you that computer? Buy it here.

Quit **48**

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

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 debut this month. But Oric has announced a change of tactics and the computer will now be available in March.

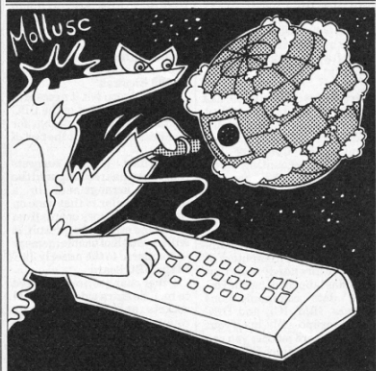
Bruce Everiss, managing director of Tansoft, said: 'It looks as though the Stratos will be manufactured in France and not the UK as originally planned.'

'The French Government tends to support new technolo-

gy 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 Teletext.'

Teletext 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 BAPT-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 Teletext.

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.

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 (TGRS), 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 TGRS 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 1²*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 toy-making. 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.



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 Warriors, 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.

Commodore ads taken to task

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, Eric-

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 franchisees.

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.

son should look out for letters from the NSPPC.

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 publicly 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.



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 Caesar subdues ancient Gaul?' Or Logo, domestic economics, breadmaking 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 Kosmoski, 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 Jr's 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

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 Computer-mate (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.

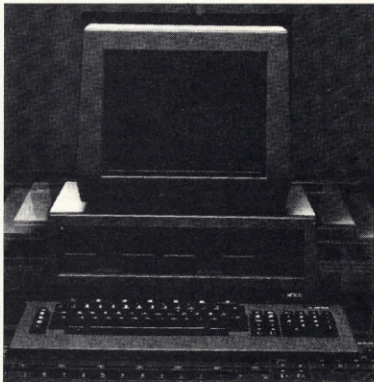
Battle wars over Sirius name rights

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



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

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.

free a trademark that it has invested a lot of time and effort in promoting.

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 embarrassment of an unseemly courtroom battle.

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.



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.



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 J.C. 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-pager.

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

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	DT's Decathlon	Ocean	SP,C64	£6.90
12	9	Underworld	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
19	19	Combat Lynx	Durell/Martech	SP,C64	£7.95
20	—	Kong Strikes Back	Ocean	SP	£7.90

SPECTRUM

TW	TITLE	PRICE
1	GhostBusters	£9.95
2	Airwolf	£7.95
3	Match Day	£6.90
4	Knight Lore	£9.95
5	3D Star Strike	£5.95
6	Doomdark's Rev.	£9.95
7	Select 1	£12.49
8	Underworld	£9.95
9	DT's Decathlon	£6.90
10	Skooldaze	£6.95

COMMODORE

TW	TITLE	PRICE
1	GhostBusters	£9.95
2	Staff of Karnath	£9.95
3	HunchBack II	£7.90
4	Raid over Moscow	£9.95
5	Booty	£2.50
6	Select 1	£12.49
7	Kong Strikes Back	£7.90
8	DT's Decathlon	£7.90
9	Combat Lynx	£7.95
10	Indiana Jones	£9.95

MICROS

BELOW £1,000

TW	MACHINE	PRICE
1	CBM 64	£199
2	Spectrum	£125
3	Electron	£199
4	Amstrad	£349
5	BBC B	£399
6	Spectrum Plus	£175
7	CBM 16	£140
8	Atari 800XL	£140
9	MSX (series)	£275
10	Memotech	£199

ABOVE £1,000

TW	MACHINE	PRICE
1	IBM PC/XT	£2,390
2	ACT Apricot	£1,760
3	Compaq	£1,795
4	Olivetti M24	£1,596
5	Televideo TSI1603	£2,640
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.

3D COMPUTERS

THE HOME COMPUTER SPECIALISTS

BBC 'B' + DFS £589

with 200k disk drive

BBC 'B' £399

with cassette recorder

Plus 5 software packs

SINCLAIR QL £369

COMMODORE 64 £234

with cassette recorder

ACORN ELECTRON £234

with Plus 1 interface

ACORN ELECTRON £209

with joystick and interface

QL 14" MONITOR £175

BBC 200K £120

Disk drive

FRIENDLY ADVICE & SERVICE AT EVERY BRANCH

230 TOLWORTH RISE SOUTH, SURBITON 01-337 4317

30 STATION ROAD, BELMONT, SUTTON 01-642 2534

114 GUNNERSBURY AVE, EALING 01-992 5855

26 STANLEY ROAD, NEWBURY (0635) 30047

1 MANOR ROAD, CADDINGTON, LUTON (0582) 45875



£1000 instant credit



THE PERILS OF PERCIVAL PENGUIN

- * Multi-screen arcade adventure
 - * 100% machine code
 - * Full colour mode 2 graphics
 - * Sound adjustable during play
 - * Exciting "animalistic" sounds
 - * 27 Highly detailed screens
 - * For BBC B - OS1.2
- Guide Percival across the slippery Antarctic ice to find the open sea but beware of Seals and Skuas and be very careful not to fall into a crevasse - unknown dangers await there!!!
(A DIFFICULT & VERY COMPULSIVE GAME)

£7.95

LANDING PARTY (The Search for Spark)

A Deep Space Search and Rescue Adventure

- * A real-time adventure
- * A Galaxy with 1000 different locations
- * 5 levels of difficulty
- * Random locations - every game different

* For BBC B or Electron

One of your officers is missing. Your mission is to go and rescue him. Searching the Galaxy and planets that you encounter but beware of Zinog Spacecraft lying in wait or you may have to fight. You must avoid asteroid storms and the Black Hole and must use all your skill and judgement if you are to succeed.

17.95
14.95
13.95



TYPING TUTOR

(FOR THE BBC B)

A complete Typing Tutor - for novices or those wishing to improve their skills.

Ideal as introduction to typewriting or wordprocessing.

Learn to touch-type easily and gain confidence in the use of the keyboard.

On-screen display of both keyboard and lesson with worked examples -

speeds - accuracy - time taken - full self-test facilities.

Comprehensive Book of Instructions, with hints and additional information.

12.95
10.95
10.95

10% OFF IF MORE THAN ONE PROGRAM ORDERED

For Immediate Dispatch

Send CHEQUE or P.O. to

Willow Software

The Willows, Wrington Lane,
Congresbury, Bristol BS19 5BQ
☎ (0934) 834056

* DEALER ENQUIRIES WELCOME *

BBC and ELECTRON PROGRAMS WANTED

We'll give you royalties and initial payment for your marketable and original programs for BBC or ELECTRON.
I am particularly interested in marketing your educational, business or games programs.
Send your program or description for confidential evaluation or advice.

QB "COMPUCAB"

HOME COMPUTERISTS STOWAWAY CABINET/DESK

FROM ONLY £57.50 + carr



- * DESK TOP SLIDES SHUT WHEN NOT IN USE
- * PROTECTS YOUR EQUIPMENT FROM DUST
- * NO NEED TO UNPLUG
- * 3 COLOURS - WHITE/LIGHT OAK/RUSTIC OAK

I ENCLOSE CHEQUE FOR £..... + £5.00 CARRIAGE.
PLEASE FORWARD MY COMPUCAB IN (TICK COLOUR)

WHITE	LIGHT OAK	RUSTIC OAK
£57.50	£64.00	£64.00

Name

Address

Post to:

QUEENBUCK LTD
BENTALLS, PIPPS HILL
BASILDON, ESSEX

TOUCH-TYPE

FOR THE 48K Sinclair Spectrum

DO YOU YEARN TO DO SOMETHING USEFUL ON YOUR SPECTRUM?

Are you fed up with silly games? Make this the moment you take a step forward using your Spectrum into the world of "The Office of the Future!"

Learn to touch type on any QWERTY keyboard using the Spectrum as the teaching machine.

- * Full touch typing (no eyes down to the keyboard) from the first lesson.
- * Carefully designed lessons progress from key learning to speed practice at each stage.
- * Full ten finger touch typing with correct left and right shift key operation.
- * Learning psychology built in to the program to keep you motivated and interested in progressing.
- * Full feedback of performance - you know it is working - you are learning to type.
- * Learn at your own pace neither hurried nor restricted by other pupils.
- * Comprehensive instruction manual included with every cassette.

In this age of computers isn't it time YOU learned to type!

£8.95 inc p+p and VAT.

To: JCS SOFTWARE, 1 Paddocks Close, Cobham, Surrey, KT11 2BD. Tel: 0932 65354. O.K. I'm ready to step forward and improve my ability. Please rush me a copy of TOUCH-TYPE for the 48K Spectrum. I enclose a cheque for £8.95 (Please make cheques payable to JCS Software).

Name

Address

PCN JAN 9

TOUCH-TYPE TOUCH-TYPE TOUCH-TYPE TOUCH-TYPE for the Spectrum 48K.



Share your words of praise or send us a rocket about PCN. We want to hear your views and feelings on the articles we print — and those you feel we ought to. Write to *Random Access, Personal Computer News, Evelyn House, 62 Oxford Street, London W1A 2HG*. You could win £15 for the best letter of the week.

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 appropriate channel is opened.

We deserve better than this, which I see as a cynical con riding 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 `SON PI` for `I`, 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.

Jochim 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 Ro-

land 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 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 pur-

chased 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 Antek, 41 Peabworth 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

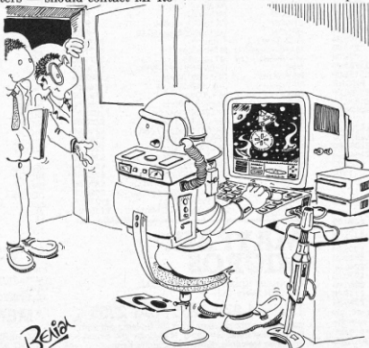
I am writing to fuel the recent debate on micro reliability. Early in 1983 I bought a Commodore 64 (I paid £330!). It had to be returned twice but it is now functioning perfectly.

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.



DO 'N'T VAT THE PRESS

There are strong reasons to believe the Chancellor of the Exchequer is planning to impose VAT on your magazine.

Such a move would turn the clock back 130 years — the last tax on newspapers and journals was repealed in 1855. Since then 'No tax on knowledge' has been a principle agreed by all Governments, even in the darkest days of war.

A free Press is a tax-free Press. No Government should be given the power to impose financial pressure on a Press it may not like.

Tell your MP to say 'NO' to any tax on reading.

Issued by the Periodical Publishers Association, London

LIGHT TO THE POINT



SPECTRUM 48K/COMMODORE 64

**£17.25
DRAGON/TANDY
£11.50**
Inclusive

NO INTERFACE REQUIRED

Discover the exciting world of creating your own graphics on screen.

The Trojan Light Pen will draw boxes, circles, lines, freehand pictures, save and load pictures with full erase facility.

All in Hi-Res screen in any of 4 colours for the Dragon/Tandy, 8 colours for the Spectrum, and 16 colours for the Commodore 64.

For educational or leisure use.

DEALER ENQUIRIES WELCOME

TROJAN

Micro Computer Software & Accessories

Send cheque/P.O. to

TROJAN PRODUCTS

166, Derwyn, Durwan, Swansea SA2 7PF

Tel: (0102) 205491.

MM

UNBELIEVABLE SAVINGS

** COMPUTERS **

AFRICOT	F1 from	£775.00
AFRICOT	Point 7 from	£2950.00
AFRICOT	PORTABLE from	£1498.00
AFRICOT	256K 315Kx2 MONITOR	£1385.00
AFRICOT	256K 720Kx2 MONITOR	£1545.00
AFRICOT	XI 256K 10MB MONITOR	£2195.00
BBC	B	£320.00
COMMODORE	9000 Multi User 21MB	£5095.00
COMMODORE	8250 DISK DRIVE	£785.00
COMMODORE	8296	£895.00
COMMODORE	5X-64 PORTABLE	£875.00
COMMODORE	64	£156.51
COMMODORE	DISK 1541	£185.21
COMMODORE	PARALLEL INTERFACE	£39.50
COMMODORE	1530 C2N CASSETTE	£32.00
COMPAQ	2X350K	£1795.00
COMPAQ	Plus(10MB)	£3195.00
IBM PC	List less 17.5%	PHONE
OLIVETTI	M20 160KB 2x320KB Drives	£1295.00
OLIVETTI	M24 128KB 2x360KB Drives	£1575.00
OLIVETTI	M24 128KB 10MB Hard Disk	£2695.00
SAGE	II & IV	POA
SANYO	MB5 555 128Kx2 160K Drives	£795.00
SIRIUS	256K 10MB	£2850.00
SIRIUS	256Kx2 4MB	£2095.00
SIRIUS	128K 1.2MB	£1645.00
ACT/IBM	Memory Expansions from	£222.00
PLUS 5	External Hard Disk Drives	POA

** SOFTWARE **

ALL MAJOR SOFTWARE PROGRAMS SUPPLIED AT LOW COST

D BASE III	£360.00
WORDSTAR	£195.00
OPEN ACCESS	£360.00
LOTUS 123	£295.00
SYMPHCNY	£420.00
MULTIMATE	£240.00
D BASE II	£230.00
DNV DELTA	£395.00
FRIDAY	£135.00
FRAMEWORK	£345.00

Not only do we offer top quality products at low prices. We also support and develop Software with the assistance of our long established software dept. NEW RELEASE — UNIX MULTI USER ACCOUNTS SOFTWARE.

** MATRIX PRINTERS **

ANADEX	DP-6500 500cps	EX VAT	£2234.00
ANADEX	WP-6200	EX VAT	£1981.00
BROTHER	EP44	POA	
BROTHER	HF5	POA	
BROTHER	M 1009 50cps	POA	£159.00
CANON	PW1080A 160cps (NLQ)	POA	£299.00
CANON	PW1150A 160cps (NLQ)	POA	£379.00
EPSON	RX 807 100cps	POA	£159.00
EPSON	RX 80F/7 100cps	POA	£159.00
EPSON	FX 80 150cps	POA	£159.00
EPSON	FX 100/PT 160cps	POA	£159.00
EPSON	LQ 1500 200cps (NLQ)	POA	£375.00
EPSON	From	POA	£177.00
HOONEYWELL	MT180 80cps	POA	£579.00
MANNESMANN	MT 180 160cps (NLQ)	POA	£535.00
NEC	PINWRITER P2(P/NLQ)	POA	£299.00
NEC	DRE 8925 240cps	POA	£1385.00
NEWBURY	844 200cps	POA	£825.00
NEWBURY	OKI	POA	£360.00
NEWBURY	OKI 92P 160cps	POA	£1535.00
OKI	OKI 2410P 350cps	POA	£520.00
OLIVETTI	DM1100E 120cps	POA	£249.00
PANASONIC	KP1091 120cps + NLQ	POA	£185.00
SHINWA	CP80 Model II FT	POA	£165.00
STAR	DELTA 10 160cps	POA	£299.00
STAR	DELTA 15 160cps	POA	£399.00
STAR	GEMINI 10X 120cps	POA	£189.00
STAR	GEMINI 15X 120cps	POA	£299.00
STAR	RADIX 10 200cps (NLQ)	POA	£419.00
STAR	RADIX 15 200cps (NLQ)	POA	£525.00
TOSHIBA	TH2100H 192cps	POA	£1275.00
TOSHIBA	930 200cps NLQ 80cps	POA	£1350.00

MAYFAIR MICROS

BLENNHEIM HOUSE, PODMORE ROAD,
LONDON SW18 1AJ

TEL: 01-870 3255 / 871 2555

We accept official orders from UK Government and Educational Establishments. Mail Order and Export Enquiries welcome. Callers by appointment.

** DAISYWHEEL ** ** PRINTERS **

BROTHER	HR1	POA
BROTHER	HR15	POA
BROTHER	HR15 Keyboard	POA
BROTHER	HR15 Sheetfeeder	POA
BROTHER	HR25	POA
DAISYSTEP	2000 20cps	£219.00
DIABLO	430 APR	£1295.00
DIABLO	Sheet Feeder	£490.00
FLUJITSU	SP320 48cps	£795.00
JUKI	6100 180cps	£325.00
NEC	2010 Serial 20cps	£545.00
NEC	2030 Parallel 20cps	£545.00
NEC	35 10 Serial 30cps	£1049.00
NEC	3530 Parallel 35cps	£1049.00
NEC	7710 Serial 55cps	£1440.00
NEC	7730 Parallel 55cps	£1440.00
OLIVETTI	DY450 45cps	£880.00
OLIVETTI	11440 RP	£1185.00
OLIVETTI	9445 RP	£1550.00
QUME	LETTERPRO 12/20	£475.00
RICOH	RP1300S	£895.00
RICOH	RP1600S	£1175.00
RICOH	RP1600S FLOWWRITER 8k	£1249.00
RICOH	RP1600S FLOWWRITER 8k	£1249.00
RICOH	IBM PC	£1299.00
RICOH	RP1600S Sheet Feeder	£458.00
RICOH	RP1600S Tractor	£138.00
CORONA	TP1 12cps	£154.00
TEC	STARWRITER F1040 40cps	£895.00
TEC	STARWRITER F3055 55cps	£1235.00
TEC	Sheetfeeder	£458.00
TEC	Tractor	£138.00

** VDU's & TERMINALS **

CIFER	T4	£760.00
HAZELTINE	ESRPT Fixed Keyboard	£395.00
QUME	QVT 103 (VT100 VT131)	£985.00
TELEVIDEO	910	£469.00

** MEMORY EXPANSIONS **

AST	HERCULES	QUADRAM	SIMONS	POA
ALL AT BIG SAVINGS				



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, Feverell, Plymouth.

```
10 MODE 1
20 INK 0,11:INK 1,1:INK 2,24:INK 3,6
30 CLR
40 SYMBOL 255,24,24,24,60,60,24,24,24
50 SYMBOL 254,0,0,24,24,60,60,24,24
60 SYMBOL 253,126,255,255,255,255,255,129
70 SYMBOL 252,0,0,126,255,255,255,129
80 SYMBOL 251,0,0,0,6,6
90 SYMBOL 250,0,0,182,182
100 SYMBOL 249,0,0,96,96
110 ship$=CHR$(15)+CHR$(2)+""+CHR$(252)+CHR$(253)+CHR$(252)
+""+CHR$(10)+STRING$(5,0)+""+STRING$(3,253)+""+
120 ship$=ship$+CHR$(10)+STRING$(5,0)+CHR$(15)+CHR$(3)+""
+CHR$(213)+CHR$(143)+CHR$(212)+""+CHR$(15)+CHR$(1)+STRING$(
2,11)+STRING$(4,0)
130 ship$=ship$+CHR$(22)+CHR$(1)+CHR$(254)+CHR$(255)+CHR$(254)
+CHR$(10)+STRING$(3,0)+STRING$(3,255)+CHR$(10)+STRING$(3,0)
+CHR$(1251)+CHR$(256)+CHR$(249)+CHR$(22)+CHR$(0)
140 FOR i=1 TO 36:LOCATE 1,12:PRINT USING "b";ship$;
FOR pause=1 TO 40:NEXT:NEXT
150 FOR i=35 TO 2 STEP -1:LOCATE 1,12:PRINT USING "b";ship$;
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 0:FILL 1:LINE x-1/2,y-1/2 TO
x+1/2,y-1/2 TO x+1/2,y+1/2 TO x-1/2
,y+1/2 TO x-1/2
,y-1/2:FILL 0
270 SQUARE x-1/2,y-1/2,1 DIV 2,0-1
```

Have you any good answers for Amstrad owners or brainwaves for the Beeb? Share them with fellow computer users by sending them to us. Not only will you get £10 for every tip published, but you could find a bonus of £50 comes your way if you are chosen as the Microwave of the month. Send them to *Microwaves, PCN, Evelyn House, 62 Oxford Street, London W1A 2HG.*

```
280 SQUARE x+1/2,y-1/2,1 DIV 2,0-1
290 SQUARE x+1/2,y+1/2,1 DIV 2,0-1
300 SQUARE x-1/2,y+1/2,1 DIV 2,0-1
310 END IF
320 END DEFINE
330 :
340 :
350 DEFINE PROCEDURE circ(x,y,r,o)
360 IF o=0 THEN
370 INK 0:FILL 1:CIRCLE x,y,r:FILL
0
380 circ x+r/SQRT(2),y+r/SQRT(2),r
DIV 2,0-1
390 circ x-r/SQRT(2),y+r/SQRT(2),r
DIV 2,0-1
400 circ x-r/SQRT(2),y-r/SQRT(2),r
DIV 2,0-1
410 circ x+r/SQRT(2),y-r/SQRT(2),r
DIV 2,0-1
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
TYA
PHA
LDA E#49
LDY E0
LDX E2
JSR#E2F
PLA
TAX
PLA
JMP #EC03
TO load:
10 FOR I=#400 TO E415
```

```
20 READ D:=VAL(" "+D$):
POKE LD
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,A8,68,4C,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 INKEYS = 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 driver 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 Computer control board inside the Epson, connect the cable supplied to the Serial I/O port on the Commodore computer and Hey Presto! The Computer board inside the Commodore now thinking it is working with a Commodore printer. All the features are there — total emulation. And it even provides a 32 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 18 pin (or other Epson special characters) will prove invaluable. So go on — speed yourself. If you are the owner of a Commodore personal computer treat yourself to an Epson — and a Computer of course!

**Price
£61.99
inc VAT**

Please add £1 P&P



Available from—



CHROMASONIC
48 JUNCTION ROAD
ARCHWAY
LONDON W15 5RD
TEL: 01-263 9493

OR A-LINE COMPUTER SYSTEMS
1 CHURCH FARM LANE,
WILLDOUGHBY, WATERLEYS
LEICESTER LE9 3UD
TEL: (053758) 486

DISTRIBUTOR
ENQUIRIES TO—
MICRO CONTROL
SYSTEMS LTD
TEL: (0773) 790011

ALL IN STOCK

BBC SPECIALISTS

S. P. ELECTRONICS

Acorn Electron	£199.00
BBC Model B 1.2 O.S.	£399.00
CP 80 Printer (inc. cable) ..	£229.00
Disc Operating System	£96.00
Disc Drives	from £175.00
Disc Operating system D-Density ..	£104.00
G3 WHO RTTY PROGRAM (TAPE) ..	£7.50
G3 WHO RTTY PROGRAM (EPROM VERSION) ..	£20.00
Circuit board for RTTY decoder Mk.3 (inc. instructions) ..	£7.00
Star 10X Printer (inc. cable) ..	£275.00
CANNON Dot Matrix 160cps NLQ ..	£350.00
Joysticks (pair) self centering + analogue ..	from £17.95
Printer Cable (Centronics) ..	£12.90
Speech Synthesis	£55.00
Disc Doctor	£33.00
WORDWISE Word Processor	£39.00
Slow Scan TV Circuit Board + Program (inc. instructions) ..	£17.50

Wide selection of software, books, leads, plugs, etc.
SAE for full list. All available Mail Order
All prices apply while stocks last — carriage extra

48 Linby Road, Hucknall, Notts.
NG15 7TS

Tel: 0602 640377

All prices include VAT



SHARP MZ-700 SERIES

USERS MAGAZINE

OVER 140 PROGRAMS

4 BOOKS

12 PERIPHERALS

SPECIAL OFFER
SEND FOR OUR COLOUR CATALOGUE NOW

SOLO SOFTWARE

95B BLACKPOLE TRADING ESTATE
WORCESTER WR3 8TJ
TELEPHONE (0905) 58351

GETTING THE JUMP

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

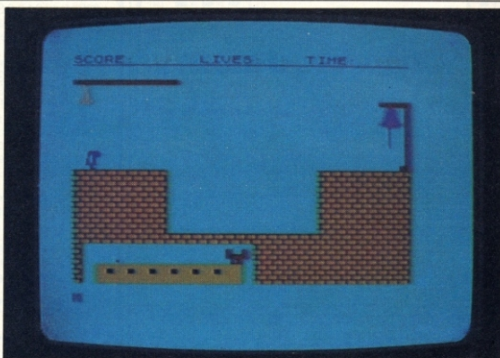
The Castle, for the Sinclair Spectrum is a version of the *Hunchback* arcade game, where you have to make your way through a number of screens to rescue Ezmarelda.

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 CLR : PRINT AT 0,10: INK 2:
PAPER 0:THE CASTLE:
3 RESTORE 10:FOR #=3 TO 21 5
TEP 4: READ 4:
5 FOR #=1 TO LEN 4:-1 BEEP .
0005.#+20:PRINT AT #,0:4#LEN 4
#-0 TO LEN 4:):NEXT #
6 FOR #=1 TO LEN 4:
BEEP .0005.#+20:PRINT AT #+2,3
2-#:#+1 TO 0):NEXT #
6 NEXT #
10 DATA "HELP THE HUNCHBACK 3
RUE","EZHARELDA BY MOVING ACROSS 5
THE","SCREEN FROM LEFT TO RIGHT
T RND","RINGING THE BELL.THERE A
RE SEVEN"
11 DATA "SCREENS AND EZHARELDA
IS LOCKED","AWAY IN THE SEVENTH
IF #1UE","SCREENS ARE COMPLETE
D WITHOUT","LOSING 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: PA
PER 5: DO PRESS ANY KEY TO PLA
Y.
25 OVER AT 0,10: INK 6: PAPER
1: OVER 1: FOR #=1 TO 19:
PRINT AT 0,#: OVER 1: INK 6: PAPER
1: NEXT #:
30 IF INKEY#="" THEN GO TO 20
40 GO TO 30
50 PRINT AT 10,10: "GAME OVER"
NEXT #,20
60 PRINT AT 4,5: "PRESS Y TO P
LAY AGAIN:AT 6,7: "OR N TO STO
P"
70 IF INKEY#="" THEN GO TO 10
0
75 IF INKEY#="N" THEN STOP
80 GO TO 70
90 RESTORE 100: FOR #=144 TO 1
85 FOR #=0 TO 7: READ B: POKE U
SR CHR# #+#:# NEXT #: NEXT #
100 DATA 0,0,3,7,7,5,4,4
101 DATA 12,14,15,15,31,6,12,6
102 DATA 0,0,164,244,284,184,12
,4,8
103 DATA 16,24,224,224,240,192,1
28,32
104 DATA 12,12,14,31,1,1,1
105 DATA 96,96,95,224,240,120,1
20,284
106 DATA 0,0,29,47,187,62,62,6
107 DATA 0,0,192,224,224,96,32,
32
108 DATA 48,112,240,240,120,96,
48,96
109 DATA 0,24,7,7,15,3,30,4
110 DATA 0,0,0,7,15,1,7
111 DATA 48,48,48,112,240,120,1
20,120
150 OVER 0: PAPER 5: INK 1: BOR
DER 5: CLR
150 GO TO 900
200 BEEP .001,30: GO TO 210+L

```

```

210 PRINT AT 10,V:"R ": LET L=1
10 GO TO 200
211 PRINT AT 10,V:"S ": LET L=0
220 LET V#V-1
240 IF V#0 THEN PRINT AT 10,V+1
:" ": LET V#0
250 IF B#V AND J#10 OR B#1#V AN
D J#10 THEN BEEP .1,10: BEEP .1,
0: LET L=L+1: GO TO 910
260 RETURN
300 PLOT OVER 1,120,167
310 DRAW OVER 1,1,1,-90
320 LET L=L+V: IF L<=42 THEN L
ET V#0
325 PLOT 120,167: DRAW L,-90
330 IF L#42 THEN LET V#-0
340 IF B#INT ((120+L)/8)-1 TH
EN LET B#B+INT (V/8): PRINT AT J
EN LET B#B+INT (V/8): PRINT AT J
:B-2: "AT J,1,B-2:"
350 RETURN
360 IF ATTR (J+1,B)<=0 AND ATT
R (J+1,B+1)<=0 AND J#10 THEN GO
TO 420
370 RETURN
410 IF ATTR (J+1,B)<=0 AND ATT
R (J+1,B+1)<=0 AND J#10 THEN GO
TO 420
415 RETURN
420 FOR #=10 TO 16: PRINT AT #,
B: "AT #,1,B:"R":AT #+2,#,B:
" BEEP .1,#: NEXT #: LET L=L+1
-1: GO TO 910
430 RETURN
500 LET L=(INT (RND*3))+0+4
520 PRINT AT 9,L: INK 2:"0":AT
10,L:"R":AT 11,L:"S":AT 12,L:"
":AT 13,L:"U"
525 IF B#1#L THEN FOR #=10 TO 0
STEP -1: BEEP .005,#: NEXT #: L
ET L=L+1: GO TO 910
530 BEEP .005,30: PRINT AT 9,1:
"AT 10,L:": "AT 11,L: INK 2:
N":AT 12,L:"0":AT 13,L:"P"
590 GO TO 400
640 LET V#V-1: PRINT AT 7,V: IN
K 1: V#0: "R"
650 IF J#1-7 AND B#V OR J#1-7 A
ND B#1#V THEN GO TO 420
660 IF V#1 THEN PRINT AT 7,V:
" ": LET V#0
690 GO TO 500
700 LET V#V+1: PRINT AT 10,V:
" "
805 IF J#10 AND B#V+1 OR J#10 A
ND B#V THEN GO TO 420
710 IF J#0 THEN PRINT AT 10,V:
" ": LET V#0
790 GO TO 500
800 IF B#24 THEN GO TO 850
805 LET V#V+1: PRINT AT 10,V:
" "
810 IF J#10 AND B#V+1 OR J#10 A
ND B#V THEN GO TO 420

```

```

815 IF V#24 THEN PRINT AT 10,V:
" ": LET V#0
820 LET L=L-1: PRINT AT 7,L:"U"
825 IF J#1-7 AND B#V OR J#1-7 A
ND B#1#V THEN GO TO 420
830 IF L#1 THEN PRINT AT 7,L:
" ": LET L#0
835 LET X#X-1: PRINT AT 0,X:"S
" : LET X#0
840 IF J#0 AND B#V OR J#0 AND
B#1#V THEN GO TO 420
845 IF L#1 THEN PRINT AT 9,X:"
" : LET X#0
849 GO TO 410
850 RESTORE 850: FOR #=157 TO 1
60: FOR #=0 TO 7: READ B: BORDER
#:#: BEEP .001,30: POKE USR CHR#
#:#: NEXT #: NEXT #
850 DATA 60,126,255,255,255,255
,127,63,60,126,255,255,255,255,2
54,252,31,7,3,1,0,0,0,246,224,
192,120,120,0,0
870 BORDER #:#: FOR #=0 TO 10: FO
R #=# TO 2 STEP -1: PRINT AT 7,2
5: INK #:"ND":AT 0,25:"PO"
880 NEXT #: NEXT #
890 FOR #=0 TO 1: RESTORE 895
FOR #=0 TO 3: READ #: READ B: BE
EP #:#: NEXT #: NEXT #
895 DATA 1,1,12,1,0,1,7,1,1,6
896 FOR #=12 TO 14: BEEP .1,#:
PRASE #:#: NEXT #
897 LET B#B+2: LET L=L+1: L
ET V#2: GO TO 911
900 LET S#0: LET L#3: LET V#2
905 LET #=2
910 LET B#B-2: IF L#0 THEN GO
TO 50
911 IF B#0 THEN GO SUB 9000
915 RESTORE 913: FOR #=156 TO 1
60: FOR #=0 TO 7: READ B: POKE U
SR CHR# #+#:#: NEXT #: NEXT #:
0 SUB #+1000
913 DATA 255,16,16,16,255,1,1,1
0,200 DATA 3,4,12,11,11,11,11,20,
23,23,47,95,191,223,63,1,192,224
,240,240,240,240,240,240,240,240
,252,254,255,255,252,120
930 PRINT AT 0,0:"SCORE: L
IVES: TIME
935 PLOT 167,167: DRAW 254,0
935 PRINT AT 0,7: INK 7:#:AT 0
,19: INK 7:
940 IF W#0 THEN GO TO 945
941 PRINT AT 10,31: INK 2: "
942 FOR #=5 TO 9: PRINT AT #,0,31
: INK 2: " : NEXT #: PRINT AT 4,
29: INK 2: "
943 IF W#5 THEN PRINT AT 5,29:
INK INT (RND*5) ,"NP":AT 6,29,"O
0": PLOT 240,110: DRAW 0,-14
944 IF W#5 THEN PRINT AT 2,0:

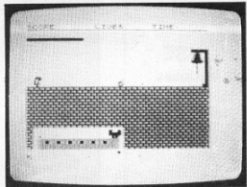
```

Variables used

- h** Jump variable. When h=0 the Hunchback jumps up, when it's 1 he goes down.
- qS** 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 Ezmarella subroutine.
- 850** Defines graphics for heart 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:
STEP 2: PRINT " ": FOR n#0 TO 5
P:AT 4,n:00: NEXT n
945 LET t:=200: LET h:=3: LET j:=1
0: LET p:=1
946 PRINT AT 10,1:
" * * * * * AT 19,1:
" * * * * * AT 2
1,1:
947 PRINT AT 19,w#2-2: OVER 1:
"
950 BEEP .5:10: PRINT AT 10,b-1
"BD:AT 9,b-1: "AC"
1000 GO SUB w#100:
"
1100:IF IN 6346#254 AND b#1 THE
N LET b#-1: PRINT AT j,b:"J":
AT j-1,b:"OH": LET p#0
1110 IF IN 6346#253 AND b#2 TH
EN LET b#-1: PRINT AT j,b-1:"B
D":AT j-1,b-1:"AC": LET p#1
1200 IF IN 6140#254 AND h#3 THE
N BEEP .01:10: LET h#0
1210 GO TO 1220:(h#3)
1220 LET j#-1: PRINT AT j+1,b:"
"
1221 IF j#0 THEN LET h#1
1222 GO TO 1230
1223 LET j#+1: PRINT AT j-2,b:"
"
IF j#10 THEN LET h#3
1400 IF b#0 THEN FOR n#0 TO 2
BEEP .2:00: BEEP .2:15: NEXT n
LET sc#sc+(300-1): LET sb#sb+2
LET w#w+1: GO TO 911
1450:LET l#-1: PRINT AT 0,28: I
NK 7,1: "IF l#=-1 THEN BEEP .1
10: BEEP .1:0: LET l#l+1-1: GO
TO 910
1500 GO TO 1510+p
1510 PRINT AT j,b-1:"KL":AT j-
b-1:"GH":GO TO 1520
1511 PRINT AT j,b-1:"EF":AT j-
1,b-1:"AC"
1599 GO TO 1000
2000 CLS : FOR n#11 TO 21: PRINT
AT n,0: INK 2: PAPER 6:"HHHHHHH
HHHHHHHHHHHHHHHHHHHH": NEXT
n
2030 RESTORE 2040: FOR z#0 TO 7:
READ r: POKEUSR "r"+z,r: NEXT
z
2131 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,
0,50
2050:LET l#1: LET v#29
2099 RETURN
3000 LET l#90: LET w#0
3010 CLS : FOR n#0 TO 21: PRINT
AT n,0: INK 2: PAPER 6:"HHHHHHH
HHHHHHHHHHHHHHHHHHHH": NEXT
n
3020 FOR n#11 TO 16: PRINT AT n,
0: INK 1: PAPER 5:"
3040 PLOT 126,167: DRU L (-,90

```

```

3999 RETURN
4000 CLS : FOR n#11 TO 21: PRINT
AT n,0: INK 2: PAPER 6:"HHHHHHH
HHHHHHHHHHHHHHHHHHHH": NEXT
n
4010 FOR n#5 TO 25 STEP 2: FOR n
-11 TO 16: PRINT AT n,n: INK 1:
PAPER 5:" : NEXT n
4999 RETURN
5000:CLS : PRINT AT 5,29: INK IN
T (RND#5):"NP":AT 6,29:"OO": PLO
T 240,19: DRU 0,-14
5002 PRINT AT 2,0: INK 2: "P
" : FOR n#0 TO sb STEP 2: "PR
AT n: INK 7:"NP":AT 4,n:"OO":
NEXT n
5005 RESTORE 5010: FOR n#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
34,33,47,63,63,63,60,63,187,119
39,47,47,63,33,35,47
5011 DATA 192,224,224,240,176,15
0,160,32,192,240,252,124,124,20,
124,124,110,112,240,240,252,192,
224,248
5020 FOR n#11 TO 21: PRINT AT n,
0: INK 2: PAPER 6:"HHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHH": 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
EG 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:"HH": NEXT n: NEXT n
5070 RESTORE 5080: FOR a#100 TO
164: FOR n#0 TO 7: READ b: POKE
USR CHR$ a+n,b: NEXT n: NEXT a
5080 DATA 32,119,160,32,32,32,32
32,32,32,32,32,32,32,32
5081 DATA 33,35,35,39,54,114
160,127,47,47,47,44,7,7,7,15,1
5,31,1,3,15
5082 RESTORE 5100: FOR n#0 TO 7:
READ a: POKEUSR "a"+n,n: NEXT
n
5100 DATA 60,66,109,109,109,109,
66,60
5110:IF w#30 THEN RESTORE 5120:
FOR n#0 TO 7: READ s: POKEUSR
"n"+n,s: NEXT n
5120 DATA 0,0,194,127,194,0,0,0
5099 RETURN
6020 LET w#29
6030 CLS : FOR n#0 TO 5000
7000 LET v#25
7099 GO TO 5000
8050 CLS : FOR n#0 TO 10: PRINT
AT n,27: INK 2: " : NEXT n
8005 PRINT AT 2,0: INK 2: "
8006:FOR n#0 TO sb STEP 2: PRINT

```

```

AT 3,n: INK 7:"NP":AT 4,n:"OO":
NEXT n
6010 RESTORE 6030: FOR n#157 TO
162: FOR n#0 TO 7: READ b: POKE
USR CHR$ a+n,b: NEXT n: NEXT a
6020 DATA 227,227,227,227,25,12
6,126,126,199,199,199,255,25,12
6,126,30
6030:DATA 240,224,254,254,254,25
4,255,255,33,127,127,127,127,127
,255,255
6040 PRINT AT 7,26: INK 2:"PO":A
T 7,30:"PO":AT 6,26:"NO":AT 6,30
:"NO"
6045:FOR n#200 TO 254 STEP 4: 0
USR 1: INK 2: PLOT n,112: DRU 0,7:
PLOT n+1,112: DRU 0,7: NEXT n
6050 INK 1: OVER 0: RESTORE 6060
:FOR n#157 TO 159: FOR n#0 TO 7
: READ b: POKEUSR CHR$ a+n,b: N
EXT n: NEXT a
6060 DATA 255,193,193,255,193,15
3,255,193,0,1,31,26,25,127,153,1
03,0,120,240,152,152,254,153,153
6070 PRINT AT 10,28: INK 0: PAPER
2:"NH":AT 9,28:"OP"
6080 RESTORE 6090: FOR n#157 TO
160: FOR n#0 TO 7: READ b: POKE
USR CHR$ a+n,b: NEXT n: NEXT a
6090:DATA 5,7,18,20,28,62,61,44,
40,10,10,10,10,10,10,10,10,10,10,
0,30,63,63,55,115,123,60,56,120,
252,252,236,256,222
6100 PRINT AT 6,29:"OO":AT 7,20:
"NO"
6110 FOR n#-2 TO 1: INK 1: PLOT
232,126: DRU 0,-9: NEXT n
6120 FOR n#11 TO 21: PRINT AT n,
0: INK 2: PAPER 6:"HHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHH": NEXT n
6130 GO SUB 4010
6140 LET v#15: LET l#24: LET w#2
6150 RESTORE 6210: FOR n#0 TO 7:
READ u: POKEUSR "u"+u,u: NEXT
n
6210 DATA 60,66,109,109,109,109,
66,60
6300:RESTORE 6310: FOR n#0 TO 7:
READ s: POKEUSR "n"+s: NEXT n
6310 DATA 52,62,145,31,246,137,7
,4,4
6399 RETURN
6900:FOR n#1 TO 50: BEEP .000,n:
BEEP .003,n-1: PRINT AT 6,1: IN
T 5-n/(10):"SUPER BONUS": NE
XT n
6910 FOR n#0 TO 8 STEP 2: PRINT
AT 3,n: " : NEXT n: "BEEP .1
n: LET sc#sc+100: PRINT AT 0,7:
sc: NEXT n
6920 LET sb#-2: RETURN

```

A PROSPEROUS NEW YEAR STARTS HERE AT

THE SOFTWARE WAREHOUSE

For the IBM PC and 100% Compatible Machines

SUPERCALC 3.2 with FASTMATH a totally integrated software package. Spreadsheet, letter writing, text editing, data management & graphics incorporating SIDEWAYS to rotate a large report 90° for printing on continuous stationery. RRP £295
SWP £225

EASYWRITER II integrated word-processing, spell-checking & mail-merging with either American, English, French or German dictionary RRP £290 **SWP £220** (Legal or medical dictionaries available)

EASYFILER database management system RRP £270 **SWP £210**

OTHER PRODUCTS SELECTED FROM OUR RANGE

RRP	SWP	RRP	SWP	RRP	SWP
diase II	£385	PC Forly	£120	Wordstar	£295
diase III	£495	Pertmaster	£550	WS + Mailmerge	£390
Friday!	£195	Pertmaster +	£385	WS Professional	£495
Open Access	£450	Easy Sales Pro	£240	Easy Printer	£170
Or	£330	Framework	£495	Multimate	£339

MAIL ORDER ONLY

Please enclose payment with order.
Add 15% VAT to above prices. Post & Packing £2.

THE SOFTWARE WAREHOUSE

9 Lappunon Walk, Reading, Hayes, Middx. UB4 9PN
Tel: 01-841 1209

F. S. ENTERPRISES

compu-desk

THE HOME FOR YOUR COMPUTER



Superbly styled in a rich teak effect finish and brown frame.

And the teak finish is easy to clean. Suitable for use with all leading makes of personal home computers: Spectrum, Vic 20, Commodore 64, Oric, Dragon and the QL.

There's room for a large recorder printer, disk drives, manuals, etc. Cable outlets rear of stands.

36" W x 34" H x 19" D
Twin-wheel castors for maximum mobility on tubular steel legs - for that professional look.

It's compact, mobile, attractive and can be moved out of the way with the minimum of space and efficiency. Therefore the Compu-Desk is ideal for the bedroom or study where space is at a premium.

Easily assembled, just slot together and tighten fittings.

A drawer to fit shelf under work top is available. Sent as a flat pack with easy instructions. Money back guarantee if not satisfied provided the goods are returned undamaged within 72 hours of delivery.

T.V.A. computer supplied by Curry's. And please allow up to 21 days for delivery.

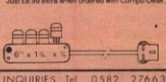
£5 off when you order using this advert
British made

Designed for the computer genius in the home

To order send Cheque-POs (made out to F.S. Enterprises) made out for £28.00. Address: 18 Power Court, Church Street, Luton, Bedfordshire LU1 3JU or 058 49 if 4 into 1" is included. You can also collect at above address.

NAME _____
ADDRESS _____
CHEQUE-POS FOR £ _____

"4 into 1" means connector with fitted 13 amp plug to hold up cables and leads from four computers. Just £8.99 extra when ordered with Compu-Desk.



INQUIRIES Tel. 0582 27663

Cash & Carry COMPUTERS

PRINTER PRICES SLASHED

Personal callers welcome at our extensive showrooms most equipment on demonstration

Seikosha GP500A Dot Matrix Printer



* 80 columns
* 50cps * tractor feed * Up to 10in. paper width
* Centronics interface
* Std and double width characters * Graphics
Package price includes 100 sheets of paper plus printer-cable or interface required, available for the following computers:
Amstrad (test only) ... £119.09 + VAT = **£136.95**
BBC, Oric, Dragon ... £113.00 + VAT = **£129.95**
Sinclair
with Kempston I/F. ... £139.09 + VAT = **£159.95**
Sinclair QL ... £130.39 + VAT = **£149.95**
MSX ... £119.09 + VAT = **£136.95**

Seikosha GP700A Multi-colour Dot Matrix Printer



* 7 colours and 30 shades in one pass * 80 columns
* Condensed & double width print * Full colour graphics * 50cps
* Friction and tractor feed * Centronics interface
Package price includes 100 sheets of paper plus printer-cable or interface required, available for the following computers:
BBC, Oric, Dragon ... £243.43 + VAT = **£279.95**
MSX ... £249.52 + VAT = **£286.95**
Amstrad ... £249.52 + VAT = **£286.95**
Sinclair QL ... £260.83 + VAT = **£299.95**
Sinclair
with Kempston I/F. ... £269.52 + VAT = **£309.95**

CBM MPS801 Dot Matrix Printer



* 80 columns
* 50cps * tractor feed
* Up to 10in. paper width * Commodore graphics * Std and double width characters * Plug straight into CBM84, VIC20, C16, Plus 4 and SX64
Package price includes 100 sheets of paper plus printer cable
£130.39 + VAT = £149.95

Commodore DPS1101 Daisy Wheel Printer (similar to Juki 6100) compatible with all Commodore home computers

£304.30 + VAT = £349.95

The UK's Best Printer Prices

Juki 6100 (P)	£325.00 + VAT =	£378.75
Brother HR15 (P and S)	£289.00 + VAT =	£338.35
Daisystep 2000 (P)	£239.95 + VAT =	£275.94
Brother M1109 (P and S)	£169.00 + VAT =	£194.35
Brother HR5 (P or S)	£125.00 + VAT =	£143.75
Canon 1090A NLD (P)	£295.00 + VAT =	£339.35
Canon 1150A NLD (P)	£379.00 + VAT =	£433.85
EPSON RX90 (P)	£195.00 + VAT =	£224.25
EPSON RX90 F T PLUS (P)	£220.00 + VAT =	£253.00
EPSON RX90 (P)	£234.00 + VAT =	£271.60
EPSON RX100 F T (P)	£339.95 + VAT =	£390.95
EPSON RX100 F T (P)	£430.00 + VAT =	£494.50

Mail Order + Export + Trade

Hot Line Phone 01-686 6362

Delivery by Securicor (3 day) please add £5.00 + VAT per item.
Delivery by T.N.T. (overnight) please add £8.50 + VAT per item.
Order by 'phone quoting your Access.
Batchcard No. 'Phone 01-686 6362. Immediate despatch on receipt of order or cheque clearance.
Or you can Telex your order on: 946240 Attn 19001335

CASH & CARRY COMPUTERS
53-59 High Street, Croydon, Surrey CR0 1BD.

OUTPUT: QL

SOUND BARRIER

Make a sound investment
of the time it takes to tap
in James Lucy's listings.

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*.

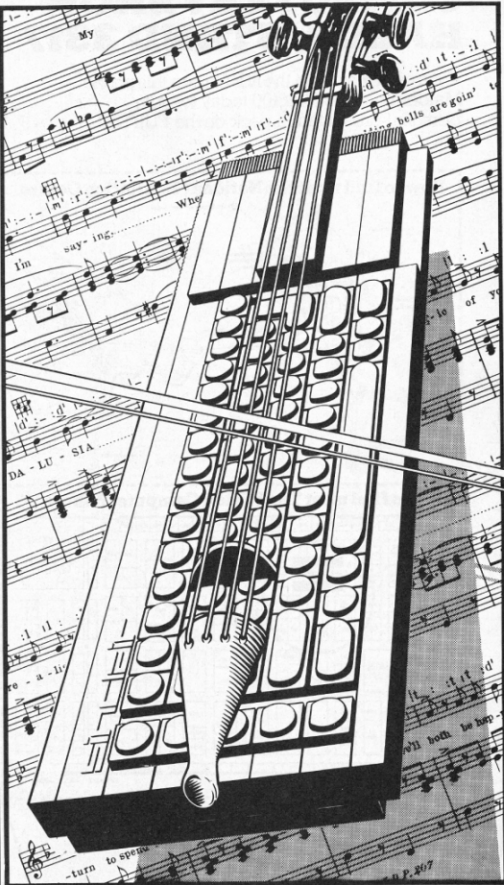
As the QL user manual implies, the only way to learn about the workings of the system is to experiment. The problem is that the BEEP command, the only sound command on the QL, can be followed by up to eight parameters which results in experimentation being a tedious and unsatisfactory process. What is 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.

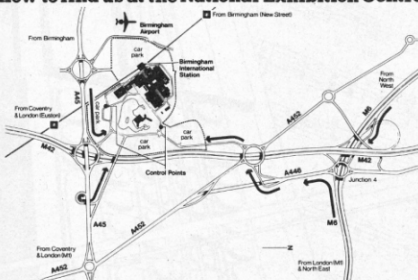
There is, of course, another way of controlling the duration of a note which seems more reliable, but it has the disadvantage of stopping further program execution while the note is sounding. The method is to BEEP with duration 0, which paradoxically gives indefinite sound, to BEEP the required time,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

富 士 通

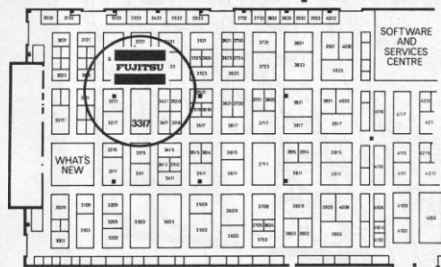
SEE THE MICRO 16s AND LET FUJITSU SHOW YOU THE WAY AT THE WHICH COMPUTER? SHOW HALL 3, STAND 3317

If you can't visit us at the NEC then telephone
Maidenhead (0628) 76100 today for your
personal presentation pack on the FUJITSU
MICRO 16s

How to find us at the National Exhibition Centre



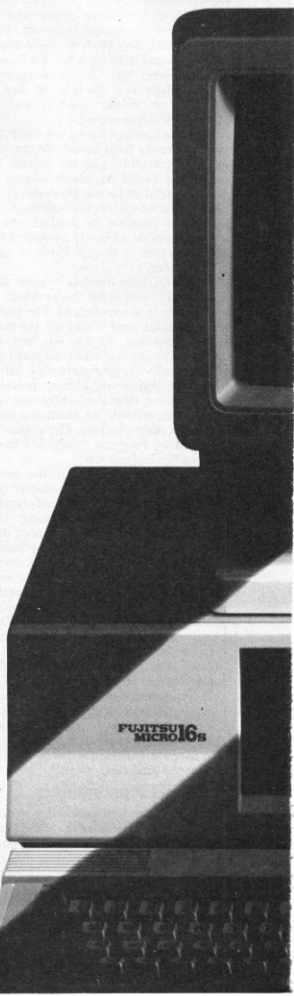
How to find us at The Which Computer? Show



FUJITSU

**FUJITSU Mikroelektronik
MICRO COMPUTER SYSTEMS**

Hargrave House Belmont Road
Maidenhead Berks SL6 6NE
Tel. 0628 76100 Telex 848955



THE FIRST 64K COMPUTER FOR ONLY £129!



1. 800K 64K COMPUTER £129



2. 400 16K GAMES MACHINE £29



3. 1010 PROGRAM RECORDER £34



4. 1050 127K DISK DRIVE £199



5. 1020 4 COLOUR PRINTER £99



6. LETTER QUALITY PRINTER £249



7. TOUCH TABLET PEN-CAR £49



8. TRAK BALL £19.95



9. SUPER CONTROLLER £9.95

THE NEW ATARI

EVERYTHING YOU WANT FROM A HOME COMPUTER

- ATARI 800K - £129:** The Atari 800K has many facilities and includes such advanced specifications that you will be amazed by its performance. At the new reduced price of only £129 inc VAT for a full specification 64K computer with a proper full stroke keyboard, we believe that the 800K cannot be beaten. Compare Atari with the competition, just look at these specifications:
 - COLOUR CAPABILITIES:** 16 colours and 16 intensities giving 256 different colours (all of the 256 colours can be displayed at the same time).
 - OPERATING SYSTEM:** 24K ROM including Atari Basic programming language and a self diagnostic test program.
 - KEYBOARD:** Full stroke design with 62 keys including help key and a special function keys, international character set and 29 graphic keys.
 - SOUND:** 8 independent sound synthesizers each capable of producing music notes at 3.1 octave range or a wide variety of special sound effects.
 - ADDITIONAL PROGRAMMING:** can achieve an octave range of up to nine octaves!
 - DISPLAY:** 11 graphic modes and 3 text modes. Up to 320-160 resolution. Maximum text display 24 lines by 40 characters.
 - SPECIAL ATARI INTEGRATED CIRCUITS:** GTIA for graphics display. Poky for sound and controller ports. Anic for screen control and I/O (Input/Output).
 - CPU:** 6502C microprocessor - 0.50 microsecond cycle and a clock speed of 1.79 MHz.
 - EXTENDED GRAPHICS FUNCTIONS:** High resolution graphics. Multi-coloured character set. Software screen switching. Multiple refined character sets. Player missile (sprites) graphics. Fine screen scrolling. Changeable colour registers. Smooth character movement. Simple colour animation facilities.
 - PROGRAMMING FEATURES:** Built in Atari Basic programming language supporting peak, poke and USR plus at least 8 other languages available. The help key will provide additional information and menu screens with certain software. Full on-screen editing is available as well as syntax checking on entry.
 - INPUT/OUTPUT:** External processor bus for expansion with memory and peripherals. Composite video monitor output. Peripheral port for direct connection to Atari standard peripherals. Software cartridge slot is included as well as 2 joystick controller ports.
 - SOFTWARE:** Over 1,500 items of software are available including self teaching programs with unique voice over. The range of programs includes Education, Home Management & Programming aids. There is also APX (Atari Program Exchange) and of course Atari's famous entertainment software now at only £9.95. In addition there is a host of support and help available from specialist Atari magazines like Anic and Anic and from over 75 Atari books/manuals.
- ATARI 400 16K GAMES MACHINE - £29:** We have several Atari 400 games consoles/computers with 16K RAM. The price is £29 (for a reconditioned model) or £39 for a new machine. Both come with 12 months guarantee. The Atari 400 can play all 800K ROM cartridge games and is expandable up to 48K RAM. Computer upgrade with Basic Programming Kit (£30) optional extra.
- ATARI 1010 PROGRAM RECORDER - £34:** For low cost storage and retrieval capability. Data transmission 600 baud. Storage capability 100K bytes on a six minute cassette. Track configuration four track, two channels (digital and audio). Auto record/playback/pause control/unique soundthrough facility. Built in accidental erasure prevention, automatic shutoff and 3 digit tape counter.
- ATARI 1050 DUAL DENSITY DISK DRIVE - £199:** 5 1/4" disks holding 127K randomly accessible bytes provide both expansion and flexibility for your 400/800 or XL system with new 'helpful' DOS 3. All customers who purchase a Disk Drive from Silica Shop will be automatically given a FREE set of 100 programs on 3 Diskettes recorded on both sides.
- ATARI 1020 COLOUR PRINTER - £99:** Printer and Plotter with four colour graphic print capability. 40 column wide printing at 10 characters per second. Can print 6, 10 and 20 characters per inch. 64 character sizes. Prints text in 4 directions. Choice of line types.
- ATARI 1027 LETTER QUALITY PRINTER - £249:** For word processing letters in professional type. Print speed of 20 chars per second.
- ATARI TOUCH TABLET - £49:** Enables you to draw and paint pictures on your T.V. screen, with the touch of a stylus.
- ATARI TRAK BALL CONTROLLER - £19.95:** Enables cursor movement in any direction and adds arcade realism to your games.
- ATARI SUPER CONTROLLER - £9.95:** The ultimate joystick with double fire button to give you a greater competitive edge in your games.

SILICA SHOP ARE THE No1 ATARI SPECIALIST

Silica Shop are now firmly established as the No 1 Atari retail/mail order and wholesale specialist in the U.K. We already offer our service to over 120,000 customers, 10,000 of whom have purchased Atari Home Computers. Because we specialise (and with a turnover of £1.5 million), we are able to keep prices low by bulk purchases. Ring one of our 45 staff and we will be glad to be of service to you. Complete the coupon below and we will send you our Atari pack with our 16 page price list and XL colour catalogue.

EXTENDED TWO YEAR GUARANTEE: We are an Atari Service Centre, able to service and repair Atari equipment and have added a 12 month guarantee to the year offered by Atari, giving you a full 2 year guarantee on your new XL computer.

SPECIALIST SUPPORT: Our technical staff are always available on the telephone to help and advise you. We endeavour to hold stocks of every Atari computer item available in the U.K. and we stock over 75 Atari books and manuals.

AFTER SALES SERVICE: When you purchase your equipment from Silica, your name will be automatically added to our mailing list. You will then receive price lists, newsletters and details of new releases and developments, as well as special offers which are exclusive to Silica Atari Computer Owners.

LOW PRICES: Our prices include VAT and are extremely competitive. We will normally match any lower price offered by our competitors.

FREE COMPUTER OWNERS CLUB: This is open to all Atari computer owners irrespective of where you purchased your equipment. Membership is FREE and entitles you to receive bulletins giving details of new releases and developments. Send now for your FREE information pack, price list & colour catalogue.

PAYMENT: We accept cash, cheques, postal orders and all Credit Cards. We also offer credit facilities over 1, 2 or 3 years, please write for a written quotation.

FREE DAY DELIVERY - FREE CASH ON DELIVERY: Silica Shop are now offering first class parcel post FREE OF CHARGE. As a special introductory offer for a limited period only we will be sending all Computers and Disk Drives by a next day Securion delivery service of our own expense.

So fill in the coupon below with a literature enquiry or order and begin to experience a specialist Atari service that is second to none.

SILICA SHOP LTD, 14 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX Tel: 01-309 1111

ORDER NOW OR SEND FOR A FREE COLOUR BROCHURE

To: SILICA SHOP LTD, Dept PCN1 0285, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX Telephone: 01-309 1111

LITERATURE REQUEST:

Please send me your FREE colour brochures and 16 page price list on Atari Computers.

I own a Videogame I own a Computer

Mr/Mrs/Ms: Initials: Surname:

Address:

Postcode:

ORDER REQUEST:

PLEASE SEND ME:

800K 64K Computer £129 1020 4 Colour Printer £99

400 16K Games Machine £29.95 Letter Quality Printer £249

1010 Program Recorder £34 Touch Tablet - Cartridge £49

1050 127K Disk Drive £199 Super Controller £9.95

ALL PRICES QUOTED ARE INCLUSIVE OF VAT - POSTAGE & PACKING IS FREE OF CHARGE

I enclose Cheque/P.O. payable to Silica Shop Limited for the following amount £.....

CREDIT CARD - Please debit my:

Access/B Barclaycard/Visa/American Express/Diners Club Card Number

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

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

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.

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 1
160 AT 4,0:PRINT"Do you require
instructions? (y/n)"
170 AS=INKEY$(1)-(1):CLS 3:IF AS="y"OR
AS="Y": instructions
180
d=0:pl=1:p2=1:gx=1:gy=1:w=1:f=1:r=1:REM-
ark SET INITIAL VALUES FOR BEEP
PARAMETERS
190 headings=keys:AT 17,7:PRINT"Press
'F1' for peace"
200 parameter 4,p1:parameter
6,p2:parameter 8,gx:parameter
10,gy:parameter 12,w:parameter
14,f:parameter 16,r
210 REPEAT soundloop
220 BEEP d,p1,p2,gx,gy,w,f,r
230 AS=CODE(INKEY$(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: pl=pl+1:parameter 4,p1:IF
pl>255 :pl=255:parameter 4,p1
270 ON a=49:pl=pl+10:parameter 4,p1:IF
pl>255:pl=255:parameter 4,p1
280 ON a=97:pl=pl-1:parameter 4,p1:IF
pl<0:pl=0:parameter 4,p1
290 ON a=122:pl=pl-10:parameter 4,p1:IF
pl<0:pl=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,wr-
aps,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"
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.

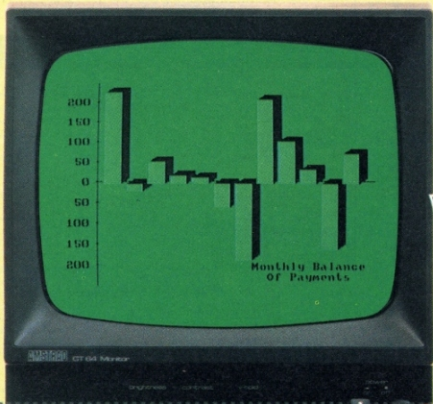
Listing

```
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 IS=INKEY$(-1);IF IS="y" OR
IS="Y";instructions;ELSE CLS 3
180 DIM note$(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 "abodefg"
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=-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+h+1,1;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+h+1,1;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 *****
```

A complete workstation for the price of a home computer.



£249

Computer complete with green screen VDU (GT64)

£359

Computer complete with colour monitor (CTM640)

CPC 464
complete
with
monitor
and
datacorder



The first low-cost personal computer to be approved by the British Electrotechnical Approvals Board.



It's mouthwatering.

64K of RAM, 32K of ROM, a high resolution green screen VDU, integral cassette data recorder, typewriter style keyboard, numeric keypad and a very fast extended BASIC. All for £249. (The CPC464 is also available with a colour



CPC464 colour monitor (CTM640)

monitor instead of the green screen VDU for £359 complete).

You'd be hard pressed to find a comparable computer at that price let alone the monitor and recorder.

And the CPC464 comes complete and ready-to-go. Just plug it in.

64K RAM (42K available).

The low cost but powerful CPC464 is equally at home in business and educational applications as it is running the household budget or playing games.

With 42K RAM available to BASIC, the opportunities for sophisticated and complex programming are considerable.

80 column text display.

The green screen VDU is purpose designed with a bright, crisp, 80 column text display that compares favourably with systems costing several times as much.

You can program up to 8 text windows and there's a graphics window, too.

The CPC464 has a typewriter style keyboard, large ENTRY key, sensibly positioned cursor keys, numeric keypad for fast data entry and a full 8-bit character set.

If you think that sounds impressive, wait until you hear the 3-voice, 7-octave stereo output through a hi-fi amplifier and speakers.

Amsoft. High quality software.

A wide range of programs is already available and we're expanding it rapidly. The software takes full advantage



of the CPC464's high specification and speedloading capability. Which means even complex programs can be loaded quickly.

Business applications, educational programs and arcade games are all designed to make maximum use of CPC464's impressive graphics, stereo sound and processing abilities.

Amstrad. User Club.

Members enjoy immediate benefits like the privilege card, Club binder, regular magazine, competitions for



valuable prizes and contact with other Amstrad users.

Whether you're interested in serious commercial applications or simply a games fanatic, you'll want to join the Club.

CPC464.

Unlimited scope for expansion.

We've thought of everything you're likely to need in the future. That's why there's a built-in parallel printer interface. A low cost optional disk drive system including CP/M* (with the option to access 3000 programs) and LOGO. Joystick port. And the virtually unlimited potential of the Z80 data bus with sideways ROM support.

Finally, a power supply and modulator (MP-1) allows you to connect your CPC464 green screen VDU system to a colour TV.



Optional disk drive DDI-1 including interface CP/M* and LOGO £199.95



Optional 80 column dot matrix printer DMP-1 operates at up to 50 characters per second. Combined with the CPC464, it offers a high performance text processing system for only £199.95.

BOOTS COMET Dixons
Menzies RUMBELOWS
AND OTHER
COMPUTER
STORES

AMSTRAD

ONE GREAT IDEA AFTER ANOTHER

*Trade mark Digital Research

I'd like to know more about the new CPC464 complete computer system.
Please send literature right away.

NAME _____
ADDRESS _____

ECN 5 _____

POSTCODE _____

To: Amstrad Consumer Electronics plc, Brentwood House, 169 King's Road, Brentwood, Essex CM14 4EF. Tel: Brentwood (0277) 228888.





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.

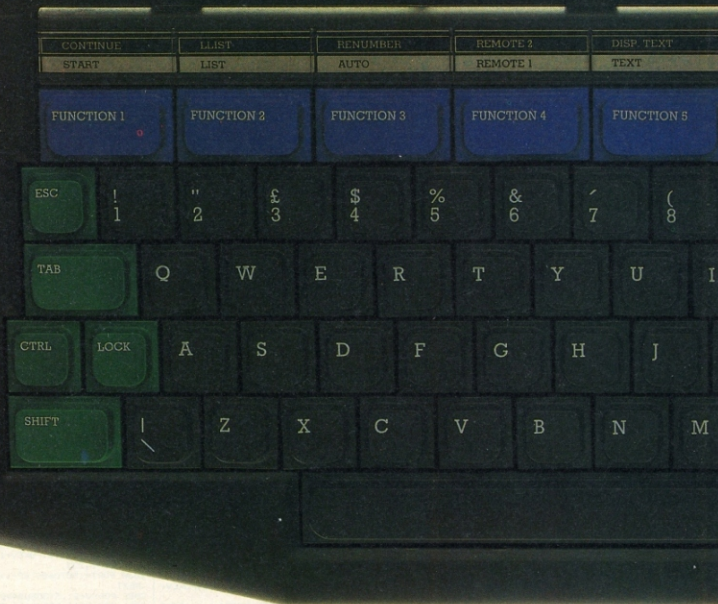
LATE STARTER

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 Wookiee on the flight deck of the Millennium 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





◀25 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

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.

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 col-



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

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 emanate 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

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

ours 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

HW 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 voice, 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



In your job, business or profession

GET THINGS GOING

... with the Philips portable computer P2000 C. In 16 bit and 8.

With all the RAM you want - 64K to 512K with 32K separate for the video. And disk capacity - up to 2x 640K floppies and a hard disk, built-in if you prefer.

CP/M, p-System and in the 16-bit version MS-DOS provide software for every business task and for many lines of business. And practically all the interfaces you need: serial printer, external floppy drives, slave monitor, data communication, hard disk, IEC/IEEE.

The 9" screen is glare-free. You have high-resolution graphics. The keyboard is low-profile.

And see what comes bundled at these prices:

£ 1,990. - for the P2009/16 - 16 bit, 352K RAM, 1x 640K floppy, MS-DOS 2.11, CP/M 2.2. Built-in 10 MB hard disk possible. Also runs 8 bit software.

£ 1,890. - for the P2012 - 8 bit, 96K RAM, 2x 640K floppies and CP/M 2.2, TTY, WordStar, CalcStar, MBASIC, Business Graphics and SAGE "Try-before-you-buy" Accounts Packages.

£ 1,560. - for the P2009 - 8 bit, 96K RAM, 1x 640K floppy, and CP/M 2.2, TTY, WordStar, CalcStar, MBASIC. Built-in 10 MB hard disk possible.

£ 995. - for the P2010 - 8 bit, 96K RAM, 2x 160K floppies and CP/M 2.2, TTY, WordStar, CalcStar, MBASIC and SAGE "Try-before-you-buy" Accounts Packages.

* CP/M is a trademark of Digital Research Inc.
WordStar and CalcStar are trademarks of MicroPro Int. Corp.
MS-DOS is a trademark of Microsoft Inc.
p-System is a trademark of Softech Micro-Systems Inc.

PHILIPS

See the Philips P2000 C at THE WHICH COMPUTER SHOW?
15-18th January, Birmingham National Exhibition Centre, Stand 429



For a demonstration post coupon now!
Personal Computer Div.
PO Box 4PD, London W1A 4PD.

Name: _____

Address: _____

Tel: _____

P2000
C

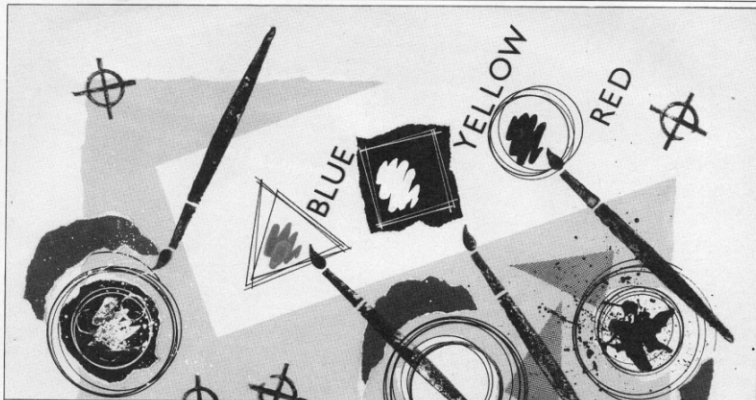
Philips
Portable
Computer



The affordable portable.

PAINT BY NUMBERS

Add a splash of colour with our Poly-filling utility routine, as supplied by Graeme Gibson.



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 CURSER 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 CLR
2 PAPER:INK3
3 POKEZ6A.2
4 PRINT
5 PRINTSPC(8);CHR$(128)**"PAINT ROUTINE FO
6 ORIC 1"
6 PRINTSPC(8);CHR$(128)**"PAINT ROUTINE FO
7 ORIC 1"
7 PRINT:PRINT
8 PRINTSPC(13);CHR$(138)**"AND ORIC ATMOS"
9 PRINTSPC(13);CHR$(138)**"AND ORIC ATMOS"
10 PLOT4,28,"Suggest 38725 for 48k and 5
89"
12 PLOT11,21,"for 16k machines"
13 PRINT:PRINT:PRINT:PRINT
14 PRINT"enter start address"
15 PRINT"of routine":INPUT " *ADDR
16 CHECK:=
17 WAIT50
18 CLR
19 PLOT4,18,"PROGRAM BEING CREATED -PLEA
SE WAIT"
20 FOR LOOP#=0 TO 186
21 READ CODE
22 CODE=VAL("E"+CODE)
23 POKE ADDR+LOOP, CODE
24 CHECK=CHECK+CODE
25 NEXT
26 DOKE ADDR+9, ADDR
27 DOKE ADDR+58, ADDR+87
28 DOKE ADDR+69, ADDR+87
29 IF CHECK<17899 THEN 28ELSE CLR:END
30 PRINT"Your version of the PAINT routi
ne has"
31 PRINT"now been created. It is suggeste
d 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);",S";IADDR",E";ADDR+186
39 PRINT:PRINT:PRINT
40 PRINT"TO USE the routine type:--"PRINT
41 PRINT " CHR$(134);"CALL " ;ADDR+6;PRINT
42 PRINT"Please read the instructions fi
rst."
43 END
1800 DATA 20,10,80,85,82,81
191 DATA A6,0E,8D,48,61,85,38,45,10,85,3

```

```

9,45,11,85,34,48
182 DATA 80,81,39,25,38,FB,14,18,45,10,6
9,20,85,39,45,11
183 DATA 69,88,85,3A,81,39,25,38,FB,14,6
8,20,80,88,38,45
184 DATA 39,69,28,85,39,45,3A,69,88,85,3
A,18,98,83,28,88
185 DATA 80,18,45,39,69,20,85,39,45,3A,6
9,88,85,3A,18,98
186 DATA 83,45,38,85,35,45,39,85,36,45,3
A,85,37,81,36,29
187 DATA 35,88,21,81,36,85,36,45,37,69,8
5,45,35,69,21,98
188 DATA EC,45,36,69,81,85,36,45,37,69,8
8,85,37,49,81,85
189 DATA 35,18,98,89,45,38,85,35,45,39,8
5,36,45,34,85,37
110 DATA 46,35,88,11,18,45,36,69,81,85,3
6,45,37,69,88,85
111 DATA 37,69,20,85,35,81,36,25,35,88,8
9,81,36,85,35,91
112 DATA 36,18,98,DC,68
288 CLR
281 PLOT2,5,"An error has occurred."
282 PRINT
283 PRINT
284 PRINT "Please check the program agai
nst the listing supplied."
285 PRINT
286 PRINT
287 PRINT"Press any key to list DATA sta
tements"
288 DETAB
289 POKEXZ6A,3
210 LIST 180-112
220 REM type 9 instead of PRINT in lines
35 & 39
230 REM for E type hash

```

Listing 2

```

5 HIRES1000
18 HIRES
28 INK3
38 CURSET45,100,8
48 CIRCLE30,1
58 CIRCLE13,1
68 CURROW58,38,8
78 DRAW68,8,1;DRAW68,-68,1;DRAW
68,68,1
88 CURROW8,8,1
98 DRAW68,8,1;DRAW-38,-52,1;DRAW-38,52,1
100 REPEAT
110 READY,Y
130 UNTILX=205
140 DATA64,98,6,98,45,88,45,119,124,99,
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£264,10
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,
167,93,174,92,158,103,150,111,150
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:
CURSET124,99,0:CALL<routine address>
Both instructions must be on the same line. Now paint the circle using:
CURSET45,80,0: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:

CURSET45,119,0:CALL<routine address>
CURSET26,98,0:CALL<routine address>
CURSET64,98,0:CALL<routine address>

To paint in the triangle use:
CURSET196,117,0: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:
CURSET205,89,0: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 they 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 pincer 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.

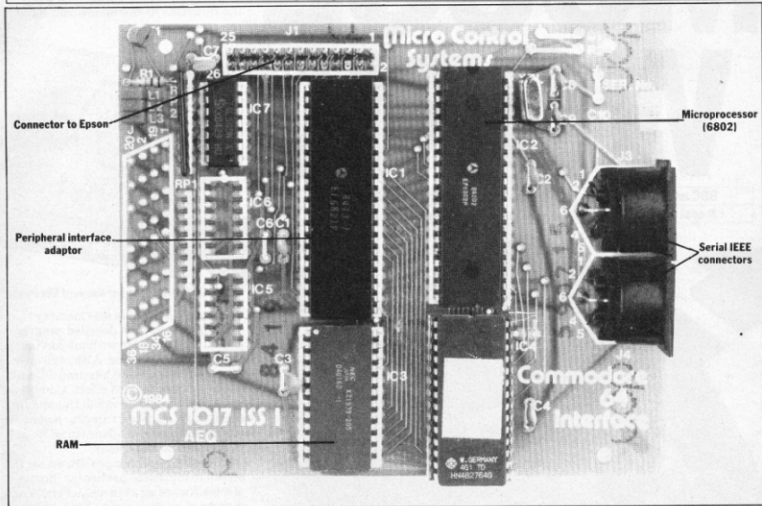




PERIPHERALS PRO-TEST: COMPRINT

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, such 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 8x8 matrix, or 11 x 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

compatibility 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	●●●●●

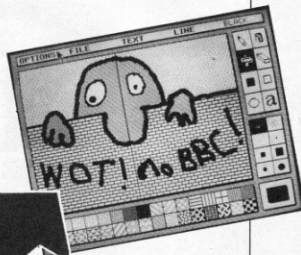
Name Comprint Price £61.99 Distributor Mail order, Micro Control Systems (0773-769011).

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.

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

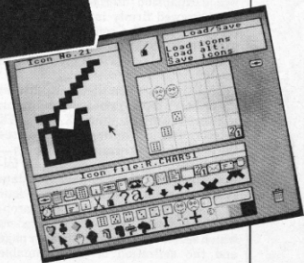


AMX Art is a mirror image of MacPaint.

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.

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



You can design your own icons, too.

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 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

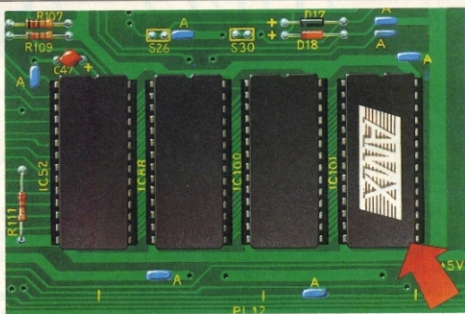
black background with a dark grey formed of black dots on a white screen. You can then start to create menus and title screens suitable for your particular

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 lightningspeed. Given an 8-bit processor and the BBC's memory limitations, AMX Art is impossible to criticise.

Peter Worlock



REPORT CARD: 1 TO 5

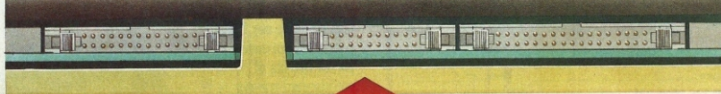
Features	●●●●●
Documentation	●●●●●
Performance	●●●●●
Overall value	●●●●●

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

Printer

User Port

1MHz BUS



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.

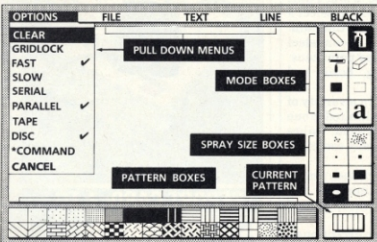
The AMX MOUSE can be used with ordinary programs to replace the cursor keys and with the AMX software it turns the B.B.C. micro into a far more user-friendly device, enabling beginners to quickly learn to use the computer for a wide range of purposes, including COMPUTER AIDED DESIGN, Word Processing, 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 commercial software such as Wordwise and VIEW.

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 5 1/4" Disc

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

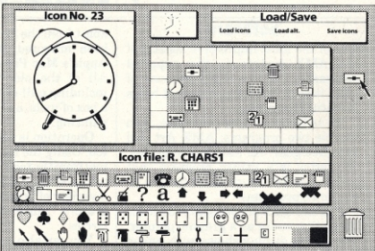
If not available from one of our main dealers, fill in the coupon and we will send you an AMX MOUSE with AMX ART with our full no quibble money back guarantee. OR phone 0925 602690/62907 for instant Access or Visa orders.

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 5 1/4" 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

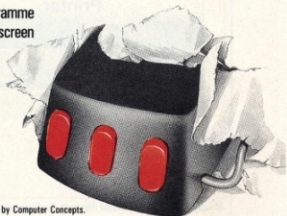
TECHNICAL REQUIREMENTS

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.

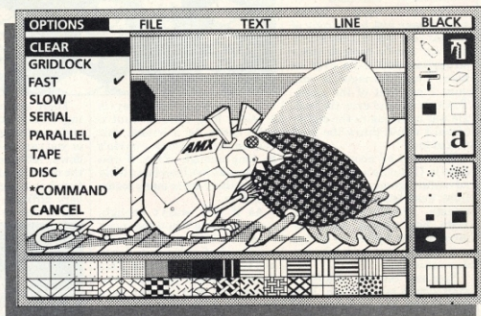


*Wordwise is a wordprocessing program by Computer Concepts.
*View is a word processing program by Acornsoft Ltd.

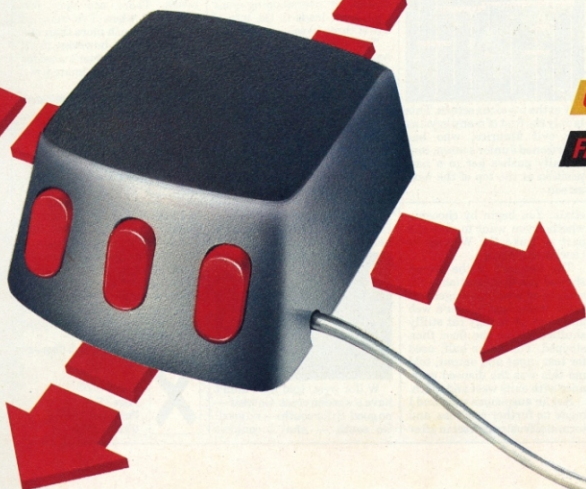
AMX MOUSE

POINTS THE WAY

**FOR THE
BBC MICRO
MODEL B**



with AMX ART GRAPHICS PROGRAM



ICON SOFTWARE

CREATIVE GRAPHICS

FASTER INTERACTION

PROGRAMS

£89.95
inc. VAT and P & P

SPECTRUM

KNIGHT LORE

STAR



GAME

Ultimate has done it again, it's managed to reduce me to a writhing wreck. Why do I succumb to such provocation? 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 bugle was covering 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, *Underworld*. 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 ranc dance and turns into a werewolf. This doesn't prevent you from continuing on your journey once you have calmed down but if a ghoulie approaches 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

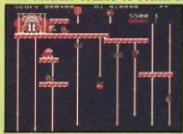
ZANY KONG JUNIOR

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 num-

ber 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 fangs 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 idiosyncrasies.

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. I 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 Anilog
0322-92513

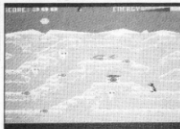
BBC

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 Willowssoft
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 misthreat. Once spotted however, it's foot down, climb to the city's upper limits and away in pursuit.

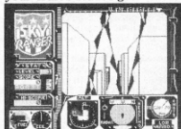
The view from the vid-screen is very well done. The buildings zoom past as you seek your victim and it's just too bad if you cannon into a wall during a tricky manoeuvre.

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 hardings, 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

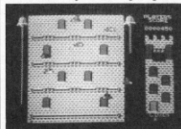
For those of you who ran like the clappers to your local software shop for a copy of *Hunchback*, here's a new load of bells to keep you hunched over your screens for a little longer. Not that there's anything wrong with the sound, graphics and general fun, but if you can reach fourth of five screens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

You need a joystick to control the Incredible Humpas 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 zippier 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&g) Tel: 092 683 2981. Or write to The Paddocks, Lonsdownford, Solihull, W. Midlands.

Amstrad Software, Manie Mirm, Roland James, Funco Electronics, Freddy, Haunted Lodges, Harriet, Atlantic Character Generator, Program Copier etc. Tel: Mark 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: Geonon 0202024.

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

Amstrad CPC464 + colour monitor and two games. Also articles and magazines. £290. Also Oric + software, £90. Tel: Geonon 0202024.

Amstrad software for sale. Original Harriet attack, Code Name Mat, Colossal Adventure, Return to Eden, £5 each. Tel: Steve 01-472 3509.

Amstrad Games. Hunchback Electro Freddy, Oh Mummy. Swap for any level 9. Arnold or Roland software, £5 each. Tel: 012 Sten Row, 150 North Grove Street, London NW1.

Acorn

BBC 'B' eight months old, excellent condition, complete with graphics ROM, software books and leads. Worth £400, only £350. Tel: Banchory (03302) 3307.

BBC Software to sell or swap. (Originals). Large collection, under 1/2 price. Tel: Welwyn 4053 or write Sean Kerrigan, 23 Heathrow Road, Oaklands, Welwyn, Herts AL6 0QG.

BBC Warp 1 (Iron), £5, and Hobbit, £12. Both unwanted gifts and have never been used. Tel: (049) 721859.

BBC Z80, second processor plus software pack. Also Opus dual d/drive 40/80 track. Both two months old, selling for only £395. Tel: Brighton 36359.

Wanted BBC B 0.5.12 PDPS if possible. Please Tel: John on 0642-484785 (north east England).

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

Selling Electron A/D converter, flash-gun, sunlamp, darkroom exposure meter telescope, vintage records. Spectrum 10 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 only. Tel: 0233 7410.

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

BBC disk drive, SE 407K, 100K, 200K double density. Opus case with PSU and space for second drive, sell £150. Tel: 06285 21206 (evenings).

BBC B's with software, graphics ROM, leads, software, books, typewriter. All for £300. Microvite 14in colour monitor, £150. Tel: Simon on 0732-833108.

BBC Originals for sale. Arcade Action, Penetration, Archon, £45 each. Also games to swap including Donkey Kong and Donkey Kong Jr from AtariSoft. Tel: Steve on 07073-3434.

BBC B 1984 and Acorn joysticks, £335. Prism model 1000 and ROM, unused. £100. Swap worth £130, only £45. Tel: 0204 6285, after 5pm.

BBC B 1.0208 with Data recorder books and software mostly adventures (Hobbit, five Level 9 etc), £295. Tel: Roy on 0602-332076.

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 Road, Hutton, Liverpool 66 5XJ.

CBM64 software swap. Sell over 40 titles: Hobbit, £5. Level 9 Adventures, Manie Mirm, Beacham Games, Demolition, £11.44. All £5. Tel: Taylor on 07712-32114.

CBM 1541 disk drive with software. Absolutely perfect condition. Unused. £185. Also Microdrive £75. Cartridges in similar condition. £80. B&B matrix printer, £60. Tel: 01-863 5113.

Exchange Commodore Printer model 1541 for Gussess model, unwanted gift. Will exchange for Commodore 64 disk drive. Tel: 01-890 0934.

CBM 64 Owner wants to swap software. I have a Commodore 64 for which I want joysticks and magbooks. Send list to Jonny Mikalson, Box 124, 5460 Hunnes, Norway.

Video 2000 + cassette recorder + super expander + 3 carts (Jupiter Lander, Jelly Monst, Adventureland) + 3 tapes (Arcadia, Catcha, Panie) + joystick + 5 blank tapes. £99. Gary Bennett, 25 Broughton Rd, S.L.E., Leicester.

Video 2016K, switchable, tape recorder, joysticks, over £300 worth of software (60 vops) + about 100 mags. Only £100. Tel: Southend (0702) 72238.

Video 20 + 16K switchable, lots of SW with Commodore tape deck + manuals. Excellent condition, ideal Xmas present. £135 only. Tel: Steve on 061-740 1040. After 5pm.

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

Commodore 64 Software. Swap Lazy Jones, Star Commodore, UGH! Music 64, Gridtrap, Kramble, Kong Galaxy, Hunchback and more. Steve, 2 Ashover St, Gorsehill, Stretdford, Manchester M32 0HG.

Commodore 64 + cassette recorder, C2N cassette + exchange, £230 64 disk. Have over 1,000 programs, will send complete list in return for yours if extensive. Per Nilsson, PL5281, S. 0293 A1. Will step on Halesworth 2689.

Wanted CBM 64 software tapes — intro to basic — games — what have you — books etc for beginner. Write Moffat, Penzance, 101 Woodley, Stockport, Cheshire SK6 1JS.

Video 20 + tape unit. For Pouch language CD cartridges. 8K + three slot motherboard, tapes, mags etc. Bargain at £200 only. Tel: Stephen on Halesworth 2689.

CBM 64 Cassette Recorder software + Commodore 64 Exposed book + mags in various languages. £100. Tel: 01-743 2619.

Commodore 64 software for sale. High Flyer, Leadline, Jumpman, Zork I, Fort Apocalypse, Dungeonquest, Cost £115, sell for £70. Tel: Andrew on 01-968 7526.

Commodore 64 software. CBM 64 disk. Have over 1,000 programs, will send complete list in return for yours if extensive. Per Nilsson, PL5281, S. 0293 A1. Will step on Halesworth 2689.

Wanted CBM 64 software tapes — intro to basic — games — what have you — books etc for beginner. Write Moffat, Penzance, 101 Woodley, Stockport, Cheshire SK6 1JS.

Video 20 + tape unit. For Pouch language CD cartridges. 8K + three slot motherboard, tapes, mags etc. Bargain at £200 only. Tel: Stephen on Halesworth 2689.

Commodore 64 software. CBM 64 disk. Have over 1,000 programs, will send complete list in return for yours if extensive. Per Nilsson, PL5281, S. 0293 A1. Will step on Halesworth 2689.

Wanted CBM 64 software tapes — intro to basic — games — what have you — books etc for beginner. Write Moffat, Penzance, 101 Woodley, Stockport, Cheshire SK6 1JS.

Video 20 + tape unit. For Pouch language CD cartridges. 8K + three slot motherboard, tapes, mags etc. Bargain at £200 only. Tel: Stephen on Halesworth 2689.

Commodore 64 software. CBM 64 disk. Have over 1,000 programs, will send complete list in return for yours if extensive. Per Nilsson, PL5281, S. 0293 A1. Will step on Halesworth 2689.

Wanted CBM 64 software tapes — intro to basic — games — what have you — books etc for beginner. Write Moffat, Penzance, 101 Woodley, Stockport, Cheshire SK6 1JS.

Video 20 + tape unit. For Pouch language CD cartridges. 8K + three slot motherboard, tapes, mags etc. Bargain at £200 only. Tel: Stephen on Halesworth 2689.

Commodore 64 software. CBM 64 disk. Have over 1,000 programs, will send complete list in return for yours if extensive. Per Nilsson, PL5281, S. 0293 A1. Will step on Halesworth 2689.

Wanted CBM 64 software tapes — intro to basic — games — what have you — books etc for beginner. Write Moffat, Penzance, 101 Woodley, Stockport, Cheshire SK6 1JS.

Video 20 + tape unit. For Pouch language CD cartridges. 8K + three slot motherboard, tapes, mags etc. Bargain at £200 only. Tel: Stephen on Halesworth 2689.

Commodore 64 software. CBM 64 disk. Have over 1,000 programs, will send complete list in return for yours if extensive. Per Nilsson, PL5281, S. 0293 A1. Will step on Halesworth 2689.

Wanted CBM 64 software tapes — intro to basic — games — what have you — books etc for beginner. Write Moffat, Penzance, 101 Woodley, Stockport, Cheshire SK6 1JS.

Video 20 + tape unit. For Pouch language CD cartridges. 8K + three slot motherboard, tapes, mags etc. Bargain at £200 only. Tel: Stephen on Halesworth 2689.

Billboard

graphics, character generator and database software. Tel: Walsall 26969.

Oric software swaps Dinky Kong, Killer Frog, The Flight of the Quark, Flight Simulator, Multigames—One, Home Finance, Teach Yourself Basic. Tel: after 7pm Lancing 762661.

Oric Basic 1.1 PROM for your Oric-1.1 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, £30 worth books and original software. £105 the lot or will split. Tel: Leicester 0533 305586 even.

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

Oric 48K, 7 games, cassette recorder, Quickshot joysticks + Interface, 2 books, Excellent condition, worth £200 +. Bargain £100 or swap for Spectrum 48K. Tel: Michael 01-671 2135-4, 9pm.

Oric 1 48K VGC, Hobbit, Galaxians, Ice Giant, M.A.R.K., Tek, Probe 3 Fantasy, Tard, Ultra, Chess. All original. Offers Stereo radio leads any card at 2400. Tel: 804 9858.

Oric 48K-1 with 3 games including Xenon 1, H. Attack, Flight, Worth £215 approx. Sell for £120 one. Includes cassette lead. Contact Ian on 0628 31706.

Oric 1 48K, cassette recorder, games, including Hobbit, Hunchback, books and mags. £100 one or swap for Commodore 1520 printer platter. Tel: Bedford 0234 42361.

Oric software for sale. Selling all my originals, over 50 at near half price if 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.

Oric 1 48K, cassette recorder, games, including Hobbit, Hunchback, books and mags. £100 one or swap for Commodore 1520 printer platter. Tel: Bedford 0234 42361.

Oric software for sale. Selling all my originals, over 50 at near half price if 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.

Oric 1 48K, cassette recorder, games, including Hobbit, Hunchback, books and mags. £100 one or swap for Commodore 1520 printer platter. Tel: Bedford 0234 42361.

Oric software for sale. Selling all my originals, over 50 at near half price if 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.

Oric 1 48K, cassette recorder, games, including Hobbit, Hunchback, books and mags. £100 one or swap for Commodore 1520 printer platter. Tel: Bedford 0234 42361.

Oric software for sale. Selling all my originals, over 50 at near half price if 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.

Oric 1 48K, cassette recorder, games, including Hobbit, Hunchback, books and mags. £100 one or swap for Commodore 1520 printer platter. Tel: Bedford 0234 42361.

Oric software for sale. Selling all my originals, over 50 at near half price if 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.

Oric 1 48K, cassette recorder, games, including Hobbit, Hunchback, books and mags. £100 one or swap for Commodore 1520 printer platter. Tel: Bedford 0234 42361.

Oric software for sale. Selling all my originals, over 50 at near half price if 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.

Oric 1 48K, cassette recorder, games, including Hobbit, Hunchback, books and mags. £100 one or swap for Commodore 1520 printer platter. Tel: Bedford 0234 42361.

Oric software for sale. Selling all my originals, over 50 at near half price if 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.

Oric 1 48K, cassette recorder, games, including Hobbit, Hunchback, books and mags. £100 one or swap for Commodore 1520 printer platter. Tel: Bedford 0234 42361.

Oric software for sale. Selling all my originals, over 50 at near half price if 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.

Oric 1 48K, cassette recorder, games, including Hobbit, Hunchback, books and mags. £100 one or swap for Commodore 1520 printer platter. Tel: Bedford 0234 42361.

Oric software for sale. Selling all my originals, over 50 at near half price if 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.

Oric 1 48K, cassette recorder, games, including Hobbit, Hunchback, books and mags. £100 one or swap for Commodore 1520 printer platter. Tel: Bedford 0234 42361.

Wanted Spectrum 48K — £70 offered, working order. Also some peripherals. Tel: Dave on 01-264 5533.

Wanted Spectrum 48K — £70 offered, working order. Also some peripherals. Tel: Dave on 01-264 5533.

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

48K Spectrum ZX printer, interface 1, Microdrive, five cartridges, tape recorder, RS232C printer interface board and cables. £200. Tel: 01-863 5113.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Spectrum programmable joystick interface, made by Stonecipher, boxed and with instructions. £100. Tel: Steve on 01-264 34389 after 6pm.

Sinclair

For sale: lightpen, interface II, Quickshot joystick, one of ZX Spectrum, will sell for £25. Tel: Whitley Bridge (0977) 761 453 after 6pm.

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

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

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

Spectrum games: Yartzee, ArmegeDon, Othello, Gulpman, Megapade 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 original. Supply leads, manuals, 25 magazines — £200. Tel: Stevenage 355874, evenings.

Spectrum 48K software, includes Scope, Jumbley, Mugsy and others. Value £40. Sell £12 one. David Wait, 108C Camberwell Rd, Camberwell, London SE10 0EE.

ZX printer with 1 roll, 4 months old — £30. Spectrum DKTronics programmable joystick interface, 3 months old — £15. Buyer collects. Tel: Rickmansworth 771655.

ZX81 16K software: Computacalc, assembler, Pimania, machine code test tool. All original — £2.50 plus 2 free games. Also ROM disassembly books totalling £5. Tel: 01-267 6034.

Z80 programmer requires work — owns Spectrum/Microdrive, working knowledge of 6502. Write to Garry Knight, 30A Stanton House, Thames Street, London SE10 9D4.

Wanted: out of order ZX Spectrum for spares and experiments. Up to £25. Also for sale Chestnut Sweet Talker, hardly used — £20 one. Tel: 01-858 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; Ty Na Nog — £6; Codename Mat Skoolzade — £3.50; Survival Millionaire — £3. Many more. Tel: Michael on 01-240 2630.

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

Spectrum interface I, Microdrive, Alpacorn 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 4392.

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

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

Spectrum 48K originals, Kalaidoscope, Death Alley, Meaney Monster, Alien Armada, Night Rider — £3.50 each, £15 set. R. G. Jones, 4 St James Court, Wicklemark 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.

Tandy

TRS 80 Level II. Complete package cassette, VDU carrying cases, extra books, games etc. As new, cost over £500. £165 for quick sale. Tel: 01-672 8862.

Tandy CDP 115 4 colours printer, £85 + interface. Spectrum Kempton 15, £25. Whole lot for £105 ono free postage. Boursaux D, 9 Rue Matherun-Regnier, 75105 Paris/France. Tel: (1) 687 3522 (office).

Attractive collection of Tandy equipment. Model 1, expansion interface, R5232, Aerocomp Doubler, CPM/Writer, Powermail, Modem 80, Vistacalc etc. Very cheap. Tel: Richardson 01-359 4587.

Tandy TP-10 Thermal printer, suitable TRS-80 C/W handbook and spare paper, £50 ono. Brand new, unused. Tel: Ron on 0266-69941 (day time), 073563-304 (evenings).

Video Genie 16K with software, £300, new, £70 ono. Tel: 01-568 9596.

T1 99/4 computer extended Basic joystick leads and basic, Basic turbo books, assorted cartridges and cassettes. Tel: Basingstoke 477468.

T1 99/4 extended Basic speech syn. 6 games modules incl. Parsec, Dual Leads, dust cover. Basic course, boxed with manuals £150. Tel: Teeside 0642 761623.

T1 99/4 with cassette player, speech synthesiser, joysticks, 2 cartridges, 3 cassettes, Introduction to Basic, £140 ono. Tel: 01-521 8444 after 6pm.

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

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

TRS-80 Model I, level II, 48K, three disk drives, printer, vdu, keyboard and interface, Cobol compiler, disks, head cleaning kit, £400. Tel: 0625 872589.

TRS-80 Model I, 48K, disk drive, word-processing, database, spreadsheet, 50 disks, printer, cable. New computer, must sell, £350 ono. Tel: David Allen on 01-251 6222 (work) or 01-803 8834 (home).

Texas

T199-4A plus ex-basic joysticks, cassette recorder, seven game modules, three adventure games, Money Manager, Personal Records, manuals etc. £150 or offer. Tel: 01-363 7203.

99/4E magazines for sale, dedicated to the T199-4A microcomputer. Loads of programs in basic and extended basic. £2 per copy. Tel: 01-904 7884 evenings/weekends.

T199-4A Speech Synthesizer £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, box, new, £295 or swap best printer with RS232 interface. Tel: Bolton 45981.

Software for sale or swap for Commodore and BBC. All originals, all half price. Tel: 0472 74584 or send list to Martin, 157 Rooley 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 extra worth £250 or more. Sell £300 ono. Tel: Deepak on 01-863 5113.

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

Acrotic video game with 22 cartridges, very little use, cost £300, sell for only £100. C. Voden, 94 Whitton Village Road, Exeter EX4 8AW.

Genel I with monitor and hundreds of games and utilities, built-in cassette recorder and graphics unit, 32K, one year old, £300. Tel: 021-358 1398.

Tensal organ to sell or swap. Sell for £25 ono or swap for Currah Speech 64 or CRM 64 software. Tel: 01-806 4684, ask for Errol.

Grandstand Astro Wars and CGL Puck Monitor table top games plus Grandstand universal adaptor. Boxed, good condition, ideal Xmas gifts, £35 ono. Tel: Peter on 0222 758477.

Intellivision, £56, cartridges around £10. Vectrex £100. Spike cartridges, £10. Acrotic cartridges, £5-£8. Everything in original packaging. Includes postage. Tel: 01-802 8724.

Epson 420 computer with micro cassette drive, printer, a/c adaptor and manuals, £390. Tel: 01-959 3082.

CGL M5 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. Abbasi on 01-486 8914.

Swap Gem electric organ (cost £600), in superb condition, for computer + extra worth £250 (IBM54 or Amstrad preferred). Sell £250 ono. Tel: 01-963 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, bell holder, manuals and sticky labels, 16K RAM, CGL ROM, extended Micro-Swap Basic, £475 ono. Tel: 01-894 1151.

Swap Aiwa portable stereo 800 (cost £320) with three years guarantee for Amstrad or C124 + C24. Cash adjustment possible. Tel: 01-863 5113 ask for Deepak.

Historic documents. Nine copies of Personal Computer World, Vols. 1 and 2 (1978/9). Offers, or exchange for ZX81 printer or hardware. Tel: 0602 251920 evenings.

ESL Sord M5 with data recorder, Basic I and G, tennis cartridge, two joystick 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 M280K computer. Tel: Jason on Maidstone 51955.

400K single drive + DD LVII interface, £150, Wafair ROM board, £15, dot-matrix printer DMP100, £130. Tel: 0225 27066 evenings.

Printer for Beeb or any RS232 interface £240 with handshakes. Tally 1602 line printer dot matrix, 120 cps on stand, £300 ono. Tel: P. Knight on 0732 62227.

Epson HX-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 micro-drive business and games cartridges as sold with Sinclair kit. Tel: Tyneside 2056523.

Selknox GP100A printer, plus Kempston Centronics interface for Spectrum (fits other computers including BBC with correct cable), hardly used, £120. Tel: 0733 22784 (Sloough).

Commodore traction printer 1422 exchanged for any Dragon printer, MCF40 or one to use with a Dragon 32. Tel: 051-420 6424.

Disk drive (5 1/4in) and interface for Spectrum computer, very good condition, supplied with two disks. Cost new £240, sell for £149. Tel: Amersham 6047.

Swap Raleigh Arena in good condition, for an Atari 1010 cassette recorder and two cassette games to go with it. Tel: Roger on 01-855 4121.

Ascom 2 32K, ZAP 2.1, Basic, port probe, microtype case, power supply, games and tapes etc. — £120. Tel: Htoxtor (08893) 4680.

Billboard Buy & Sell Form

Free forever — from now on you can advertise your second-hand equipment and (almost) anything else you want for free in PCN. To place your Billboard ad, fill in the form on the left with a maximum of 24 words. Send the completed form to:
Billboard, Personal Computer News, 62 Oxford Street, London W1A 2NG.

Note that we cannot guarantee that your ad appears in any specific issue, and that we cannot accept ads from commercial organisations of any sort.

Your name:

Address:

Telephone:

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.

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 integrating 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



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.

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
Application Software integrator System
IBM PC or compatible + 128K RAM
Other versions: None Outlets Thorn-EMI,
0252 518364

New - the official Spectrum Upgrade!

Turn your Spectrum into a Spectrum+ for just £30



- Professional full-size keyboard - includes 17 extra keys.
- Responsive typewriter-style action.
- Accepts all current Spectrum software and peripherals.
- Complete with 80-page User Guide and Companion Cassette.

Here's some exciting news for 48K Spectrum owners ... the official Spectrum Upgrade Kit.

The £30 kit has everything you need to turn your Spectrum into the stylish new Spectrum+. You don't even need an understanding of electronics, just the ability to solder a few wires together! The leaflet in the kit gives clear, step by step instructions.

If you're not sure about doing it yourself, don't worry. Simply return your 48K Spectrum to Sinclair and for £50 we'll upgrade it for you.

Whichever you decide on, you'll also receive the new 80-page User Guide and Companion Cassette.

The bigger, better Spectrum keyboard

The Spectrum+ measures 12½" x 6" - it has a large typewriter-style keyboard, with hard, moulded keys.

You'll find the new keyboard has a smooth, positive action - ideal for touch-typing, word processing, simulation programs, and extended programming sessions. Two retractable legs give a perfect typing position.

There are 58 keys in all, including 17 new keys. Programmers will be pleased to see dedicated punctuation keys, a space bar, and separate shift keys for graphics and extended modes. And a reset button allows you to clear a program from your computer's memory without disconnecting the power supply.

The official Spectrum Upgrade
Naturally your upgraded computer will accept all the peripherals in your Sinclair system - Interface 1, Microdrives and so on, as well as all

Spectrum software.

Just as important, new Spectrum software and peripherals will be designed with the Spectrum+ in mind. So the Sinclair upgrade adds stylish looks, new capabilities ... and new potential for the future.

Included - the new Spectrum+ User Guide and Companion Cassette

The new User Guide has over 80 pages of information, including a handy BASIC dictionary. The Companion Cassette provides an interactive tour of the new keyboard, and includes three entertaining arcade games.



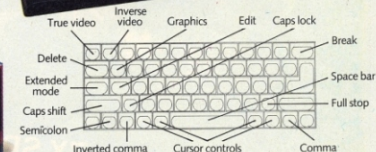
TO ORDER BY MAIL:

When ordering the Upgrade Service, send off your 48K Spectrum to the address below, carefully wrapped, together with the completed coupon and appropriate payment. (Please do not return the mains adaptor, manual or other ancillaries.) Your upgraded computer will be despatched to you within 10 days of receiving your order.

When ordering the Upgrade Kit, simply complete the coupon, enclosing the appropriate payment and post it to us at the address below. Please allow up to 28 days for delivery.

BY PHONE: Access or Barclaycard holders can call Camberley (0276) 685311 for personal attention, 9am to 5pm Monday to Friday. Only the Upgrade Kits can be ordered by phone.

Please note: the upgrade offer applies to working 48K Spectrum models in the UK only.



To: Sinclair Research Limited, Upgrade Dept, Stanhope Road, Camberley, Surrey GU15 3PS.

All prices include VAT, post and packing, User Guide and Companion Cassette.

Please send me the Spectrum+ Upgrade Kit. I enclose payment of £30.

OR

Please upgrade my 48K Spectrum for me. I enclose my computer together with payment of £50.

I enclose a cheque/postal order

payable to Sinclair Research Limited for £ _____

OR

Please charge my Access/Barclaycard no. _____

Signature _____

Name: Mr/Mrs/Ms _____

PLEASE PRINT

Address _____

PCW 502

Sinclair Research Limited,
Upgrade Department,
Stanhope Road, Camberley,
Surrey, GU15 3PS.

sinclair

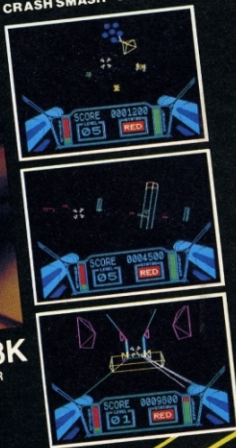
REALTIME SOFTWARE



£5.95

3D STARSTRIKE

The battlerun to end them all!
Blast the aliens, invade
the battleplanet and destroy it!
The mean and deadly
CRASH SMASH - 93%.



ZX SPECTRUM 48K
SINCLAIR, KEMPSTON AND CURSOR
JOYSTICK COMPATIBLE

3-D TANK DUEL

You against
enemy tanks, UFOs
and missiles -
A killer of a game!
CRASH Rating 83%.



£5.50

REAL TIME SOFTWARE, PROSPECT HOUSE, 32 SOVEREIGN STREET,
LEEDS LS1 4BJ

Both games for only £10

Name _____ Address _____
Postcode _____ P&P incl.
Cheques/d.p. payable to REAL TIME SOFTWARE

DEMONS OF TOPAZ



100% GRAPHIC EXPLORATION



A game of distinction  from British Telecom.
WELLINGTON HOUSE, UPPER ST. MARTIN'S LANE,
LONDON WC2H 9DL. TEL: 01-379 6755/5626

COMMODORE 64

**GOLD
EDITION
£5.95**

MICROSHOP

Rates: £12 per single column cm. Minimum size 3cm. Series discount available. Also spot colour available. **Mechanical Data:** Column width, 1 column 57mm, 2 columns 118mm, 3 columns 179mm. **Copy Dates:** 10 days prior to publication. **Contact:** Anita Stokes, Isable Middleton or Jacqui Edmondson.

ORIC FUN

Games for your Oric I and Atmos
Downsday programmable joystick interface £29.95
Quickshot II joystick £12.95
UK Don't Press the Letter Q £7.50
UK Don't Press the Letter Q £7.50
UK Don't Press the Letter Q £7.50

NEW

GURIEL

P.S.S.

LOTHLEHEN

PHILDATA (PCN),
8 Richmond Terrace,
Putney, W. Yorks.

LS28 9BY.

ACCESS Orders, Telephone (0532) 578851

TANSOFT

UK

OCEAN

ATARI AMAZING OFFERS

SAVE £30 Atari 800 XL Computer
plus **Atari 1050** disk drive only **£299.95**

SAVE £30 Atari 1050 disk drive plus
10 blank disks (worth £20) for only **£189.95**

All prices include VAT
For **FREE** fast delivery - please send cheque/PO to:
S.J.B. DISK SUPPLIES (Dept. 03)
11 Ousele Drive, Nottingham NG8 1BN

UNIVERSITY OF MANCHESTER

Department of Pharmacy Assistant Programmer

required for a 3 year appointment to develop computer-assisted lecturing programs for Pharmaceutical Sciences. A knowledge of Pharmacy is not required but some experience with micro-computers is essential. The successful applicant will also have responsibility for associated equipment.

Initial salary on the scale £6,106 to £7,024 pa according to previous experience and qualifications.

Applications giving full details of age, qualifications and experience, together with the names of two referees, should be sent to the **Department Superintendent, Department of Pharmacy, The University, Oxford Road, Manchester M13 9PL.**

THE QL SuperBasic Utilities

These 100% micro & multi-tasking utilities run as independent jobs within QDOS and are controlled separately from BASIC. Displays are real time and versions are supplied for monitor and TV displays (Custom screen formats on request).

TRACER

— The current executing BASIC line number.

POINTER

— The actual statement in use on the line.

SIZER

— Dynamic size of statement and variable stack.

BATER

— Current Data line and statement.

Run with in/vice to disk and with any memory size. Low, recoverable memory usage. Speed control of BASIC programs. These are possibly the last word in Utilities for the BASIC Programmer. (Screen-identify machine runs quickly and on an error exit all pointers are intact for inspection. Save yourself hours of boring, brain-pouring and frustration.)

5000s (41), on a cartridge — £14.95 inc. VAT/P&P.
Also in the **DataManagement QL** series and more at the time!

MACROCP — fast, multi-tasking backup. **£9.50**
JOBDIR — what's on in RAM. **£4.50**
MTIME — fast time terminal program. **£12.50**
(Add £4.95 for a cartridge if ordering separately.)

Checkouts PDS to DataManagement: £2, Larch Way, Hoxby, TV 030 RB or Telephone (0647) 763333 for further details.
Have YOU written any G6000 machine language (C/BIPL, BASIC, software)? Why not let us look at it. We offer the BEST royalties for the BEST software.

LYNX

Over 50 arcade games, adventures and utility programs, including Software Projects.

JET SET WILLY

List available from:
Phoenix Software
Unit 70, Marsh Lane Site, Marsh Lane,
Frodsham, Cheshire WA8 7BX.
Phone: 0528 35525

WDSOFTWARE

Utilities for the QL (£10 on Microdrive)

This package offers single-key loading, running or deletion of files, multiple formatting of cartridges, and auto backup of files from one or more cartridges to another with optional over-writing of namesakes. In addition, a directory of 60+ files can be viewed without screen overflow. NB a VERIFY program is unnecessary — QDOS does this automatically. Now includes directory print-out and 'uprint' to print any or all files on a cartridge with optional dated files. Owners of the earlier package can update by sending OUR cartridge and 25p.

Current Spectrum Software

Tradewind (CS Cassette)

Buy a ship, provisions and cargoes to trade between the harbours of the Coral Islands. Make a fortune if the weather and pirates let you long enough to master seamanship and economics. A strategy/adventure game with graphics for 48K.

Jersey Quest (CS Cassette)

Following an accident, you are stranded in the labyrinth of time and must find your own way back to the present with the aid of persons and objects from Jersey folklore. Meet the Black Horse of St Omer, the Dragon and Knight of La Hougue Bie, the Black Cat of Carrefour a Centre, the Witches of Rocquebelle and many others. A text-only adventure for 48K in machine code (Quill).

Morse Tutor (CS Cassette)

This one has 4 all 4-19 words/minute, variable spacing, variable number of groups of random letters numbers or mixed, random sentences, one of message, single characters (including punctuation), available alpha, RETRACK via screen, printer or SPEECH (phonetic alphabet via Cartrid uSpeech on 48K version only), and repeat facility. Takes you to and beyond RYA and Amateur Radio receiving standards. 16k and 48k-versions on one cassette. 48K only on Microdrive cartridge.

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. P.O. 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.

available from

WDSOFTWARE,
Hilltop, St Mary, Jersey, C.I.
Tel (0534) 81392

BLANK CASSETTES

Guaranteed top quality computer audio cassettes of great budget prices.

Packed in boxes of 10 with labels, index cards and library case.

Prices include VAT, post and packing.

(C5) £3.35 (C30) £4.70

(C10) £3.40 (C60) £5.30

(C17) £3.45 (C90) £7.00

(C15) £3.75

BASF FLOPPY DISCS

Prices of boxes of 10

5 1/4" Single side/Double density \$19.95

5 1/4" Double side/Double density \$21.85

5 1/4" Double side/Quad density \$28.75

MICRO FLEXI DISCS

Prices per 10

3 1/2" Single side \$4.00 each

3 1/2" Double side \$4.75 each

Indicate quantity of each product required in boxes. Free-delivery UK only. Cheque/P.O. Enclosed for \$

NAME _____

ADDRESS _____

PROFESSIONAL MAGNETICS LTD

Cassette House, 329 Housley Road, Leeds LS10 3YJ

FreePost Tel: (0532) 760666

BLANK DISKS SPECIAL OFFERS

5 1/4" BLANK DISKS (40 track)

Prices for box of 10

All prices include VAT, P&P is FREE

VERBATIM single sided/double density £18.95

SCOTCH 3M single sided/double density £18.95

DYSKAC single sided/double density £21.85

SJB SUPER SAVERS

50 single sided/double density 5 1/4" blank disks perspex storage box only £69.95

50 double sided/double density 5 1/4" blank disks in a perspex storage box only £79.95

FOR FREE FAST DELIVERY — Please send cheques/PO to:

SJB DISK SUPPLIES (DEPT 03)

11 Ousele Drive, Nottingham NG8 1BN

Tel: (0662) 782310

SOFTWARE

Amstrad	
S. Davis Snooker	£6.40
Manic Miner	£7.50
Hunchback	£7.50
Blogger	£6.95
Code name/Mat	£7.50
Commodore 64	
Ghost Busters	£9.50
Matchpoint	£6.95
Blackhander	£6.95
Cad Cam Warrior	£8.50
Hunchback II	£6.90
Electron	
Zalaga	£6.00
Chuckie Egg	£7.00
Hunchback	£6.00
Mr. Wiz	£6.75
Blogger	£6.75
BBC	
Frak	£7.95
Zalaga	£6.50
Mr. Wiz	£6.75
3D Grand Prix	£8.00
Manic Miner	£7.00
Spectrum	
Starstrike	£5.95
Airwolf	£5.95
Matchday	£6.95
Back-Packer Guide	£6.50

All categories catered for: Arcade, Adventure, Strategy, Utilities, Homes/Business and Educational. Write or phone for free catalogue (state micro). P&P FREE on software. Send cheque/P.O. to:

MICRO COMPUTER WORLD

1 Lane Close, London, NW9 6QZ

Tel: 01-452 0893

ACCESS TAKEN

Please phone for availability 100's of other titles



EDUCATIONAL

NEW 1985 SPECTRUM 48K COLOUR TELEVISION



Cassette & Circuit Diagram

FAULTS PRINCIPLES HOW DOES IT WORK

£6.95 ALLOW 21 DAYS DELIVERY

Wilson & C.D.
64 Victoria Gardens
Ferndown
Dorset BH22 9JH

BLANK CASSETTES AND DISKS

C160 10 for £3.85, 100 for £25.00

C160 10 for £3.85, 100 for £25.00

C240 10 for £4.80, 100 for £27.00

C240 10 for £4.15, 100 for £26.00

5 1/4" DISKS, DOUBLE SIDED-DOUBLE DENSITY 10 for £16.00

● All goods fully guaranteed and inc. p.p.p.

● C.O.D. orders add 6%.

● Immediate dispatch.

UK HOME COMPUTERS

82 Churchwood Ave., Swindon, Wilt.
24hr order phone 0793 895634

EVERYMAN HOUSE

77 OXFORD STREET, LONDON W1

3,000 sq ft — 28,000 sq ft

£5.00 per sq ft

Tel: 04868 29009/29991/23386

R.E.C.

116 High Street, Godalming, Surrey

SINCLAIR COMPUTER REPAIRS

Fast, reliable repairs by experienced engineers, having serviced Sinclair computers since the introduction of the ZX80. Our price is inclusive of all parts, labour, postage and VAT irrespective of fault. *No hidden charges. *While-you-wait service available. Spectrum £18.75. ZX81 £11.50. 16K Ram £9.95. Call or send with cheque or P.O. to: T V Services of Cambridge Ltd, French's Road, Cambridge CB4 3NP. Tel (0223) 311371.

Now available

SPECTRUM 'XK' MEMORY EXPANSION SYSTEM

XK System Kit £15.95 inc. VAT

XK System Factory fitted £20.95 inc. VAT

WANTED!

Machine code programmers
for all makes of home
computers.

*If you think you have
anything to offer.*

WRITE TO:-
GUY MILLS
GREY COLLEGE,
DURHAM,
DH1 3LG.

WANTED

PERSONAL COMPUTERS

all models bought for cash

Morgan Camera Company

160 Tottenham Court Road,

London W1. Tel: 01-388 2562

MICROCOMPUTER EXHIBITION BROMLEY CIVIC CENTRE

(Rochester Ave. off Widmore Rd A222)

THIS SATURDAY JANUARY 12th

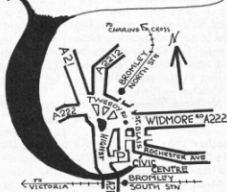
— 10am to 5pm —

MICROS FOR HOME, HOBBY & BUSINESS

Admission £1.85 (OAP & UB40 £1, disabled free)

(Travels to Bromley North & South)

East-West Trade Centre Ltd. 01-290 5299



BASIC COMPILER

Now supports around 90 key words. Turns Basic Programs into really fast Machine Codes. Its very easy to use and comes complete with full instructions. Suitable for the Model B or Model A

with 32 K

Enquire at your local computer store or order direct (post free) from:

Cassette Dept P.O. or S&E for details to £17.95

Disk (40/80 TRACK) DEPT PCN £19.95

21 Salcombe Drive, Redhill,

Nottingham, NG5 8JF

Tel: (0602) 262498

DEALER ENQUIRES WELCOME

NOW YOU'VE GOT IT... KEEP IT



BINDER ORDER CARD. Please rush me _____ PCN binder(s) at £3.50 each. I enclose my cheque made payable to Personal Computer News. Please charge my Access/Visa/Diners/American Express Card.

NAME ACCOUNT NO:

ADDRESS EXPIRY DATE:

..... TOWN: POSTAL CODE:

..... SIGNED:

SEND TO PERSONAL COMPUTER NEWS, BINDERS DEPARTMENT, 53/55 FRITH STREET, LONDON W1H 2HG



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' modelers 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 manufacturers 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'.

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:

```
2300ENDPROC
2940DEFPROC left (points%)
```

NEXT WEEK

C3 P70

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.



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?

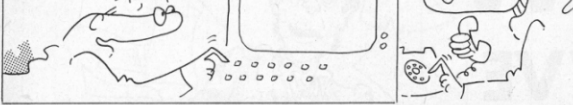
PAL2000

by Mollusc

(Want to play "U.S. Defence System"?)

what's that? a new game program...

Not exactly.



PCN DATELINES

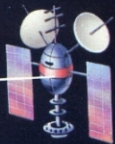
Event	Dates	Venue	Organisers
CADCAM Intl Show	Jan 8-10	NEC, Birmingham	EMAP Intl Exhibitions, 01-837 3699
What is artificial intelligence? Ten weekly meetings.	From Jan 15	City University, London	B Zanditon, 01-253 4399 ext 3268/9
Which Computer?	Jan 15-18	NEC, Birmingham	Clapp & Poliak 01-891 5051
High 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	AEI Ltd, 01-379 7628

EDITORIAL: Editor Peter Worlock **Deputy editor** David Guest **Production editor** Lauraine Turner **Deputy production editor** Harriet Arnold **Editor's assistant** Karen Isaac **News writers** Ralph Bancroft, Sandra Grandison **Features editor** John Lettice **Software editor** Bryan Skinner **Peripherals editor** Kenn Garroch **Hardware editor** Stuart Cooke **Programs editor** Nickie Robinson **Art editor** Dave Alexander **Assistant art editor** Tim Brown **Layout artist** Bruce Preston

PUBLISHER Cyndy Miles **Publishing assistant** Tobe Bendeth.

ADVERTISING: Group advertising manager Peter Goldstein **Advertisement manager** Bettina Williams **Assistant advertisement managers** Laura Cade, Claire Rowbottom **Sales executives** Claire Barnes, Phil Benson, Mike Blackman, Steve Corrick, Jacqui Edmiston Tony Keefe, Andrew Flint, Christian McCarthy, Isabel Middleton, Sarah Musgrave, Tony O'Reilly Anita Stokes **Production** Richard Gaffrey **Advertisement assistant** Jan Moore **Subscription enquiries** Gill Stevens **Subscription address** 53 Fifth Street London W1A 2HG 01-439 4242 **Editorial address** 62 Oxford Street London W1A 2HG, 01-636 6880 **Advertising address** 62 Oxford Street London W1A 2HG 01-323 3211 **Published by** VNU Business Publications, Evelyn House, 62 Oxford Street London W1A 2HG © VNU 1983. No material may be reproduced in whole or in part without written consent from the copyright holders. Photoset by Quicksat, 184-186 Old Street, London EC1. Printed by Chase Web Offset, St Austell, Cornwall. Distributed by Seymour Press, 334 Brixton Road, London SW9, 01-733 4444. Registered at the PO as a newspaper

BUGGY BLAST



SPACE MISSION SIMULATION



firebird
SOFTWARE

A game of distinction  from British Telecom.

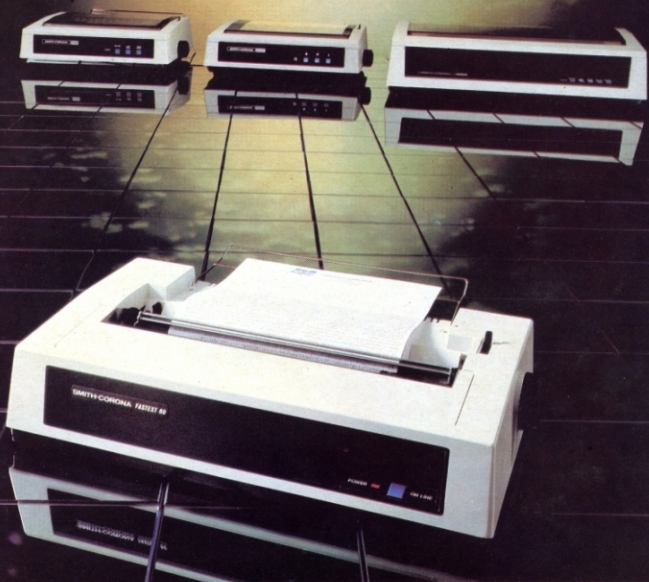
WELLINGTON HOUSE, UPPER ST. MARTIN'S LANE,
LONDON WC2H 9DL. TEL: 01-379 6755/5626

Firebird and the Firebird logo are trademarks of British Telecommunications plc.

SPECTRUM 48K

**GOLD
EDITION
NOW
£5.95**

SEE US ON
STAND 4630 HALL 3
AT THE COMPUTER SHOW
WHICH COMPUTER? SHOW



THE FASTEXT 80 Dot Matrix Printer from the New Force in Computer Printers



**SMITH
CORONA**

The Fastext 80 comes from an exciting new range of printers created to give speed, reliability and flexibility to the businessman at a price to suit the home user. Models in the range are compatible to all home computers, PCs and business micros. The Fastext 80 has a Centronics parallel interface – an RS232C serial interface is optional.

A machine of the highest quality, the six-pitch Fastext 80 performs at a speed of 80 cps with 80 column width (at 10 cpi). The host of features include a full line buffer, graphics capabilities, bi-directional text printing and logic-seeking. Friction feed is standard with a tractor feed available for continuous stationery.

Fill in the coupon and find out how you can make the most of your computer with a printer from Smith-Corona Data Products.

To: Smith-Corona Data Products, Unit 23, Northfield Industrial Estate, Beresford Avenue, Wembley, Middlesex HA0 1XP.

Please send me:

- A free copy of the full colour printer brochure.
 A list of local dealers.

Name _____

Company (if appropriate) _____

Address _____

Post code _____ Tel. No. _____

Make and model of computer used _____

PCN 9/1