# PERSONAL Computer NEWS

**WIN £100**

**New from Commodore**

**New from Atari**

# COMMODORE AND ATARI STEAL THE SHOW
## Magnificent seven from US giants

**SPECTRUM TOOLKIT**
Helpline for programmers –p12

**CANON's CONTENDER**
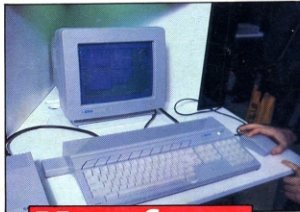Can it stand out from the MSX crowd? –p24

**BBC EXPANSION**
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**PLUS...**
Programs for QL, 64 and BBC

**NEWS EXTRA INSIDE**

**New from Atari**

# MENU

Apologies to faithful followers of the Next Week panel on the Quit page. In recent weeks we have constantly been overtaken by events — this issue is no exception.

Those of you eagerly looking forward to our reviews of home robot systems will have to contain yourselves. We decided to hold that for a while in view of the momentous events in Las Vegas. Watch out for robots (and other missing features) in coming issues.

## OUTPUT

## HARDWARE

## PERIPHERALS

## SOFTWARE

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# CES SHOW

## Magnificent seven lead out by Atari

When the wreckage was cleared away and the bodies removed, the score at last week's Consumer Electronics Show in Las Vegas was Atari 5, Commodore 2.

'Business is War,' says Atari boss Jack Tramiel, and his new-look corporation went for every juglar in sight, as its multiple product launch stopped the show. Commodore hit back, but was beaten for panache, scope, and sheer nerve. The rest were nowhere.

The Atari slogan at Las Vegas was 'Power without the Price'. When the dust settles and the machines get the chance to prove themselves, we'll know about the power; but the prices are amazing. On paper Atari has killed off the Macintosh, the QL, and any number of mid-range micros in one fell swoop.

That's on paper. Coleco made a splash along the same lines at the same show two years ago, and in the end it couldn't deliver. Atari's machines look far more ambitious, but with Tramiel involved anything could happen.

As he'd promised before Christmas, Atari had complete families on show at Las Vegas. The XE line of 8-bit systems are direct descendants of the 800XL; the ST twins break new ground for Atari with Motorola 68000 processors. For good measure there were also new peripherals and some startling software. Members of the Tramiel family were also in evidence.

From the bottom: the 65XE is an 800XL with a face-lift, but the differences aren't all superficial. The XE range has re-jigged circuitry, with the result that they are visibly faster than the 800XL and reputedly more reliable. The 65XE will cost about £120.

The 65XEM adds a music synthesiser to the basic design — its price will be under $160. The 65XEP is a luggable version of the 65XE, with a built-in 3.5in floppy drive and a 5in monochrome monitor, for about $400.

At the top of the XE range is the 130XE, with 128K to the 64K of the others. This machine will reach US shops later this year with a price tag of about $200. Like the others, it's driven by a 6502 with a new version of Atari DOS. Owners of the 800XL are promised an upgrade from their DOS 3.0 to the new version, and Atari is claiming compatibility with all 800XL software for the new systems.

The XE range looked good in its own right, but it turned out to be just an appetiser before the main course — the 130ST and the 520ST. Both machines run a 68000 processor with a proprietary operating system that is still called TOS (Tramiel Operating System). Anybody who thought that this might be a temporary name while something more suitable was devised looks like being disappointed. Tramiel seems to be making a bid for immortality in more ways than one.
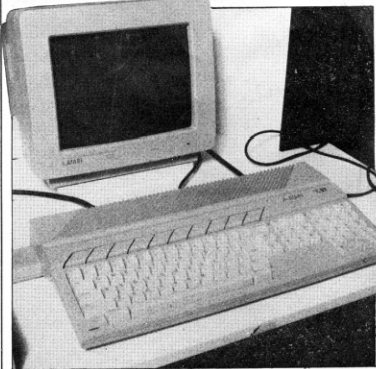


Atari 130ST — what price a tatty old Mac with this on the way?

TOS incorporates Digital Research's GEM. That means mice, windows, icons, handsome graphics, the whole Macintosh kit and caboodle. Wags around Las Vegas were calling the machines Jackintoshes. With 128K and 512K they will cost $399 and $699 respectively.

Apple executives will find it hard to hide the lump in their throats. IBM will refuse to comment, since it never acknowledges competition; if it gets its head out of the sand it may find that Atari has stolen its feathers.

The crucial feature will be software. Atari demonstrated an impressive package called Infinity on the XE range, but applications for the STs will depend on how well software suppliers respond to TOS. Infinity is a combination of spreadsheet, word processor and re-

Tramiel also launched a disk drive. Like everything else, its price is breathtaking — 500K on a 3.5in drive for $100. It can be hooked up to any of the new systems, EX and ST alike. A 3.5in hard disk is due to follow shortly, offering 10Mb. Shell-shocked industry analysts wouldn't speculate on what the price tag on 10Mb might be.

Atari demonstrated a trio of printers in the $50 to $100 range. There was a thermal colour printer, an impact dot-matrix unit, and a daisywheel. The company said that these devices were compatible with current Apple and IBM machines, and you got the impression that Atari was on the offensive even here.

The other 1,399 or so exhibitors could only look on in awe. Atari's new systems should start appearing in the US in the spring. But Commodore clawed



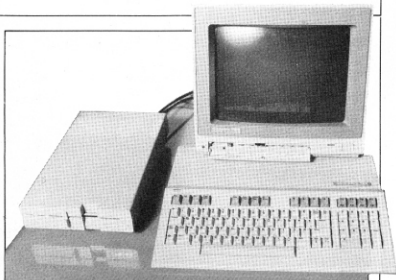Centre of attention — Atari rules the roost at the CES.



XEP — new-look Atari packaging around 800XL compatibility.

lational database with on-line help, windows, and a shared command structure, described by an observer as 'jazzy'.

GEM (and CP/M-68K) are implemented in ROM on the STs, but for old time's sake



Commodore's 128 plus business additions — a Plus/4 killer?

unlike any previous Commodore system, and the company has broken with another tradition by making it compatible with the 64. But, elegant as it was, it paled beside the clumsily named Commodore LCD.

This is a portable in the tradition of the Tandy Model 100: it tips the scales at 3lbs, carries 32K of RAM, and has basic business software built-in. The LCD name refers, of course, to its screen, an 80 by 32 display. Power is from standard batteries or, through an adaptor cord, from the mains. It is expected to cost about $500.

The C128 appeared with a trim half-height 360K disk drive, and the layout on Commodore's vast display area was calculated to appeal to business users as well as home micro fans. The system has the dimensions of an Apple IIc, and a keyboard with clusters of keys all over the place.

Will the C128 put pressure on the Plus/4? Its price is likely to be about $250; its 128K can be built up to 512K and it holds out the rather vague promise of

'CP/M-compatibility'. In any other context this would look very attractive; but at CES, with Atari running amok, the Plus/4 looks irrelevant.

Commodore might have stolen some of Atari's thunder if it could have demonstrated the Amiga machine — or it might have risked having the system submerged before it has a chance to make an impact.

In the world's most famous gambling city Jack Tramiel was in his element. The most awe-inspiring feature of Atari's performance at CES is that the new machines are the first to be released under his leadership — it was far from being the last desperate throw of a cornered man. There are more on the way: 32-bit systems due to be demonstrated in the spring.

According to Tramiel, he spent a lot of last year touring Atari's manufacturing plants and building up capacity. If the market responds to his new machines in the way you'd expect, the company will need every last inch of production line to meet demand.

back some of the attention with a couple of releases of its own. At any normal show it might have made the headlines.

The C128 (whose appearance was forecast in last week's PCN) proved to look completely
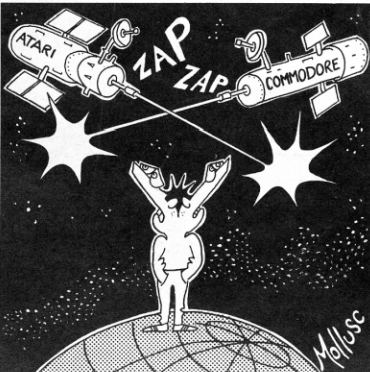
## Money talks in Currah collapse

Currah Computer Components, well-known for its speech synthesis devices, has been bought out by DK Tronics.

The Hartlepool-based company went into receivership on December 20, and following a request by the directors of Barclays, MJ Moore and DM Middleton of Coopers and Lybrand were appointed as joint receivers to attempt to find ways of resolving the company's problems.

Then in stepped DK Tronics, with expertise in the same field as Currah, with a bid to rescue it from sinking. Neil Rawlinson, financial director of DK Tronics said: 'The reason why DK Tronics has bought Currah is to ensure the Currah name and reputation is maintained.

'Currah's products are complementary to our own. We have both produced speech devices for popular home micros.

'In addition to giving support and backup to the current Currah range of products, we are going to finish off the final development of a product called Microsource which Currah was working on.'

If you intend buying a Currah speech add-on you should keep a sharp eye on the warranty. Although DK Tronics has exclusive rights to manufacture, market, and sell Currah products, Welwyn Electronics also has some contractual rights to sell to retail outlets stocks of Currah products it has.

In a statement from the receivers the situation was clarified: 'At the date of receivership, Welwyn was the sole manufacturer for Currah's Microspeech, Microslot, and Speech 64.

'Welwyn has stock of the above products which it has decided, as it is entitled to, to sell to the market direct. The right stems from a contractual situation between Welwyn and Currah, and ends when Welwyn has disposed of outstanding stock.

'The receivers feel that it's important to stress that Welwyn has purchased none of the support information and backup to the products that now belongs to DK Tronics.'

What this boils down to is that Welwyn will have to put is own warranty card with products sold — and therefore has the responsibility to support and backup any of its products.

## Spectrum/C64 top Xmas micro sales

Sinclair with the Spectrum and Commodore with the 64 were the winners in the last-minute Christmas sales rush.

Between them they accounted for around 65 per cent of all home micros sold with the Spectrum (in both its guises) outselling the 64.

For Acorn, the figures make depressing reading. Despite its expensive TV advertising campaign, the Electron accounted for only around nine per cent of home micro sales, and the BBC B around four per cent. In fact, the BBC B was overtaken by the Amstrad, which accounted for around five per cent of all sales. The Commodore 16 accounted for four per cent.

Perhaps the biggest loser was MSX, which taking all models together barely made an impression on the buying public. This was predictable, as few of the MSX manufactures showed any sign of wanting to take this Christmas seriously.

The figures come from RAM/ C, the market research company that compiles the *PCN* Charts (see page 5). According to Simon Treasure, RAM's managing director, Sinclair's and Commodore's share of the market is a significant increase on last year, and they now dominate this market sector.

News of the figures hit Acorn's share price with the company forced to respond with a public relations campaign to re-inspire City confidence. An Acorn spokesman said that sales of both the BBC and the Electron over the Christmas period were satisfactory.

### Win £100 per words!

This could be the easiest £100 you've ever made — thanks to *PCN's* unparalleled generosity. In last week's *Random Access* page we omitted the caption on Benian's cartoon (reprinted below). All you have to do to get your hands on the cash is write your own caption — tell us what any of the characters might be saying.

The entry deemed the funniest by the laugh-a-minute staff of *PCN* will receive the £100. Send your entry to Missing Caption Competition, *Personal Computer News*, 62 Oxford Street, London W1A 2HG, by Friday, January 25.
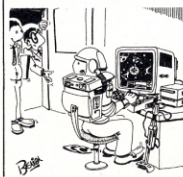


## Sending the MSX menace packing

Japan over Christmas and the New Year should be a home computer owner's dream: most companies shut down from noon on December 28, not to open again until January 4. This year my company extended that to January 7, thereby providing an abundance of time for personal computing. So why is it that I feel I'd rather have gone to the office?

The reason is MSX, which has invaded my home. Yes, we're a two-computer family, and if my experience is anything to go by there should be an adventure game on the pitfalls of introducing a games-type computer into the home.

In Japan at the moment there are two classes of citizen: the proud, patriotic, upstanding type who buys an MSX micro and glories in it; and the neo-Luddite who skulks in dark corners avoiding the ladies who press white feathers into his clammy palms. Under these circumstances I hardly had a choice.

You may have read that MSX isn't going down too well in its native land, but like everything else you read in the papers (well, almost everything — we still strive for excellence in some quarters), you ought to take this with a pinch of salt. From all appearances MSX is gathering strength all the time, and there is excited talk of MSX II, which is supposed to be just around the corner.

Meanwhile, as I reported in a previous column, the prices are attractive and they're becoming more so all the time. There is an element of the football pools about all this, or, to borrow a slogan from the national Australian lottery, 'You've got to be in it to win it'.

There is a standing rule here that my kids can watch television for 30 minutes of their choice every day. If my wife wants to watch something, they're welcome to join in her. In some mysterious fashion, they have worked out a schedule of programs they've all agreed to watch, but when my daughter missed her favourite show because her older brother has the MSX machine linked to the set, the *entente cordiale* became the *enfant terrible*. I don't know

where she learned the language she used, but MSX gained another enemy in the house.

Then my wife got involved with a game called *Clapton II* (nothing to do with the cream of blues guitarists or the much maligned town near London). it's my solemn belief that nothing should come between a man and a hot cup of tea — now it seems that my demure Japanese wife would rather blast objects in space than put the kettle on to boil.

And naturally, as I'd expected, my seven-year-old son takes great delight in embarrassing me at a game called *Pair-Pair*, in which the object is to match hidden pairs of fruit, vegetables and animals while avoiding being gobbled up by little black things that wander about the screen. Not only has he managed to embarrass me in front of his friends, but on one occasion in front of mine.

In desperation I turned to my own machine for the companionship and solace that old friends are said to offer. Ha! A simple act like updating my mailing list on *dBase II* turned into an act of contrition, with a dozen or so letters aimed at various destinations around the globe. Looking on the bright side, I'd again managed to avoid writing the accounts receivable and invoicing program I'd been meaning to set up to keep track of my free-lance work.

Not that I got to do too much of that. I'm the only writer at the office with a word processor at home, so guess who got to bring home an urgent project. Working at the office with only the telephone for interruptions is one thing, but working at home with three children, a wife, and an MSX computer with ear-shattering sound effects, each trying to outdo the other, is a situation no writer should have to endure.

So I didn't. For all their faults, MSX systems are lightweight and compact. They pack easily into the trunk of a car, and hook up just as easily to grandparent's television as they do chez Powell.

So it was with great pleasure that I stood in the driveway waving goodbye to my wife and kids as they headed off in the direction of the grandparents. I must confess I even uttered a slightly vindictive chortle as I remembered that the most audible irritant among the accompanying ROM packs had been a Christmas present from their grandfather.

Until I remembered that although it does many things well, I've yet to figure out how to teach my trusty NEC to make a proper cup of tea. Naturally I blame that on MSX as well — wouldn't you?　**Serge Powell**

## Unix on the move with H-P source

Personal computing took another step forward last week with Hewlett-Packard's launch of the Integral, a luggable micro that runs Unix.

Unix or one of its clones is usually regarded as the operating system of the future, a multi-tasking environment that will take over from MSDOS as the standard in microcomputing. So far it has been living up to its billing in dribs and drabs, but the appearance of the Integral could give it a shot in the arm.

Hewlett-Packard's machine weighs in at 25lbs. Besides Unix System III implemented under the name of HP UX, it offers 512K of RAM, 32K more to drive the 9in amber electroluminescent screen, 256K of ROM to accommodate the oper-



**H-P Integral: Unix on the move.**

ating system, a built-in 710K floppy, and the H-P Thinkjet printer — an impressive package for the price of £5,450.

H-P says it expects the machine to sell mainly to scientific and engineering users (the company's traditional market), but it has also put windows and its Personal Applications Manager into the bundle.

Version 7 Unix, at the core of System III, was developed in 1977, but was't distributed until 1979. Estimates of the number of working Unix or Unix-like systems in the UK last year vary from 4,500 to 12,000 — a minute total when you consider that there are now more than 200 hardware vendors offering Unix or its more common derivative, Xenix (75-80 per cent of Unix licences around the world are, in fact, for Xenix, Microsoft's version that recently won the support of IBM in its PC AT).

Business software publishers are making sure that when

Unix takes off they'll be in a position to supply the applications. Redwood, for example, claims to have the first integrated packages developed in Europe for Unix systems.

But the turning point will probably come when users move in large numbers from stand-alone single user personal computers to communicating, multi-tasking systems.

## R&R and Abbex — '85's first casualties

Two software companies, R&R Software and Abbex, saw in the New Year by going bust.

Robert Brenchley, managing director of R&R, blamed large sums of money owed to it by a South African company, allied to a bleak Christmas period, for the downfall of the business.

He said: 'It was a quiet summer, but we were keeping our head above water. Then came Christmas and we thought we'd have good sales — but it didn't happen.'

R&R's best-known game for the Spectrum was appropriately called Titanic, and the company was in the process of making a 64 version. However, on December 12 things ground to a halt, and the receiver Mr David Lovett was brought in on January 8, 1985.

Mr Brenchley, who will find refuge in the industry doing freelance work, had no immediate plans to start all over again. 'It would be unwise to jump into a similar venture as a lot of medium-sized companies are having a hard time at the moment,' he said.

Abbex also hit the dust. The last game that the company produced was All or Nothing for the Spectrum. Numerous attempts to contact the company last week failed.

Further signs of trouble and strife in the computer games market come from K-tel. It has withdrawn financial backing from its software subsidiary Front Runner 'for the time being'.

A spokesman for K-tel said that Front Runner is continuing to trade and will continue to fill orders for existing products; but it is not planning to bring out any new titles.

## Wayward path for Spectrum upgrade

Sinclair has come up with an upgrade path for Spectrum owners, to the surprise of some of its staff. But the cost of the upgrade is the difference between a new Spectrum and a new Spectrum Plus, unless you fancy yourself with a soldering iron.

The kit costs £30 and the upgrade service £50. It may pay you in the long run to make the change one way or the other — Sinclair says that future software and add-ons will be designed with the Plus in mind.

Sinclair is advertising the upgrade widely. 'That must be why we're getting people's machines in,' said a Sinclair livewire as realisation dawned. See Quit (page 48) for a full explanation of the upgrade.

## Optical reader for mass market

Optical character recognition is at last available for the mass market with the launch of the Omni-reader from Oberon International. (Tel. 0442-3803).

The Omni-reader is a device that lets you read the printed word driectly into a computer via the RS232 port. Previous machines that could do this cost from £6,000 to £10,000. The Omni-reader is a breakthrough at a price of £458.85, although it is limited.

The four typefaces it is capable of reading are courier 10, courier 12, letter gothic 12, and prestige elite 12. It may also be possible, at a later date, to load new fonts from the host computer.

Omni-reader is a manual
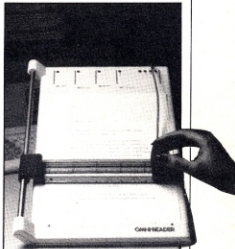


**Read Only Memory — Omni-reader takes it all in.**

system that uses a scan head moved across a line of text by hand, using a ruler as a guide. The data is output via an RS232 port as ASCII characters, and the accuracy depends on the quality of the text to be read. Oberon claims that on average there will be only one error per A4 sheet.

At the moment there is software for the IBM PC only, but Oberon will be bringing out software for CP/M systems, the Apple IIe and IIc, the Mac, the Lisa, and the Sirius. The complete package also includes full details on the RS232 connection.
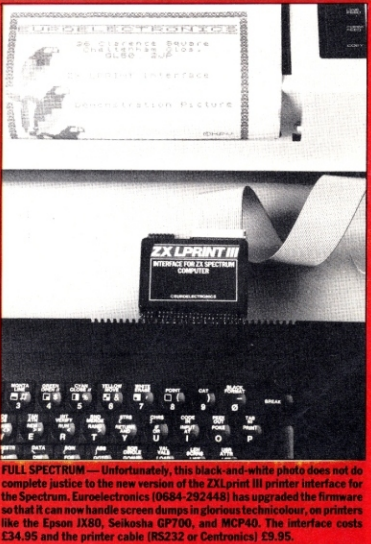


**FULL SPECTRUM** — Unfortunately, this black-and-white photo does not do complete justice to the new version of the ZXLprint III printer interface for the Spectrum. Euroelectronics (0684-292448) has upgraded the firmware so that it can now handle screen dumps in glorious technicolor, on printers like the Epson JX80, Seikosha GP700, and MCP40. The interface costs £34.95 and the printer cable (RS232 or Centronics) £9.95.

## Dominant duo should look to their laurels

Behind the news that Sinclair and Commodore dominated the Christmas sales table (page 3), there are signs that a more significant change is taking place in the home computer market.

For a start, home computer sales this Christmas were no higher than in the previous year. This has led some prophets of doom to forecast that the great home computer boom is over. But as always, the entrails of Christmas require careful reading.

In terms of actual machines, sales may have levelled out. But sales of software, peripherals and upgrades have surprised some retailers.

'Overall, we probably sold about the same value as in previous years, but fewer computers,' said John Flatman, merchandise controller for Boots. 'The peripherals and software business was very bouyant and disk drives sold particularly well,' he added.

'Sales were really very good, well up on last year,' said Richard Francis, retail operations controller for Dixons.

'The principal reason for this was our special promotions like the Commodore business outfit, which bundled the 64 with disk drive and printer,' he added.

On the software front games continued to dominate the sales chart but as with the hardware, the winners were the big names with top selling titles.

Simon Treasure, managing director of market research company RAM/C, agrees that software sold very well over Christmas. 'The big dozen software houses did particularly well but after that sales started to fall away very rapidly.'

In the peripherals sector, equipment related to games playing, such as joysticks, did best of all.

So why the trend away from hardware to software and peripherals? First, most people who are likely to buy a home micro have already bought one or had one bought for them.

Second, having acquired a micro, most users now want to put it to work, usually as a games machine. Hence the sales of games software and peripherals like joysticks.

Christmas also confirmed that the shakeout of the computer industry is well under way. Sinclair and Commodore increased their stranglehold of the market because quality software for these machines is so abundant.

This creates a vicious circle. The reason for the abundance of software is the large user base for the Spectrum and the 64.

The good news is that these machines should continue to be good sellers for some time.

The bad news is that users could find themselves locked into a dependence on these machines, both of which are beginning to look dated.

Commodore admittedly appears to be making the right move with the US launch of the C128 — a machine that offers a higher performance while maintaining compatibility with the 64.

An alternative strategy is to diversify into other areas such as the business market. But Sinclair's and Commodore's attempts to tap the low priced end of this market have not been markedly successful.

Both the QL and the Plus/4 have flopped with the volume sellers, probably because neither has appealed to the top end of the home market (no games software). Nor have they appealed to the serious business user who is probably looking for something that has proper disk drives and is compatible with existing office machines.

The continued growth of games software suggests that home micros are still seen by the buying public as a home entertainment product.

Which is probably where MSX could come in. Sony has already demonstrated a home micro with a video interface that can be used to generate titles on home videos. Yamaha's MSX machine can be used to drive its electric organs.

In the not too distant future we are likely to see home micros that can interface with video disk players, opening up the possibility of interactive video games.

Whichever way you look at it, no home computer manufacturer — least of all British manufacturers — can afford to rest on its laurels.

In the games machine market, Sinclair and Commodore have effectively seen off the opposition. Anyone wanting to stay in the volume computer business would do best to concentrate on the next generation of machines that the buying public will want. **Ralph Bancroft**

# GAMES

| TW | LW | TITLE | PUBLISHER | MACHINE | PRICE |
|----|----|-------|-----------|---------|-------|
| 1 | 1 | Ghost Busters | Activision | SP,C64 | £9.95 |
| 2 | 2 | Airwolf | Elite | SP | £7.95 |
| 3 | 3 | Match Day | Ocean | SP | £6.90 |
| 4 | 5 | 3D Star Strike | Real Time | SP | £5.95 |
| 5 | 11 | DT's Decathlon | Ocean | SP,C64 | £7.90 |
| 6 | 6 | Elite | Acornsoft | AC | £15.00 |
| 7 | 4 | Knight Lore | Ultimate | SP | £9.95 |
| 8 | 13 | Skool Daze | MicroSphere | SP | £6.95 |
| 9 | 9 | HunchBack II | Ocean | SP,C64 | £7.90 |
| 10 | 8 | Select 1 | Comp Records | SP,C64 | £12.49 |
| 11 | 10 | Doomdark's Rev. | Beyond | SP | £9.95 |
| 12 | 7 | Staff of Karnath | Ultimate | C64 | £9.95 |
| 13 | 14 | Gift of the Gods | Ocean | SP | £9.95 |
| 14 | 20 | Kong Strikes Back | Ocean | SP,C64 | £7.90 |
| 15 | 12 | Underwurld | Ultimate | SP | £9.95 |
| 16 | 19 | Combat Lynx | Martech | SP,C64 | £7.95 |
| 17 | 15 | Raid over Moscow | US Gold | C64 | £9.95 |
| 18 | 16 | Booty | Firebird | SP,C64 | £2.50 |
| 19 | — | F15 Strike Eagle | US Gold | C64 | £9.95 |
| 20 | — | Sabre Wulf | Ultimate | SP,AC | £9.95 |

| | SPECTRUM | |
|----|----------|-------|
| TW | TITLE | PRICE |
| 1 | GhostBusters | £9.95 |
| 2 | Airwolf | £7.95 |
| 3 | Match Day | £6.90 |
| 4 | 3D Star Strike | £5.95 |
| 5 | Knight Lore | £9.95 |
| 6 | DT's Decathlon | £7.90 |
| 7 | Skool Daze | £6.95 |
| 8 | Select 1 | £12.49 |
| 9 | Doomdark's Rev. | £9.95 |
| 10 | HunchBack II | £7.90 |

| | COMMODORE | |
|----|-----------|-------|
| TW | TITLE | PRICE |
| 1 | Ghost Busters | £9.95 |
| 2 | Staff of Karnath | £9.95 |
| 3 | HunchBack II | £7.90 |
| 4 | Kong Strikes Back | £7.90 |
| 5 | DT's Decathlon | £7.90 |
| 6 | Raid over Moscow | £9.95 |
| 7 | Select 1 | £12.49 |
| 8 | Booty | £2.50 |
| 9 | F15 Strike Eagle | £9.95 |
| 10 | Int Soccer | £12.90 |

# MICROS

| | BELOW £1,000 | |
|----|--------------|-------|
| TW | MACHINE | PRICE |
| 1 | Spectrum | £125 |
| 2 | CBM 64 | £199 |
| 3 | Electron | £199 |
| 4 | Amstrad | £349 |
| 5 | CBM 16 | £140 |
| 6 | BBC B | £399 |
| 7 | Atari 800XL | £125 |
| 8 | MSX (series) | £250 |
| 9 | Einstein | £500 |
| 10 | Sharp MZ700 | £250 |

| | ABOVE £1,000 | |
|----|--------------|--------|
| TW | MACHINE | PRICE |
| 1 | IBM PC/XT | £2,390 |
| 2 | ACT Apricot | £1,760 |
| 3 | Compaq | £1,795 |
| 4 | Olivetti M24 | £1,595 |
| 5 | Televideo TS1603 | £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 cover both independent and multiple sources across the nation. They reflect what's happening in high streets during the week up to January 10. 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.

## Anti-MSX stand leads to dead end

I looked at myself in the mirror this morning and as far as I can see my skin isn't yellow and my eyes don't slant. That's reassuring when you're psyching yourself up to write a pro-MSX letter to *PCN*.

To judge from recent letters, you're preaching to the converted with your anti-MSX stance. Sir Clive of the Black Watch has an obvious axe to grind, I suppose, but Anthony Cleall on last week's page misses the point by such a long way that he ends up almost arguing against himself.

You don't have to be a Spectrum owner to know that it's out of the question to buy a new computer every time a better one is produced. It's possible that Spectrum owners actually have an advantage in this respect — the chances are that they paid so little for their machines that they can consider buying another more easily than those of us who forked out £200 or more. But that's beside the point. Producing newer and better machines isn't the way to beat the Japanese.

Acorn has the right idea with the BBC B; here's a machine that can serve as the engineroom of a system that can be expanded in any number of ways. Sir Clive can't do that with the Spectrum because the Spectrum isn't suitable for anything that needs more than two or three key strokes. But the BBC B is expensive. What we need is a half-way house — a system that can be expanded without costing you an arm and a leg in the process.

Isn't that what MSX will offer? I don't know whether they've got disk drives sorted out yet, and I don't know what the impact of MSX Mark 2 will be, but it seems to me that a group of big companies that set out to promote a standard can be relied on to maintain compatibility as the standard and the systems develop.

The prospect of a Spectrum with extra ROM and perhaps a music synthesiser is enough to make a cat laugh. It wouldn't be a Spectrum any more, so why not call it a day and put it out to grass somewhere while you go ahead with a system that will let you expand in those kinds of ways.

It needn't be MSX, strictly speaking. An Electron, an Amstrad, maybe even an Oric will give you the same scope eventually. But you're still out on a limb with them. With an MSX machine you'll have first call on all the little extras that people put out for all the systems in the group.

At the moment that could mean any one of a dozen micros. Isn't anything else a dead-end street by comparison?
*Jim Tappy,*
*Plymouth.*

## 'Doomdark' map dig unfair?

In your review of air game Doomdark (issue 93) you say we are cashing in with our Icemark chart; actually we are not.

To obtain a map of the Icemark, Mike had to write a special program. That took time and he couldn't do it until the game was finished. As he didn't finish the game until the day before we went to duplication we were obliged to put a pretty picture on the back of the rules — pretty, but no help to anyone; so the map seemed like a good alternative.

We produced the illustration and had the map printed and produced in one week flat (delivered on December 21), and kept the price to £1.95. If I gave it to our mail order fulfilment house, they would charge me £1 handling per item, so we would end up making nothing at all.

To hold costs further I spent

Christmas Eve, and the two days after Christmas stuffing maps into envelopes. We've sold over 1,000 to date, and people are now asking us for *Midnight* maps. So there.

We are going to be producing more add-ons like the map. I hope to get an *Midnight* map out in February.
*Clive Bailey,*
*Beyond Software.*

## User group member moans

In June 1984 I paid £10 to the Independent Sinclair User Group (189 Rosehill Road, Burnley, Lancs) as my first annual membership fee. Within a few days I received the first newsletter. Since then, despite writing several letters, I have received nothing further. Neither have I had a reply to my letters.

The Independent Sinclair User Group is reputedly run by a man called Vic Webber. If Mr Webber is reading this letter I invite him to justify his lack of action while holding money belonging to other people.

If any of your readers have had the same problem, or indeed if they have had successful dealings with this group, I should be obliged if they would write to me as soon as possible, so that I can get a clearer idea of what's going on.
*John Schofield,*
*Lancs.*

*Over to you, Mr Webber — Ed.*

## Compatibility claim misleads

McGraw Hill publishes a business program for the Spectrum called Projector 1, which is good for displaying data in the form of graphs; however, potential users should be warned that, although it is described on the cover as 'Microdrive Compatible', they should not imagine that the program can be put on Microdrive. It takes five minutes to load the program from cassette. Only the data can be stored on Microdrive.

I think this term 'Microdrive Compatible' should be used only where the program itself can be loaded from Microdrive. This is especially true of business programs. Who wants to have to load an important presentation from cassette, waiting five or more minutes?

Other important practical programs for the Spectrum — Tasword and Masterfile — can be loaded from Microdrive, and I regard these as genuinely compatible.
*E G Matthews,*
*Dorset.*

## Virtues of Sanyo extolled

I certainly agree (Routine Enquiries, issue 90) that the Sanyo MBC is a worthy alternative to the QL. Indeed, I bought my Sanyo in June after cancelling a QL order, and have never been pleased with the decision. But I really must take up the insinuation that the Sanyo only runs bundled software.

I have up and running *Friday, dBase II, Cardbox, Easywriter, Wordstar Professional* with Correctstar and Starindex, *Multiplan, Supercalc 3* (with excellent graph making ability dumpable to a wide variety of printers), Pascal, Fortran 77, a painting programme called *Graffiti*, not to mention some arcade games that would put the 'populars' to shame.

Any Sanyo owners out there who would like to know how to get these programs can ring me (01-986 6752). *PCN* might like to contact us at the Sanyo User Group before publishing rash comments about the machine.
*Keith Teare,*
*50 Airmead House,*
*Kengsmead Way,*
*London E9.*

Machine code!! I can't even understand the Green Cross Code.

Suffering from circuit crunch or data dyslexia? Want some sound advice on speech synthesis or the best type of printer? Then consult the experts. But remember, no SAEs, 'cos we can't reply personally. Address your queries to Routine Enquiries, *PCN*, Evelyn House, 62 Oxford Street, London W1A 2HG.

## Caught in the classic micro buyer's snag

**Q** I am thinking of buying a computer and I'm torn between the BBC Micro and the Enterprise. I'd like the BBC because of its software but having seen it around for such a long time gives me second thoughts.

I like the Enterprise because I've heard that after buying a converter You can load Sinclair and BBC games on it. Is this true?
SA Mohyuddin,
Putney, London.

**A** You're caught in the classic snag of computer buying — although for the wrong reason. So far no-one has produced a machine emulator for any of the popular computers and the Enterprise is the least likely candidate.

In short, no . . . you won't be able to run any of the Spectrum or BBC programs on the Enterprise.

In deciding on the computer to buy, you will always be stuck between a tried and trusted system that has a lot of software and peripherals, and a red hot, new design with very little available for it.

In deciding which machine to go for, you should look back at numerous issues of *PCN* where we have answered similar questions. Last week's review of the Enterprise, and our retrospective on the BBC in December should help you decide.

## Can my typewriter double as a printer?

**Q** Can you please tell me if it is possible to use my typewriter as an input keyboard? I have a 48K Spectrum, with Kempston Centronics interface, and also a Silver Reed EX43N with IF/40 interface, and am using *Spectext* for word processing.

If it is possible, could you please suggest how I should begin to achieve this?
S A Young,
London, NW6.

**A** We're not aware of any way this could be done; however, we reckon that the best way of achieving something along these lines would involve connecting the typewriter to the Spectrum through an RS232 interface, and using the typewriter as a terminal. But in order to do this you need a typewriter with a full send and receive capability, which means it has to have the circuitry built in to scan for keypresses and send them to the Spectrum; but the Silver Reed hasn't got this facility.

The Brother EP44 is an example of a printer/typewriter that will allow you to do this, and there are a few others around, but in this case you seem to be out of luck.

## How to increase the Dragon's text screen

**Q** I have a Dragon 32 and would like to increase the text screen to around 30 × 60 characters. I would also like upper and lower case characters. Are there any products that do this, or could I try to convert a board from another machine?
C Jones,
Brierly Hill, W Midlands.

**A** If you're up to converting boards you're way beyond any advice that we can give you.

The only product we know of that will solve some of the difficulties is the OS9 operating system which gives you a display of 16×51 characters. This was marketed by Dragon Data before its demise and may still be available from some dealers. It was priced at around £40.

You could also try Premier Microsystems which produces a sprite board for the Dragon. (Tel. 01-659 7131).

## Flashy interrupt for the Atari

This machine code routine uses a vertical blank interrupt to flash the cursor on any Atari. In the routine it decreases memory location 71. When this reaches zero it turns the cursor off (using POKE 755,0), then repeats this but turns the cursor back on (using POKE 755,2). As POKE 755,0 also turns off inverse characters, this routine also flashes anything printed or typed in inverse.

After running this program it will continue until the computer is turned off or reset is pressed (typing A=USR (1536) restarts the routine).

To change the speed at which the cursor flashes, alter line 105. Replace this number by the speed you want. The higher the number is, the slower the cursor will flash. After doing this RUN it and NEW it. If you wish to change the speed type POKE 1538, speed, (speed being the number for your speed) then type A=USR (1536)>.

*Jason Gosling,*
*Notts.*

```
5 REM FLASHING CURSOR BY JASON GOSLING
10 FOR N=1536 TO 1592: READ I : POKE N,I : NEXT N
20 A=USR(1536)
30 END
100 DATA 104,169
105 DATA 16
110 DATA 133,70,165,70,133,71,160,19,162,6,169,7,32,
    92,228,96
115 DATA 198,71,240,3,76,98,228
120 DATA 169,2,205,243,2,240,12,169,2,141,243,2,165,
    70,133,71,76,98,228
130 DATA 169,0,141,243,2,165,70,133,71,76,98,228
```

## Spectrum half-way measure

If you want to save a program still under development and clear the computer's memory to test a subroutine or program lines before incorporating them, you may find this procedure useful:

1 Let a = PEEK 23637 +256* PEEK 23638: PRINT PEEK a: PRINT PEEK (a+1): STOP

Enter RUN 1 and note down the two Peeked numbers given. Now change the line to:

1 Let a = PEEK 23637 +256 * PEEK 23638: POKE a,64: POKE (a+1),0: STOP

and enter RUN 1. All the program lines after number 1 should vanish. Now any subroutines or other lines can be entered to be tested and even RUN, to get them right.

To return to the original program, it is essential to delete any temporary lines by using the edit key in the usual way, after which, enter RUN 1 (to reset Var a), and enter as a direct command:

"POKE a, (the first number noted): POKE (a+1), (the second number)",

and it will re-appear.

*R Luxton,*
*Solihull, West Midlands.*

## 16K random access files

BBC owners can create random access files on disk using less than the 16K of disk space claimed by the OS.

The manuals mention that since any file can be accessed by the random access commands (OPENIN, OPENUP, PRINT £, etc), you can reserve disk space for files longer than 16K simply by "*SAVE "filename" ssss+LLLL to save any block of code of the required length from anywhere in memory (ie, any garbage at all). You can then write to and read from the file using OPENUP ("filename") and OPENIN ("filename").

You can use the same techni-que to create files on disk shorter than the default 16K.

X = OPENOUT ("NAME"): CLOSE£X. This creates a file on the disk, while the operating system reserves the default 64 sectors, or 16K.
*SAVE "NAME" 0000 + 8000. This creates a file on the disk, 32K long, which can be accessed by OPE-NUP and OPENIN in the usual way.
*SAVE "NAME" 0000 + 00FF. This creates a file on the disk only 255 bytes long, which can also be accessed in the usual way, by OPENUP and OPENIN. This is a very handy technique for storing small data files, without using large amounts of disk space.

*Archibald McDonald,*
*Glasgow.*

```
10 REM : HIRES OVERLAY
20 POKE 48000,156 : REM PUT UP OVERLAY
30 POKE 704,3     : REM SET STATUS AS HIRES
40 CURSET 0,0,0
50 FILL 135,40,64 : REM CLEAR SCREEN OVERLAY
60 CURSET 100,60,1
70 FOR N=1 TO 50 STEP 5
80 CIRCLE N,1 : REM JUST A DEMO
90 NEXT N
100 CURSET 6,0,0
110 FILL 135,1,5   : REM INK CHANGE
120 END
```

## Oric overlay delusions

You can usefully delude your Oric 1 or Atmos by exploiting the strange effect that pressing ESC and DEL together has. The program above overlays the Text screen with the Hires screen by poking 48000,156. It then overcomes the restriction of not being able to draw on this psuedo window when in Text mode by convincing the Oric that it is actually in Hires mode with a POKE 704,3.

If you have just switched on, poking location 48000 with 156 reveals the Hires screen filled with vertical lines. You can now move your cursor around the screen and it disappears under the overlay and then re-emerges. Try typing some text when the cursor is out of sight, then type Return a few times to bring back the cursor. Next, type POKE 48000,32 and you will find your text screen with all you previously typed.

The following listing is a demonstration. Remember that the Oric thinks it is in Hires, so TEXT or POKE 704,2: POKE 48000, 32 returns things to normal.

Do not try to use a y-axis value greater than 135 and remember which mode you have poked 704 with as PRINT AT, etc will not work in Hires (ie, 704 contains 3). Finally when in Text, POKE 704,1 provides a safeguard against selecting Hires if you wish to preserve this area of memory.

*K Heptinstall,*
*Blackpool, Lancs.*

## Error-free BBC programs

This program helps avoid mistakes when typing programs into a BBC micro. It gives a short bleep when lower case letters are entered.

It differs from other programs of this type as it uses the keyboard vector OSRDCH leaving the 'events' vector free.

With OS 1.2, *FX 214,1 shortens the bleep, while *FX 212,216 or 212,232 softens it. The rest of the listing works with all versions of the OS. *FX210,1 turns all sounds off.

*H Hoffman,*
*London E9.*

```
10 *K. 10?&210=0:?&211=9:*FX214,1!M
20 VEC=!&210 AND &FFFF:IFVEC=&900 END
30 FOR P=0 TO 2 STEP 2
40 P%=&900:[ OPTP
50 CMP#(ASC"a"):BCC E
60 CMP#(ASC"z"+1):BCS E
70 LDA#7:JSR&FFEE
80 .E JMP VEC
90 ]:NEXTP
100 REM_RUN then press BREAK
```

## Golden tip for Memotech silence

Having tried the save/load screen routines for the Memotech in the November 17 issue, I have discovered that the computer carries on making noises even after all the data has been transferred to tape.

To stop this try inserting the following lines of code after the CALL &AAE instructions:

LD A, &9F
OUT (6), A
IN A, (3)

*Julian Barkway,*
*Chandlers Ford, Hants.*

# BASIC TOOLKIT

Improve your programming skills with these toolkit listings from Stuart Nicholls.

This program is intended to help both Basic and machine language programmers to develop and produce their working programs. It has five routines to achieve this aim.

1. Renumber
2. Delete lines
3. Delete REMS
4. Create line 0 REM
5. Keep line 0 REM only

To call the program enter as a direct command:

RANDOMIZE USR 63400

but note that there must be a Basic program in memory before the utility is used. An error report 'Sorry . . . no Basic' will be printed if an attempt is made to use it without a Basic program being present.

## Renumber

This option, as its name implies, will renumber a Basic program from any line number to the end of the listing, and includes all the usual keywords, GOTO, GOSUB, RESTORE, LIST, LLIST and RUN.

It starts by asking you three questions:

● **From old line no.** — This can be any number from 0 to 9999 but defaults to 10 if Enter is pressed without entering a number. As with all inputs only numeric key presses are entered and after the entry of four figures only Delete or Enter is accepted. Numbers can be entered with or without leading zeros. The normal Break can be used at any time to return to the menu.

● **New line start no.** — This again can be in

the range 0 to 9999 with a default value of 10.

● **Step between lines** — This must be in the range 1 to 9999 and has a default value of 10.

After all three inputs have been entered, a check is made on the validity of each. If an entry is not acceptable then one of the following error messages will be printed:

Old line no. too large — the old line number exceeds the last line number of the Basic program.

New no. not valid — the new number is less than the old number and will overwrite an unchanged line.

Start/step size will overrange — a combination of start and step will cause the last line to exceed the maximum allowed of 9999.

Zero steps not allowed — a zero step size was entered.

Once all three values are accepted the program will be renumbered. You may see something similar to morse code on the screen, this is part of the program and should be ignored. The screen is used as a buffer to hold keyword addresses and values catering for approximately 1000 alterations to GOTO, GOSUB etc.

After renumbering, the routine returns to Basic and automatically lists your program.

There are several points to note with this routine. If a GOTO, GOSUB etc is
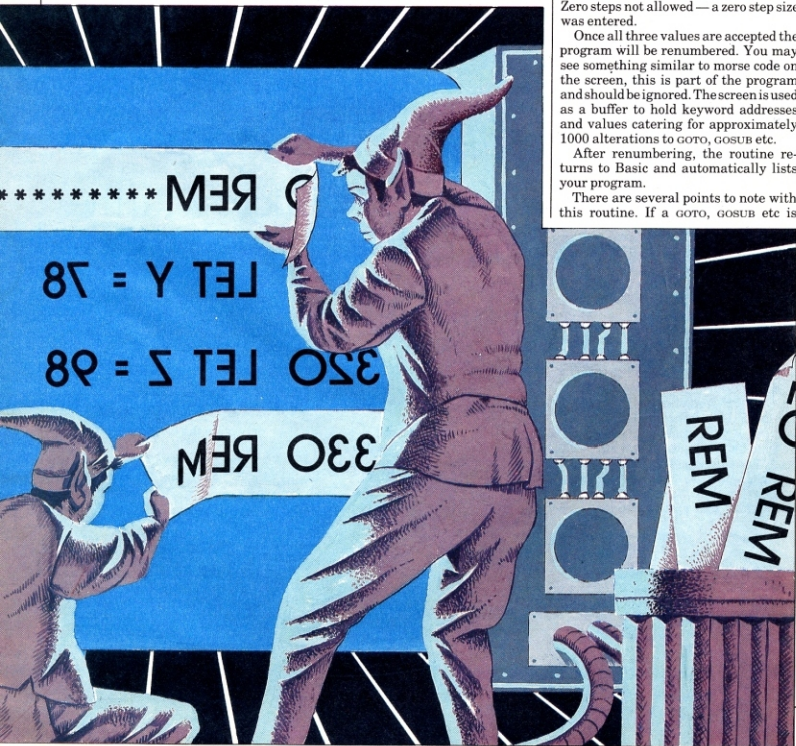
calculated the routine cannot recalculate for you but will highlight that particular keyword by making it flash. This will indicate that it should be amended. Edit the line and delete the two hidden characters before and after the keyword.

If a GOTO, GOSUB etc referred to a line number that did not exist but was within the program, this will be corrected by the routine and in renumbering will refer to the next line. If a GOTO, GOSUB etc referred to a line number above the largest in the program then, because when renumbering it may refer to a renumbered line, this will be highlighted by removing the number and replacing it with a flashing OTT.

The program will ignore keywords in the after REM statements and also in PRINT statements.

Once you have used the renumber routine, scan the listing for any of the above points and amend as necessary before running your program. Renumbering from a specified line allows you to open holes in your listing for insertion of extra lines.

## Delete lines

Should an area of a Basic listing require deleting, and if it is of such a size that it would be tedious to remove one line at a time, this option should be used. The input requirements are:
Delete from line no.
to line no. (inclusive).
You need a start and a finish line number, and the default is 10. It does not matter which number is entered first as the program sorts this out. However, an error message may be printed if the higher number exceeds the last Basic line number.

The lines deleted are inclusive, but note that if a line number is specified as the lower and that line does not exist then the next line will be taken, whereas a higher line number that does not exist will be taken as the previous line. So, for example, taking a program with a listing in steps of 10 from 100 to 1000 and requiring deletion lines input as 875 to 359 will delete lines 360 to 870 inclusive.

This program is instantaneous and will list your remaining program on completion.

## Delete REMs

Once this option is accepted it will automatically search your program and delete all REM statements whether in a multi statement line or on their own. REMs are helpful when producing programs but do slow down execution of Basic so it can sometimes be a benefit to remove them once a program is fully tested and working.

## Create line 0 REM

This routine is of most use to machine code programmers who use an assembler which enters code directly into first line REM statements (the McGraw-Hill Assembler for example). If your code is several hundred bytes long it can take several minutes to set up the initial REM statement even using multi statement techniques.

Using this facility, all that is necessary is to enter the number of bytes required (0 to 9999) and, providing there is sufficient memory available, you will get an instant line 0 REM statement set up and listed.

## Keep line 0 REM only

Should you have an assembler of the McGraw-Hill type, or even a simple hexloader program, this routine can be used to remove all the Basic listing except the first line which, if it is a REM statement, will be renumbered line 0.

## The machine code

To enter the hex dump into the Spectrum a Basic hexloader must be used, so first enter the dual purpose Basic program as in Listing 1.

GOTO 100 allows the input of hex numbers in blocks of eight, with a checksum number which is the sum of the previous eight numbers modulo 256, and will detect most errors in inputs and allow that line to be re-entered. To end the input of hex numbers enter ZZ after the last checksum number.

GOTO 1000 will print, either to the screen or the printer, a hex dump with checksums of any block of memory. It can be used to check memory locations should the program fail to function as described in the instructions.

Once this Basic program has been typed in we are able to enter the machine code. First enter as a direct command CLEAR 63399 to ensure that the code will be safely poked in above RAMtop, then enter the hex numbers as in the hex dump. These numbers should be entered in blocks of 18 characters, ie eight two-character numbers and the checksum characters.

Remember there must be no spaces between characters so the first block will be entered as:

C3ACF9000000000069 ENTER

## Listing 1

```
   10 DEF FN a()=INT (y/16)
   20 DEF FN b()=y-FN a()*16
   30 DEF FN c()=INT (x/256)
   40 DEF FN d()=x-FN c()*256
   50 DEF FN e()=INT (t/256)
   60 DEF FN f()=t-FN e()*256
   70 DEF FN g(a,b)=CODE a$(b)-4
8-7*(CODE a$(b))57)
   80 DEF FN h(a$)=16*FN g(a$,1)+
FN g(a$,2)
   90 DEF FN c$()=CHR$ (FN a()+48
+7*(FN a()>9))+CHR$ (FN b()+48+7
*(FN b()>9))
  100 PAPER 7: INK 0: CLS
  110 LET r$="0"
  120 PRINT AT 11,7; FLASH 1;"HERE
 SET CAPS LOCK!"AT 13,5;"HAVE YO
U CLEARED MEMORY ?"
  130 INPUT "Start address (DECIM
AL) ";adr
  140 PAPER 7: INK 0: CLS
  150 LET x=adr
  160 LET y=FN c(): PRINT FN c$()
;
  170 LET y=FN d(): PRINT FN c$()
;
  180 INPUT "8 bytes + CHK. ";b$
  190 IF b$="" THEN GO TO 180
  200 IF b$="ZZ" THEN GO TO 450
  210 LET st=adr
  220 LET len=LEN b$: IF (INT (le
n/2))*2<>len THEN PRINT "Odd no
. of chrs. ": GO TO 410
  230 IF len=18 THEN GO TO 250
  240 IF b$(len-1 TO )<>"ZZ" THEN
 PRINT "No 'ZZ' marker ": GO T
O 410
  250 FOR a=1 TO len-2: IF b$(a)<
"0" OR b$(a))"F" THEN PRINT "In
valid chr. ": GO TO 410
  260 IF b$(a)<"A" AND b$(a))"9"
THEN PRINT "Invald chr. ": GO
TO 410
  270 NEXT a
  280 LET x=0
  290 FOR k=1 TO 8
  300 LET a$=b$( TO 2): LET b$=b$
(3 TO )
  310 IF b$="ZZ" THEN LET k=9: L
ET r$=b$: LET b$=a$: GO TO 340
  320 PRINT AT8;" ";
  330 LET p=FN h(a$)
  340 LET x=x+p
  350 POKE adr,p: LET adr=adr+1
  360 NEXT k
  370 LET y=FN d(): PRINT "= ";FN
 c$();"/"1b$
  380 LET a$=b$
  390 IF y=FN h(a$) THEN GO TO 4
30
  400 PRINT "Checksum ";
  410 PRINT "error -re enter": BE
EP .25,5: BEEP .5,2: LET adr=st
  420 GO TO 180
  430 BEEP .1,20
  440 IF r$()"ZZ" THEN GO TO 150
  450 PRINT "PROGRAM TERMINATED"
  500
  600
 1000 PAPER 7: INK 0: CLS : LET p
=0
 1010 INPUT "(S)creen OR (P)rinte
r ?"q$
 1020 IF q$="P" OR q$="p" THEN L
ET p=1: GO TO 1040
 1030 IF q$()"S" AND q$()"s" THEN
 BEEP .5,2: GO TO 1010
 1040 INPUT "From address (DECIMA
L) ";ist
 1050 INPUT "To address (DECIMAL)
 ";jend
 1060 PAPER 7: INK 0: CLS
 1070 FOR x=st TO end STEP 8
 1080 LET y=FN c(): IF p THEN LP
RINT FN c$(): GO TO 1090
 1085 PRINT FN c$();
 1090 LET y=FN d(): IF p THEN LP
RINT FN c$(): GO TO 1100
 1095 PRINT FN c$();
 1100 LET t=0
 1110 FOR z=0 TO 7
 1120 IF x+z)end THEN LET z=8: G
O TO 1150
 1130 LET y=PEEK (x+z): LET t=t+y
 1140 IF p THEN LPRINT t$();FN c
$(); : GO TO 1150
 1145 PRINT FN c$();" ";
 1150 NEXT z
 1155 LET y=FN f()
 1160 IF p THEN LPRINT "= ";FN c
$(); : GO TO 1170
 1165 PRINT "= ";FN c$();
 1170 IF x+z)end THEN GO TO 1210
 1180 IF p THEN LPRINT : GO TO 1
200
 1190 PRINT
 1200 NEXT x
 1210 IF p THEN LPRINT "ZZ": STO
P
 1220 PRINT "ZZ"
```

15▶

# You'd better get the hang of this.
# One day you might be up here for real.

Space Shuttle.
The flight simulation program that
leaves others earthbound.
Developed with NASA's assistance
to turn your computer into
Columbia's Flight Deck.
£9.99 Commodore 64, £7.99 Sinclair Spectrum.
Available soon for all popular systems.

## SPACE SHUTTLE FROM
## ACTIVISION

### Your computer was made for us.

Once all the hex dump has been entered, save the code using:
SAVE "UTILITY" CODE 63400,1952

Then check that the code functions correctly as per the instructions. Enter RANDOMIZE USR 63400 and check it out. If a command does not work as described use the Basic program (GOTO 1000) to compare hex dumps (the quickest way is to look at the checksum numbers) and correct any mistakes.

◄13

## Listing 2

```
F7A8 C3 AC F9 00 00 00 00 00 = 6B
F7B0 16 0B 07 53 6F 72 72 79 = 47
F7B8 2E 2E 2E 2E 2E 6E 6F 20 = E3
F7C0 42 41 53 49 43 16 81 0B = 84
F7C8 14 01 45 4E 4E 45 55 4A = 5E
F7D0 16 04 06 31 2E 32 20 45 = 36
F7D8 4E 55 4D 42 45 52 16 06 = C5
F7E0 06 32 2E 48 45 58 20 44 = 34
F7E8 54 45 20 4C 4F 48 45 45 = 34
F7F0 16 30 06 33 2E 20 44 45 = 3E
F7F8 4C 45 54 45 20 52 45 4D = 3E
F800 53 16 0A 06 33 2E 56 30 = 3A
F808 52 45 54 41 49 4E 20 52 = E7
F810 45 4D 20 38 20 52 45 4D = 32
F818 16 0C 06 35 2E 20 4C 49 = A9
F820 45 5E 20 20 20 4C 49 4E = D8
F828 45 20 20 20 52 45 4D 20 = D9
F830 4F 4E 4C 59 16 0E 36 16 = A2
F838 2E 06 54 45 20 41 32 52 = FF
F840 45 16 0B 07 4E 45 52 4D = EE
F848 16 01 4E 41 4E 45 45 4C = 36
F850 56 20 45 6C 69 6E 65 20 = FD
F858 6E 74 20 52 45 4D 16 00 = FD
F860 01 4E 6F 2E 20 6F 46 20 = C1
F868 14 01 20 54 45 14 14 01 = B0
F870 0D 28 20 39 39 39 39 20 = 71
F878 41 5B 45 16 11 09 14 01 = 0C
F880 59 53 45 20 54 45 20 41 = 91
F888 43 45 53 45 50 46 16 13 = A1
F890 14 01 4E 4E 4D 20 28 20 = 5A
F898 14 01 4E 4E 6D 20 2E 01 = 2A
F8A0 64 00 76 0B 78 B1 20 28 = 28
F8A8 C9 23 35 23 56 23 19 = 22
F8B0 C9 78 B1 0B 28 76 1A = 68
F8B8 D7 18 F6 CD 0D F9 11 7B = 37
F8C0 F8 F8 01 24 00 0D CD F8 = 94
F8C8 FE DF 0D 78 C8 67 20 02 = 96
F8D0 37 C9 01 FE 7F ED 70 C8 = 46
F8D8 5F 20 EC AF C9 2A 53 5C = BC
F8E0 ED 5B 4B 5C A7 ED 52 8A = BA
F8E8 E1 C9 3E 02 CD 01 16 C0 = 9B
F8F0 6B 0D 3E 02 CD 01 16 C9 = 05
F8F8 3E 16 D7 0D 79 0D C9 = 93
F900 C9 3E 3E 07 3E 14 3E 01 = 25
F908 D7 3E 3E 07 14 01 AF 01 = F7
F910 D7 C9 0D 0F C5 23 11 AB = F7
F918 F7 E5 06 05 36 20 23 10 = F0
F920 FB E1 C1 0C CD AD FD FD = 1B
F928 C9 23 13 0A CD CB 01 = 25
F930 AE CD C2 FB CD 54 1F D0 = 48
F938 3A 00 FE 0C 20 10 79 = FE
F940 FE 18 28 E0 0D 2A 36 20 = AC
F948 CD F0 F8 79 0D 15 D5 FE = FD
F950 0D 20 05 CD 2B F9 37 C9 = 73
F958 FE 30 38 C8 FE 3A 30 C4 = 54
F960 5F 79 FE 2C 28 04 C9 = 18
F968 FE 3E 13 07 3E 01 D7 = 2E
F970 7E 0D 3E 13 07 AF D7 0C = 9F
F978 23 18 A9 79 E8 18 28 1F = BA
F980 EF 05 20 10 7E FE 7E = E9
F988 20 28 10 E5 D6 30 28 38 = 38
F990 20 EF 01 A4 00 0F 30 C9 = 73
F998 23 18 E8 CD A2 2D C9 3E = 4F
F9A0 0D 21 0A 00 C9 3E 07 0D = 6A
F9A8 01 0A 0C C9 36 53 DD F8 = 82
F9B0 22 F8 20 36 53 CD DD F8 = B8
F9B8 20 0E CD EA F8 11 B0 F7 = C9
F9C0 01 15 00 CD B1 F8 C9 = 04
F9C8 CD EA F8 11 C5 F7 01 84 = 01
F9D0 00 CD CD 20 FD FE EF 0D = 51
F9D8 CD 7B CB 0B CD FB CB AD = 48
F9E0 70 30 78 CB 67 28 DC C9 = E6
F9E8 CA 10 FB CB 57 CA 0D FA = 48
F9F0 CB 5E 20 4D C8 67 20 DC = 0C
F9F8 01 04 0C CD 8E FB 30 00 = 89
FA00 0D 0A F9 CD 20 15 00 = CE
FA08 23 23 7E FE 23 2E 0E 11 = CF
FA10 49 F8 01 15 00 CD B1 F8 = 0B
FA18 CD 9F 18 18 AB 2A 53 5C = BB
FA20 4B 17 20 27 CD 19 F9 7E = A2
FA28 2A 4B 5C CD E5 19 CD EA = 53
FA30 FB E5 C3 F9 17 01 04 0A = A7
```

```
FA38 BB F8 30 8C CD EA F8 11 = 2F
FA40 5E F8 01 1D 00 CD B1 F8 = EA
FA48 01 17 0D CD 12 F9 D2 C8 = B6
FA50 F9 2A 53 5C 05 C1 06 00 = 9E
FA58 05 16 23 AF 77 23 77 23 = 1B
FA60 C1 C5 05 03 23 71 23 = 00
FA68 23 23 36 EA 23 36 00 C1 = DA
FA70 78 B1 20 F7 CD 55 16 C1 = CF
FA78 23 F9 17 CD 55 16 C1 23 = EF
FA80 36 30 0D 70 B1 20 F8 C0 = F2
FA88 EA F8 C3 F9 17 01 04 0B = C2
FA90 5C 0D CD E0 F8 CA DA F6 = 90
FA98 23 5E 23 56 E5 19 EB E1 = C4
FAA0 D5 ED 5B 5D 5C 05 11 EA = A6
FAA8 FF CD 8B 19 D1 ED 53 5D = BE
FAB0 5C D1 30 03 23 18 DA 2B = 49
FAB8 7E FE 3A 20 0A 2B 2B 2B = 69
FAC0 13 EB CD 65 19 18 CA EB = 96
FAC8 CD E5 23 23 18 C3 CD EA = 84
FAD0 F8 01 A3 00 CD E0 F8 = 40
FAD8 23 5E 23 56 EB 1A FE 4A = A4
FAE0 F7 23 23 E5 23 54 5D = 67
FAE8 23 7E CD B6 18 FE 0D 20 = 67
FAF0 F7 A7 ED 52 EB E1 73 23 = 3F
FAF8 72 23 19 19 DF 2A 53 5C = 7E
FB00 CD 8B 19 01 30 02 37 C9 = 94
FB08 00 19 D0 CD A9 F8 18 F0 = 2F
FB10 F9 CD EA F8 11 1A BA F8 = 51
FB18 01 17 00 CD B1 F8 17 00 = B1
FB20 23 00 CD E0 F8 01 01 00 = B1
FB28 CD 12 F9 D2 C8 F9 ED 43 = 9B
FB30 86 FB 01 17 02 CD 12 F9 = 72
FB38 D2 C8 F9 ED 43 88 FB 2A = FD
FB40 88 FB ED 5B 86 FB CD E4 = FD
FB48 FB 30 08 ED 53 86 FB 9C = DC
FB50 22 88 FB 44 4D CD 70 FA = EA
FB58 30 05 2A 4B 5C 18 45 2A = 43
FB60 4B 5C 09 23 22 88 FB 03 = 03
FB68 4B 86 FB CD FD FA 30 03 = C3
FB70 2A 4B 5C 54 5D 20 88 FB = 9F
FB78 CD E4 FB 28 03 CD 88 FB = 2F
FB80 ED 5B C3 F9 17 00 00 = B3
FB88 00 00 44 45 4C 45 54 45 = B3
FB90 20 44 45 4D 45 53 20 14 = CF
FB98 01 44 52 4F 47 4D 01 20 = CF
FBA0 20 04 A9 40 63 2E 29 20 = 6B
FBA8 E5 21 D6 FA 22 36 5C 01 = 6B
FBB0 3E 13 D7 3E 0D D7 8F 20 = 8B
FBB8 D7 C9 E5 21 00 3C 22 3C = 3A
FBC0 5C E1 C9 3E 13 D7 3E 20 = 82
FBC8 C3 C3 CD 23 C3 FF CA 9A = 67
FBD0 BE FC 00 00 00 00 00 00 = FC
FBD8 00 00 44 45 4C 45 54 45 = 6C
FBE0 52 45 4E 53 45 52 54 20 = 50
FBE8 14 00 00 4F 4C 44 20 4C = 6C
FBF0 C0 00 01 53 54 41 20 14 = A3
FBF8 01 45 20 4E 45 57 2E 14 = 88
FC00 20 0D CD 58 14 60 08 00 = B0
FC08 3E 20 D7 3E 28 3A 2E FF = 56
FC10 00 00 00 00 00 00 00 00 = FC
FC18 45 20 4E 4E 2E 14 01 35 = B8
FC20 53 54 45 54 16 08 20 80 = 80
FC28 00 04 4E 4F 53 54 20 14 = A3
FC30 52 2F 10 FB E5 18 6B 16 = 16
FC38 52 2E 20 4E 4E 2E 20 6E = 3F
FC40 6F 4E 20 76 61 6C 69 64 = 69
FC48 20 00 00 53 54 41 20 14 = 67
FC50 2F 53 54 45 20 28 20 47 = 67
FC58 7A 65 20 77 65 6C 6C 20 = 5D
FC60 4F 4E 45 52 74 52 2E 2E = 61
FC68 70 53 41 41 20 20 6E 00 = A0
FC70 2E 6E 20 74 65 72 6C 65 = 8D
FC78 2E 20 74 6F 6F 20 6C 61 = 61
FC80 72 67 65 16 08 00 5A 45 = 79
FC88 52 4F 14 00 53 54 45 20 = 50
FC90 69 64 20 74 04 04 04 20 = 56
FC98 6F 72 0A 01 42 41 04 53 = CE
FCA0 E2 DE 40 44 45 41 20 14 = B3
FCA8 FB 01 40 00 CD B1 F8 DD = F1
FCB0 17 01 CD 12 F9 30 ED D7 = 6D
FCB8 43 E1 FB 01 17 02 CD 12 = 18
FCC0 F9 30 DD ED 43 E3 FB 01 = 15
```

```
FCC8 17 03 CD 12 F9 30 D1 78 = 6B
FCD0 B1 20 08 11 83 FC 01 17 = 81
FCD8 00 18 1F ED 43 E5 FB ED = 34
FCE0 4B E5 FB CD FD FA 38 1A = 3F
FCE8 56 23 5E 21 F3 FB 84 A7 = 6F
FCF0 ED 52 30 0B 11 2E FC 01 = B9
FCF8 1A 00 CD B1 F8 CD 9F F8 = F4
FD00 18 A1 ED 4B E1 FB CD FD = 97
FD08 FA 30 08 11 69 FC 01 1A = C3
FD10 00 18 E7 01 FF FF ED 5B = D5
FD18 A9 FB CD 28 20 F7 70 = D5
FD20 E5 FB 19 09 78 B1 20 04 = 4B
FD28 ED 58 E5 FB CD FD FA 30 = 6E
FD30 11 1D 27 A7 ED 52 30 00 = 4E
FD38 11 48 FC 01 21 00 18 A4 = 49
FD40 CD 8A FE 21 00 40 22 EB = 1D
FD48 FB D9 20 00 22 E7 FB 2A = EA
FD50 53 5C CD E0 FA 5A FE 76 = 76
FD58 3A 0A FB A7 20 0C ED 28 = ...
FD60 E1 FB CD 80 19 38 03 22 = 9F
FD68 E7 FB 23 23 23 73 FE 7E = 62
FD70 5A 20 0C 23 7E C6 18 52 = 52
FD78 FE 00 23 18 31 13 03 77 = 0D
FD80 B6 18 90 28 26 7E 3A 19 = 52
FD88 23 E3 FE 22 00 00 23 7E = F4
FD90 FE 22 20 FA 18 7F 5E 18 = 07
FD98 3B 22 E9 22 E9 23 FE EC = 1E
FDA0 28 1D FE ED 28 17 FE E5 = E5
FDA8 20 16 2B FE 28 00 FE 4F = 5F
FDB0 20 29 FE C1 FE 3A 04 46 = 5F
FDB8 00 20 C1 FE 3A 28 AE 06 = A9
FDC0 05 7E 23 FE 0E 28 09 C0 = B0
FDC8 1B 02 3B 16 0F 13 12 C3 = C3
FDD0 05 78 32 ED FB 11 05 00 = AD
FDD8 19 7E FE 0D 28 32 FE 3A = 3A
FDE0 2E 28 2A E9 FB 01 02 00 = 67
FDE8 01 26 13 16 23 36 00 55 = 6C
FDF0 01 23 31 02 00 CD 55 = 6C
FDF8 16 23 16 23 36 00 23 36 = 98
FE00 23 16 23 36 12 23 36 36 = 98
FE08 1B 2B 3A 17 ED FB 13 1A = FC
FE10 2B 28 2B 36 20 55 01 = C1
FE18 FB E5 A7 E5 52 E1 30 04 = E1
FE20 23 23 18 DB 3A E5 FB 23 = 8B
FE28 E9 FB 20 00 0A 4F 28 04 = AE
FE30 20 CD 55 16 04 86 23 36 = BE
FE38 30 18 F9 E5 58 E9 FF 06 = 04
FE40 2A EB FB 73 23 72 E9 01 = 04
FE48 09 00 09 EB 23 1A 77 1B = CC
FE50 1A 23 77 23 22 E9 FB 01 = C0
FE58 18 A5 2A EB FB 23 23 CA = 00
FE60 FF 2A E7 FB CD E0 F8 CA = 7A
FE68 FE 11 E1 FB 01 02 00 C5 = CC
FE70 5D 30 2A E7 FB 3A E4 FB = 85
FE78 77 77 3A E9 FB 23 77 21 = 42
FE80 40 7E 3C 28 3A CD 2E FF = 56
FE88 3E 3F E5 36 03 22 46 28 = 9E
FE90 4E 4E 23 E3 13 18 E5 03 = 95
FE98 CD 3C FF 11 64 00 CD 3C = 86
FEA0 FF 11 0A 00 CD 3C FF D7 = 06
FEA8 C6 30 02 21 04 00 09 3A = 68
FEB0 E9 FB 23 3A 4A 78 23 77 = 08
FEB8 E1 EC 13 23 32 21 18 C2 = 1A
FEC0 CD E7 23 E7 FB 23 23 22 = 41
FEC8 ED C9 23 7E CD B6 18 FE = 67
FED0 F7 23 22 E7 FB 23 18 85 = 5D
FED8 85 FB 7C 85 FE 40 CA D6 = C5
FEE0 FA 2B 2E FB 20 DC 20 10 = EB
FEE8 03 23 5E 23 56 28 04 23 = 23
FEF0 F9 23 36 12 23 00 21 36 = 56
FEF8 00 49 26 13 23 36 23 16 = 68
FF00 4F 23 36 23 36 54 23 16 = 98
FF08 10 23 31 12 23 36 00 17 = FC
FF10 18 52 6B 01 FF FF 03 13 = FC
FF18 36 20 28 F9 23 7B 01 20 = EC
FF20 B6 20 28 19 18 B1 E5 ED = 1F
FF28 BE 30 28 17 E3 78 B1 20 = 1F
FF30 FB 78 BE E1 C9 3E 2A A7 = 30
FF38 3C 20 FB 19 02 03 C9 = 50
FF40 ED 52 30 FA 19 02 03 C9 = 50

ZZ
```

15

# SMOOTH OPERATOR

Alan Turnbull outlines some machine code utilities which help make more of QDOS operations

The flow of information about QDOS, the QL operating system, has been only a trickle. As well as being handy utilities, the machine code routines given here show how to make the best use of the QDOS manual, which has done something to spread the knowledge.

The utilities fall into four categories:

● A new SuperBasic procedure called BOOT which, when called like other SuperBasic procedures, attempts to 'bootstrap' the QL from Microdrive 1 as normally happens upon power-up or reset. This procedure may be used in applications programs or as an abbreviated form of the direct command LRUN mdv1 boot.

● A new SuperBasic procedure called RESET which, used in applications programs, provides the facility to simulate pressing the reset button (as used in the Psion software suite).

● A procedure SWITCH which allows the user to toggle between modes 4 and 8 and the QL screen from within a SuperBasic program.

● An interrupt server which scans the QL keyboard 50/60 times per second and tests if Function key F3 is pressed. If so, it calls the SWITCH routine to change the screen mode. When the routine is loaded, the key F3 acts in a similar manner to CAPS LOCK.

For full details, consult your QDOS manual.

## BOOT

This procedure tests whether the QL it's running on is an 'AH' or 'JM' version by reading the QDOS release number: 1.02 for 'AH'; 1.03 for lucky 'JM' owners. (Actually, there are only minor differences between releases 1.02 and 1.03 of QDOS, and they will not affect the execution of applications software.)

The routine loads the relevant 'booting' address and jumps to the ROM routine. While the QL searches Microdrive 1 for the file 'mdv1 boot', the QL screen is cleared down and the message "Attempting to boot off Microdrive 1" is displayed.

Note that what BOOT actually does is

an MRUN, so make sure any program currently in the memory is either deleted by NEW before BOOT is called or is effectively deleted by the overlaying file 'mvd1 boot'.

## RESET

This fairly simple routine took some time to work out. It is no use just calling the initialisation routine from Basic with something like CALL 360 (or CALL PEEK-L(4), for the pedantic). When you do this, the Motorola MC68008 is running in user mode. To do the reset correctly, the MC68008 must be in supervisor mode.

This can be arranged by doing a TRAP #0, which discards the special QDOS return address, and then load the MC68008 Processor Status Word with the correct bit-pattern.

This Processor Status Word is arranged as two bytes: the user byte and the system byte. The user byte holds the usual, application program-related flags such as zero, overflow, carry, etc. The system byte, however, holds flags

## Listing 1

```
00100           LEA      PROC_DEF(PC),A1   ; point to procedure table
00110           MOVE.W   $110,A2           ; QDOS vector to link-in procedures
00120           JSR      (A2)              ; call link-in routine
00130           BSR      INTS              ; set up 50/60 Hz interrupt server
00140           RTS                        ; return to SuperBASIC
00150  PROC_DEF: DC.W    3                 ; number of procedures
00160           DC.W     BOOT-*            ; offset of boot routine
00170           DC.B     4,'BOOT',0        ; name of procedure
00180           DC.W     RESET-*           ; offset of reset routine
00190           DC.B     5,'RESET'         ; name of procedure
00200           DC.W     SW_MODE-*         ; offset of switch routine
00210           DC.B     6,'SWITCH',0      ; name of switch procedure
00220           DC.W     0                 ; end of procedure declarations
00230           DC.W     0                 ; number of functions
00240           DC.W     0                 ; end of function declarations
00250  BOOT:    MOVEQ    #0,D0             ; signal: get QDOS system info
00260           TRAP     #1                ; 'manager' call
00270           MOVE.L   #19392,A1         ; set up boot address for VER$ 'JM'
00280           CMPI.L   #'1.03',D2        ; QDOS version 1.03 (QL VER$ 'JM')?
00290           BEQ      DO_BOOT           ; yes: so do the boot
00300           MOVE.L   #19328,A1         ; set up boot address for VER$ 'AH'
00310  DO_BOOT: MOVE.L   #131072,A2        ; clear screen down
00320           MOVE.L   #8192,D0          ;
00330  FILL:    MOVE.L   #0,(A2)+          ;
00340           DBRA     D0,FILL           ;
00350           MOVE.L   A1,-(A7)          ; save boot address
00360           SUB.L    A0,A0             ; signal: use command channel
00370           LEA      MESSG(PC),A1      ; point to message
00380           MOVE.W   $D0,A2            ; QDOS vector for message writing
00390           JSR      (A2)              ; call message printing routine
00400           MOVE.L   (A7)+,A1          ; retrieve boot address
00410           JSR      (A1)              ; do the boot!
00420  MESSG:   DC.W     36                ; message for booting
00430           DC.B     'Attempting to boot off Microdrive 1',10
00440  RESET:   TRAP     #0                ; go into supervisor mode
00450           MOVE     #$2700,SR         ; set up processor status word
00460           MOVE.L   $4,A0             ; QDOS system reset vector
00470           JSR      (A0)              ; do reset!
00480  SW_MODE: MOVEQ    #$10,D0           ; QDOS vector for screen mode
```

## Listing 1 cont

```
00490          MOVE.B     #-1,D1          ; read 4/8 mode flag
00500          MOVE.B     #-1,D2          ; read RGB/UHF flag
00510          TRAP       #1              ; do the read
00520          EOR.B      #8,D1           ; toggle 4/8 mode flag
00530          MOVE.B     #-1,D2          ; leave RGB/UHF flag
00540          MOVEQ      #$10,D0         ; set screen mode
00550          TRAP       #1              ; call QDOS routine
00560          RTS                        ; return to caller
00570 INTS:    MOVEQ      #$1C,D0         ; set up 50/60 Hz int server vector
00580          LEA        LINK(PC),A0     ; set up link
00590          LEA        INT(PC),A1      ; point to server
00600          MOVE.L     A1,4(A0)        ; save pointer in second long word
00620          TRAP       #1              ; link in server
00630          RTS                        ; return to caller
00640 INT:     MOVEQ      #$11,D0         ; Send command to i8049
00650          LEA        IPC_CMD(PC),A3  ; set up pointer to command
00660          TRAP       #1              ; do it!
00670          CMPI.B     #16,D1          ; is F3 pressed?
00680          BEQ        SW_MODE         ; yes: change screen mode
00690          RTS                        ; otherwise no action
00700 IPC_CMD: DC.B       9               ; command number: read keyboard row
00710          DC.B       1               ; number of parameters for command
00720          DC.L       0               ; amount of each byte significant
00730          DC.B       0               ; key row number
00740          DC.B       2               ; signal one byte reply
00750 LINK:    DS.L       2               ; reserve interrupt link space
```

for trace mode, supervisor/user mode and the interrupt masks.

In fact, the whole Processor Status Word is arranged as follows:

**User byte (least significant)**
Bit O: Carry;
Bit 1: Overflow;
Bit 2: Zero;
Bit 3: Negative;
Bit 4: Extend;
Bit 5-7: not used.

**System byte (most significant)**
Bits 0-2: Interrupt mask;
Bits 3-4: not used;
Bit 5: Supervisor/user mode select;
Bit 6: not used;
Bit 7: Trace mode select.

For a proper system reset the user byte should be set to zero and the system byte to 00100111 (binary) in order to signal supervisor mode and enable all interrupts.

This means that the 16-bit value placed in SR, the Processor Status Word, should be 0010011100000000 (binary) or 2700 (hex).

## SWITCH

This routine simply reads the current screen mode (4- or 8- colour — stored as code 0 or 8) and toggles it by 'Exclusive-OR'ing the value read with 8. This new value is then sent back to set the new screen mode. The whole operation is carried out by using the same QDOS TRAP.

## Interrupt Server

The addition of the 50/60 H3 interrupt-server routine to the QL's operating system provides a screen mode toggle switch, similar in function to CAPS LOCK.

The interrupt server simply examines

the Function key F3 every time a screen frame is displayed to see if it is depressed. This is done by communication with the QL's secondary processor chip (IPC) — the Intel i8049. The QDOS Manual should be studied for the IPC communication command format.

## Adding the new features

You have a choice of what to do. You could assemble the Motorola format assembly listing in Listing 1, save the code generated (position independant) to a Microdrive file, say, 'mdv2 listing1', reset the QL, and type in:
LET reserved_address=RESPR(256)
LBYTES mdv2_listing1, reserved_address
CALL reserved address

On the other hand you could type in, save to Microdrive, reset the QL, and LRUN the program in Listing 2. ∎

## Listing 2

```
100 REMark SuperBASIC program to add useful utilities to the Sinclair QL
110 REMark              COPYRIGHT (c) December 1984, Alan Turnbull
120 :
130 LET reserved_address=RESPR(256)
140 LET offset=0
150 REPeat read_data
160    IF EOF THEN EXIT read_data
170    READ data_byte
180    POKE reserved_address+offset,data_byte
190    LET offset=offset+1
200 END REPeat read_data
210 CALL reserved_address
220 :
230 DATA 67,250,0,14,52,120,1,16,78,146,97,0,0,178,78,117,0,3,0,32,4,66,79,79,84
,0,0,126,5,82,69,83,69,84,0,130,64,83,87,73,84,67,72,0,0,0,0,112,0,78,65,34
,124,0,0,75,192,12,130,49,46,48,51,103,6,34,124,0,0,75,128,36,124,0,2,0,0,32,60
,0,0,32,0,36,252,0,0,0,0,81,200,255,248,47,9,145,200,67,250,0,12,52,120,0,208,78
,146,34,95,78,145,0,36,116,116,101,109,112,116,105,110,103,32,116,111,32,98,11
1,111,116,32,111,102,102,32,102,32,77,105,99,114,111,100,114,105,118,101,32,49,10,78,64
,70,252,39,0,32,120,0,4,78,144,112,16,18,60,0,255,20,60,0,255,78,65,10,1,0,8,20,
60,0,255,112,16,78,65,78,117,112,28,65,250,0,38,67,250,0,10,33,73,0,4,78,65,78,1
17,112,17,71,250,0,12,78,65,12,1,0,16,103,198,78,117,9,1,0,0,0,0,0,2,0,0,0,0,0,0
,0,0
```

# SPRITE GYMNASTICS

**Put an extra spring into the movement of your 64's sprites with this sprite handling program from Barry Thomas.**

The Commodore 64 is famous for its sprites and although Commodore Basic has no commands to give you direct control over them, they are fairly simple to set up and use. Just make a design on a 24×21 grid, convert the binary patterns to decimal numbers, and they can be poked into position at a suitable place in memory, ready for use. So far, so fine and dandy, but these sprites can appear a little pedestrian if all they can be made to do is scuttle to and fro across the screen. What's needed is a little more athleticism.

The program shown here supplies that extra something. It enables you to: change sprite colours at the drop of a hat; toggle any of them on or off with a simple command; turn any sprite upside down or reverse it or even get a whole new block of data for a new sprite.

The bulk of the program comprises five Basic loaders, which poke machine code instructions into a 4K block of memory high up in memory where they will be safe from Basic. Once there, they can be called by the SYS command whenever needed.

So, the large subroutine between lines 1000 and 1610 contains these five loaders, all clearly labelled. If your particular application just needs sprites that can turn upside down, you can hijack the relevant section from that subroutine, the sprite inverter at lines 1360-1470. The subroutine from line 2000 onwards simply sets up a sprite to contain pictures of Glob and Blob.

This data is stored at addresses 832 to 894, block 13 in the memory map. (That is, 13 blocks of 64 bytes up from address 0, because 13×64=832). As this area of memory is used by the system only when loading and or saving to cassette, it's usually quite safe. However, if you are using the datasette during your program you must put your data somewhere else.

The rest of the program, between lines 10 and 150 sets up a menu on the screen and prompts you to select from six courses of action. These are the five machine code routines and the option to quit the program. All the routines run independently.

## Using each routine

Choice 1 on the menu enables you to change the colour of a sprite. First, specify the sprite number, and the colour number. The sprite number in this program is always 0 since only one sprite is set up for action. The colours are from the usual Commodore selection where 0=Black, 1=White and so on. To use this machine code routine, we must type, or include in a program, the instruction:

SYS 50265,SN,CN

where SN is the Sprite Number (from 0-7), and CN is the Colour Number (from 0-15).

The instruction may be typed in with real numbers for the SN and CN, or as above with variables. The commas must be included or the routine jumps to the error message table in ROM. The

working of the routine is quite simple: it looks for the first comma, then checks that the sprite number is not greater than seven. This being so, the next comma is checked for. The colour number must be in the appropriate range, and provided all is in order, with the operands supplied along with the SYS address, the Colour Number is placed in the appropriate place in the registers of the VIC II chip.

Choice 2 on the menu is to reverse the sprite. This process just turns the data in the sprite about-face, so if your sprite contained, eg a train facing right, it would be facing left after the sprite had been reversed. Simple, innit?

The workings of this routine are a little more complex than the first. No sprite number is specified when you use the routine — instead, the address of the start of the data for the sprite to be reversed must be poked into two addresses in page 0 memory. These will act as a pointer which the routine can refer to.

So, in this program, the data for sprite 0 is located in addresses 832 onwards, and the low and high bytes of this number must be poked into locations 253 and 254 respectively. In hexadecimal, 832 is $0340. The low byte, $40, converts into decimal 64 and can be poked into location 253. The high byte is $03 which in decimal remains the same in decimal and can be poked into location 254. This occurs in the main program on line 110. Once this is done, the SYS instruction can be used thus: SYS 49770

## Listing

```
10 PRINT"[CLEAR]"
20 POKE 53249,170:POKE 53277,255:POKE 53
271,255:POKE 53248,255:POKE 2040,13
25 GOSUB 1000:GOSUB 2000:POKE 53269,255
30 PRINT:PRINT"    THIS IS GLOB AND BLOB..
"
40 PRINT"    THESE ARE THE CHOICES"
50 PRINT:PRINT"    1.CHOOSE A NEW COLOUR"
:PRINT"    2.REVERSE THE SPRITE":
60 PRINT"    3.INVERT THE SPRITE":PRINT"
    4.TOGGLE THE SPRITE ON OR OFF"
70 PRINT"    5.GET NEW SPRITE DATA":PRINT
"    6.QUIT"
80 PRINT:INPUT"WHICH OPERATION";C
90 IF C<1 OR C>6 THEN GOTO 80
100 IF C=1 THEN INPUT"COLOUR NUMBER";CN:
SYS 50265,0,CN:PRINT"[CLEAR]":GOTO 40
110 IF C=2 THEN POKE 253,64:POKE 254,3:S
YS 49770:PRINT"[CLEAR]":GOTO 40
120 IF C=3 THEN POKE 253,64:POKE 254,3:S
YS 49840:PRINT"[CLEAR]":GOTO 40
130 IF C=4 THEN SYS 50215,0:PRINT"[CLEAR
]":GOTO 40
140 IF C=5 THEN INPUT"START ADDRESS";SA:
SYS 50315,SA,0:PRINT"[CLEAR]":GOTO 40
150 PRINT"[CLEAR]":END
900 END
1000 REM
1010 REM-----NEW DATA LOADER-----
1020 REM
1030 FOR X=50315 TO 50380
1040 READ A:POKE X,A:NEXT X
1050 DATA 32,253,174,32,138,173,32,247
1060 DATA 183,250,251,133,252,32,253
1070 DATA 174,32,138,173,32,247,183,201
1080 DATA 0,208,34,133,253,133,254,192
1090 DATA 8,176,26,185,248,7,240,24,133
1100 DATA 253,162,6,6,253,38,254,202
1110 DATA 208,249,160,63,177,251,145
1120 DATA 253,136,16,249,96,76,72,178
1130 DATA 76,69,178
1140 REM
1150 REM-----COLOUR SETTER LOADER-----
1160 REM
1170 FOR X=50265 TO 50310
1180 READ A:POKE X,A:NEXT X
1190 DATA 32,253,174,32,138,173,32,247
1200 DATA 183,201,0,208,30,192,8,176,26
1210 DATA 32,251,32,253,174,32,138,173
1220 DATA 32,247,183,201,0,208,11,192
1230 DATA 16,176,7,152,164,251,153,39
1240 DATA 208,96,76,72,178
```
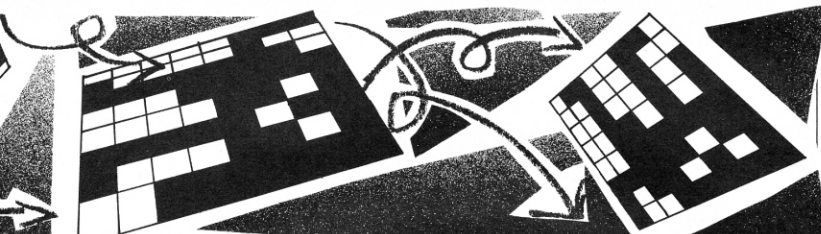
The sprites are, of course, three bytes wide, and the routine works by taking the first byte on a row and reversing it. This byte is then put into temporary storage on the stack in page 1 memory. The second byte on the row is then reversed in the same way, and put back just where it came from in the middle position in the row. Next, the third byte is reversed and placed in the position where the first byte was taken from. This leaves just the original byte 1 to be taken from the stack and put in the right most position on the row.

In fact, this isn't as complex as it sounds. Try it out with a pictorial view of three bytes in a row on a piece of paper. That's how each row of three bytes is treated, but there are 21 rows, and each must be done in turn. If that sounds like a lengthy number crunch, the routine does, in fact, work so fast it all seems to happen at once. Pretty effective it is too.

Number three on the menu is the matching pair to the last routine because it turns the contents of the sprite upside down. This one works by taking the top row of three bytes, putting them into storage, and replacing them with the three bytes that form the bottom row of the sprite. This done, the original three bytes can be put into position on the bottom row. The next step is to take the second row down and the second row up and swap them around in exactly the same way, and so on. When the middle row is reached, row 11, it is left exactly as it is.

The syntax for using the routine is simply SYS 49840.

As with the last routine, the address of the start of the sprite data must be put into addresses 253 and 254 in page 0 to act as a pointer. Both routines use that pointer in a non-destructive way, ie when the routine has done its job, the pointer is still where you put it, so the routine can be used again without having to put the two numbers in position again.

The only problem is that since page 0 memory is at such a premium, due to the system using almost all of it, the other routines use the same two bytes as pointers too. So, if you put your pointer into page 0, use the reverser routine and then the colour change routine on a different sprite. Don't expect your pointer to be safe and sound later on — it won't.

The third item on our menu is the sprite toggler. This lets you switch a sprite on or off, without even knowing which state it is in when you start. If the sprite is off, it will be turned on, and vice versa. It operates on the sprite switch location in the VIC II chip in exactly the same way as can be done from Basic. The difference is that you must remember one address, that is the start of the routine, and know which sprite you want to toggle. To use the routine, just type: SYS 50215, SN. As usual, the comma must be present, and SN is either a real number or a variable designating the number of the sprite to be toggled.

Last on the list is a routine to grab 63 bytes of data from anywhere in memory and put them into the space allotted for any particular sprite. This comes in handy when your particular application means using several different sprites. As the VIC II can only 'see' 16K of memory at once, all eight sprites in use at any one time must be in the particular 16K bank of memory currently in use.

Finding room for all these sprites can be a problem. It makes sense to put the sprite data out of the way in high memory, and just grab the data for a new sprite as and when it's needed. The sprite data can be stored safely in the 4K block of memory where I have put these five routines. (Between $C000 and $CFFF.) That's enough storage space for another 64 sprites. The routine is accessed with the instruction: SYS 50315,SA,SN where SA is again a real number or a variable for the start address of the new data, wherever you have chosen to store it. SN is of course the sprite number.

As usual, the commas are checked for, and all the routine does is transfer a block of 63 bytes, one by one, from the address specified to the address allocated to contain the data for the selected sprite. Hence, a grand total of 271 bytes of machine code can give that extra bit of pizzazz to ordinary sprites.

```
1250 REM
1260 REM-----SPRITE TOGGLER LOADER-----
1270 REM
1280 FOR X=50215 TO 50257
1290 READ A:POKE X,A:NEXT X
1300 DATA 32,253,174,32,138,173,32,247
1310 DATA 183,201,0,208,27,192,7,176,23
1320 DATA 162,1,134,252,192,0,240,6,6
1330 DATA 252,136,24,144,246,173,21,208
1340 DATA 69,252,141,21,208,96,76,72,178
1350 REM
1360 REM-----SPRITE INVERTER LOADER----
1370 REM
1380 FOR X=49840 TO 49891
1390 READ A:POKE X,A:NEXT X
1400 DATA 162,29,134,251,160,35,132,252
1410 DATA 169,3,133,2,164,251,177,253
1420 DATA 72,164,252,177,253,164,251,145
1430 DATA 253,104,164,252,145,253,198
1440 DATA 251,198,252,198,2,208,230,165
1450 DATA 251,48,9,165,252,24,105,6,133
1460 DATA 252,208,213,96
1470 REM
1480 REM-----SPRITE REVERSER LOADER----
1490 REM
1500 FOR X=49770 TO 49836
1510 READ A:POKE X,A:NEXT X
1520 DATA 160,0,177,253,32,143,194,72
1530 DATA 200,177,253,32,143,194,145
1540 DATA 253,200,177,253,136,136,32
1550 DATA 143,194,145,253,200,200,104
1560 DATA 145,253,200,192,63,208,222,96
1570 DATA 162,0,134,251,232,134,252,162
1580 DATA 8,24,10,144,9,72,24,165,252
1590 DATA 69,251,133,251,104,6,252,202
1600 DATA 208,238,165,251,96
1610 RETURN
2000 REM
2010 REM-------SPRITE SETUP-------
2020 REM
2030 FOR X=832 TO 894
2040 READ D:POKE X,D:NEXT X
2050 DATA 3,224,0,31,248,0,63,254,0,63
2060 DATA 255,128,115,231,128,115,231
2070 DATA 192,255,255,192,255,255,128
2080 DATA 252,159,128,112,134,56,124,30
2090 DATA 124,127,252,124,31,232,254,31
2100 DATA 248,214,7,240,214,3,97,215,3
2110 DATA 97,255,3,97,255,3,97,255,7,113
2120 DATA 147,15,121,147:RETURN
```

# BRUCE IS BACK



The hero returns in Andy Clark's game continued from issue 94.

## Listing (cont)

```
2036 PRINT"[HOME][DOWN][DOWN][DOWN][DOWN
     ][RIGHT][RIGHT][RIGHT][RIGHT][CYA
     N]ANOTHER GO?"
2038 PRINT"[RIGHT][RIGHT][RIGHT][RIGHT][
     RIGHT]PRESS [c 3]'FIRE'[CYAN] FOR [c 3]Y
     ES"
2040 PRINT"[RIGHT][RIGHT][RIGHT][RIGHT][
     RIGHT][CYAN]PRESS [c 3]'N'[CYAN]FOR [c
     3]NO"
2042 GETA#:IFPEEK(56321)=239THENPOKEV+21
     ,0:CLR:RESTORE:PRINT"[CLEAR]":RUN8
2044 IFA$<>"N"THEN2042
2046 PRINT"[CLEAR]":POKEV+33,6:POKEV+32,
     14:END
2999 END
20000 REM***SONG*********
20010 DATA6,6,0,7,9,11,9,9,0,-1
30000 REM****BRUCE RIGHT 1
30001 DATA0,0,0,84,0,0
30002 DATA8,0,0,104,0,0,124
30003 DATA21,48,0,25,168,0
30004 DATA25,184,0,25,184,16,25
30005 DATA127,240,0,25,85,80,21,168
30006 DATA4,4,168,0,21,84,0
30007 DATA0,168,0,0,64,0
30008 DATA0,0,128,0,0,64
30009 DATA0,64,0,0,80,0
30010 REM****BRUCE RIGHT 2
30011 DATA0,0,0,0,84,0
30012 DATA8,0,0,104,0,0,124
30013 DATA21,48,0,25,168,0
30014 DATA25,184,0,25,184,16,25
30015 DATA127,240,0,25,85,80,21,168
30016 DATA4,4,168,0,21,84,0
30017 DATA0,168,0,0,84,0
30018 DATA128,0,0,22,128,0,16,0
30019 DATA0,0,0,0,0,0
30020 REM****BRUCE LEFT 1
30021 DATA0,0,0,0,84,0
30022 DATA140,0,0,164,0,0,244
30023 DATA0,49,80,0,169,144
30024 DATA0,185,144,0,16,185,144,63
30025 DATA249,144,21,85,84,0,18,169
30026 DATA169,0,168,64,0,85,80
30027 DATA0,168,0,0,168,0,0
30028 DATA0,114,0,0,8,0,0,4
30029 DATA0,2,0,0,10,0
30030 REM****BRUCE LEFT 2
30031 DATA0,0,0,0,84,0
30032 DATA140,0,0,164,0,0,244
30033 DATA0,49,80,0,169,144
30034 DATA0,185,144,0,16,185,144,63
30035 DATA249,144,21,85,84,0,18,169
30036 DATA0,0,168,64,0,85,80
30037 DATA0,168,0,0,8,0,0,10,80,0,0
30038 DATA0,2,0,0,10,80,0
30039 DATA16,0,0,0,0,0,0,0,0
30040 REM****BRUCE UP
30041 DATA0,0,0,84,0,0
30042 DATA4,4,0,104,0,0,220
30043 DATA13,101,192,77,169,196,253
30044 DATA101,85,85,84,0,84
30045 DATA0,0,0,0,21,85,0
30046 DATA0,152,0,0,84
30047 DATA0,168,0,0,168,0,0
30048 DATA168,0,0,21,85,0,68
30049 DATA0,68,0,1,69,0
30050 REM****BRUCE DOWN
30051 DATA0,0,0,84,0,0
30052 DATA100,0,0,160,0,0,252
30053 DATA0,116,0,3,171,0
30054 DATA3,171,0,67,171,4,255
30055 DATA171,252,85,169,84,0,168
30056 DATA168,0,0,0,84,0
30057 DATA0,168,0,0,168,0
30058 DATA0,16,0,0,136,0,68
30059 DATA0,68,0,1,69,0
30060 REM****FUEL HANGING
30061 DATA2,0,128,2,0,128,2
30062 DATA0,128,2,130,128,0,130
30063 DATA0,130,0,0,170,0
30064 DATA2,178,128,10,170,160,42
30065 DATA170,168,249,155,230,233,155
30066 DATA166,249,155,230,233,155,166
30067 DATA233,91,229,170,170,170,42
30068 DATA170,168,10,170,160,2,170
30069 DATA128,0,170,0,0,0,0,0
30070 REM**FUEL STANDING
30071 DATA63,255,252,85,255,220,87
30072 DATA235,213,22,170,212,5,170
30073 DATA80,1,170,64,1,170,64
30074 DATA85,170,85,186,170,169,106
30075 DATA170,170,106,170,170,169,90,170
30076 DATA165,22,170,148,22,170,148
30077 DATA45,170,80,5,170,80,1
30078 DATA170,1,64,1,85,64,5,20
30079 DATA88,20,20,20,84,20,21
30080 REM****BRUCE NAME 1 #####
30081 DATA0,0,1,80,0,15
30082 DATA244,42,173,0,42,169
30083 DATA64,47,251,64,45,91,64
30084 DATA45,11,64,45,173,0,42
30085 DATA180,0,42,180,0,47,173
30086 DATA64,11,64,45,91,64
30087 DATA45,11,64,45,11,64,42
30088 DATA171,64,42,173,0,15,244
30089 DATA1,80,0,0,0,0
30090 REM****BRUCE NAME 2
30091 DATA0,0,0,0,0,0
30092 DATA0,0,0,0,0,0,0
30093 DATA178,64,130,170,67,142
30094 DATA150,147,142,145,147,145
30095 DATA147,147,150,147,142,170,147
30096 DATA142,170,67,142,169,3,142
30097 DATA67,142,154,67,142,150
30098 DATA67,142,146,67,254,146,67
30099 DATA142,64,170,0,0,0
30100 REM****ALIEN SHIP
30101 DATA0,0,0,0,63,0
30102 DATA85,194,169,85,114,169
30103 DATA85,194,169,85,114,169
30104 DATA125,194,89,115,114,65,112
30105 DATA194,64,112,2,84,112,2
30106 DATA170,64,112,2,164,112,242,84
30107 DATA115,114,65,125,114,169,85
30108 DATA114,169,85,194,169,0,0
30109 DATA0,0,0,0,0,0
30110 REM****ALIEN SHIP
30111 DATA0,0,0,0,0,0
30112 DATA0,0,128,0,8,32,0
30113 DATA32,2,128,24,31,255,208,65
30114 DATA85,194,128,21,255,208,85
30115 DATA85,84,102,102,100,85,85
30116 DATA84,31,255,208,7,255,64
30117 DATA1,85,0,0,0,0
30118 DATA0,0,0,0,0,0
30119 DATA0,0,0,0,0,0
30120 REM****GIRL 1
30121 DATA0,0,2,160,0,2
30122 DATA176,0,2,240,0,10,240
30123 DATA0,42,192,0,1,91,0
30124 DATA1,144,0,1,171,0,1
30125 DATA88,0,1,80,0,2,160
30126 DATA0,1,80,0,1,80,0
30127 DATA5,184,0,21,85,0,21
30128 DATA85,0,3,48,0,3,32
30129 DATA2,40,0,2,168,0,0
30130 REM****SWORD
30131 DATA0,32,0,2,170,0,10
30132 DATA128,128,2,170,0,0,32
30133 DATA2,170,0,0,16,0
30134 DATA0,16,0,0,16,0,0
30135 DATA16,0,0,0,16,0,0,16
30136 DATA0,16,0,0,16,0,0
30137 DATA16,0,0,0,16,0,0,16
30138 DATA0,16,0,0,16,0,0,16
30139 DATA0,16,0,0,16,0,0
30140 REM****STAKE AND ROPES
30141 DATA168,0,0,168,0,0,168
30142 DATA0,0,168,0,0,168,0
30143 DATA168,0,0,85,64,0
30144 DATA168,0,0,85,80,0,168
30145 DATA85,80,0,168,0,0,168
30146 DATA85,80,0,168,0,0,168
30147 DATA85,64,0,168,0,0,85
30148 DATA80,0,168,0,0,85,0
30149 DATA168,0,168,0,0,168,0,0
30150 REM****DROID #1
30151 DATA0,0,0,0,0,3
30152 DATA255,192,15,255,64,15,255
30153 DATA128,15,255,64,3,255,192
30154 DATA0,48,0,0,48,0
30155 DATA48,0,0,48,0,0,252
30156 DATA0,0,252,0,0,252,0
30157 DATA0,252,0,0,252,0,0
30158 DATA252,0,0,48,0,0,48
30159 DATA0,0,48,0,3,255,0
30160 REM****DROID #2
30161 DATA0,0,0,0,0,0,1
30162 DATA0,0,1,169,0,1,169
30163 DATA0,0,1,169,0,1,85,0
30164 DATA0,0,48,0,0,48,0
30165 DATA0,48,0,0,48,0,252,0
30166 DATA0,252,0,0,252,0,0
30167 DATA0,252,0,0,252,0,0
30168 DATA252,0,0,48,0,0,48
30169 DATA0,0,252,0,3,255,0
30170 REM****DROID #3
30171 DATA0,0,0,0,0,15
30172 DATA255,7,255,192,15,255
30173 DATA192,7,255,192,15,255,0
30174 DATA0,48,0,0,48,0,0
30175 DATA48,0,0,48,0,0,252
30176 DATA0,0,252,0,0,252,0
30177 DATA0,252,0,0,252,0,0
30178 DATA252,0,0,48,0,0,48
30179 DATA0,0,252,0,3,255,0
30180 REM****ALIEN SHIP 2
30181 DATA0,0,0,0,0,15
30182 DATA0,0,0,0,0,32
30183 DATA32,0,128,2,2,0
30184 DATA0,81,0,85,85,64,21
30185 DATA0,253,255,128,21,253,80,21,253
30186 DATA182,21,85,88,1,85,80,0
30187 DATA0,0,0,0,0,0,0
30188 DATA0,0,0,0,0,0
30189 DATA0,0,0,0,0,0
30190 REM****ALIEN SHIP 3
30191 DATA0,0,0,0,0,0
30192 DATA0,0,0,0,0,0
30193 DATA0,0,128,8,0,128,2,2,0
30194 DATA0,136,0,1,85,0,5
30195 DATA85,64,253,255,64,5,85
30196 DATA54,5,85,80,1,85,80
30197 DATA0,0,0,0,0,0
30198 DATA0,0,0,0,0,0
30199 DATA0,0,0,0,0,0
30200 REM****ALIEN SHIP 4
30201 DATA0,0,0,0,0,0
30202 DATA0,0,0,0,0,0
30203 DATA0,0,0,0,2,2,0
30204 DATA0,136,0,32,32,0
30205 DATA84,0,1,117,0,0,84
30206 DATA0,0,0,0,0,0
30207 DATA0,0,0,0,0,0
30208 DATA0,0,0,0,0,0
30209 DATA0,0,0,0,0,0
30210 REM****ALIEN SHIP 5
30211 DATA0,0,0,0,0,0
30212 DATA0,0,0,0,0,0
30213 DATA0,0,0,0,0,0
30214 DATA0,0,0,0,0,136,0
30215 DATA32,0,0,84,0,0,168
30216 DATA0,0,0,0,0,0
30217 DATA0,0,0,0,0,0
30218 DATA0,0,0,0,0,0
30219 DATA0,0,0,0,0,0
```

# LANDER

A spaceship pilot works hard for a living in Jason Holiday's game.

Your expert skills as a docking pilot will certainly stand you in good stead, when you carefully guide your space shuttle on to the rugged terrain of an unknown planet.

This almost foolhardy mission is entirely in the interests of science. Two boffins have decided that they must alight and examine the area. Wary of dangerous chemical substances that may cover the planet's surface you intend to land on one of the two landing pads. This is easier said than done, especially as one is at the bottom of a very deep crevasse. If you choose to land on this pad instead of at ground-level you are awarded a bigger bonus. The risk is optional!

You cannot land at a speed greater than -5 or your ship disintegrates, so while aligning yourself with the base you must use your thrust to brake your descent, which uses up fuel. The contents of your fuel tank are therefore displayed all the time, as is your speed.

It seems that your arrival is not welcome and you are set upon by a series of missiles which are on course around the planet's surface. You are also bombed from above.

There are four levels of difficulty:

## Listing 3

```
   10IF PAGE<>&D00 CLS:PRINT"PAGE SHOULD
= &D00":VDU2:END
   20
   30
   40REM DELETE LINES 1,2 & 3 IF A TAPE
SYSTEM IS IN USE ie PAGE <> &600
   50REM*******************
   60REM*      Lander       *
   70REM*                   *
   80REM*    J.Holliday     *
   90REM*                   *
  100REM*  (c)1984 Hollisoft *
  110REM*******************
  120
  130DIMSC(15),NAME$(15)
  140FORT=1TO15:NAME$(T)="Hollisoft":NEX
T
  150*FX200,11
  160ONERROR PROCERR
  170HI%=0
  180REPEAT
  190MODE7
  200PROCINSTRUCT
  210PROCRESTORE
  220RESTORE
  230MODE2
  240VDU19,13,1;0;0;0;
  250VDU19,8,5;0;
  260VDU19,9,4;0;
  270VDU19,11,3;0;
  280VDU19,15,2;0;
  290PROCDRAWSCREEN
  300PROCSHIP
  310PROCSHIP
  320REPEAT
  330DU%5
  340PROCSHIP
  350PROCCALC
  360FUEL%=FUEL%-1:PROCFUEL
  370PROCENERGY
  380PROCONOFF
  390IFFUEL%<200 FUEL%=199
  400UNTIL DEAD
  410IF EX PROCEXPLODE
  420PROCIFSCORE
  430UNTILFALSE
  440DEFPROCCALC
  450IF JOY%=FALSE PROCMOVE:ELSE PROCJOY
  460IF y%>600Ame*:n%=met:x%-(LEV%+32)!:Ifme
t=x%:QR%=POINT(x%+64,y%+8)
  470IFy%<600PROCBOMB:bomy%=bomy%-32
  480IFbomy%<64 PROCCHANGE2
  490ENDPROC
  500DEFPROCDRAWSCREEN
  510RESTORE 570
  520MOVE0,0
  530GCOL0,1
  540FORT=0TO12
  550READX,Y:PLOT85,X,Y
  560NEXT
  570DATA0,500,200,600,220,650,230,500,0
,0,250,300,270,250,300,240,0,0,350,200,3
```

```
00,120,0,0,100,50
  580MOVE800,10:MOVE800,50
  590FORT=0TO9
  600READX,Y:PLOT85,X,Y
  610NEXT
  620DATA400,50,500,200,650,450,800,50,8
00,500,750,610,1280,610,1280,10,800,10,8
00,610
  630GCOL0,3:MOVE500,650:PLOT85,750,600
  640MOVE1280,16:MOVE1280,0:PLOT85,0,0:M
OVE0,16:PLOT85,1280,16
  650COLOUR129:COLOUR2:PRINTTAB(11,31)"x
10";
  660PRINTTAB(13,14)"x2"
  670PROCPADS
  680PROCfuel
  690ENDPROC
  700DEFPROCSHIP
  710GCOL2,0:MOVEx%,y%:VDU224:IF THRUST=
TRUE MOVEx%,y%-25:VDU18,3,13,225
  720IF y%>1087 PROCZAP:DEAD=TRUE:ENDPRO
C:ELSEx%=x%+NL%:y%=y%+D%:D%=-E%:IFx%<=0
THEN x%=0 ELSE IFx%>=1100 x%=1100
  730GCOL3,4
  740MOVEx%,y%:VDU224
  750THRUST=FALSE
  760PROCCHECK
  770ENDPROC
  780DEFPROCMOVE:IF FUEL%<=200 INC=INC-1
:ENDPROC
  790IF INKEY(-98)NL%=-DRIF%
  800IF INKEY(-90)NL%=DRIF%
  810IF INKEY(-74) INC=INC+2:THRUST=TRUE
:FUEL%=FUEL%-4:PROCTHRUST ELSE IF INC=-9
INC=INC-1:PROCTHRUST
  820ENDPROC
  830DEFPROCJOY:IFFUEL%<200 INC=INC-1:E
NDPROC
  840JOY1%=ADVAL(1)DIV256:JOY2%=ADVAL(0)
AND3
  850IFJOY1%>150 NL%=-DRIF%
  860IFJOY1%<50 NL%=DRIF%
  870IFJOY2%=1 INC=INC+2:THRUST=TRUE:FUE
L%=FUEL%-4:PROCTHRUST ELSE IF INC=-9 INC
=INC-1:PROCTHRUST
  880ENDPROC
  890DEFPROCCHECK
  900Q%=POINT(x%,y%-37):QW%=POINT(x%+64,
y%-32):QE%=POINT(x%+64,y%):QR%=POINT(
x%,y%):Q%=POINT(x%+64,y%+8)
  910IFQ%=1ORQW%=1 OR QE%=1 ORQR%=1ORQT%=
1 DEAD=TRUE:ENDPROC
  920IFQ%=4PROCTURE:PROCPADS:IF DEAD=TRU
E ENDPROC ELSEIFQ%=4 PROCScore(10):PROCS
CORE
  930IFQ%=5PROCTURE:PROCPADS:IF DEAD=TRU
E ENDPROC ELSE IFQ%=5 PROCscore(2):PROCS
CORE
  940IFQ%=2 OR QW%=2OR QE%=2OR QR%=2OR Q
TX=2 DEAD=TRUE:ENDPROC
  ROQE%= 6 DEAD=TRUE:ENDPROC
  960ENDPROC
```

```
  970DEFPROCTHRUST
  980IF THRUST=TRUE:GCOL3,13:MOVEx%,y%-2
5:VDU225:SOUND0,-15,4,1
  990D%=D%+INC
 1000SPEEDX=D%
 1010ENDPROC
 1020DEFPROCFUEL:MOVE150,FUEL%:GCOL0,1:V
DU231:ENDPROC
 1030DEFPROCONOFF
 1040IF INKEY(-17) THEN *FX210,1
 1050IF INKEY(-82) THEN*FX210
 1060IF INKEY(-66) PROCPAUSE
 1070ENDPROC
 1080DEFPROCTUNE
 1090IIFDEAD=TRUE ENDPROC
 1100IF SPEEDX<=5 DEAD=FALSE ELSE IF-SP
EED%5 DEAD=TRUE ENDPROC
 1110SOUND2,0,0,0
 1120RESTORE 1250
 1130FOR=1TO14
 1140READ note%,dur%
 1150SOUND1,-15,note%,dur%
 1160NEXT
 1170INC=16
 1180GCOL0,2:VDU231,227:FOR T=1TO500:NEXT
 1190GCOL0,0:MOVEx%,y%:VDU226,226,226
 1200x%=x%+480=800
 1210PROCCHANGE
 1220PROCSCORE
 1230PROCERASEBOMB
 1240ENDPROC
 1250DATA5,1,21,1,33,1,53,5,33,1,21,1,5,
1,13,2,25,2,41,2,61,18,41,2,25,2,13,2,-1
 1260DEFPROCScore(sc%)
 1270SQX=ABS(sc%*D%)*3:SC%=SC%+SQ%:fuel%
=200+SQ%*3
 1280GCOL4,9
 1290REPEAT:MOVE150,FUEL%:VDU231:FUEL%=F
UEL%+16:SOUND1,-10,FUEL%,2:UNTIL FUEL%>
fuel% OR FUEL%>=532
 1300ENDPROC
 1310DEFPROCSCORE:IFSC%>HI%:HI%=SC%
 1320NL%=0:LEV%=LEV%+4:IFLEV%>64 LEV%=64
:DRIF%=DRIF%+4:IFDRIF%32 AND DRIF%<37
 1330VDU4:VDU23;8202;0;0;0;:COLOUR129:CO
LOUR4:PRINTTAB(9,23)"Score ";SC%;TAB(11,
25)"Hi ";HI%
 1340PRINTTAB(11,27)"Level ";INT(LEV%/8)
 1350PRINTTAB(11,29)"Drift ";INT(DRIF%/8
)
 1360VDU5
 1370ENDPROC
 1380DEFPROCDEAD
 1390VDU22,7
 1400SOUND1,0,0,0:SOUND0,0,0,0
 1410SOUND2,0,0,0
 1420*FX15
 1430FORT=3TO4:PRINTTAB(5,7)CHR$141CHR$1
32CHR%136*!!!***D E A D***!!!"
 1440NEXT
 1450FORT=8TO9:PRINTTAB(2,7)CHR$141CHR$1
33"You scored";CHR$136;SC%:NEXT
```

## Listing 1

```
80VDU23,224,24,102,129,255,66,60,66,1
29
90VDU23,225,60,60,24,24,20,32,0,0,0
100VDU23,226,255,255,255,255,255,255,2
55,255
110VDU23,227,56,186,146,254,56,56,68,6
8
120VDU23,228,0,62,127,255,255,127,62,0
130VDU23,229,7,24,236,247,235,234,24,7
140VDU23,230,99,119,127,62,62,62,28,8
150VDU23,231,60,60,60,60,60,60,60,60
160VDU23,232,129,129,129,129,129,129,1
29,129
170MODE7
180FORT=1TO10
190PRINTTAB(3,2)CHR$141CHR$132CHR$157
CHR$133"LANDER "CHR$156
200PRINTTAB(3,3)CHR$141CHR$133CHR$157
CHR$132"LANDER "CHR$156
210FORT=1TO100:NEXTR
220PRINTTAB(3,2)CHR$141CHR$133CHR$157
CHR$132"LANDER "CHR$156
230PRINTTAB(3,3)CHR$141CHR$132CHR$157
CHR$133"LANDER "CHR$156
240SOUND1,-(T+5),1,1
250NEXT
260FORT=1TO4:PRINT"CHR$154CHR$(146+T)T
AB(5)"k 7k k 7k k   k7 7k 7k"k7"
270NEXT
280PRINTCHR$154CHR$(146+T)TAB(5)"z u u
z jpp,ppp zu pz uz  5   j5"
290NEXT
300VDU28,7,24,32,22
310CLS:PRINTTAB(8)CHR$136CHR$129" LANDER IS
LOADING"
320PRINTTAB(5)CHR$132CHR$136l;CHAIN"La
nder2"
>
```

### Listing 2

```
80
90PRINT"Do you want'''Instructions"
100A$=GET$:IFA$<>"Y"ANDA$<>"N"ANDA$<>"
n"ANDA$<>"N" THENRUN
110IFA$="y"OR A$="Y" THENPROCINSTRUCTI
ONS
120CHAIN"Lander3"
130
140DEFPROCINSTRUCTIONS
150VDU22,7:PRINT''TAB(9)CHR$141CHR$129
CHR$157CHR$134"  MOWER   ";CHR$156:PRIN
TTAB(9)CHR$141CHR$129CHR$157CHR$134"  MO
WER   "CHR$156
160FORT=7TO8:PRINTTAB(9,7)CHR$141"By.
J HOLLIDAY,"NEXT
170FORT=1TO12:PRINTTAB(4,7)CHR$141"FO
R HOLLISOFT PUBLICATIONS"NEXT
180PRINTTAB(0,23)CHR$129CHR$157CHR$135
"PRESS < SPACE BAR > TO CONTINUE
"
190PROCSPACE
200VDU22,7
210CLS:FORT=2TO3:PRINTTAB(7,7)CHR$141
CHR$157CHR$141CHR$131" INSTRUCTIONS  ";
CHR$156:NEXT
220CLS:PRINTTAB(7,2)CHR$141CHR$129CHR$
157CHR$135"* * L A N D E R * * ";CHR$15
6
230PRINTTAB(7,2)CHR$141CHR$157CHR$157
CHR$129"* * L A N D E R * * ";CHR$156
240PRINTTAB(2,5)"You are the pilot of a
shuttle craft from the 'Enterise'."
250PRINTTAB(1,7)"  Your task is to land
```

```
1910PLOT85,x%+RND(800)-400,y%+RND(800-
400)+RND(100)
1920NEXT:SOUND2,-1,5,5:NEXT
1930IFPROCERASEBOMB:GCOL0,0:MOVEbom%x%,
bom%x%32:VDU226
1940bomx%=1000
1950ENDPROC
1960DEFPROCBONUS
1970VDU4:COLOUR3:COLOUR 128:PRINTTAB(0,
6)'''B O N U S '''
1980RESTORE2010
1990FORT=1TO6:READA,B,C,SOUND1,-15,A,B:SO
UND2,-10,A,D
2000NEXT
2010DATA5,5,53,5,101,5,149,5,197,5,245,
5
2020FORT=1TO1000:NEXT
2030PRINTTAB(0,6)"
"
2040SC%=SC%+50:ENDPROC
2050DEFPROCSPEED:VDU4:PRINTTAB(9,21)"Th
rust rate";SPEED%;"  ":VDU5:ENDPROC
2060DEFPROCPADS
2070MOVE250,16:MOVE250,0:GCOL0,4:PLOT85
,500,0:MOVE250,16:PLOT85,500,16
2080GCOL0,5:MOVE1000,610:MOVE800,500:PLO
T85,1000,500:MOVE1000,610:MOVE800,610:PLO
T85,800,500
2090DEFPROCPAD2
2100DEFPROCPAD
2110VDU22,2
2120EX=FALSE
2130VDU5
2140FORT=1TO15:MOVERND(1280),RND(1023):
PLOT85,RND(1280),RND(1023):COLOURRND(15
):6COL3,RND(16)
2150NEXT:GCOL0,4:COLOUR0
2160VDU4:COLOUR3:PRINT
2170VDU22,8,16,RND(3)+4,3:SOUND1,-10,RN
D(50),3:PRINTTAB(RND(19),RND(23))"*":NE
XT
2180GCOL2,4:COLOUR5
2190VDU228,0,16,RND(3)+4,3:SOUND1,-10,
RND(50),3:PLOT85,RND(19),RND(23)"*":NE
XT
2200DEFPROCKEYORJOY
2210DEFPROCKILL
2220AX=INKEY(0)
2230UNTIL AX=32 OR AX=69 OR ADVAL(0)AND
3
2240IFAX=32 JOY%=FALSE:ENDPROC
2250IFAX=69 PROCKILL
2260JOY%=TRUE
2270ENDPROC
2280DEFPROCPAUSE
2290FX=1:Z%=0
2300REPEAT
2310A%=GET
2320UNTILA<>65
2330ENDPROC
2340DEFPROCINIT
2350VDU23,8202;0;0;0;:x%=800:met%x
X=1100:met%X=800:X=375:bom%X=800
```

```
1440FORT=11TO12:PRINTTAB(1,T)CHR$141CHR
$135"Hi-score"CHR$136I;HI%:NEXT
1470FORT=18TO15:PRINTTAB(2,T)CHR$141CHR
$133"On level";CHR$136I;INT(LEV%/8):NEXT
1480FORT=16TO17:PRINTTAB(2,T)CHR$141CHR
$132"With a drift of";CHR$136I;INT(DRF%/
8):NEXT
1490PRINTTAB(8,20)CHR$141CHR$134"Anothe
r go?"
1500PRINTTAB(8,21)CHR$141CHR$135"Anothe
r go?"
1510A$=GET$:IFA$="A"ANDA$="Y" ENDPROC ELSEIFA$="N
"PROCKILL ELSEGOTO1490
1520ENDPROC
1530DEFPROCINSTRUCT
1540FORT=1TO2
1550PRINTTAB(4,T)CHR$141CHR$129"Level
(1 Easu - 4 hard)"
1560LEV%=GET-48:IFLEV%<10RLEV%>4GOTO155
0
1570PRINTTAB(4,5)CHR$141"KEYS   "CHR$156
1580GetT=6TO7
1590PRINTTAB(4,T)CHR$141CHR$135"Rate of drift"
(Low Drift-8High drift)"NEXT
1600DRF%=GET-48:IFDRF%<10RDRIF%>4GOTO
1590 ELSE DRIF%=INT(DRIF%*8)
1610PRINTTAB(10,8)DRIF%/8
1620PRINT"CHR$129CHR$157CHR$135"PRESS
<Space Bar> To (Fire) TO START"
1630PROCKEYORJOY
1640EX%=16
1650ENDPROC
1660DEFPROCMETEOR
1670IF bomy%<(1000 AND x%)400 PROCERASEB
OMB
1680GCOL0,2
1690MOVEmet%,mety%:VDU228,229;GCOL0,0:
MOVEmet%x%128,mety%:VDU226,226
1700ENDPROC
1710DEFPROCDOWN
1720IFDEAD=TRUE ENDPROC
1730MOVEmet%,mety%:GCOL0,0:VDU226,226,
226,226
1740met%=%+1100:mety%=RND(300)+700
1750ENDPROC
1760DEFPROCDOWN
1770IFbomy%)950PROCIRASE
1780MOVEbom%:GCOL0,6:VDU230:MOVE230,0:
MOVEbom%x%,bomy%x%32:VDU226
1790ENDPROC
1800DEFPROCHANGE2
1810GCOL0,0:MOVEbom%,bomy%x%32:VDU226
1820bom%=RND(100)+325:bom%y%=1000:ENDPR
OC
1830DEFPROCIRASE
1840MOVEmet%,mety%:GCOL0,0:VDU226,226,
226,226
1850ENDPROC
1860DEFPROCEXPLODE
1870SOUND5,2,0,0,0
1880FORT=-15 TO1
1890GCOL3,RND(16)
1900MOVE x%x%12,y%x%-16  :MOVE x%+RND(100),y%
```

```
2360NL%=0:SC%=0:INC=16:SPEED%=0
2370THRUST=FALSE:DEAD=FALSE:EX=TRUE
2380FORL%=532
2390ENDPROC
2400DEFPROCER:VDU22,7,7:PRINT'';:REPORT
:PRINTCHR$135CHR$178"at line"CHR$136CHR
$138;ERL:NEXT
2410DEFPROCHISCORE
2420IFSC%<SC(10) PROCDEVICE:ENDPROC
2430##X21
2440VDU22,7:RESTORE2610:FORT=1TO4:READA
,B,C,D:SOUND1,-15,A,B:SOUND2,-10,C,D#
2450FORT=7TO8:PRINTTAB(5,7)THEN CHR$141C
HR$129CHR$157CHR$130"You have a HIGH SCORE
"#NEXT
2460#FX21,0
2470PRINTTAB(0,11)CHR$129CHR$157CHR$131
"    "CHR$156
2480PRINT''TAB(6)" PLEASE ENTER YOUR NA
ME"TAB(12)C$:#
2490REPEAT
2500A$=#:Q%=Q%+A$:PRINTA$;:UNTILLEN
(Q$)>14 OR A$=CHR$(13:IFLEN(Q$)>14 VDU7,12
7
2510N%=0:REPEAT:N%=N%+1:UNTILSC(N%<SC% ORN
=10
2520IFSC(15)<(SC% NN=16:REPEAT NN=NN-1:S
(NN)=SC(NN-1):NAME$(NN)=NAME$(NN-1):UNT
ILNN=N%:SC(N%)=SC%:NAME$(N%)=Q$
2530CLS:FORT=0TO11:PRINTTAB(5,7)THEN CHR$141C
HR$129CHR$157CHR$130" LANDER HALL OF FAM
E     "CHR$156:NEXT
2540PRINT
2550FORP=1TO15:PRINT;P;TAB(4);" ";SC(P
);TAB(12);; ";;TAB(19);NAME$(P):NEXT
2560Q%="
2570PRINT''CHR$135CHR$136CHR$157CHR$132"
PRESS (Space) OR (Fire) TO START"
2580PRINT''CHR$136CHR$157CHR$132" TO (F
IRE) TO START"
2590PROCKEYORJOY
2600ENDPROC
2610DATA1,89,1,117,1,89,1,101,1,101,1,11
7,1,117,1,137,1
2620DEFPROCKILL
2630#FX21
2640#X%10
2650CALL !FFFC
2660ENDPROC
2670DEFPROCfuel
2680VDU5
2690GCOL0,8
2700FORT=200TO500STEP32:MOVE150,T:VDU23
1
2710NEXT
2720GCOL0,4
2730FORT=200TO500STEP32:MOVE150,T:VDU23
1
2740NEXT
2750ENDPROC
```

Level 1 is relatively easy with less bombs and missiles than level 4. There are eight drift speeds (the speed at which you advance, and as you complete each stage you automatically move up a level till you reach the most difficult level.

Successful landings could result in your name being entered in the 15-name long hiscore table,.

Enter the program in order in three parts (Lander 1-3), saving the program at each stage.

---

on a unknown planet so some scientists can examine some rocks.

```
260PRINTTAB(10,11)CHR$141CHR$129"BEWAR
E"
270PRINTTAB(10,12)CHR$141CHR$135"BEWAR
E"
280PRINTTAB(1,14)" Enemy missiles patr
ol the planet and bombs drop from the s
ky"' You also have to land with a speed
     greater than -5"
290PRINTTAB(1,19)"There are 8 difficul
ty levels and 8   different speeds.Your
speed and"
300PRINT"difficulty levels automaticall
y increasedwhen you land."
310PRINTTAB(4,24)CHR$129CHR$136"Press
(SPACE BAR) to continue"
320REPEAT UNTILGET$=" "
330CLS:PRINTTAB(10,3)CHR$141CHR$129CHR$
157CHR$135"KEYS  "CHR$156
340PRINTTAB(0,4)CHR$141CHR$135CHR$157
CHR$129"KEYS  "CHR$156
350PRINT"CHR$129"Z ....... Left"
360PRINT"CHR$130"Delete .. Right"
370PRINT"CHR$131"Return .. Thrust"
380PRINT"CHR$132"Q ....... Sound off"
390PRINT"CHR$133"S ........ Sound on"
400VDU28,22,15,39,13
410ENDPROC
420
430DEFPROCSPACE:REPEAT UNTIL GET=32:EN
DPROC
```

# CANON'S SHOT AT MSX

The advent of yet another MSX machine is no longer big news. But how does Canon's venture into this area of the market measure up? Is MSX the answer to the computer industry's dreams? Kenn Garroch investigates.



The V-20 keyboard layout conforms to the MSX standard.

The MSX revolution is trying hard to happen. This version from Canon is another of the surprisingly old-fashioned (new) machines.

### First impressions

The first thing that strikes you about the Canon V-20 is, naturally enough, its close resemblance to the other MSX machines. It sports a similar keyboard, an identical Basic, the same interfaces, and the same good old Japanese engineering inside and out.

For £280 you get the Canon itself with internal power supply, a cassette lead with motor control, an aerial lead, and two manuals. It's all packed into a cardboard box just the right size for you to carry it easily out of the shop — more good Japanese engineering.

All that remains to be done is attach a mains plug, plug into the TV and mains, and off you go.

### In use

Switch on and the Canon sits and thinks for three seconds or so as if in shock. Then up comes a message that this is MSX Basic and there are just over 28K bytes free. For a machine that is supposed to have 64K of RAM, this is a little meagre.

On perusing the memory maps in the manual, I discovered that 32K of the RAM is not in fact available to Basic. Curiouser and curiouser. This memory is hidden beneath the Basic ROM, and appears to be used for the video RAM. Part of this is used to store the sprite data and with a maximum of 256 8×8 sprites, this comes to 2K. The rest must be used for the video display itself, although from the resolutions available, there must be quite a lot spare. The Spectrum fits a 256×192 plus eight colours and three attributes in 7K of RAM. The V-20 and presumably all other MSX machines have 256×192 with 15 colours and one attribute.

What, we ask ourselves, happened to the other 23K of video RAM? Perhaps it will be used at a later date, running the mythical CP/M system, to give an 80-column screen and higher density graphics, although why they didn't do this as standard beats me.

The V-20 keyboard is of the standard defined by Microsoft, ie the same layout as the rest. The resemblance ends here as the function keys are larger and rattle more. I also think they are relatively poorly positioned, though they do come preprogrammed with a selection of useful functions such as RUN and LIST. They can, of course, be reprogrammed using the KEY command but accept only 16 bytes of data.

The other eight large keys are split into two groups. Four are used as cursor control keys allowing full on-screen editing as with the Commodore 64. Again, these are too large to be comfortable. The other four are the stop key, insert, delete, and home/cls. The stop key, when pressed, only pauses the

program; control stop actually breaks you out of Basic.

On the rear are the connections for the cassette, audio, video and RF outputs, and the printer port. The latter uses a bizarre plug that is apparently a 14-way Amphenol. This could cause some people problems with interfacing to printers but presumably, if MSX takes off to any extent, they will become more common.

On the front are the two joystick ports. These are the standard Atari/Commodore connections.

The cartridge slots are on the top and the side. The V-20 differs from some of the other machines in this respect as both these slots are cartridge connectors and not edge connectors. This is handy as the peripherals are designed to connect into the cartridge slot and this system should allow you to have both a cartridge and a peripheral connected at the same time without needing a special connector for one or the other.

In general, the machine is solidly built, although it would have been nice to be able to detach the power cable in transit.

## The Basic

Most MSX machine reviews have covered the hardware in detail, so let's take a closer look at the Basic.

As its name implies, this is based on the good old standard as used by Dragon, Commodore, IBM, and CP/M MBasic. The extensions are a whole host of additional commands to allow control over the fancy bits of hardware, such as the sprite and screen controllers plus a few commands that appear to have been added because it seemed like a good idea at the time.

Altogether 150 commands and functions are available, covering everything from Binary, Hex, and Octal conversions to error handling, sprite, and I/O controls. Unfortunately, this vast array of commands is poorly documented in the Basic reference manual. One particular moan here is lack of details on the string handling. Simple things such as how to define them are demonstrated in the explanation of the DATA statement which means that you are sent rooting about all over the manual before you get anything done.

Overall, these extra commands appear to be handy and innovative — particularly the interrupt facilities which were previously available only on the Amstrad. The trouble is, they are not implemented nearly as well as the Amstrad, though interrupts can be made to occur on a number of different events such as sprite collision, the joystick fire button being pressed, the timer hitting zero, or a function key being pressed. The commands for controlling them are ON event GOSUB line No., where an event can be any one of the above, and event can be ON/OFF or STOP.

When the event occurs, the program
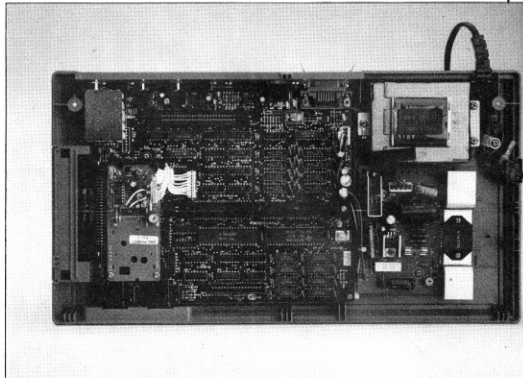


The machine is made from readily available components.

jumps to the subroutine and begins executing it. When it finishes, the main program resumes from where it left off. The only thing to watch is that variable names do not become confused.

The problem with the interrupts is things are not as simple as initially appears. For instance, if you set up an interrupt to occur when a function key is pressed, holding the key down gives repeated interrupts. If, however, you then press another function key, the repeat stops working. This is downright annoying if it is one of the movement controls in a game. I suspect that this is a bug (oh, dreaded word) that will be corrected in a later version.

The question here is why not allow an interrupt for any key on the keyboard instead of one of the ten function keys, five of which need the shift key to access them and all of which are badly placed for game controls?

Still on the subject of the interrupts, when two sprites collide, an interrupt occurs. This sounds great until you realise that the machine will not automatically tell you which sprites collided. You must work it out for yourself. What this boils down to is that if there are more than about four sprites on the screen at once, it's faster to detect collisions by keeping track of them in the program than use the interrupt, since you're going to have to do it anyway.

On the whole, these interrupts are a marvellous idea. It's just unfortunate that they are not better implemented.

One of the better features of the V-20 (or any MSX) is its sprite handling capabilities from Basic.

Sprites are constructed from a series of character code numbers stored in the psuedo array SPRITE$. The numbers themselves are stored in part of the unused section of the video RAM. They can be in either of four sizes depending on the SCREEN mode selected, 8×8 or 16×16, normal or double size (enlarged). Since a limited amount of storage space is available, you get 256 in 8×8 and (obviously) 64 in 16×16 mode. Once defined, it is possible to select any 32 to be on the screen at once. This is a handy way of doing things as it allows easy animation effects to be created.

Unfortunately, there can be only four sprites on any horizontal line at once. If an extra one is put there, it rubs out the right-most one. This causes a problem when writing a space invaders-type game as only the launcher and the rocket can be sprites otherwise there are only three invaders per line which looks pretty silly.

Defining the sprites is simply a matter of setting up eight DATA statements, each with an 8-bit binary number in it, using the BIN commands. A short routine reads these, converts them into decimal and puts the CHR$ numbers into a string array. The resulting eight character string is then placed into SPRITE$(n) where n is the sprite to be defined. Placing the sprite on the screen is fairly straightforward, using the PUT SPRITE command, specifying the sprite number, whether the next position is relative or absolute, position, colour, and sprite image to use number. Obviously this sequence shows that the sprite handling is flexible.

The only real problem is in changing screen modes, as this deletes all previously stored sprite information. You can't have everything, it seems.

Where the MSX machines do score is in their wealth of high-resolution graphics commands including CIRCLE, PAINT and a neat line command. This allows either point-to-point lines, relative to the last position or using absolute screen coordinates. An additional feature is obtained by using the B or BF

suffixes. The first draws an outline box, the second does the same but fills it in *ie* an implied PAINT command.

Even better is the DRAW command which allows drawing macros. This function allows a selection of commands to be placed within a string, such as U for up, D for down, rotate (A), scale (S) and colour (C). This gives you a simple turtle graphics system. Once the string is set up it is executed with DRAW string.

The screen size is a nice large, logical -32768 to 32767 of which points 0 to 191, vertically, and 0 to 255 horizontally, actually appear on the screen. So, points can be plotted off the screen without errors occurring (unless the logical limit is exceeded).

A total 15 colours are available plus a transparent option. These are obtained mainly with the COLOR command although what colours are available depends on the screen mode you're in. There are four of these, the first giving 40×24 characters, no graphics or sprites, no border, and only one colour. The second is the default, *ie* boot-up screen giving 32×24 characters with every eight pixels having their own colour, sprites are also allowed but no graphics.

The next mode allows graphics but no

text and again only every eighth pixel may have its own colour. This mode gives the highest 255×192 resolution. For graphics where each pixel has its own colour, SCREEN 3 is used. Unfortunately, this only gives a medium resolution of 64×48.

Also defined by the SCREEN command are the sprite size, the key click (on/off), the tape speed, 1200/2400 baud, and printer type. The last specifies whether the printer can produce the MSX character set. If it can't, the printer produces spaces.

As for getting into the insides, MSX Basic is well-equipped. PEEK, POKE, and USR are available as well as INP, OUT, TIME and WAIT. Access to the video RAM is via the VDP command which allows you to go straight into the controller registers. VPEEK and VPOKE are also there giving even more direct access.

Easy sound output is via the BEEP command. More complex features are available with SOUND giving access to the programmable sound generator. The

macro facility again comes into its own with PLAY. This resembles the DRAW macros but instead of movement commands, you have the notes ABCDEFGA and the £ character for sharps. Once a tune is set up, the speed, volume and waveform shape can be changed. The sound normally comes from the TV speaker, but if you use a monitor, there is a direct sound output socket.

MSX machines will, in future, allow an upgrade from cassette systems to disk and possible CP/M. The file handling is standard Basic for the cassette system. There are two save and load commands. CSAVE saves files in internal, tokenised format and SAVE does the same in ASCII format. BLOAD and BSAVE allow sections of memory to be directly saved — all pretty standard stuff.

At the back of the MSX Basic reference manual is a brief summary of MSX DOS commands. No disk systems are currently available for MSX

machines but details in this section give the IBM, and it remains to be seen whether the commands given in the Canon manual are the real thing or not.

While the Basic is a flexible programming tool, one or two drawbacks make it tricky. The lack of a good manual contributes to this, but it's likely that any number of helpful books will soon appear.

Another problem is execution speed. It's slow compared with other machines that offer even more facilities. The interrupts should get round this speed problem a little, but as they have not been that well thought out, they are more trouble than it's worth.

a clue to some of its possibilities.

The standard access commands are there including FORMAT (none of those tricks that Acorn plays), DEL, COPY, and DIR. With the MSX DOS system disk you will get a separate disk Basic giving far more flexible filing with random access and field control. The DOS appears to be quite similar to the Basic A system on

## Verdict

The Canon V-20 doesn't stand out in the MSX crowd. It just conforms to the standard in most senses. Initially, the Basic appears excellent, but closer acquaintance and poring over the manuals took off some of its lustre.

If the Japanese push hard enough, they may snaffle part of the British market. However, if this is their best home micro, Sinclair, Commodore and Acorn, to name but a few, are still winning hands down.

## SPECIFICATIONS

| | |
|---|---|
| **System** | Canon V-20 MSX |
| **Price** | £280 |
| **Processor** | Z80A running at 3.58MHz |
| **ROM** | 32K |
| **RAM** | 64K, only 28K for Basic |
| **Screen** | 40×25 characters Mode 0, 32×24 Mode 1 |
| **Sprites** | 8×8 or 16×16 normal or enlarged |
| **Graphics** | 256×192 Mode 2 64×48 Mode 3 |
| **Colours** | 15 plus transparent, less depending on screen mode |
| **Keyboard** | 74 keys including ten function keys |
| **Interfaces** | Two cartridge ports, cassette port, two joystick ports, centronics printer, audio output, video output, RF output |
| **Operating system** | MSX Basic |
| **Software included** | None |
| **Distributor** | Most high street stores |

# SPINNING A WACKY WEB



**The amazing Spider-Man, like his comic strip colleague the Hulk, has entered the realm of advantage games. Bob Chappell marvels at Spidey's progress.**

Tired of trudging through damp caves and endless forests? Do you find it difficult to stifle a jaw-cracking yawn as you bash your umpteenth Orc? Are you just that teensiest bit jaded with the same old stock characters and situations being trotted out in adventures?

Well, just hurry on down to your nearest software store and take a long hard look up at the shelves: see the garish masked figure on the package? Is it a bird? Is it a plane? Is it some twit who's got lost on his way to a fancy dress ball? That last guess was nearly right, for that lithe slab of muscle in the gorblimey garb is none other than Marvel Comics Superhero, Spider-Man, taking the starring role in Adventure International's follow up to the successful *Hulk* adventure, being the second by Scott Adams in the Questprobe series. As with *Hulk*, *Spider-Man* combines text with attractive and instantaneous hi-res graphics of every location.

Spidey delivers a swift slice of knuckle pie to any idea you might have about meeting the standard set to wizards, goblins, and other overfamiliar foes. The wackiness of the adversaries in this adventure make your average troll seem as normal as Julie Andrews.

## Sandbagged

Take Sandman for instance — a neat variation on those old Charles Atlas ads if ever I saw one. Sandman has the mildly disconcerting property of being able to transform himself from a small portion of beach into a sandstone strongman. And there's more where those weirdos came from. Hydro-Man is a big drip — literally: he's made of water. Electro is not the best of people to greet with a handshake, as his body contains 100,000 volts of grade A electricity.

Ringmaster looks and acts like he's just escaped from the big top and now craves a bit of privacy — he throws you out of his computer lab every time you enter. The Lizard is Doc Conners in one of his reptillian moods.

You are not completely without friends. Madame Web, though blind, is able to scan other people's thoughts and can sometimes predict the future. The Chief Examiner (remember him from *Hulk*? All the evidence points to the conclusion that the CE is none other than Scott Adams himself) may offer advice and a way of escape.

The basic plot is pretty much the same as in *Hulk*: find and store all the gems. Since you can bet your suction-padded boots that some of the jewels are being protected by the oddballs above, the job is not going to be easy.

## Doubletake

I began in a hall, way up in a high-rise building. Thinking to explore some of the other floors, I made my way to the very obvious lift and pressed the even more obvious call button. You're right, that *was* too obvious. Think again, Spidey. At one point in my perambulations, I began to think that either my computer had gone on the blink or I was suffering from double vision.

Turned out that I had encountered another fiendish foe, Mysterio. His speciality is hypnotism and special effects. Good job I didn't ring the TV repair man or optician.

It helps if you have read the comic that comes with the game, especially the potted biographies of the characters. The puzzles range on a scale from candy-from-a-baby to hurl-micro-through-window. The packaging describes the

difficulty level as moderate — a fair assessment. I foolishly believed I was doing brilliantly by finding eight of the gems (you shouldn't have too much hardship in finding where to store them), but my score showed that I still had a long way to go.

There is a much improved command analyser, allowing you to move away from the normal verb/noun input. Now you can enter compound orders and use a more English-like structure. I still found myself using two-word input (old habits die hard), but I particularly liked being able to 'TAKE ALL' objects in a room, instead of picking them up (or dropping them) one by one. Response to your input is, as ever, immediate.

*Spider-Man* is good, zany fun and provides as wild a collection of characters as you could wish to meet, together with the usual teasing puzzles of Scott Adams, and walking on the ceiling certainly makes a change from battling with dragons.

## Cloak doom

I do declare, an adventure for the Atari and a welcome rarity it is too. *Cloak of Death* (by Mind Games) is a text and graphics romp through a haunted house where you've wagered to spend the night. I haven't made much progress yet, but what I've seen I've liked.

The game has a comprehensive vocabulary (67 verbs and 94 nouns), decent graphics for each location (you can turn them off), and a reasonable assortment of puzzles. It also displays a dry sense of humour (when I typed 'SCORE', I was told to give myself ten out of ten if I got out alive).

An enjoyable adventure — versions are also available for the Spectrum and Commodore 64.

## Dungeonade

Returning to Questprobe, some *Hulk* fans cannot find anything in the dome by the small holes. Just DAMT EG. If ants are your problem, why not SEYE ESOL C. (Dungeon Master at your service.)

# TUNE IN TO TTX

**The world of teletext has been reserved for BBC users — that is until this OEL adaptor for the Spectrum arrived, says Ian Scales.**



The TTX2000 in all its glory. Tuning knobs, aerial socket and power supply are at the back.

The company which brought Spectrum users the VTX 5000 Prestel adaptor has just released the TTX 2000 Teletext adaptor, also for the Spectrum. OEL's newest little gizmo allows Spectrum users to join the wonderful world of telesoftware and instant information, a place in the sun so far reserved for those with BBC micros and teletext TVs.

Teletext is the technology behind the Ceefax and Oracle services provided by the BBC and ITV respectively. You've probably already seen 'teaser' teletext pages going through a few predetermined accesses. You may even have seen a TV set with a teletext adaptor which enables teletext signals to be decoded and displayed at will. (See the box for more on teletext.)

The TTX 2000 is supposed to sit under the Spectrum. Connection is simple — the TV aerial goes into the teletext unit and the results are output from the Spectrum in the conventional way. The 2000 attaches via a ribbon cable from the edge connector and the cable has a male appendage for the further connection of printers and other peripherals.



Sporting results can be easily checked.

The unit has its own 18-volt adaptor which, unfortunately, has the same business end as the Spectrum power jack. A few fried Spectrums could be in the offing. Another minor quibble is the documentation. Teletext may be simple, but seven pages of meagre instruction is a little tight-fisted.

## In use

Setting up is simplicity itself. Just tune in the decoder to the four channels and settle down to use it. No need for passwords, baud rates, user ID numbers etc.

The only problem is getting the

## Teletext technology

Being digital, teletext seems an ideal technology for computer enthusiasts to hook into. But micro users in 1985 need to answer certain questions. Does teletext shape up as a useful service? Would a VTX 5000 or a multi-purpose hardwire modem be a better investment? Indeed, is it worth worrying about communications it all? The answer to the last question is probably 'yes', but the first? . . . well, I'm not sure.

Unlike a service such as Prestel, teletext is non-interactive. You are a passive receiver of information so while you can be selective about the limited information available, you can't send information back to the service.

Teletext is broadcast on what is most easily described as spare bits of the bandwaves reserved for television transmission. Unlike TV it's not sent as an analog picture scan, but as digital information. The data is intercepted and decoded by the adaptor and the resulting text is modulated into videotext and put up on the TV screen.

The teletext service broadcasts its information as a series of pages in a loop. Page 300, say, is followed by page 100 then 102 then 103 right on through to page 300 again. The key is speed. Several pages are broadcast every second and all the user has to do is select a page number. The system waits till that page arrives, decodes it and sticks it on the screen.

When the information has been perused by the user, he selects another page number and the process repeats itself. Obviously, the more pages on the system, the greater the average waiting time between pages.

This limitation is evident on Ceefax and Oracle, especially once you've used a service like Prestel. So the big limitation is the lack of information bulk, and the lack of interaction — you can't talk back.

reception just right. Teletext is pedantic about perfect reception and you may find you get either a full page of information or nothing. Be prepared to mount an external TV aerial if you don't already have one.

There are only eight commands to remember plus few ENTERS where needed. Accessing a page involves pressing 'P' followed by a three-figure number — the pages start at 100 (depending on which system you use) and seem to go up to about 900 or so. You can change channels with a single command, save displays to Microdrive or send them to the ZX printer.

Teletext also has a 'wheels within wheels' function where information at a particular page number is rotated on each cycle, so by the time you've finished reading one page the next arrives. You suppress this feature with a Hold command.

R reveals a concealed line (where the page is concerned with a quiz for instance). You can also exit to Basic and use the Spectrum normally.

Nothing in computing is as simple to use as Teletext.

Its second big plus is that it doesn't cost you anything. Once you've bought the adaptor there are no uptime or user fees or telephone charges to feel guilty about.

## Verdict

The prospect of access to Ceefax and Oracle via your computer is attractive, but there are some drawbacks. For instance, a limited amount of information is available, and it takes some time to access it.

If you can't afford Prestel but would like to take part in the information revolution, however, the TTX2000, even considering the limited amounts of information available may still be for you.

## REPORT CARD: 1 TO 5

| Features | ●●● |
| --- | --- |
| Documentation | ●● |
| Performance | ●●● |
| Overall value | ●● |

**Product** OEL TTX2000 **Price** £143.75
**Availability** OE Limited 0768-66748

# ROMS AWAY

**Simon Williams looks at two ROMs for the Beeb that get over the problem of accessibility.**

Until recently, if you wanted to plug more than three extra ROMs into your BBC micro you had to buy a ROM expansion board. The trouble with these is that you usually have to wield a screwdriver and take the top off to get at the ROMs.

Systems from Viglen and Micro Pulse get around the problem of accessibility and have the added advantage that they draw no extra power from the computer's supply.

## Setting up

In the Viglen system the extra ROMs are contained in cartridges, which are plugged into a socket attached to the BBC in the hole next to the keyboard. This hole, popularly known as the 'ashtray', was left by Acorn to house the ROM cartridges for its speech synthesis system.

The socket is connected to the BBC by a ribbon cable to one of the sideways ROM sockets. Your expansion ROMs fit into carriers that plug into the ashtray socket.

The system comes in kit form consisting of socket with 28-way ribbon cable attached; one cartridge; cover for the socket; cover for the ROM carrier when not in use; and blanking plate to restore the Beeb if you want to take the system out.

The cartridge has two plastic mouldings which screw together to sandwich a small circuit board that contains the ROM of your choice. A notable omission

from this otherwise comprehensive kit is a set of labels to stick in the cartridges to identify their components.

The edge-connector that plugs into the socket on the Beeb has one foreshortened contact to ensure that all connections are made before the power is applied to the ROM. Because of this, cartridges can be exchanged freely with the micro switched on. Once in, ROMs are called by pressing Break and then addressed in the normal way.

The Micro Pulse ROM box can hold up to eight integrated circuits (including one in a zero insertion force socket) housed in a metal case with a hinged perspex lid. The box is manufactured to a high standard and uses good-quality components throughout.

Connection to the micro is via a length of ribbon cable with a DIL plug on one end that goes into one of the spare sideways ROM sockets on the Beeb's main board. Operating instructions come on two photocopied sheets and advise inserting the plug into the BBC with the cable facing left and the indexing red stripe to the rear — physically impossible. The cable actually runs out to the right of the machine and connects to the ROM box via a socket in its side.

Clamping the cable to the BBC is achieved by the Heath Robinsonish method of trapping it between the two halves of the case.

Once everything is set up, applying power to the BBC will illuminate one of

the eight LEDs. These are used to indicate which of the ROMs is chosen: selection is made by turning the switch fitted to the box. As with the Viglen, the appropriate ROM is enabled by pressing Break, although the instructions on the box suggest the rather more radical CTRL Break sequence.

## In use

Each approach to using ROMs external to the Beeb has its pros and cons. Both suffer from the disadvantage that the selected ROM cannot be called without using the Break key first. Using toolkit ROMs in this way could prove awkward, and from Basic you will have to remember to OLD the program under development.

Any software that uses more than one ROM (*DataGem*, *Logo* and *ISO Pascal*, for example) is unusable with both systems since only one ROM is accessible at a time.

## Verdict

The Viglen system is more elegant as there are no trailing leads hanging from the side of the micro when it is not in use. The price quoted for the system includes only one cartridge and you will need one for each ROM.

The Micro Pulse ROM box holds a maximum of eight ROMs, all available at the twist of a switch. Because of its flying lead it is not as neat as the Viglen, and this could cause trouble if the micro is to be moved around. A better method of fixing the lead to the BBC should not be beyond the wit of Micro Pulse's designers. Otherwise, the box seems to be good value.

I will seriously consider getting a Viglen system for ROM software that gets used less frequently.



The Viglen is more elegant than the Rom box but the latter is easier to use.

### REPORT CARD: 1 TO 5

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

**Product** Sideways ROM cartridge system **Price** £19.95 (£6.95 per extra cartridge) **Distributor** Viglen, Unit 7, Trumpers Way, Hanwell, 01-843 9903

### REPORT CARD: 1 TO 5

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

**Product** ROM box **Price** £57.45 **Distributor** Micro Pulse, Churchfield Road, Frodsham, Cheshire, 0928 35110
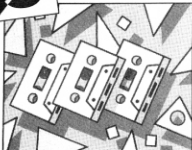
We check out the latest contenders on the software market, and cast an eye to the future. Don't forget, if you want your company's package to be included on this page, send your latest releases to Bryan Skinner, PCN, 62 Oxford Street, London W1A 2HG, along with prices and 'phone numbers.

## AMSTRAD

Just when you thought the Amstrad wasn't getting anywhere, Amsoft bring out Pascal, Kuma produces a version of Logo, and Arnor and Kuma release assemblers. The Pascal looks very good on paper at least, but the state of the Logo is less sure. Arnor's assembler is superior to Kuma's Zen, outperforming it but costing £8 less. We'll be comparing the assemblers in the near future.

Amsoft continues to release games for its machine, and it looks as if support from third party software houses is growing rapidly. Better still, software standards seem to be rising as well, as witnessed by Manic Miner from Software Projects.

| | | |
|---|---|---|
| Hisoft Pascal | £34.95 | Amsoft 0277-230222 |
| Fruit Machine | £8.95 | Amsoft 0277-230222 |
| Pitman Typing Tutor | £9.95 | Amsoft 0277-230222 |
| Screen Designer | £14.95 | Amsoft 0277-230222 |
| Mr Wong's Loopy Laundry | £8.95 | Amsoft 0277-230222 |
| Mutant Monty | £8.95 | Amsoft 0277-230222 |
| Bridge Player | £9.95 | CP Software 0423-57089 |
| Manic Miner | £8.95 | Amsoft 0277-230222 |
| Logo | £19.95 | Kuma 0735-4335 |
| Assembler | £11.60 | Arnor PO Box 169, London SE25 |
| Wise and Fool | £6.50 | Nemesis 0933-623967 |
| Crystal Theft | £7.99 | Wiccasoft 0625-72988 |

## BBC

Some of Acornsoft's recent releases look promising, there are a couple of decent games like Labyrinth, and Acheton could easily become a very popular adventure despite its price. We'll be comparing Acornsoft's GO with another soon, and it's interesting to note that neither version uses the full 19 x 19 board.

Sound synthesisers for the Beeb have enjoyed considerable attention recently, the latest is Fsoft's Music Maker. This offers some 16 preset tones, tone envelope editing, keyboard mode, colour display and much more. Given the price it's an interesting product.

| | | |
|---|---|---|
| The Wizard Citadel | £6.95 | Triffid 0425-616605 |
| The Secret River | £6.95 | Triffid 0425-616605 |
| Music Maker | £9.00 | Fsoft 0273-736042 |
| Fmon | £9.00 | Fsoft 0273-736042 |
| Holy Horrors | £6.99 | Romik 0753-71535 |
| The Complete Cocktail Maker | £9.95 | Acornsoft 0223-316039 |
| Firebug | £9.95 | Acornsoft 0223-316039 |
| Maze | £9.95 | Acornsoft 0223-316039 |
| Labyrinth | £9.95 | Acornsoft 0223-316039 |
| Black Box & Gambit | £9.95 | Acornsoft 0223-316039 |
| Bouncer | £9.95 | Acornsoft 0223-316039 |
| Go | £9.95 | Acornsoft 0223-316039 |
| The Seventh Star | £9.95 | Acornsoft 0223-316039 |
| Quondam | £9.95 | Acornsoft 0223-316039 |
| Workshop | £9.95 | Acornsoft 0223-316039 |
| Acheton | £17.65 | Acornsoft 0223-316039 |

## SPECTRUM

Gift From The Gods is Ocean's latest and it's rather better than the disappointing follow-ups to Hunchback and Kong. You're in the role of Orestes, and if you think that's an odd name your mother's called Clytaemnestra.

But seriously, this graphic adventure is based on the Greek tragedy in which Orestes, aided by the Gods, must regain the Mycenae kingdom from his evil mother. To do this he has to find his sister Electra whom his mother has imprisoned in the catacombs below the palace.

The action boils down to the last bit. It's largely a maze-type game, the graphics are quite well done and the action tricky.

Loading routines are getting more and more advanced. First the BBC used a counter so you could tell how long a game would take to load. Then many software houses wrote fast loaders for the Commodore 64, or licensed Novaload or Pavloda.

New Generation's Technician Ted adds to the range with an animated loading display. Ten coloured figures march to and fro and a counter indicates 'T minus' units.

The game is a difficult platform affair and a full review will be published soon.

| | | |
|---|---|---|
| Gift From The Gods | £9.95 | Ocean 061-832 6633 |
| Lazy Jones | £6.95 | Terminal 061-761 4321 |
| Beam Rider | £7.99 | Activision 0628-75171 |
| Pitfall II | £8.99 | Activision 0628-75171 |
| 3D Starstrike | £5.95 | Realtime 0532-458948 |
| The Jewel of Power | £9.50 | Slogger 0634-811634 |
| Arendarvon Castle | £5.95 | Addison Wesley 0734-794000 |
| Technician Ted | £7.95 | New Generation 0273-693640 |
| Heathrow ATC | £7.95 | Hewson 0273-693640 |
| Hunchback II | £7.95 | Ocean 061-832 6633 |
| Kong Strikes Back | £6.95 | Ocean 061-832 6633 |
| Match Day | £7.95 | Ocean 061-832 6633 |
| Buggy Blast | £5.95 | Firebird 01-375 6755 |
| Space Shuttle | £7.99 | Activision 0628-75171 |

## COMMODORE 64

If you need a spreadsheet for your 64, you might take a leaf out of many an Apple user's book and invest in a copy of Practicalc II. For just under £70 you get a tried and tested product.

Melbourne House showed Castle of Terrors at the PCW show in September, but it didn't release till just before Christmas. It's an illustrated adventure which features animated characters but this isn't exploited as much as it could and should have been.

Leisure Genius continues to dominate the field of board game conversions for micros. Its latest is Monopoly.

Shoot the Rapids is an original and addictive game. It takes the unlikely theme of canoe simulation.

| | | |
|---|---|---|
| Practicalc II | £69.95 | Practicorp 0473-462721 |
| Castle of Terrors | £9.95 | Melbourne House 01-940 6064 |
| Match Point | £7.95 | Psion 01-723 9408 |
| Monopoly | £12.95 | Leisure Genius 01-935 917440 |
| Country Quest | £5.50 | Wye Valley 05446-202 |
| Big Ben | £7.00 | Interceptor 07356-3711 |
| Cad Cam Warrior | £9.95 | Task Set 0262-673798 |
| Tristan & Isolde | £8.95 | CRL 01-533 2918 |
| Spiderman | £9.95 | Adventure Intl 021-359 0801 |
| Space Shuttle | £9.99 | Activision 0628-75171 |
| Titans | £6.99 | Romik 0753-71535 |
| Animal Magic | £6.99 | Romik 0753-71535 |
| Aliard's Tome | £6.99 | Romik 0753-71535 |
| Shoot the Rapids | £7.95 | New Generation 0273-693640 |
| Indiana Jones | £9.95 | US Gold 021-359 3020 |
| Break Fever | £7.50 | Interceptor Micros 0735-71145 |
| Zaga Mission | £7.95 | Anirog 0322-92513 |

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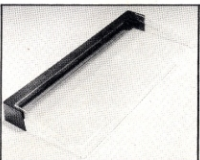
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## SPECTRUM

### THE BACKPACKERS GUIDE TO THE UNIVERSE, Pt I

Navigate caverns, avoid free-floating obstacles, collect items, decipher clues, and return triumphant to safety. It's a familiar recipe, but you may not have seen it served up as well as this for the Spectrum before.

The backpacker is Ziggy, faced not by the Universe but by the superbly designed Caverns of Exile. Ring wraiths patrol the caverns, where exotic creatures are exiled among the irridescent stalagmites and corals. The scrolling is smooth and Ziggy's progress, whether on foot or through the air by jet-pack, is a treat to watch. His flame-thrower flickers like a lizard's tongue.

The game comes with more information than you can take in immediately. Coast through it a few times, rattling around the caverns like a pin-ball. Items go into Ziggy's backpack. Symbol Shift gives you a progress report on their status, but don't be dismayed by the news that the Googly Bird has died of a nervous breakdown. It's quite happy decaying slowly in the backpack. Later the status report will add Flook to news of the Googly Bird's demise, suggesting that it was just hard luck that you picked up a neurotic specimen.

Many of the game's best



features turn up through trial and error. Short-cuts, barrier-breaching combinations of backpacked items, and rock-like rock formations all help you on your way. The time allowance is generous enough for you to take your time. The main point of frustration is that the flame-thrower doesn't settle the ring wraiths' hash for very long — next time you visit one of their screens, they're back on patrol intent on causing you even more trouble.

Keys and a talisman are the ultimate objects of the game, and the talisman is due to come in handy when Part II is published. Part I should keep you entertained until then.

**David Guest**

✓ **Rating** 8/10
**Price** £7.50 **Publisher** Fantasy Software
0242-583661

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## BBC

### JET BOAT

If there's any justice in the world this game will find its way into many Christmas stockings. It is excellent, from its redefinable control keys to its detailed graphics, from its smoothly scrolling landscapes to its icon-inspired 'time-up' alarm clock at the end of the game.

The concept of Jet Boat is nothing new — controlling cars around tracks has been the staple diet of a lot of games writers since time immemorial (well, 1980 anyway). The neat twist of using a boat is well matched by the idea of holding it steady in the centre of the screen and scrolling the shoreline around it. The boat is



a good chunky sprite with at least 16 orientations and the archipelago around which you race against the clock (70 seconds a lap) is well populated with castles, villages, graveyards and so on.

First time out you'll have to get used to the controls. There are only three of them — left, right and accelerate. Unplug anything you might have in the analogue port, otherwise the keyboard controls may go crazy. You should try to remember the best route through the maze of islands, since the clear run you get on the first lap is not repeated until lap 16. Laps two to 15 involve negotiating an increasing number of obstacles, from boats to crocodiles, and ducks to sea monsters. A collision with any of these, or a bank, sets the screen flashing and slows you down to a crawl.

Rewards are small. Complete a lap and you are greeted with the first bar of the Sailor's Hornpipe and the chance to go round again. The game soon becomes compulsive, though. It has a very responsive 'feel' — the boat decelerates smoothly as soon as you take your finger off the accelerate key, and turns corners promptly.

Jet Boat should acquire the kind of following that A&F's ChuckieEgg attracted.

**Simon Williams**

✓ **Rating** 9/10
**Price** £9.95
**Publisher** Software Invasion, 50 Elborough Street London SW18 5DN

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## COMMODORE 64

### KAMI-KAZE

It's fairly safe to say that this game is original — I'm sure I'd have remembered if I'd seen another set in a public convenience in Cleethorpes; well, not actually in the convenience (it's not that original), but the action takes place in and around this loo with a view half-way along Cleethorpes Pier.

In fact it's not a loo at all, could our human eyes but tell, it's the flag-ship Argon of the Xenon battle fleet; but the men and dogs of Cleethorpes insist on treating it as a convenience and so are using up the ship's vital battle plans in a most undignified manner.

The crafts that you control are much more conventional in design, more about at the touch of joystick or keyboard, and can rapid-fire in eight directions — even with a keyboard control, though that's rather more tricky. The loo is, naturally enough, at the bottom-centre of the screen, and men and beasts walk towards it from either side. You fly round above and must pop them off before they go about their business, otherwise each time one of them reaches the loo the paper-counter at the



bottom right of the screen starts counting down.

Once they're inside there's nothing you can do, though you can still shoot them when they emerge again. You have to shoot the dogs, of course, as the counter ticks away like mad when they're running off with the paper, but the drawback to this is that the local RSPCA helicopter descends and starts firing at you. You've also got to watch out for low-flying aircraft and clouds — not to mention the choppers, of course. You also have four smart-bombs to aid you.

Kami-Kaze is a graphic delight, such as the way the dogs must jump up to reach the catch of the loo door, and the way the bodies topple over and splash into the sea beneath.

**Mike Gerrard**

✓ **Rating** 8/10
**Price** £5.95
**Publisher** Supersoft
01-861 1166

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## BBC

### EWGEEBEZ

A maze by any other name . . . But, when Spectrum and 64 games are expanding into thousands of screens, it should at least be interesting to play one on the Beeb with 80. But with the limited memory available, what are the chances of an effective maze game? If Ewgeebez is the best attempt, not very high.

You play the part of Zelob the Melkon (whatever happened to John the Journalist or Roy the Dynorod Man?) who has foolishly got himself stuck in the space station of the title. As



is the way with such artefacts, the station consists of a maze of little passages inhabited by various stationary nasties, as well as aliens from the neighbouring planet, who beam in on the chance of a good bust up.

There is one ray of hope (sic) however. If you can retrieve the twelve power crystals and find the teleport before being split into your constituent atoms, you can escape.

The whole epic is shot in Mode 1, meaning that it's a little short of colour, but Matthew Newman has made the most of what's there by mixing them to produce various patterns.

There are three types of aliens — the bent VHF aerial, the Software Projects logo and the gnashing teeth — and they appear in increasing numbers and are lethal to the touch. They don't shoot at you though, unlike the larger hostiles which send bolts bouncing around the corridors or extend long beams from their extremities.

The concept is not new, and although everything happens at a reasonable speed, there is neither the variety nor the challenge to keep you going.

**Simon Williams**

✓ **Rating** 6/10
**Price** £7.95
**Publisher** Software Projects
051-428 7990

## COMMODORE 64

### HENRY'S HOUSE

Another platform and ladders game this may be, but it features some of the best graphics and animation ever seen on the Commodore 64. The different high-resolution screens are a feast for the eyes.

Little Henry is about to take you on a romp through his amazing home. First stop is the clothes cupboard which contains an assortment of bags, gloves, hats and bow-ties. In order to progress to the next screen, Henry must collect all of these plus a key which appears only after he has grabbed a certain object in the room.

Some of the items are placed in really tricky positions and you have to plan the best way to get at them. Among the hazards in this bizarre closet are three giant boots that clump up and down and a whirling string of batty buttons.

Once Henry's gathered all the necessary objects, the screen changes to show him marching across an impressive hallway to the next room. One feature I particularly like was that on starting a new game you can opt to skip any previously conquered rooms.

The bathroom is really barmy and contains a huge grinning sponge, a squeezed toothpaste tube and the largest dripping tap and sink you're ever likely to see in a game. When you pull the plug out of the sink, the water gurgles away and an enormous toothbrush starts scrubbing away at a nearby set of false gnashers. Objects to collect include rubber ducks and plastic scissors.

The kitchen is even kinkier.

It includes a fearsome food mixer, a powerful pop-up toaster and a twisting tin-opener. If you're clever enough to conquer the kitchen, there's Henry's lounge, playroom (with a marvellously impressive teddy bear), nursery, dining room and finally the deadly dungeon.

The graphics and animation are absolutely superb. There's a wide variety of excellent sound effects and the different challenges make this a game not to be missed.          **Bob Chappell**

Rating 9/10
**Price** £8.95
**Publisher** English Software 061-835 1358

## BBC

### FIREBUG

Not another platform game, running up ladders and along ledges! Well, not really. Although those elements are present, the idea is original and its neat execution provides one of the most hair-tearing, frustrating games I've played in a long while.

You act the part of a fireman who is desperately trying to deal with the chaos caused by a firebug. The young arsonist is doing his best to burn down the warehouse where the game is set.

He has an extended taper with which he lights fires on the ledges. These gradually creep along the beams until they reach a wall.

Against this wall may be an extinguisher or, worse, a can of petrol. Either will explode on contact. You must take the cans
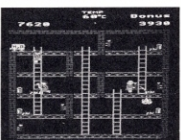
to the safety of the cold water tank in the roof, and put the fires out with the extinguishers.

Unfortunately, you can only carry one vessel at a time. And touching either the firebug or any of his fires knocks you to the ground floor. You can begin to see the difficulties involved in the game.

Each petrol explosion adds ten degrees to the temperature and at 100C the whole building goes up. There are three different screens. Screen three features two firebugs, while the fourth starts with a higher temperature.

The game is well animated, with the large figures moving convincingly around the screen. Sound effects are realistic rather than exciting, but since they're mainly bangs and squirts, this is reasonable.

There are a couple of minor problems with the game, however, which make it less enjoyable. On occasions, particularly at the higher levels, the swapping of extinguisher for petrol can doesn't always work. This can be very frustrating when time is tight. Also the placing of the jump key is awkward. With up and down being * and ?, and extinguish being Return, why on earth choose Shift for jumping?

A good game, despite these little foibles.          **Simon Williams**

Rating 8/10.
**Price** £9.95
**Publisher** Acornsoft 0223-316039.

## SPECTRUM

### 3D STARSTRIKE

The title tells you a lot about this game — you're going to be either hurtling through space firing at missiles or hurtling along corridors. In fact you get to do both, though neither is a particularly thrilling experience for the seasoned Spectrum space pilot.

The intention is to get a direct hit on an alien base's reactor systems; but first you have to fly through space to get there. Having set your controls for the heart of the Kempston, Sinclair or Cursor joystick, or even the keyboard (a sensibly wide range of choices), you choose from the four skill levels.

Your sights are at the centre of your view through your cockpit, and sure enough strange objects start to come out of the screen towards you as you hurtle along. The panel at the bottom shows your shield strength, laser strength, skill level, score and status, this last moving from green through yellow to red.

The 3D effect is achieved by simple wire-graphics technique, which never seems altogether convincing to me, but at least it means you can get a bit more in. You rush headlong through space for about half a minute or so, and provided you survive (not too difficult) you then rush headlong just above the planet's surface, firing at more enemy

craft and also trying to shoot what appear at first sight to be goal-posts, but which turn out to be shoe-box type buildings — hit 15 of those for a bonus score.
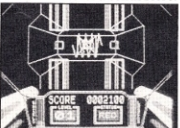
Next comes the corridor sequence, with the same nasties to fire at, but with the addition of barriers across the corridor to fly under or over. Then comes a strange little sequence where your sights are apparently locked on to the reactor pods you're

after, so you fire furiously for a few seconds before it's back to the corridor to make your way out (which is much like making your way in).

After that I'm not sure as this was usually where my shields gave out and the game abruptly stops, showing you your score and giving you a chance to start again. There's no high score table, but that's no great loss as I can't see many people wanting to knock up high scores at this graphically limited game with poor sound and few thrills.

**Mike Gerrard**

Rating 4/10
**Price** £5.95
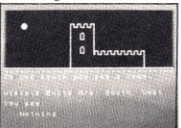**Publisher** Realtime Software 0532-458948

## SPECTRUM

### BLACK TOWER

If only Black Tower had been as good as the cassette inlay said — I'd have had a great treat. Boredom, however was the main source.

Let me translate some of the inlay's hyperbole for you. Take 'exciting'. If an excruciatingly slow response coupled with the most mundane text seen this side of a telephone direc-

a large forest, a huge forest, a pub and a hut are magical lands then welcome to Oz.

tory is exciting, this is a thriller. Take 'magical lands'. If a wood, a large forest, a huge forest, a pub and a hut are magical lands then welcome to Oz.

Take 'exciting people'. I met one, a character called Josh about whom I was told absolutely nothing. Any attempt to examine an item was stonewalled with 'Curiosity killed the cat.' Take 'interesting places'. If location graphics that would shame a three-year-old are exciting, my doodles should hang in the Tate. The 'difficult problems' part, turned out to be true — the problems of keeping awake.

What can you say about an

adventure that, when fed with the verb ZQX (or any real word it doesn't recognise), responds 'You can't do that . . . yet'. Yet?

I placed Black Tower in the slot of my magical one-armed bandit and hit the jackpot — three raspberries.

**Bob Chappell**

Rating 2/10
**Price** £6.50
**Publisher** Dollarsoft 0742-363246

## COMMODORE 64
### IMPOSSIBLE MISSION

Every once in a while a game quietly appears which pushes the standards of excellence a little higher. Impossible Mission from Epyx (marketed in Britain by CBS) is one of these.

On the face of it, there's little remarkable about the game — just another platform outing in the mould of dozens of others. What makes Impossible Mission different, and better, is the imagination, execution and attention to detail. Things like the brilliant animation and the superb use of software-generated speech.

The scenario is familiar — mad scientist threatens to destroy the world. The secret agent (guess who?) has to penetrate his underground complex, evading the security robots and collecting parts of the master password. Once you have all the pieces you must assemble the code and save civilisation as we know it.

The game begins with your agent in a lift. The bottom of the screen shows the display of your portable computer which automatically maps the complex as you explore it. Passwords are hidden in items of furniture which are searched by positioning your agent in front of them. Search time is related to size, so a bookshelf takes longer to search than a table lamp.

Occasionally you will find parts of the master puzzle, or utility passwords. The latter allow you to turn off the robots for a while, or to reset the lifting platforms.

But there's more. The puzzle pieces are like graphic jigsaws. The master password is made up of nine smaller puzzles, the smaller puzzles require four pieces each. Using your portable computer you can fit the pieces together, rotating and flipping them or changing their colour until they match.
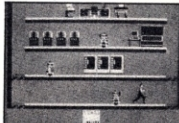


To help you, the portable computer has built-in communications with your base computer at your base. You can call it up to determine whether a solution for any given puzzle exists, or to flip the pieces to the correct orientation. When you complete the password you go to the main control room.

The outstanding feature of Impossible Mission is the speech software. On entering the room, Atombender commands, 'Destroy him, my robots,' in a voice that sounds remarkably like Boris Karloff. If you fall to your doom, your demise is greeted by fiendish laughter, but success brings a message of congratulations in a woman's voice. This is easily the best artificial speech yet heard on a micro.

Impossible Mission is perhaps the best game released in 1984 for the Commodore 64. Other software houses will have to work to match it for sound, graphics and features.

Peter Worlock

> **Rating** 9/10
> **Price** £8.95 (£11.95 on disk)
> **Publisher** CBS 01-738 8181

## BBC
### MAZE

I must admit that from the cover of the box, Maze looked to be about as inspiring as its title: the old 3D chase format when you run along corridors which look like partitioned-off offices, meanwhile being pursued by red meanies, blue meanies, or whatever colour is left over from the micro's palette. But while Maze is in fact little more than that, it does go to show that a simple idea that is well-implemented can keep you enthralled.

The game begins with lift-doors opening and you stepping out into the first maze in a multi-level security system, each level being patrolled by robot guards. Pressing the V key gives you a bird's eye view of the maze, but only the portions of it that you've visited, so right at the start all you'd see would be the symbol for the elevator doors, one or two walls, a couple of robots buzzing about, and a green arrow representing you and pointing the way you're facing.
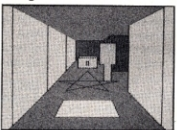


Your lives are indicated by three green arrows at top right of screen, and these also serve as a compass, moving round as you move your view-point to left or right.

As you travel and re-view the maze, it slowly gets filled in, and what you're looking for are three coloured squares, representing identity tags. These are on the floor, and the T key takes one when you come across it. With all three in your possession, you must find the iridium box (or make your way back to it if you've already passed it), and drop the tags. This opens the box to give you a key, allowing you to return to the elevator and ascend to the next floor . . . which is naturally even worse than the one you just left.

This would all be fairly straightforward, were it not for the robots. They're not super-intelligent, but you have to keep a constant watch on their movements otherwise they can sneak up and blast you from behind. You also have to keep an eye on the number of bullets you have — you start with three and must replenish your stocks by passing over a power-point, represented by pentangles on the floor of the maze — again, they're not shown on the plan until you've located them.

The keyboard controls are a little clumsy, all being grouped together in a huddle — many a time I wasted a bullet when I merely wanted to check the map. You can use a joystick too, but the game is made by the speed with which you move through the maze, the warning noise you get for a robot's approach, and the all-round convincing nature of the excellent action.

Like a mini-adventure in graphics, Maze had the old heart pounding nearly as much as the fingers. Who needs Elite?

Mike Gerrard

> **Rating** 9/10
> **Price** £9.95
> **Publisher** Acornsoft
> 0223-316039

## SPECTRUM
### MATCH DAY

No-one yet has managed to produce a piece of Spectrum software to rival Commodore's International Soccer cartridge, but here's Ocean's attempt at blistering 3D action with Match Day.

There is a bewildering array of options available, making you wonder how there's room left for the program itself, so let's deal with those first. It supports a Kempston joystick, and you can support any team you like by changing the eight available names. For keyboard control you can select your own keys, this being done by a lovely routine displaying the Spectrum keyboard on screen, and you can each half of your chosen match lasting five, 15 or 45 minutes.

There are three skill levels, you can have a one-player or two-player game, or even an eight-player knock-out tournament (though if the result here is a draw then a winner is picked randomly). Finally, you can change the team's colours, as well as the background, by running through the Spectrum's palette. Short of an action replay and Jimmy Hill's pontifications, there's not much missing from this extensive list of options.

On the whole, though, I'd rather have seen fewer options and better action.

The opening's a little tedious — do you really want to sit through the sight of all 22 players running out every time you start the game, to an inaccurate rendering of the Match of the Day theme?

In the top right-hand corner a clock ticks away, while across the back bob the heads of the crowd in the stand. Control is always with the player nearest the ball, this switching automatically as the ball moves about.



If you have 20/20 vision and a very quick eye you might be able to spot the player you're controlling as his socks change colour to match the rest of his outfit. However, by the time you've spotted the change of hue he's probably lost the ball anyway.

A great number of features are taken care of automatically, such as kick-offs, corners, and goal-kicks.

If taking a throw-in, there is a good deal of control you can exercise over the player you've selected to make it (or the goal-kick, etc).

There are three strengths of shot or throw, and three directions to choose from.

The action is a little slow, the choices almost overwhelming, and while this probably just has the edge on Artic's World Cup, I can only end where I began: no-one has yet managed to produce a piece of Spectrum soccer software that is a serious rival to Commodore's International Soccer.

Mike Gerrard

> **Rating** 7/10
> **Price** £7.95 **Publisher** Ocean Software
> 061-832 6633

# TMS GETS A SPIN

**Make your musical dreams come true with The Music System. Simon Williams says this music generator beats the competition hands down.**

The 1984 prize for software package design goes to *The Music System* TMS by my reckoning. Not only is it the most comprehensive synthesiser software for a home computer, but it beats most of the competition with its intelligent use of graphic symbols (icons) and the way it groups and sub-divides its functions.

*TMS* is available either on two cassettes, or on a 40/80 track disk, with a further library disk of jolly tunes. It comes with an excellent 76-page manual and a function key strip.

### In use

I used the disk version of *TMS* but differences between the two systems will be pointed out where appropriate. On booting up the main disk, the 'control screen' appears. This is your first look at the style of display adopted throughout. It consists of five large icons indicating the various modules of the system, a strip showing the title and a piece of music manuscript across which notes scroll smoothly from right to left, echoing the display used by the Editor module. The five icons represent the Editor, the Keyboard, the Linker, the Printer and the Synthesiser. The space bar highlights each icon in turn in reverse video and the Return key will make the selection. This technique is repeated within each module for selection of items from a given menu.

The Editor is essentially used for entering music note by note on a conventional pair of treble and bass staves. The initial menu covers system parameters such as the name of the current music file, key signature, tempo and number of bars entered in each voice. There are four voices, corresponding to the Beeb's sound channels, with the fourth being used for percussive sounds (not available on cassette). A composition previously entered, or any of the library pieces (of which there are many) may be played in up to four parts from this menu. Once the main editor
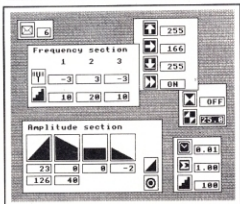

Complex settings of the Synthesiser.

has been entered only the selected voice is heard on playback.

An interesting feature which can be called from this menu allows you to tranpose a piece of music automatically. This can be done from any key to any other, assuming none of the transposed notes falls outside the pitch range of the system. The manuscript display is updated accordingly. The main Editor allows entry of individual notes by positioning an arrow cursor, and using the up and down cursor keys to shift the note's pitch and the Q and W keys to change its duration. This proved very easy, since it is possible to play the music back at any stage. The volume and envelope of each note and the time signature and tempo may be altered as you wish.

The Synthesiser is the most complex of the five modules as it deals with the enveloping system of the BBC micro. *TMS* struggles bravely to sort it all out and provides three levels of display. The first level, like that on the Editor, allows system parameters to be altered. Two sets of 15 envelopes may be maintained in the system at any time and individual envelopes may be copied or swapped between the two sets, which allows great flexibility. Files of envelopes may be saved in either 'music' or 'BBC' format. The former is for use within the system, but the latter allows the envelopes to be saved in a form that may be accessed straight from Basic — useful if you want to use *TMS* envelopes in your own programs.

The second screen display shows all the envelope parameters divided into the appropriate frequency, amplitude and timing sections. Any parameter may be altered by selecting it and using the Q and W keys (good to see consistent use of the same keys throughout the system). Switching from one section to the next (space bar again) puts the cursor onto the parameter within the section that was last altered. This allows easy alteration of a pair of parameters

within different sections to see how their varying combination affects the overall sound. The third level of display shows the actual frequency and amplitude graphs. The parameters may be altered from this screen too.

The Keyboard module allows you to use the QWERTY keys on the BBC to play and record music 'from the source'. To this extent it is a better executed version of previous music processor programs. Here, though, there is an on-screen animated metronome, a keyboard display which shows you the notes as you hit them and a full digital recorder which copies your magnum opus as it all flows out. The current volume and envelope are displayed, as are bar graphs of the number of notes played in each voice.

The Printer module reproduces manuscript on an Epson compatible printer. It produces draft or manuscript quality printout at different speeds.

The Linker module attempts to overcome the only shortcoming of *TMS*, the rapid use of available space. By switching to a Mode 7 display and loading and linking several files, long pieces can be
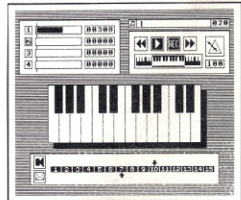

Keyboard 'play' display.

played from their component parts. Indeed, the library file named 'Longest' lasted well over five minutes and wasn't a protracted funeral march.

### Verdict

I haven't yet explored the whole system. Although the possibilities of obtaining music from the BBC may have been 'limited only by your imagination', the advent of *TMS* brings this computer cliché much closer to the truth.

## REPORT CARD: 1 TO 5

| | |
|---|---|
| Features | ●●●●● |
| Documentation | ●●●●● |
| Performance | ●●●●● |
| Overall value | ●●●●● |

**Name** The Music System **Application** Music Generator **Price** Cassette £12.95, disk £24.95 **Publisher** Island Logic 01-741 1511 **Outlets** Retail.
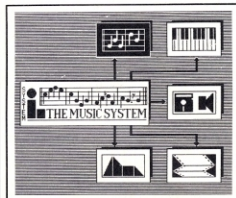

Starting point: the control system.

# WORD-PERFECT

**The word processor that claims to have everything is checked out**
**by Geof Wheelwright**

With all the *Wordstars*, *Microsoft WORDs* and *Easywriters* in the world, you might wonder if anything else could be added to the electronic wordsmith's toolbox. However, a US company has done just that.

Rather than taking the popular route of developing a minimalist word processor and selling it cheaply or adding it to a group of other specialist applications in the form of an integrated suite, Samna has tried to put every conceivable word processing feature in one package, *Samna Word III*.

## Features

Features include full footnote and indexing facilities, multiple documents displayed on screen, print spooling, software selectable international character sets, keyboard-generated box and line drawing, newspaper-style printout in parallel columns, a built-in 'calculator', unlimited horizontal scroll display, spell-checking from an abridged version of *Webster's New Collegiate Dictionary* and a direct typing mode.

The inclusion of several international keyboard configurations indicates a cultural appreciation often lacking in American packages — although a few of the configurations look doubtful to me. The French, Spanish, German and Greek keyboards all seemed straightforward — but the inclusion of English (UK), English (American) and Canadian keyboards is an example of overkill. (The Canadian keyboard allows you to generate all the characters needed in both French and English).

Not everyone needs all *Samna Word III*'s features — or wants to pay the whole £485. So, the company is offering two other versions; *Samna I* at £260 and *Samna II* at £395 — each of which strips some of the features off the *Samna III* configuration.

## Documentation

The documentation is thick and comprehensive. It comes in the standard ring binder and divides into seven sections; a 'road map', visual guide, introduction, alphabetic function description, appendices, index and 'tips and tricks' section. The size is a bit intimidating, but assimilating the documentation is eased by the use of the unique 'road map' and visual guide.

Although I didn't make much of the 'road map' — a series of sample texts showing ordinary printer's editing marks and where information on them

could be found — they would be helpful to the novice. Much more help was the 'visual' guide, which uses a combination of screen shots and symbols to provide an alternative to the standard table of contents or index.

The other plus was the existence of 'how-to' boxes, which step you keystroke-by-keystroke through what you must do. This doesn't make much difference on simple commands readily accessed with a keystroke or two — but on something like mailmerging, it is a boon.

initially disconcerting. (Most IBM packages put Help on F1 and Undo or Cancel on the Escape key). Once settled in, however, *Samna Word III* started to impress. For a start it is incredibly quick.

Experimenting with some of the unique features proved equally satisfying. To make boxes and enclosures on screen, for example, you only need hold down the Control key and one of the cursor keys. Carriage returns are moved about as needed to make the boxes
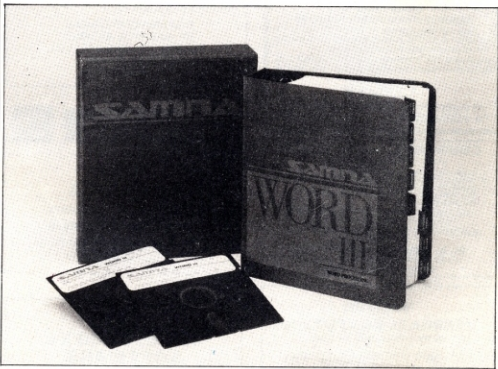


Samna Word III — in a crowded word processing market, it sets out to do better than the rest.

## In use

The first thing you notice is that it takes a minimum of 256K RAM and *two* disks to get started. The first hints that a meaty package is at hand.

Not only do you need two disks to get started, but the printer drivers, dictionary and tutorial also have disks to themselves.

Once booted up, the program presents itself as a blank screen with column, page, left and right margin and tabbing details along the top and something resembling wallpaper on either side. This entry-mode is known as the 'scratch-pad' area, which means you're working in memory and don't have to immediately save a file name to your work. Once you start to type enough text to approach the limits of that memory — or you request to save the file — you are prompted for a filename and come out of 'scratch-pad' mode.

Operation is much the same as on most IBM word processors, although I found the placement of Help on the Escape key and Cancel on the PRTSC * key to be

'whole' without disturbing any text inside them.

The other notable plus was the extensive dictionary — but that plus was marred by the fact that it requires lots of memory to use (more than the 256K in my little machine) and resides on a separate disk from the program. It's one of those trade-offs between power and accessibility.

## Verdict

*Samna Word III* is impressive, with many more features than there's room to mention. It lacks a word-count facility, but then considering how much else is in the package, I won't quibble.

## REPORT CARD: 1 TO 5

| | |
|---|---|
| Features | ●●●● |
| Documentation | ●●●● |
| Performance | ●●●● |
| Overall value | ●●●● |

**Name** Samna III **Price** £485 **Application** Word processor **System** IBM PC/AT or compatible +256K RAM **Other versions** None **Outlets** CBIS Intl 01-930 6083.

# MICROSHOP

# Amstrad

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

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

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

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

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

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

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

# Acorn

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

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

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

**BBC Z80,** second processor plus software pack. Also two months old, selling for only £595. Tel: Brighton 36359.

**Wanted BBC B** 0.S.1.2 FDFS 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 Heathbrow Road, Oaklands, Welwyn, Herts AL6 0QG.

**Selling** Electron A/D converter, flashgun, sunlamp, darkroom exposure meter telescope, vintage records, Spectrum 1/0 Port, racing bicycle. Sell or swap for Psion. Tel: 0408-21870.

**Acorn Electron,** £60 worth of software, leads and dust cover. Total cost £270, sell for £190 ono. Tel: 0233 27457.

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

**BBC disk drive,** SS 40TK, 100K, (200K double density). Opus case with PSU and space for second drive, sell £150. Tel: 06285 21206 (evenings).

**BBC B** with Wordwise, graphics ROM, lots of software, books, joystick. All for £300, Microvitec 14in colour monitor, £150. Tel: Simon on 0732-833108.

**BBC Originals** for sale. Arcade Action, Philosophers, Quest, Arcadians, £5 each. Also games to swap including Donkey Kong and Donkey Kong Jnr from Atarisoft. Tel: Steve on 0073-34513.

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

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

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

# Commodore

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

# PCN Billboard

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

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

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

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

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

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

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

**Commodore 64 Software Sale:** Football Manager, Chinese Juggler, etc. Also Pixstick lightpen with paintbox program + 3 games for £25. Tel: 082374410 ask for Steve!!

**Commodore 64 Software.** Swap Lazy Jones, Star Commando, UGH! Music 64, Gridtrap, Skramble, Hunchback and more. Steve, 2 Ashover St, Gorsehill, Stretford, Manchester M32 0HG.

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

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

**CBM 64 + 1520 Printer/Plotter + C2N** cassette + joystick + 5 books (including CBM 64 reference guide). Games: Skramble, Snooker, Qbert (cost new £400+). Well sell – all originals. Tel: Birmingham 378 3137.

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

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

**Commodore 64** disk software for sale. High flyer, deadline, Jumpman, Zork I, Port Apocalypse, Dungeonquest. Cost £115, sell for £70 ono. Tel: Andrew on 01-868 7526.

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

**Wanted CBM 64** software tapes – intro to basic – games – what have you – to swap. Write Moffat, 42 Pennine Rd, Woodley, Stockport, Cheshire SK6 1JS.

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

# Oric

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

**Printer/plotter Oric** MCP40 Printer (unused) £85 ono. Oric software, Tansoft CAD (£7), Author (£10). Various

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

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

**Oric Basic** V1.1 PROM for your Oric-1.1 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 303586 eves.

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

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

**Oric 1 48K** VGC, Hobbit, Galaxians, Ice Giant, M.R.K., Trek, Probe 3 Fantasy, Toad, Ultra Chess. All original. Offers? Stereo radio loads any game at 2400. Tel: 804 98958.

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

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

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

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

# Spectrum

**Spectrum 48K** £100s worth including Sabre Wulf, Beaky, Games Designer, Scrabble, Kempston conversion tapes. All originals £49 the lot ono. Tel: Peter 01-422 7583 evenings.

**Spectrum 48K** DK 'Tronics keyboard Microdrive Interface 1, Zxprinter Interface II, 4 × Microdrive cartridges, quickshot II £150, software books, courses mags. Sell for £280. Tel: Sandwich (0304) 613424.

**Spectrum software** Atic Atac, Penetrator Pimania Groucho, and many more – all originals £3 each. Tel: 061-775 3213.

**Spectrum software** 5 swap or sell. Valhalla £5, Kong Galaxians, Pogo, Atic Atac, Fred, £2.50 each. Tel: Nigel on 01-643 8126.

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

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

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

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

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

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

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

**48K Spectrum** ZX printer, interface 1, Microdrive, five cartridges, tape recorder, RS232 printer interface board and cable, case, £120 worth software, £200. Tel: Sean 01 061 264 3439 after 6pm.

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

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

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

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

**Spectrum,** only six months old, two 48K RAM packs and dust cover. All manuals and leads supplied. Quick sale £120. Tel: 01-891 6496.

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

**ZX81** Forth ROM with all manuals. Hardly used £25. Tel: 01-733 7188 after 5pm.

**Spectrum Software:** Scrabble £8. Games Designer £7. Match Point £4. JSW, Visions Snooker, Trashman, Bugaboo £3.50. Jetpac, Cookie, CDS Pool £3. Tel: 021 453 8876.

**Spectrum 48K** only six months old VGC. Some software, tape recorder £120 ono. Tel: 01-590 4849. Write T. Holloway 32B Belgrave Road, Ilford, Essex.

**Spectrum 48K** ZX printer, data recorder, transform keyboard (needs repair) software, books, magazines, £150. Feguson IX TV £140. Tel: 01-8864797.

**Spectrum 48K** + Turbo interface with ROM cartridge port + Quickshot 2 joystick + 150 original boxes £150 ono. Tel: 031 337 0200 after 4pm.

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

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

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

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

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

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

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

**Spectrum Pyjamarama** swap for American Football or Battlecars. Also Valalla and Wild Bunch for Eureka (other games considered). Tel: Sandbach 7054.

**Spectrum 48K Software** for sale. All originals, half price, including Manic Miner, Sabre Wulf, Cyrus Cuess, etc. Tel: Holywell 0352 712444. **Sinclair Interface 2,** 2 Microdrives, 8 cartridges, manual + all leads. As new (boxed). Worth £155, sell for £100. Tel: Romford 42574.

# PCN Billboard

## Apple

**Apple II+ Look-a-like** Never used, some software on disks and cassette, including Vixelic, data recorder all 12 mths old. Genuine reason £350 ono. Runcorn 77140. Bargain.

**Wanted Apple software.** Send list of prices to Ayo Lawani, Downside School, Stratton on the Fosse, Bath BA3 4RJ. Please include phone number.

## Peripherals

**Alphacom 32.** printer for Spectrum, £50 ono. Also DK'tronics double joystick interface £10 and large collection of Spectrum software. Tel: 01-203 0324 (after 6pm).

**Spike** speaking Vectrex cartridge £10. Also Acetronic cartridges Shoot-Out, Tank/Plane Battle £8.50. Soccer, Air/Sea Attack £5. Excellent condition packaging. Everything includes postage. Tel: 01-802 8724

**Prestel adaptor** and Colelo vision TV game. Sale or swap. Poss Spectrum WHY. Tel: 01-223 5491, (day or night). Peter.

**Intellivision** for sale with cartridge £55, also Astromash, Armourbattle, Lock-'n'Chase, Subhunt, Golf + Advanced Dungeons And Dragons, £10 each. Excellent condition. Tel: 01-802 8724 (eves).

**Microvitec** colour monitor 14in 1441 vgc. Will swap for portable colour TV or any Spectrum hardware. Mr Rooney, 7 Redhill Ave., Southdene, Kirkby, Liverpool.

**Swap excellent** Honda 250cc, T-reg. bike for dual 80 track drives for BBC. Will also sell for £250. Tel: 01-961 1655 (after 5pm — Derrick).

**VTX 5000 Modem** for Spectrum. Cost £99, sell for £60 ono. Connector included. Tel: (Bodfari) 0745 75425 (after 6pm).

**Colecovision cartridge** Qbert £10. Intellivision cartridges Tutankham, Superscobra, Novablast, White Water, Safecracker £10 each. Eight others from £8 each. Full details. Tel: 01-764 4075 (eves).

**Epson MX80** type 3 printer £150 ono. Also parallel interface for Apple. Tel: Anthony 01-578 7704 (after 7pm).

**Epson MX80** 16k portable with printer and micro cassette unit. As new £320. Tel: 0904 760351 (after 6pm).

**Wanted, Polymorphic system 8813 boards,** expecially 16k RAM. Would like to hear from users of 8813 or system 88. Tel: 0602-506101 ext 3136, 0602-251920 (eves).

**Brother HR-5** RS232 printer, with mains adaptor £150. Tel: Glasgow 041-959 6125 (ask for Gregor).

**Selling electron A/D** converter, flashgun sunlamp, darkroom exposure meter, telescope, vintage records, Spectrum I/O port, racing bicycle. Sell or swap for Psion organiser hardware. Tel: 0408-21870.

**For sale Electron A/D converter** flashgun sunlamp, Zoom telescope 40 approx. vintage records, darkroom exposure meter, Spectrum I/O port, racing bicycle, Sinclair P.S.U. Tel: 0408-21870.

**Prism VTX 5000,** modem as new — unwanted gift. £75. Tel: (Bradford) 0274 81440 (eves — ask for Brian).

## Sinclair

**ZX81 16K,** plus full travel D.K. Tronics keyboard and two software titles. Good condition, £45 ono. Tel: 01-854 0129 evenings.

**Spectrum** 6 months guarantee £75. Also six games tapes £20. Tel: 01-205 6919.

**Swap Spectrum 48K,** Interface 1, Microdrive, 4 cartridges, software, dust cover, (Spectrum under guarantee). For Commodore 64 with c2n unit. Tel: 01-907 1204 (Douglas).

**48K Spectrum,** £750 software, books, magazines and cassette recorder sell for £350 ono. Write to S. Royal, 33 Ealing Park Mansions, South Ealing Road, London W5 4QH.

**Sinclair Spectrum 48K** with nine original games. As new. With magazines and tape recorder. £140 ono Steve. 12 Church Street, Tranent, East Lothian, Scotland.

**Wanted. Private buyer** requires cheap 48K Spectrum would consider a damaged one. Tel: 01-855 5585.

**A Spectrum programmable** joystick interface for only £16? impossible but true! Stonechip programmable joystick interface, boxed and full instructions, excellent condition. Tel: 027-785 291 after 5pm.

**48K Spectrum** + £180 software + £50 books + reliable cassette deck + joystick + interface, mags etc. £139 ono CBM1541 drive new + £220 software inc Flight Simulator II. £195 ono 01-863 5113.

**48K Spectrum** and software with Interface one and Microdrive including two cartridges. Might split. £180 Tel: Warefield 255894 after 6pm.

**48K Spectrum** with Fuller FDS keyboard Currah Speech joystick with Kempston interface and sound amp software £250. Flat 7, 18 Victoria Park, Dover, Kent.

**Spectrum 48K wanted:** and/or interface one and/or Microdrive, half price offered. Tel: (daytime) 051 424 5558.

**Wanted Spectrum** faulty or broken, no guarantee needed, for educational experiment Sensible price. Tel: 01-250 1930 ask for Joe.

**Epson MX-80** Type III printer, £150 ono. Also Apple parallel interface card £30. Tel: Tony 01-578 7704 (after 7pm).

**CY-90R** semi-professional cassette deck — cost £499. Boxed, perfect condition. Offered £215 by dealer, so swap for £250. Tel: 01-863 5113.

**Microvitec Cub** monitor, model 1451 M for BBC, cost £310 in July, medium resolution, as new. £240. Tel: Basingstoke 51623.

**Microvitec Cub** monitor, model 1451 as new cost £310 in July. Selling for £260. Tel: Basinstoke 51623.

**MPI disk drive,** 501B SS/DD bare drive. No case or p/s, perfect condition. Used less than 2 mo. £60. Tel: Chesham 0494 784409 (after 9pm).

**Epson MX-80,** type 3 dot-matrix printer. Very good condition. Expensive forces sale £150 ono. Also Apple parallel interface. £30 ono. Tel: Anthony 01-578 7704 (after 7pm).

**Casio FX700P** with printer and cassette interface. Upgrade forces sale £100, tapes, manuals all accessories. Tel: (Leic) 0533 671228 — Charles.

**Epson MX-80** type III printer £150 ono Also Apple parallel interface card £30 Tel: 01-578 7704 — Anthony.

**Silver Reed** I/F44 printer interface and cable. Connects your electronic type-writer to the BBC/B computer £60. Tel: 01-462 1379 (eves).

**Acoustic couplers** — pair of AV 311's. Suitable for PTN comms. Reasonable offers considered. Tel: 0884 259392.

**Mitsubishi** 40/80 track 400K disk drive for BBC, with disc doctor and over £1,000 of software, only £230. Tel: 05827 69152.

**Brother HR5** printer with RS232, many features, as new, including mains adaptor. All for only £130. Tel: 0325-312417.

**Shinwa CP80** printer sale, 6 months old, boxed, as new. Excellent condition £150. Tel: 01-907 8661 (after 5pm).

**Microvitec Cub** monitor for BBC model 1451, as new. Cost £310 in July, £250 or near offer. Tel: Basinstoke 51623.

**BBC 'B' Quickshot** joystick, cost £20, sell for £10. Complete conversion, still boxed as new. Tel: Mark on 0472 695906.

**Watford DFS ROM** for sale, complete with Watford disk filing system manual, £22. Tel: 041-636 1239 — Tony.

**Brother HR5** printer with RS232, many features, and including mains adaptor. Ideal for BBC, QL, Spectrum etc. Only £120 ono. Tel: 0325 312417.

**EPROMS**—2764 (8K). Ten unused, only £5. Suitable for BBC. Tel: Julian on 0423 68383.

**Wanted:** about six "Disk bank" or these "Floppy Manager" 5.25in disk boxes. Tel: Keith on 021-328 6853.

**Video Genie** expander EG 3014. Gives full 48K user RAM. Also printer and disk interface. S100 bus. £85. Tel: Winchester 0962 880312.

**Swap Cheetah R.A.T.** infra-red joystick and interface for Quickshot II or Wild joystick + interface. Tel: 01-341 3355 — Niall.

**Box of ten** unused 5.25in blank disks. Single sided, double density. Unwanted gift, accept £12.75 the lot. Could post if necessary. Tel: 0244 675717.

**Sinclair Spectrum 48K** with tape deck and Kempston interface and joystick £70 of software, books manuals, leads. £140 ono. Tel: 061 881 1144.

**Spectrum software** large selection sell or swap. Send s.a.e. for list. Wanted any Spectrum hardware. Mr Rooney, 7 Redhill Ave, Southdene, Kirkby, Liverpool Loans.

**Spectrum games:** Colditz, Apocalypse, Voice Chess, P1-eyed, Olympimania, I Ching, Firetop Mountain, £3 each or swap for CBM64 software. Tel: 0946-822 651.

**Spectrum 48K** data recorder joystick interface and joystick, over £70 worth of software, swap for Atari 600XL or 800XL and recorder with games joystick. Tel: 061 881 1144.

**Spectrum 48K** two months old complete with its own guarantee and many games including Fighter Pilot, Hobbit, £100 the lot. Tel: 01-733 6827.

**48K Spectrum,** Interface 1 Microdrive and 2 cartridges, Printer, Currah Speech, Interface II, joystick, 2 roms, 12 original games, cassette recorder, plus all leads and manual. Tel: (0803) 215163 worth £500 + sell £350. ono.

**Q.L. Swap** (latest version plus 12 cartridges, leads, manual, Psion chess) swap for B.B.C. Model B and disk drive — C. Richardson 32 Abbeydale Oval, Leeds. Tel: (0532) 590101.

**Spectrum 48K** software Valhalla £4, ZZOOM £3, 4D Terror-Daktyll £2. Past £3, Tank Trax £1.50 The lot for £10. Tel: by 552661.

**ZX81, 16K,** good condition with manual, mastering machine code, software titles includes chess, 3-D Monster, Star trail etc. £40 ono. Tel: 01-993 6026 evening after 8pm and weekend.

**Spectrum 48K** with full-size keyboard, 16 in 1 metal case, video monitor output, books, software, manuals, leads, customised case, superb. £140. Tel: Howard, Margate 0843 295284, anytime.

**Swap Spectrum software** 350 titles send your list of games and adventures solved to: Allan Hern, 19 Alum Chine Road, Westbourne, Bournemouth, Dorset.

**16K Spectrum** 32K Rampack, Dustcover, original software, machine code book, and magazines, must sell, good offer over £100. Tel: Mark Asteris on Emsworth 5897.

**Spectrum 48K.** Lo-Profile keyboard, 53 keys. As new/original package — £40. L.A. Davies, 44 Daventry Close, Mickleover, Derby DE3 5QT.

## Others

**Employer Wanted,** graduate business studies. Diploma in computing. Also Dip. office management seeks relevant vacancy. Also possess 3-yr. Book-keeping experience. Tel: 01-686 2041 Mike.

**Unwanted Prize:** Memorex twin-pack IS2D-40 Flexi-disks Welcome offer from someone who uses?? Postal replies only: sae's appreciated Charles Fraser, 7, Grantley Street, Glasgow G41 3PT.

**EG2000 colour Genie** 32K plus cassette recorder with leads and manuals, users group mags and books, plus software Kong, Skramble etc. £130. Tel: Leeds 497840, after 5pm.

## 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:

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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.

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Sinclair delivery promises have always been good for a laugh (as long as you aren't on the receiving end), and the official Spectrum upgrade is no exception. There are two possibilities: either you perform the upgrade yourself from a kit, or you send your Spectrum to Sinclair and let the experts deal with it. If you do the job yourself you're asked to allow 28 days for delivery; but if you opt for the full upgrade service you'll get the machine back in 10 days.

This is almost inexplicable — why should it take 2.8 times as long to put a box of components into the post as it does to put them together in an upgraded machine? PCN's team of experts has the answer. To get your kit of parts Sinclair's experts have to dismantle a completed Spectrum Plus.

Arch-rival Commodore avoids this kind of trouble by producing totally incompatible, non-upgradable machines; but that's on the home side.

The company is a little over-excited about its new PC-compatible machine. This, it announces, is 'the first stage in its declared offensive on the UK business systems market'. Taken literally, this is nonsense, of course; but is it possible that the 'declared' refers to something else? Our Cricket Correspondent Christopher Martin-Bormann reports:

'On a day full of early promise and a wicket as even as an executive desktop, the Commodore innings opened smoothly with the 4032 and 4096 seeing off the new balls. After steady but unspectacular progress, during which the 4032 was dropped several times in the gulley, it was replaced at the crease by the 8000 series.

'But disaster struck the Commodore middle order. The first 8000 was dismissed after many deliveries but few runs, the 500 broke down during the drinks interval, and the 700 retired hurt after blow upon blow to its Porsche-style box.

'The incoming 8096 stopped the rot, and the 700 pluckily came back, but had to retire again after a particularly unpleasant delivery. The Commodore captain finally declared the innings closed, to spare the gritty 700 further punishment.'

LAUGHLINE — The response to the HRH Princess Anne Laughline competition was muted but respectful. Nobody mentioned corgis, horses, or importunate journalists, but there was a touch of topicality about the winner. We discounted Tony Mayne's 'Might One's fingernails get caught between the keys . . .' on the grounds that it went on too long, and settled instead on Donald Grant of Edinburgh's terse, economical: 'When is the christening?' Donald wins £20.

## NEXT WEEK

**Sharp patrol**
Can Sharp make the breakthrough into British businesses with its MZ5600? We find out how much of an edge it has.
**Karma Koala**
Transform your Koala graphics tablet into a handy extra functions unit.



PAL2000 by Mollusc

Who with?

I'm having a love affair over the phone

the computer at the Whitehouse

"I'M A TOSHIBA HX10. I'VE GOT ALL THE BEST BITS FROM EVERY OTHER HOME COMPUTER. AND MORE. I HAVE A 64K MEMORY, LIKE THE COMMODORE 64. A CASSETTE INTERFACE, LIKE THE BBC. TWO JOYSTICK PORTS, LIKE THE COMMODORE 64. A BUILT IN POWER SUPPLY, LIKE THE BBC. 16 USABLE COLOURS, LIKE THE ACORN ELECTRON. OVER 70 FULL STROKE KEYS, LIKE THE BBC. A CARTRIDGE SLOT, LIKE THE COMMODORE 64. A PRINTER INTERFACE, LIKE THE ORIC ATMOS. SOUND OUTPUT THROUGH THE T.V., LIKE THE COMMODORE 64. AN AUDIO/VIDEO OUTPUT CONNECTION, LIKE THE COMMODORE 64. RF BUILT IN LIKE THE BBC. AND: A SEPARATE 16K VIDEO MEMORY, UNLIKE MOST NON-MSX COMPUTERS. 32 SPRITES, MORE THAN MOST NON-MSX COMPUTERS. AND I USE MICROSOFT EXTENDED BASIC, LIKE EVERY OTHER MSX COMPUTER."

"WOW. WITH A SPECIFICATION LIST LIKE THAT. NO WONDER YOU'VE GOT A 64K MEMORY."

You'd expect one of the best-selling home computers in Japan to have a specification list as big as its memory.

But the Toshiba HX10 doesn't just limit itself to that.

It was developed along with other Japanese home computers to operate on one language: MSX. You can swap programs, games, cassettes, even peripherals like disk drives, printers, and joysticks: they're all compatible with every other MSX computer.

All of which makes MSX the system of the future.

So if you want a computer that won't be obsolete in a few years, buy an MSX. If you want one of the best-selling MSX computers in Japan, buy a Toshiba HX10.

**TOSHIBA** **MSX**

# · · MAY WICO BE WITH YOU · ·
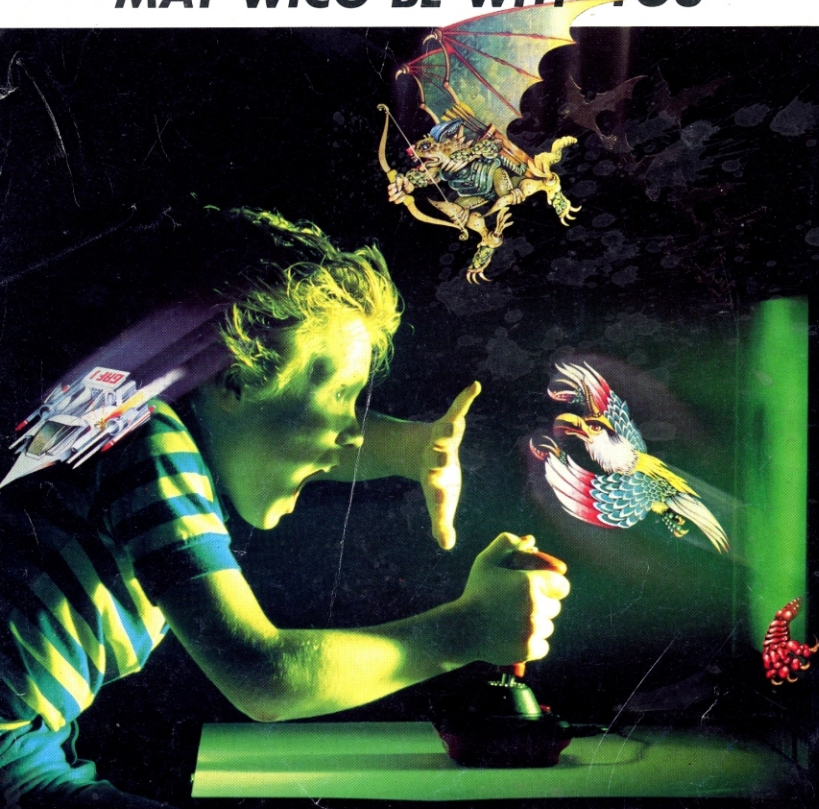


**W**hen you're up against all the evil in the universe, you need the finest joystick. Weak, sticky, slow controls can only lead you to your doom.

You need a Wico® The controls in more than 500 modern arcade games are actually made by Wico® They set the industry standard for durability and performance. And the same arcade quality goes into the Wico® you take home.

Wico® joysticks work directly with the Commodore 64,™ Vic 20,™ all Atari® Home Computers and Atari® Video Games.

Add an interface, and you can connect into a Sinclair Spectrum or Apple II® and IIe® If you have a new MSX computer there's the just released MSX Grip Handle for you.

What do you get? A man-sized handle on a virtually unbreakable shaft. Tough, ultra-sensitive Wico® switchgear. A heavy-weight base. A year's guarantee. And more sheer dodging, chasing and blasting power than ever before.

The Wico® range includes the famous Red Ball,™ straight out of the arcades. The Three Way Deluxe with interchangeable handles. The light but rugged Boss. And check out the state-of-the-art Trackball: many owners use it for serious programming, where it gives them effortless cursor control.

Ask your dealer to let you handle a Wico® Quality (you'll find) costs money.

But if you want to have less trouble fighting your controls, and more power for fighting the forces of darkness . . . only Wico® is worthy of your hand.

## WICO®
### THE FINEST HAND CONTROLS IN THE KNOWN UNIVERSE