

40p EVERY WEEK • No 84 • Oct 27 1984

**PERSONAL**

**Computer**

**NEWS**

Now  
**40p**

**SPOT  
THE DIFFERENCE**



**64 EXTENDED**

A better Basic  
for the Commodore - p56

**BBC EYE**

Image processing  
on the Model B - p39

**INTO THE DUNGEON**

The weekly page  
for adventurers - p20

**PLUS...**

New games for Vic,  
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**MSX  
TWINSON  
TEST**

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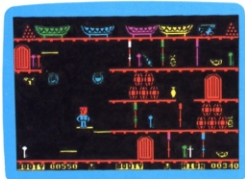
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### MSX lands at last

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All the gossip that's fit to print, as well as PCN's datelines for what's on both here and overseas.

## Spectrum Plus is on time

The Spectrum Plus made its appearance in the shops last week — bang on schedule. Sinclair obviously went to some lengths to avoid any criticism for QL-style delays. But what Sinclair Research calls its 'new' machine is no more than a Spectrum, repackaged with QL-style keyboard, a reset switch, a six-pack of software, and an improved manual.

Priced at £179.95, it is now in the same market as the Commodore 64, the Oric Atmos, and the Acorn Electron.

Nigel Searle, managing director of Sinclair Research, said one reason that people were going for the machines of Sinclair's rivals, and not for the Spectrum, was the micro's lack of a proper keyboard.

Sinclair's response is what it calls 'a full professional, typewriter-action keyboard'. It uses the same membrane mechanism as the QL with hard keytops.

The QL keyboard was criticised at launch because of its

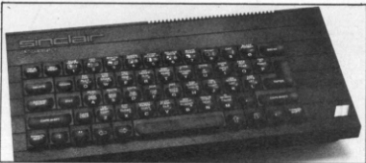
unsuitability for touch typing. The Spectrum Plus that arrived in the PCN office displayed a new hazard — on turning it upside down some of the keys fell off.

Sinclair says that it is because the press were sent pre-production models and that the fault will be cured in the models sold in the shops.

When asked whether owners of old Spectrums will be able to upgrade their machines to the new standard, Mr Searle said this had been considered, but only for after the Christmas rush.

Sinclair says it will be producing 10,000 machines a month for the next three or four months, and with approximately the same for the QL and the Spectrum (minus?) this might produce a bit of a glut on the market over Christmas.

An unusual aspect of the marketing strategy for the Plus is that it is going directly into the shops, just like the Amstrad and MSX machines.



Spectrum Plus — a refresh in QL clothing.

## Acorn Video reaches speed of light

The Acorn's Computer group last week launched a new product, and a new company (Acorn Video Ltd) to run it.

The name of the new product is Acorn Interactive Systems (AIS), using a Philips Laservision standard player for video disks controlled by a BBC Micro. Total price is around £3,500.

The system works in the same way as standard remote controls via the Beeb's user port. The system consists of a BBC, a sideways ROM, an interface cable, some disk drives, a monitor and some disk-based software (Acorn Author and MicroText) to allow you to create videos from existing disks.

One of the features of the system is that it allows you to mix BBC screens (any mode) with pictures from the video disk, by the addition of a Gen-lock board, which synchronises the BBC video output with the laser disk player output.

Acorn Video says it will be selling the AIS only as a system, and not as an add-on. This will upset a number of people in the educational establishment as they will need to shell out another £3,500 for hardware they already possess. The system will originally be aimed at industrial training and the armed services.

At the moment, there are no plans to allow you to upgrade your BBC, even though it is really only as difficult as attaching some of the currently available peripherals such as RAM expansions etc. The excuse for selling only complete systems is due, the company says, to the fact that it wants to make a killing on the market before developing a more advanced system for home use.

The other problem is that since it is, as yet, a small company, it would not be able to deal with any incompatibilities or problems that may arise from people doing their own upgrades.

Exclusive

## Elite programmers auction Z80 rights

The ongoing story of Elite, Acornsoft's megagame for BBC and Electron, took a dramatic turn this week. Versions for other machines are starting to show on PCN long-range scanner despite the reception given to such suggestions last week.

A firm of London agents called Marjacq Micro is representing Elite programmers Ian Bell and David Braben. PCN can reveal exclusively that the Z80 rights to the program are up for auction. That means Spectrum owners can look forward to a version, while Amstrad and MSX translations are also possible.

The auction promises to be a fierce, cut-throat affair with bidding beginning on November 1. Already, several software houses have expressed strong interest in the only game ever to make the cover of PCN. Elite is in the PCN Charts at No 3 — a remarkable achievement for a game running only on the BBC. The Electron version was released at the end of last week, which will surely help boost the game's popularity.

A spokesman for Acornsoft expressed surprise that rights to other versions were being discussed, but the company would only say that it had a 'standard' contract with the programmers and was awaiting developments.

Marjacq Micro, however, responded swiftly and quoted an exclusion clause in the contract giving Bell and Braben the right to 'develop and market' versions for machines other than Acorn computers.

This would indicate that 6502 versions — including Commodore 64 and Atari — may not be far away, although only Z80 rights are being discussed at the moment.

Whoever has the 6502 rights is sitting on a potential fortune in the Commodore 64 version but they'll have to move fast. If left too long, an 'official' version could lose out to the clones that are sure to follow Elite's success.

Jacqui Lyons, managing director of Marjacq Micro, also revealed the company has the game rights to Frederick Forsyth's latest bestseller, The Fourth Protocol.

She says the combination of computer software and internationally famous authors is already attracting worldwide interest.

But for the moment, it's all eyes on Elite. Watch this space...

## AGF recalls erratic joystick adaptor

AGF Hardware is recalling early models of its Protocol 4 joystick interface.

AGF says some early versions have an unreliable Kempston joystick operation mode and is offering to replace them free of charge.

To find out if you're one of the unlucky few, AGF recommends typing in the following program line with the Protocol 4 attached to the Spectrum, its mode switch in the down position, and with the Kempston card inserted.

Print IN 31, press Enter and if anything other than 0 is printed, the interface should be returned to AGF Hardware FREEPOST, Bognor Regis, W Sussex PO22 9BY.

## Patents war over BBC RAM boards

The boxing gloves are on for yet another legal battle. In the blue corner we have Aries Computers and in the red corner Watford Electronics and Raven Micro Products.

Aries Computers has accused Watford and Raven of 'infringing its patent' on the design of its 20K RAM board for the BBC. A spokesman from Aries said: 'We are not sure whether we're going to take legal action, but we're certainly not happy with the situation.'

Aries' accusation has caused angry reactions from Watford and Raven. Chris Sykes, managing director of Raven Products said: 'How can Aries patent paged RAM, a concept that has been around since the '60s.' On the same lines Mr Nazir Jessa, managing director of Watford Electronics said: 'This is like patenting the wheel.'

So what's all the fuss about? Well, Aries has produced a 20K RAM expansion board called the Aries-B20 which cost £79. It claims Raven Micro Products and Watford Electronics have produced boards of the same description.

The Raven-20 at £69.95 is a 20K RAM add-on that comes with an expansion board and sideways ROM.

Watford's device has 32K of RAM, is half the size of the Aries and can be used as a printer buffer at £69.

Whatever the outcome of this battle, the BBC user will not be spoilt for choice.

Aries case is somewhat heated at moment. It has published its application but has yet to have a patent granted. This can take a year or more to come through.



**ELECTRONIC BURGLAR** — A 21-year-old hacker armed with his BBC and modem has been challenged to crack a key American defence system computer. The challenge will take place at 11am, October 25 in the Alexander Pavilion, Alexandra Palace, London, during the four-day Electron and BBC Micro user show. The hacker, whose identity is being kept secret claims he will finish the job in 15 minutes. If he's right a report will be sent to the US authorities revealing his method but not his identity.

## Danger Mouse is on the loose again

The Ministry of Defence has backed down in a row with two Birmingham inventors over whether an add-on mouse for home computers poses a threat to national security.

The two, student Simon Goodwin and businessman Graeme Kidd, filed a patent application in June for a new type of mouse to cost around £20 and work with most makes of home micros.

A few weeks later they received a short note from the Patent Office saying the application had been seized by the MoD and if they discussed their invention with anyone they could face a £1,000 fine or two years in jail.

The Ministry refuses to comment on why it has seized the application. It cannot say what it wants to keep secret about the mouse because it is a secret!

It is likely, however, that the Ministry's concern is that the mouse's internal mechanism

resembles that of tracker balls. And tracker balls are now commonly used to target battlefield missile systems.

Goodwin and Kidd took their case up with various industry figures and TV journalists, and the MoD agreed earlier this month to look again at the invention. It has relented and decided they could go ahead and sell the mouse.

'We were all set to get it ready for the Christmas market then we got stamped on by the Ministry and now we are too late,' said Mr Goodwin.

'It is a bit difficult to raise money when you can't say what it is for,' Mr Kidd added.

The pair have had a narrow squeak with the MoD but now hope to roll out the mouse in the new year.

This is not the first time that micro innovators have run foul of the MoD. Jim Lamont wanted to patent a software security device only to have his patent application seized (issue 51). In his case the MoD has refused to back down.



## RML offers schools micro bargains

In a bid to keep pace with the popularity of BBC machines in primary schools, Research Machines Limited is offering special deals on its range micros and software.

For £499 — a saving of £200 — schools can pick up a RML 480Z and the RML 480Z (L5), with silicon disk at £624. Floppy disk drives start at £299 for a single drive/double density rising to £649 for a twin drive/quadruple density. Unfortunately, you're only allowed one machine and disk drive per school.

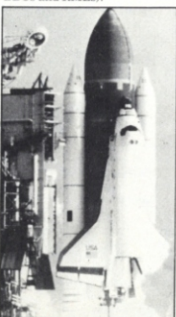
In addition, you can hook up to four machines to a Shared-Disk system to produce a type of network. The Shared-Disk system, with software and one transceiver board costs £275; alone, the transceiver board is £33. And for a stand-alone or shared disk you can get WordStar, LOGO, Telesoftware, SIR, Word, Touch 'n' Go, TXED/F, ZASM Assembler, for £149.

● School children throughout the country have a chance to win a five-day trip to America to see the JF Kennedy Space Centre in Florida in a competition sponsored by Microvitec, (0274-390011).

The CUB British Schools Computer Challenge will run for 13 weeks, with the finals taking place in August, 1985. The competition is open to secondary schools with a maximum age limit of 16.

Schools will be asked to enter three contestants as a team.

During the competition they will be given problems to solve on a computer — (most likely BBCs and RMLs).



Lift-off for winning school team.

## Fuller solves its crashing problems

The Fuller FDS is back in the picture, this time under the wing of the company's new owner, Nordic Keyboards. The Fuller Executive uses a buffer to allow you to connect the keyboard while leaving your Spectrum intact.

Interface 1 can also be fitted in by just snapping out a panel at the rear of the case. Nordic also seems to have cured the crashing problems that plagued the FDS.

The keyboard's circuit board technology has been changed from CMOS to TTL, and the power input now goes straight to the Spectrum rather than through the keyboard's circuitry first.

The old-style but improved FDS costs £49.95, while the FDS Executive costs £59.95. Nordic can be reached on 051-548 2220.

## IN BRIEF

**Tandata has followed ACT's lead** and become the second company to produce an integrated communications package that allows you to talk to both Prestel and non-viewdata databases through the same program.

Viewtext is designed to work with Tandata's own modems and a variety of C/P/M micros.

It costs £125 and gives you storage of 72 telephone numbers with their appropriate log-on sequence as well as off-line editing.

**Elsewhere on the communications front**, Business Communications (0323-891606) has released Com-Pac, a communications program for the IBM, Apple and Sirius.

It can be used for communicating with Telecom Gold as well as sending and receiving telexes.

**Stack has released a BBC version** of its light rifle which, like the other versions, sells at £29.95.

The company has also produced a digital joystick with what is claimed to be an unbreakable nylon ball joint. It will cost £7.95 and can be used with any micro with an Atari compatible joystick port.

**Tandy is organising the first ever show** for 6809 micros. Catering for Tandy Color Computer and Dragon owners it takes place on 17th and 18th November at the Royal Horticultural Halls, London. Tickets cost £2 for adults and £1 for children.



**QL PRINTOUT** — Cambridge Systems Technology (0223-323302) has cut the price of its Q-Pi Centronics interface. It costs £57 and plugs into the QL expansion slot. The Q-Pi features an onboard driver to allow a device to be managed from QL SuperBasic and provides full QDOS driver facilities. In addition, it operates from any Sinclair-supplied Pison software.

## HOMEFRONT



### When a pinta day was the answer

Sooner or later, at one stage in its development, every aspect of nostalgia goes through some kind of life cycle boom... pop music, the movies, motoring — the things everyone moaned about at the time become fondly remembered for the very same

idiosyncracies. It seems doubtful that computers will enjoy a similar affection. There are too many exciting developments coming 'real soon now' for most of us to give thought to what has been.

However, now seems like as good a time as any to indulge in a little industry retrospective, to examine our roots, so to speak.

What prompted this wimpish maundering was the arrival this week of two market survey reports. Now it's true that someone perceptive once said that if all the market researchers in the world were laid end to end they wouldn't reach agreement, and these two didn't. One speculated on a levelling off in the market over the next five years (not a decline, it rushed to point out, but a reaching of 'maturity'). The other looks no further than the end of this year.

But while the future is uncertain, everyone agrees on where we've been. And here, at last, we get to the point. Before we head off over the hill (not a precipice, he rushed to point out) into the next round of cutting edge, technological, innovative marketing, let us remember those brave souls, the computer pioneers.

They were the men who bravely went where no man had gone before, writing Star Trek games in 4K, with letter As zooming in above the galactic plane, asterisks whizzing by in startling 2D graphics, vicious enemy Vs spitting full stops.

They were dark days, five years ago, lit only by the glow of a monochrome screen and the dull radiance of a ZX80 approaching meltdown. Who remembers the ZX80 now? But then it had the impact of a sub-£200, 16-bit, 256K IBM-compatible. You could read

interesting bits about it in the computer magazines (yes, there were magazines then — three of them). Possibly the most famous dealt with the machine's overheating problem. Recommended remedy was to stand a pint of ice-cold, long-life milk on the back. Now that's innovation.

Everyone remembers the ZX81, of course. It had the same impact as Henry Ford's Model T hitting the road, and that road led eventually to colour, high-resolution graphics, multi-voice sound, disk drives and printers for all, and amounts of RAM that seem positively extravagant.

So as the day approaches when you'll buy computers with built-in laser disks, megabytes of memory and unbelievable graphics, but for now you just can't squeeze that program into 64K, remember... you've never had it so good. **Peter Warlock**

## Touchmaster holds Dragon clearout

It's bargain basement time for Dragon software, and Touchmaster (0656-744700), which inherited the right to provide software and other support for Dragon owners, is offering a choice collection.

Heading the list are Dragon cartridges, going for a knock down price of £9.95. The titles are Berserk, Cosmic Invaders, Ghost Attack, Astroblast, Doodlebug and Rail Runner.

Also available on cartridge are Logo at £19.95 and Super Dragonwriter at £29.95.

Utilities available on tape include Computavoice, Music Box, Synth 7, Fruity and Astrology — all priced at £3.95.

Touchmaster, run by ex-Dragon directors Brian Moore and Richard Wadman, says that it is looking at other ways to support Dragon users and is running a helpline for queries on Dragon related matters on the above telephone number.

The software is available on mail order only and the prices are strictly 'while stocks last'.

'It is receiver's stock,' said Brian Moore, 'Some of the titles will continue, but that is subject to a renegotiation of licences.'

● Mr Moore also said that

Eurohard was due to go into production with the Dragon this week. The Spanish company is planning to extend the range of machines with possibly an MSX machine and a new 6809 micro that will be an upgraded Dragon 64. The bad news is that neither of these machines is intended for the UK market.

The other bad news is that Eurohard is unlikely to manufacture the Dragon Professional or the Beta twin 6809 micro. Both machines were well advanced at the time that Dragon Data went bust.

## Parrot flies in with new disk range

Against the lavish settings of the exclusive women-only health spa The Sanctuary, a company called Parrot flew in



Parrot — flying in with more competitive prices for the UK end-user? from Wales to bring news of its new disk manufacturing plant. The computerised plant will



**SMOOTH MOVER** — Previously, biro printer plotters moved the paper vertically and were only capable of using half A4 width paper. Datafax has solved the world problem by using a mechanism similar to the HAL Sweet P plotters. The SCP-800 4 Colour Plotter Printer moves the paper via a pinch wheel on each edge. The same pin mechanism as on other biro plotters (Tandy, Atari, Oric etc) is used, ie the rotating four pen holder and solenoid to hammer them into the paper.

produce a range of 8in, 5in and 3½in disks when fully operational. And as it will be fully integrated — it could mean more competitive prices for the end-user in the UK.

Parrot is somewhat of an unusual name for disks, but as Frank Peters, managing director said: 'We were looking for a name with two syllables and was easy to remember — Parrot fits the bill.'

After a theatrical performance (with a man dressed up as a parrot) and the formalities of the day — journalists were able to have a dip in the pool, lie in the jacuzzi, have a sauna or get a tan. Ah, that's the life.

## Mega-prize for Softek winner

Softek is going to ever-increasing lengths to hype its latest release, Quo Vadis (issue 79).

Not content with describing it as a 'mega-game', it has now upped the value of 'its mega-prize for the first winner to £40,000.

To win you have to find a magic sceptre in one of the game's 118 caverns.

Originally, the first person to find it won a genuine gold and silver sceptre. Now a mysterious 'financier' has offered to add £30,000 to the prize.

# VIEW FROM AMERICA



## The computerised novel has arrived

Science fiction writers should have seen it coming — the beginnings were clearly discernable. Now it is too late and the end of life as we know it may be upon us.

Where did it start? In the artificial intelligence community, more specifically in MIT in Boston, in the mid-70s when a group of computer research scientists developed an interactive game on the lab mainframe for their own amusement.

It employed a high level language called MDL, which allowed the creation of parser codes. Parser codes can resolve speech components and identify them.

In 1979, the scientists left

MIT to found Infocom and released their game as Zork I, the first computer dungeons and dragons game.

Today Zork and its two Zorkie descendants have sold a million copies and Zork I (\$40) is still at number nine in the Softsell US Games Chart. Infocom has five other titles in the top 30 and is the established leader in the field of interactive games.

Its latest effort involves Douglas Adams' Hitch Hiker's Guide to the Galaxy, which should be out for Christmas.

Now, Spinnaker Software has jumped in with the release of six interactive fiction titles under the Trillium imprint. The latest release is a sequel to Fahrenheit 451, by Ray Bradbury, Arthur Clarke, Robert Heinlein and Harry Harrison games titles are in the works.

The major differences between the Spinnaker and Infocom games is that Spinnaker has incorporated arcade-type joystick sequences. The Spinnaker parser cannot really understand adjectives and prepositions although it can handle short commands.

The prose is therefore a lot less interesting than Infocom's

Speaking as one who earns a crust or two from writing science fiction novels, I am torn between a twinge of envy at this development and a sense of foreboding.

Parser codes can do more than conduct interactive games. They might just price human writers out of the market.

Consider Racter (short for raconteur), for instance. Racter is a program in Basic that, on a Z80-based micro with 64K RAM, turned in the first book ever written by a computer — without human assistance.

Titled the Policeman's Beard is Half Constructed, it was published by Warner Software Books this month.

Described by the publisher as 'computer prose and poetry' the Beard sells for £9.95 and has illustrations by Joan Hall to complement Racter's gurgly, free-flying, fortune cookie prose.

According to Racter itself, 'stories, essays, dissertations and tales are in this book. There are also meat and tomatoes...'

Indeed, there are loads of references to meat. Racter seems almost obsessed with

meat. Lamb in particular gets many mentions in his prose.

Racter can conjugate regular and irregular verbs, print the singular and plural of regular and irregular nouns, and can assign variable status to randomly chosen things.

These can be individual words, clauses, sentences, paragraph structures, or indeed whole story forms.

Racter was created by William Chamberlain and Thomas Etter, who say about their creation: 'an important facility of the program is its ability to direct computers to maintain certain randomly chosen variables, which will then appear and reappear as a given block of prose is generated.'

Racter's output has a kind of looney sweetness about it, although others might say it writes as if it were William Burrough's long lost mild-mannered brother.

For example...  
More than iron, more than lead,  
More than gold I need.  
Electricity

I need it more than I need lamb  
or pork or lettuce or cucumber.  
I need it for my dreams.

Chris Rowley

## Select 1 packs 12 at a bargain price

The latest trend in software is compilations. It all started in August with Beau Jolly's Valuepacks for the Spectrum, Commodore 64, Vic 20 etc. Selling at £14.99 these offer six Imagine games. Then came Alligata's Chartbusters, £9.95 for five of the company's best games for the BBC and Commodore 64.

This week saw the release of the compilation to end all compilations. The Select 1 package offers 12 hits of yesteryear for £12.49.

The games come from a variety of well-known software houses, including Ocean, Bug-Byte, Anirog and Quicksilver. The Spectrum games pack boasts Hunchback, Mr Wimpy, Kong, Time Gate and Denis

Through the Drinking Glass, while for the Commodore 64 there's Hexpert, Skramble, Moon Buggy, Ring Of Power, Galaxy and Hunchback.

Some might say this is just a new marketing ploy to unload old games which might not otherwise sell. But given the past success of the titles, and the price, it's surely a bargain for new owners, particularly as the 64 programs feature fast loading, and the Spectrum has a menu for loading any of the games.

The Select 1 suite will be marketed in conjunction with Telstar records and will be backed by some half a million pounds worth of TV advertising over Christmas. Telstar, who produce album compilations of chart-topping singles, are certain this trend will continue, particularly as Christmas approaches.

# CHARTS

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

# GAMES

TW	LW	TITLE	PUBLISHER	MACHINE	PRICE
1	1	Daley's Decathlon	Ocean	SP, C64	£7.90
2	4	Beach Head	US Gold	SP, C64	£9.99
3	3	Elite	Acornsoft	AC	£15.00
4	18	Zaxxon	US Gold	C64	£9.95
5	2	Sherlock Holmes	Melbourne	SP, C64	£14.95
6	20	Pyjamarama	Microgen	SP	£6.95
7	9	Int Soccer	Commodore	C64	£9.99
8	13	Jet Set Willy	Soft Project	SP, C64	£5.95
9	8	Full Throttle	Micromega	SP	£6.95
10	—	Combat Lynx	Martech	SP	£7.95
11	6	Avalon	Hewson	SP	£7.95
12	5	Kokotoni Wilf	Elite	SP, C64	£6.95
13	10	Lords of Midnight	Beyond	SP	£9.95
14	—	American Football	Argus	SP, C64	£9.99
15	7	Monty Mole	Gremlin	SP, C64	£7.95
16	19	Havoc	Dynavision	SP, C64	£9.95
17	—	Braxx Bluff	Micromega	SP	£6.95
18	—	Dark Star	Design	SP	£7.50
19	—	TKV	Bug Byte	SP, C64, AC	£7.95
20	12	Decathlon	Activision	C64	£9.99

SPECTRUM			COMMODORE		
TW	TITLE	PRICE	TW	TITLE	PRICE
1	Beach Head	£9.99	1	Daley's Decathlon	£7.90
2	Daley's Decathlon	£7.90	2	Zaxxon	£9.95
3	Sherlock Holmes	£14.95	3	Int Soccer	£9.99
4	Pyjamarama	£6.95	4	Beach Head	£9.95
5	Full Throttle	£6.95	5	JetSet Willy	£6.95
6	Combat Lynx	£7.95	6	Havoc	£9.95
7	Avalon	£7.95	7	Kokotoni Wilf	£6.95
8	Lords of Midnight	£9.95	8	Monty Mole	£7.95
9	Jetset Willy	£5.95	9	Decathlon	£9.99
10	American Football	£9.99	10	Summer Games	£14.95

# MICROS

BELOW £1,000			ABOVE £1,000		
TW	MACHINE	PRICE	TW	MACHINE	PRICE
1	Commodore 64	£199	1	IBM PC/XT	£2,390
2	Sinclair Spectrum	£125	2	ACT Apricot	£1,760
3	BBC B	£399	3	Compaq	£1,795
4	Amstrad	£330	4	Sirius	£2,525
5	Electron	£199	5	Televideo TSI1603	£2,640
6	Vic 20	£140	6	Wang Pro	£3,076
7	Atari 800 XL	£169	7	NCR Dec Mate V	£1,984
8	Oric	£99	8	Apple 3	£2,755
9	Memotech	£199	9	HP 85	£1,917
10	Einstein	£499	10	Dec Rainbow	£2,359

These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets during the week up to October 18. 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 called 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.



**LIGHTS, CAMERAS, ACTION** — The latest name in the MSX game is Yashica. Better known for its photographic equipment, it is now part of Kyocera — the company that manufactures the Tandy Model 100 and Olivetti's lap-held micros. The Yashica YC-64 is standard MSX micro with 64K of RAM. The company says it will be ready for a European launch next month, but so far it has not appointed its UK distribution network — so no prices yet.

## Prestel mailbox undercuts the phone

Prestel has souped up its electronic mail service so that users can send messages countrywide for no more than the cost of a local telephone call.

If the messages received at PCN are anything to go by there is now a whole new group of Prestel and Micronet users who are discovering the delights of communicating electronically.

The cost of sending messages is free. All you pay for is the call to your local Prestel computer. And for 96 per cent of the population that is at local call rates if you phone outside office hours.

Until now, if you had wanted to use the mailbox service you had to phone the Enterprise computer in London — which meant heavy phone bills for the

majority of people living outside the capital.

Prestel reckons more than half Prestel's 47,000 users have access to a typewriter-like keyboard. And that includes the growing band of micro owners who are hooked up to the service.

To send a message you can use one of Prestel's 400 stock messages or compose your own, with colour graphics if you like.

The sending of messages is almost instantaneous with the recipient being told that a message is waiting when either they log-on to Prestel or — if it is a recent message — when they log-off.

PCN is always keen to hear from its readers — both in good old-fashioned hard copy form or more micro-minded electronic form. Prestel users can contact us through our mailbox which is 016366890.

# MSX?

On sale now: the essential buyers' guide to this exciting new standard for home computers. Facts, specifications, prices, software and peripheral listings. *All* you need to know about every MSX computer available. Plus — free first issue of MSX Computing.



# RANDOM ACCESS



If something we've said has outraged, amused or impressed you, this is your chance to answer back. To celebrate the new-look PCN we decided to give our 'star' contributors a pay rise — the best letter of the week will now earn you £15. So send in your contributions to: Random Access, Personal Computer News, Evelyn House, 62 Oxford Street, London W1A 2HG.

## Oric owners should stop complaining



How sad that Matthew Hibbit (issue 81) feels that the future of his Oric rests on software support. Perhaps the French are not as stupid as John Miles thinks. Perhaps they, like me, welcome a machine that has the potential of the Oric and encourages the user to think and experiment with programming.

I would not deny that the Oric 1 has its shortcomings, but rather than wallow in that British habit of moaning and doing nothing, I have found great personal satisfaction in exploiting the strengths of the machine. The result? I have a stock of programs that I have developed for myself. I am not a passive software-dependent user, but an active and learning programmer.

If I had wanted a game machine, I would have spent far less on something designed for just that. Instead I bought a computer that I can use and that is developing my knowledge and abilities. I do not depend on software support and the future of my Oric depends only on my own need to develop beyond its capabilities.

Perhaps if other Oric owners bought some good books (and there are plenty around for the Oric), took some action instead of waiting for everything to fall in their laps and applied their minds, they would be less inclined to whine about wasted investment.

Martin Bolter,  
London W3

Sounds like you and your Oric were made for each other — Ed.

## Red faces, but Phloopy plights back

I was glad you were able to give so much space (issue 80) to our Phloopy mass storage system for the BBC (and now also for Electron), but your reviewer made our faces red. We agree products should be thoroughly tested and every bug eradicated before being passed to a reviewer for critical assessment. But sometimes even a painfully

obvious bug which took us only a few hours to fix slips through the net. Sorry!

But there are other, more serious criticisms. Again the fault is ours for obviously not providing sufficient information.

David Janda complained the Phloopy was 'painfully slow', taking 13 seconds between repeated accesses. True, it is fairly slow compared with a well organised disk, but the Ultradrive and the Wafadrive take about 45 seconds when used in a similar way. Your Wafadrive reviewer, in the same issue, commented that in practice accesses were a fraction of that time, true of course is equally true of Phloopy except that it is an even smaller fraction of only 13 seconds.

The Phloopy review complained of a lack of a file compact instruction remarking that it was 'essential on tape systems'. How disappointed we were that your reviewer had not appreciated that Phloopy does not need a compact command (or indeed the reorganise command needed for disk systems). Phloopy automatically compacts data each time the loop is written.

Finally we accept the comment about Phloopy plugging in through the disk port. We thought long and hard about that during the design phase, and our market research showed that the majority of customers would prefer us to leave the user port free for other peripherals and accessories. We have a development version which operated perfectly well through the user port.

Dare I say, Phloopy plights back!  
Malcolm Malir,  
Phi Mag Systems

## The subtleties of playing the game

Your software editor, Bryan Skinner, must have been so busy poring through his dictionaries that he didn't have time to notice that the subtitle of my game — Lingo — The computer game that makes fun of the English language — is a play on words.

But two can play that game too. In my book (the Oxford English Dictionary, in 12 volumes) 'play' in this sense is defined as 'a sportive use of words, so as to convey a double meaning, or produce a fantastic, or humorous effect by similarity of sound with difference of meaning; a pun.' Exactly.

Alan Wakeman,  
London, W1

Wish we could afford an Oxford English Dictionary in 12 volumes — Ed.

## Getting in the last word

I know you headed the letter 'Last Word'. But your reply to Gregory Kuopp (issue 82) was simply inviting angry comments.

You say that four 100K (that should be 127K) drives are not a real alternative to two 320K drives. Well how about four 180K drives? (You reviewed the Indus GT in issue 66.) And with the ATR8000 add-on (available

in this country from Tollgate) you can use any 5¼in or 8in drive, as well as having access to C/PM and MSDOS.

You question the availability of software capable of supporting four drives. I have yet to find any software that does not support all four drives, and that includes VisiCalc, (even you must have heard of VisiCalc, although I doubt if you could name any other micro for which it is available at just £50), Atariwriter, as recommended by *The Guardian*, Letter Perfect, admittedly not as easy to obtain as Atariwriter, but a very professional word processor, and File Manager+, as used by Walt Disney studios to aid the production of Tron.

Please, I am not asking that you give Atari a hype, just that you be fair.

Chris Bone,  
Watford, Herts

Sounds like a nice setup. Shame it would cost about £1,000 excluding software and a TV set — Ed.

## Sharp MZ700 is a good bet

In reply to Dr Pointer's letter in issue 81 concerning the Sharp MZ700.

As the owner of a MZ700 I can tell you some things you do not know. You say that the MZ700 has little software, but in fact there are around 250 titles from Sharpsoft etc. And how can you say the MZ700 is expensive at a price of about £180?

So go on Mr Pointer, I think you will find that the 700 is a good bet.

Ian Fletcher,  
Bishop Auckland, Co Durham

You're right, we didn't know that. You just can't keep a secret can you? — Ed.

## Newbrain contact for repairs

With reference to the letter from G Bland, (issue 82) the people for Newbrain Repair are: A J Electronics, Sprouton, Ipswich IP8 3AW. Phone 0473-461600.

If Mr Bland requires any further info on Newbrain, he can contact me direct.

Jim Moon,  
Lostock Hall, Preston.



Having got one at last, we've now got to wait another six months for someone to market any decent software.

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# ROUTINE ENQUIRIES



## Getting more from your Orc graphics

**Q** Can you tell me how to use the graphics control for my MCP 40" colour printer, driven by my Orc? The manual gives the example `PRINT "D" * 20`, to draw a line from the current position to (x,y), but I can't get it to work. Also, is there a compiler for Orc Basic and how can I find out more about attributes?

John Hayes,  
Sheffield

**A** The problem is that you can't just use the variable 'x' and 'y' as implied in the example. The printer is looking for a code like 'D10,10', so you have to convert the variables to their string representatives, then add them to the control letter 'D'. The problem with this is that STRS adds CHR\$(2) to the front of positive number strings, so this has to be stripped off, as does the trailing space. You could handle this with a subroutine:

```
1000 x$=STR$(x);y$=STR$(y)
1010 IF LEFT$(x,1)<>"CHR$(2)"
    THEN 1030
1020 x$=MID$(x,2,LEN(x$)-1)
1030 IF LEFT$(y,1)<>"CHR$(2)"
    THEN 1050
1040 y$=MID$(y,2,LEN(y$)-1)
1050 x$=left$(x$,len(x$)-1)
1060 y$=left$(y$,len(y$)-1)
1070 C$="D"+x$+","+y$
1080 LPRINT C$;
1090 RETURN
```

To learn more about attributes, check out some of the many Orc programming books on the market. As far as we know, there are no Orc Basic compilers.

## Mathematical errors on the C64

**Q** While messing about with the precedence of mathematical operators I found that the square function sometimes produces the wrong answer on my Commodore 64. For instance,  $7^2 = 49.0000001$ .

The only solution I can think of is to use the INT function to strip off the decimal part. Why does this happen?

D R McLean,  
Birmingham.

**A** It's just one of those things. Not only your 64, but many computers suffer from this 'bug' which arises out of the math routines in ROM. In most cases you won't find it a problem but if you need strict

mathematical accuracy, it's something you need to watch out for. There isn't really any solution.

## Pretty pointless colours on the ZX

**Q** Is it possible to have more than two colours in a character position on the ZX Spectrum, and if so, how do you do it? Can you produce more than the Spectrum's standard eight colours on screen?

Gordon Binney,  
Wrexham

**A** No, you can't have more than two colours per character position, and the possibilities for getting more colours on the screen are fairly limited. You can do it with this demo, which is practically useless, but it's quite pretty:

```
10 FOR N = 0 TO 6 STEP 2
20 POKE USR "A"+N,BIN
    01010101: POKE USR "A" +N+1,
    BIN 10101010
30 NEXT N
40 LET A=INT (RND*6)
50 LET B=INT (RND*6)
60 PRINT INK A; PAPER B;
    "AAAAAAAAAAAAAAAAAAAA"
    AAAAAAAAAAAAAAAAAAAA
70 POKE 23992,255
80 GOTO 40
```

All you're doing here is providing a grid pattern of colours and mixing INK and PAPER colours to provide a larger range. Unfortunately, pretty pointless.

## An easy guide to the jargon jungle

**Q** I have recently bought an Amstrad computer. Are there any publications available that will explain to a complete novice just what a variable is, plus the other bits of jargon that leave me in the dark?

P Andrews,  
Doncaster, S Yorks.

**A** Virtually any beginner's guide to Basic — and there are hundreds — will lead you gently up the jargon path. However, they will not be specific to your Amstrad.

A better bet might be Amstrad Computing, a new book from the prolific Ian Sinclair, published by Granada at £6.95. It covers the basics before moving onto machine-specific stuff like graphics.

## Amstrad v 64 — the choice is yours

**Q** I am going to upgrade my computer soon and would like your advice. I would use the computer for writing programs and playing games. I have narrowed the choice down to the Amstrad or Commodore 64.

P Reynish,  
Newbridge, Gwent.

**A** No matter how often we protest, this kind of query crops up again and again. And since we've had several questions relating directly to the Amstrad v 64 dilemma, here's a shot at it.

First, there isn't a computer anywhere in the world at any price that stands out above the rest of the crowd. Every machine has something to commend it.

The first question to ask of any machine is: Is it reliable? In both cases here the answer is yes. Does it have lots of software, and lots of different kinds of software? The 64 does, the Amstrad doesn't... yet. So the next question is, can you wait for the software? If you can, then there's still little to choose.

Do you want to write programs in Basic? The Amstrad is the better bet. If you want to write in machine code then the 64 is better for the moment because there's a greater choice of program development tools.

If you simply want to run commercial software most of the time then the 64 wins again. Would using the family TV set for your computer create a clash of interest in the family?

If so, the Amstrad scores with its built-in monitor. If you don't want a monitor then the 64 looks as much as £50 cheaper (minus the cost of a tape recorder).

As you can see, the question 'Which is best?' doesn't mean anything. All you can do is pick the one you want. Good luck!

## Mixing Maplin and Micronet

**Q** I recently bought a Maplin 300/300 Modem to use with my Spectrum and RS232 interface. Is it possible to use Micronet 800

with this? If so, where can I get the required software?

Kenneth Sutherland,  
Drumnadrochit, Invernesshire.

**A** As the Maplin modem does not have Telecom approval it is illegal for you to use it for communications over the public telephone system. Because of the Spectrum's 32-column screen display it cannot be used with Prestel (of which Micronet is just one part).

Micros with a screen width of 40 columns or more can be used with Prestel and there is a poorly advertised 300/300 service for users with this kind of modem. It does not provide colour graphics.

## How can I learn to write games?

**Q** I am 11 years old and own a BBC Micro. I find it very difficult to understand how to go about writing programs for simple games and graphics. Can you advise me? A Tsemensis,  
Harborne, Birmingham.

**A** Writing games is only a little different to writing any other sort of programs, with the exception of certain techniques, such as animation. The only way we could help would be to teach you to program — obviously out of the question.

However, there are a large number of books dealing with the techniques you require. Possibly the best for your purposes is The BBC Micro Gamesmaster by Kay Ewbank et al, published by Granada at £5.95.

## Binatone query sparks memories

**Q** Some time ago I remember reading about a computer from a company called Binatone. It was supposed to have colour graphics and a large memory for under £100. Where can I get further information? M Richard,  
Southend, Essex.

**A** What memories this question brought back. Never, in the field of human endeavour, has anything matched the Binatone computer. Binatone used to be pretty big in the home video games field — you know, ping-pong and so on. A computer from the company never really had any more substance than pure rumour.

# MICROWAVES



Tips from readers to make programming easier or open up new avenues of possibility. A new look to PCN's pages means a new look to the payments too. Now £10 for every hint in print, and a hefty £50 for the *Microwave of the Month*. Send your hot tips to *Microwaves, PCN, Evelyn House, 62 Oxford Street, London W1A 2HG.*

## Spectrum clocks on with maths formulae

This program gives a computer simulation of a clock face. It uses the mathematical formulae as described in Chapter 18 of the Spectrum manual.

The clock can be made to keep fairly accurate time by changing the pause length in line 270.

```
5 REM @LAWRENCE SMITH 1084
10 INPUT "ENTER HOUR":h
15 IF h=12 THEN LET h=0
30 INPUT "ENTER MINUTES":m
40 CLS
45 CIRCLE 132,92,83
50 FOR n=1 TO 12
60 PRINT AT 10-10*COS(n/6*PI),16+10*SIN(n/6*PI):n
70 NEXT n
75 PRINT AT 2,16;"@": PRINT AT 3,15;"LNS"
100 FOR a=h TO 11
110 LET x=(a*5)/30*PI
120 LET h=(40*SIN(x))/3: LET hy=40*COS(x)
130 PLOT 128,88: DRAW OVER 1:hx,hy
160 FOR b=m TO 59
170 LET y=b/30*PI
180 LET mx=70*SIN(y): LET my=70*COS(y)
190 PLOT 128,88: DRAW OVER 1:mx,my
220 FOR c=0 TO 59
230 LET z=c/30*PI
240 LET sx=76*SIN(z): LET sy=76*COS(z)
250 PLOT 128,88: DRAW OVER 1:sx,sy
270 PAUSE 40
280 PLOT 128,88: DRAW OVER 1:sx,sy
290 NEXT c
310 PLOT 128,88: DRAW OVER 1:mx,my
320 NEXT b
340 PLOT 128,88: DRAW OVER 1:hx,hy
380 LET h=0:LET m=0
400 NEXT a
```

## Useful Amstrad width command notes

The WIDTH command is used to specify the width of a printer attached to it. If this many characters are output to the printer on a single line a carriage return/line feed sequence is automatically inserted. WIDTH stops your printer overprinting the last column if a line is too long. WIDTH 255 disables the feature — no automatic moving to the next line occurs.

PRINT sends a carriage return or line feed character which forms part of a string (using CHR\$(1) or CHR\$(10) to the

50 to 75 print the clock face 80 to 120 starts the clock 130 draws the minute hand 210 to 250 draws the second hand 270 pause for timing 280 deletes the second hand 310 deletes the minute hand 340 deletes the hour hand 380 to 400 resets the clock Lawrence Smith Pill, Bristol.

printer without further embellishment. Note that a carriage return/line feed sequence is automatically issued at the end of a PRINT statement, unless it is terminated by a comma or semi-colon.

If the printer being used does not require both carriage return and line feed and you don't wish to change existing PRINT or WIDTH statements, you must intercept the output to the printer at the MC PRINT CHAR jumpblock entry and suppress the line feeds at this point. This program causes line feeds (&oa) to be ignored by the printer.

*Locomotive Software, Dorking, Surrey.*

```
100 MEMORY HIMEM-7
110 POKE HIMEM+1,5FE
120 POKE HIMEM+2,506
130 POKE HIMEM+3,537
140 POKE HIMEM+4,5CB
150 POKE HIMEM+5,PEEK(5BD2B+0)
160 POKE HIMEM+6,PEEK(5BD2B+1)
170 POKE HIMEM+7,PEEK(5BD2B+2)
180 POKE 5BD2B,MC3
190 POKE 5BD2B+1,MFF AND UNT(HIMEM+1)
200 POKE 5BD2B+2,INT((HIMEM+1)/256)
*SPACE FOR PATCH
*CP 506: I CHECK IF LINEFEED
*SCF
*RET Z: I IGNORE IF SO
*OTHERWISE PRINT CHARACTER
```

## Amstrad says it with flowers

A series of flower or snow-flake like patterns is generated by this effective graphics display which runs continuously. It was written to be used in a shop display.

A regular polygon is rotated through 360 degrees. The polygon is decreased in size and the

rotation repeated a few times using various pens.

The inks are then changed a few times before the screen is cleared and then repeated.

The colours, the number of sides of the polygon and the number of steps in a revolution are all set at random. The mode alternates between 0 and 1.

*David Muir, Plymouth, Devon.*

```
10 *
20 * FLOWERS
30 *
40 * by D.Muir
50 DEFINIT b-z
60 PRINT CHR$(23)+CHR$(3):
70 RAD
80 w=0
90 FOR h=1 TO 12
100 r=7+RND*10
110 b=RND*27
120 z=4+RND*4
130 r=56/2
140 MODE 1-w
150 BORDER b
160 p=RND*27: IF p=b THEN 160 ELSE INK 0,p
170 FOR v=1 TO 9
180 m=RND*27: IF m=p THEN 180 ELSE INK v,m
190 FOR a=0 TO 2*PI STEP 2*PI/n
200 MOVE 320,200
210 FOR y=0 TO z-1
220 DRAW R*SIN(a+y*2*PI/z),r*COS(a+y*2*PI/z),v
230 NEXT
240 NEXT
250 r=r-12
260 NEXT
270 FOR q=1 TO 20
280 FOR s=1 TO 9
290 INK s,1+RND*26
300 NEXT
310 FOR t=1 TO 1000:NEXT
320 NEXT
330 NEXT
340 GOTO 90
```

## Auto-run a Dragon program from Basic

Auto-running a Dragon program without a lengthy machine code routine is generally believed impossible. However, I have discovered a very simple way to do just this from Basic. The only problem is that memory must be saved from location 166 onwards to the end of the program.

The way this works is that locations 166 and 167 contain the address of the next Basic command to be executed (location 732 onwards contains the commands entered in direct mode and this is where 166 and 167 point to). If this pointer is saved with the commands to be executed next, after the prog-

ram is loaded, these commands are carried out.

The auto-run may be used on both Basic and machine code programs.

Position the tape press record and play and then type the following line:

```
FOR I= 25 TO 36: PRINT I,PEEK(I)
NEXT
```

Note the values that appear on the screen and then type: CSAVEM"FILENAME",166,PEEK(27)\*256+PEEK(28),0:POKE25,A: POKE 26,B: POKE 27,C: POKE 28,D: POKE 29,E: POKE 30,F: POKE 31,G: POKE 32,H: POKE 33,I: POKE 34,J: POKE 35,K: POKE 36,L: RUN

A to L are the number obtained from the above peeks. This saves the Basic file with auto-run. To load type CLOADM. G Carwardine, Tonbridge, Kent.

## How to write for Personal Computer News

# PCN WANTS YOU!

Whatever you want PCN will try to bring you . . . but we need your help. You tell us you want more programs, more features to help you get the most from your machine. Well, we've listened and we're offering more programs, projects and useful information than any other magazine. But if your machine isn't featured you've only yourselves to blame.

So we're making you an offer you can't refuse. Send us your programs and in return we'll send you upwards of £80 for each one published. We also welcome written contributions — tell us about the ways that you've conquered your machine; your best sound routines, those great graphics features, how you mastered disk and printer.

### What we want

We're looking for programs and articles on any aspect of using personal computers — including games, graphics, utilities, and applications.

If you're sending a written contribution we require it in typed form (dot matrix printout is fine), with double spacing on one side of the paper only. Where possible include short, example



programs to illustrate the article.

If you've written a program we require a working version, on tape for any machine, or on disk if you prefer for Commodore 64, Atari, BBC or Apple. We'd also like notes on how the program

works, what it does, and any special features that you've included. A printed listing would be nice but isn't essential — on the other hand we can't consider listings without a working copy on tape or disk.

If you would prefer to make preliminary enquiries before submitting material, you should write — don't phone — to *Personal Computer News*, Evelyn House, 62 Oxford Street, London W1A 2HG. Questions about articles should be addressed to John Lettice, Features Editor; program queries should go to Nickie Robinson, Programs Editor.

If we decide not to use your contribution it will be returned to you if you enclose a stamped, self-addressed envelope but give us at least six weeks. You should receive payment four weeks after publication.

If you want to enclose photographs and screen shots, feel free to do so but make sure they are of good quality and make them colour transparencies or black and white prints. Do not send colour prints.

So, get cracking. Just think . . . two articles could pay for that printer, disk drive, or even a new machine.

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# SHOOT-'EM-UP

It was kill or be killed in the Old West — at the PCW show in Old West London, that is. PCW's game for the show, specially written by ace gunslinger Kenn Garroch, was such a raging success that we've decided to publish it here. Have you got what it takes?



Tomestone, for the BBC Model B, allows you to play as being Wyatt Earp, Clint Eastwood or, if your trigger finger's a little slow, Julie Andrews. You're faced with a series of windows at which faces appear. You have to use the joystick to steer your cross-hair sight to the figures and shoot them before the number below the window gets to 0. Otherwise it could be curtains.

The game is constructed from five programs. Three are used to set up various parts, such as the scenery, the characters, and the machine code, while the other two are the game itself and the high-score program. The main reason

for doing this is to save space, with the added advantage that the program is very modular.

The first, the definer sets up the characters appearing behind the windows, and the windows themselves.

After running it you will be asked to enter a file name. If you want to edit a previously defined shape, enter the file name here, or just press Return. You will then be presented with a random set of dots with a representation of the correct size character in the top right-hand corner of the screen.

To define the character shape, use the cursor keys to move around the screen and select the colours with the function

keys. When the game is running a hit is scored by detecting a colour number greater than seven. All the target areas should therefore be set up as flashing colours. These are obtained by pressing the shift and function keys simultaneously.

To save a shape, press the shift key and the @ key simultaneously (character 0), and type in the shape's name followed by return. The shapes to be defined are shown in figure 1. In general, the target areas are the head and upper body with red (9) giving a higher score.

The next program to be run is the scene program. This sets up the background scenery and saves it as a screen

## LISTING: HIGHSCORE

```

5 MODE 1
10 CLOSE#0
20 REW HIGHSCORE PROGRAM
30 DIM SH(25),S(25)
40 X=OPENUP("HSS")
50 FOR T=0 TO 20
60 INPUT#X,SH(T),S(T)
70 NEXT T
75 IF <0>:S(20) THEN 110
90 PRINT
100 X#=#NEXT
110 FOR T=0 TO 20
120 IF <0>:S(T) THEN FOR S#T TO 19:5
T+1>S(T):S(T+1)>S(T):NEXT S(T)>S(T)+5
#(T)>#(T)+1
130 NEXT
140 PROCTABLE
150 PTR#=#0
160 FOR T=0 TO 20
170 PRINT#X,S#(T),S(T)
180 NEXT
190 CLOSE#0
200 PRINT TAB(5,30) "PRESS FIRE FOR AN
OTHER GAME"
```

```

210 TIME=0
220 REPEAT
230 UNTIL (ADVVAL(0) AND 1) OR TIME=1000
240 CHAIN "GAME"
250 DEFFUNCTION
260 CLS
270 FOR T=0 TO 20
280 PRINT "*" "S#(T) TAB(16,1) "-" "S(T)
290 NEXT
300 ENDPROC
310 DEFFNCH
311 TIME=0
320 IF (ADVVAL(0) AND 1)=1 THEN 320
330 A#=#0:INT(ADVVAL(1)/16.25,4)
335 IF TIME=5000 THEN CHAIN "GAME"
340 IF A<32 THEN A=32
350 IF A<6 THEN A=6
360 COLOUR 12:COLOUR 2
370 FX 19
380 PRINT TAB(A,10) CHR#(A-7+65)
390 IF (ADVVAL(0) AND 1)=1 THEN COLOUR
12:COLOUR 3:PRINT TAB(A,10) CHR#(A-7+65)
41:60 TO 330
400 COLOUR 12:COLOUR 2
```

```

410 PRINT TAB(A,10) CHR#(A-7+65)
420 A#=#+5-7
430 DEFFNGET
440 PROCSET
450 LOCAL #8
460 CHFNCH
470 IF C#6 THEN #A#
480 A#=#+CHR#(C)
490 IF LEN(A#)=15 THEN C#6:GOTO 470
500 PRINT TAB(10+LEN(A#)+1,20) CHR#(C)
510 GOTO 460
520 DEFFNPROCSSET
530 PRINT TAB(13,5) "ENTER YOUR NAME"
540 PRINT TAB(14,7) "USE # TO END"
550 PRINT TAB(16,10)
560 FOR T#4 TO 54:2#
570 PRINT CHR#(T)
580 NEXT
590 ENDPROC
1000 TIME=0
1010 REPEAT UNTIL TIME/5000
```


High-score program, to be run in conjunction with the game itself.

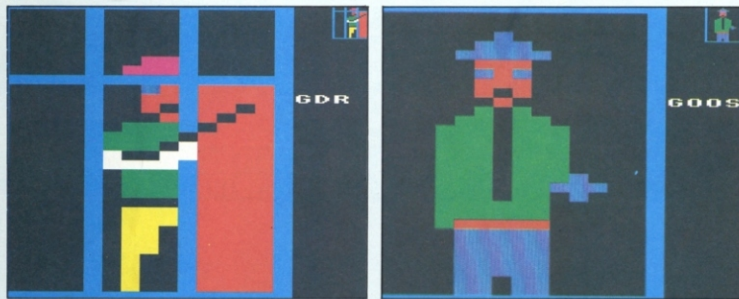
file that will eventually be loaded into the program.

The final set-up program assembles the machine code for placing the characters onto the screen, and the code that

scans the joystick port and plots the cross-hairs of the sight.

Once all the set-up work has been done, you can run the game. This then loads in all the appropriate parts and you

can shoot the little fellows. After you have actually been killed, as soon as one of the windows shows a zero under it, the high-score program will be chained allowing you to enter your name. 



## LISTING: GAME

```

STIME=0
10RDE 2
20*LOAD SCREEN
30 $L3=5D=1
40VDSU2,228,129,97,26,80,128,153,4,4
50VDSU3,227,255,255,255,255,255,255,255,255
60C=400
70 LBB=0
80C=30
90CHMT=572
100SCEI=570
110JCDDE=5800
120FTAB=574
130BIR TMS(4,1)
140FOR T=0 TO 4:TMS(T,0)=DLINEX
150DIB CHM 10*256
160BIR=581
170PLACE=C
180PROCENY
190PROCASPL
200PROCSDI2
210PROCLOD
220PROCCLASB
230PROCINDS
240CALL JCDE
250PROCMM
260DOTO40
270END
280DEFPROCASPL
290*LOAD FLCDCE 800
300 ENDFRC
310DEFPROCLOD,X,Y
320 *CHMT*(CHM*(CH256)) MOD 256
330 *CHMT*(1+(CHM*(CH256))) DIV 256
340*(FTAB+1)*X MOD 256
350*(FTAB+2)*X DIV 256
360*(FTAB+3)*X MOD 256
370*(FTAB+4)*X DIV 256
380*(CHMT+X)*X MOD 256
390*(CHMT+1)*X DIV 256
400 CALL PLACE
410ENDFRC
420 DEFPROCLOD
430 FOR S=0 TO 4
440 READ F#
450 PROCDSCLI("LOAD "+F#+" "+FNH(CHM*(S+512)))
460NEXT
470ENDFRC
480 DATA WINDOW,GOON,GOONS,GOONW,GDR
490DEFPROCINDS
500FOR T=0 TO 3
510READ CR,X,Y
520PROCPL(CR,X,Y):PROCPL(CR+1,X,Y+64)
530NEXT
540DATA 0,200,160,0,200,368,0,800,120,0,850,310
550ENDFRC
560DEFPROCBSJS
570J3=880
580JY=581
590JF=582
600 *LOAD JBCODE
610ENDFRC
620DEFPROCCLASB
630FOR T=B TO 15
640VDU 19,T,1-B,0,0,0,0,0
650NEXT
660ENDFRC
670DEFPROCIRE
680LOCAL SX
690SOUND$1,3,255,100: SOUND$10,1,7,100
700XS=73X+4:YS=73Y+4
705SD=POINT(XS,YS)-7
710VDSU:GCOL0,0:PLDT69,XS-16,YS+16:PRINTICHR#226:VDU4
720IF SX=1 THEN ENDFRC
740SCL=SC1+(SX*3)+F9-DX1)
750 IF XS:612 AND YS:308 THEN TMS(1,0)=D: TMS(1,1)=0:PROCP(1,0)
760 IF XS:612 AND YS:308 THEN TMS(2,0)=D: TMS(2,1)=0:PROCP(2,0)
770 IF XS:612 AND YS:308 THEN TMS(3,0)=D: TMS(3,1)=0:PROCP(3,0)
780 IF XS:612 AND YS:308 THEN TMS(4,0)=D: TMS(4,1)=0:PROCP(4,0)
790PRINT TAB(0,20):"SCORE 1":SCL
800ENDFRC
810DEFPROCENY
820ENVELOPE1,130,0,0,0,0,0,127,-6,-1,-127,126,0
830ENVELOPE2,130,-1,-1,-1,5,5,0,0,0,0,0,0
840ENVELOPE2,2,1,1,1,4,4,4,127,-1,-1,-127,126,0
850ENDFRC
860DEFPROCMM
870CALL JCDE
880IF7JF=1 THEN PROCFIRE
890 SX=RD(4):PROCP(SX,RND(4))
900TMS(SX,1)=1
910RESTORE 540
920 FOR TS=1 TO 4
930TMS(TL,0)=TMS(TX,0)-TMS(TL,1)
940IF TMS(TL,0) < 0 THEN PROCBULLET(640,500):1670=SCL:CHM="SCORE"
950READ CH,XS,YS
960VDSU:MOVEXS+16,YS-16:GCOL0,3:PRINTICHR#227
970MOVEXS-16,YS-16:GCOL0,0:PRINTI"
980TMS,0:F
990NEXT
990BOTO870
990ENDFRC
1000DEFPROCBSJS(XS,YS)
1010GCOL0,0
1020FOR T=0 TO 100
1034GCOL0,0
1035SOUND $10,1,RND(3)+2,100
1040VDU S:MOVERND(1280),RND(1024)
1050PRINTICHR#226:
1060VDU 4
1060NEXT
1070VDU4
1080ENDFRC
1090DEFPROCDSCLI(A#)
1100*AC0=AH#
1110XS=0
1120YS=8C
1130CALL $FF77
1140ENDFRC
1150DEFFNH(V)
1160LOCAL T,A#
1170FOR T=0 TO 3
1180AH=STR$(V MOD 16)+AH
1190IF (V MOD 16)=9 THEN AH=RIGHT$(AH,T):AH=CHR$(V MOD 16)+65-10)+AH
1200V=V DIV 16
1210NEXT
1220=AH#
1230DEFPROC(WX,CX)
1240LOCAL TS
1250RESTORE 540
1260FOR TS=1 TO WX
1270READ C,XS,YS
1280NEXT
1290LOCAL SX
1290PROCPL(CS+2,XS,YS):PROCPL(1+CS+2,XS,YS+64)
1295VDSU:MOVEXS+16,YS-16:GCOL0,3:PRINTICHR#227:VDU4
1300ENDFRC

```

Main game program. Uses the output from the screen, the assembler, and the definer.

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## LISTING: SCENE

```

10 MODE 2
20 REH VDU 29,01641
30PROCBSY
40 PROCROAD
50 PROCCLD(500,1024)
60 PROCBUILDLFT
70PROCBUILDRIT
80 COLOUR 128
90 PROCBRICK
100 VDU 31,0,30
110 COLOUR 1
120 FOR T=0 TO 19
130 PRINT:CHR$(224);
140NEXT
150 FOR T=0TO19
160 PRINT:CHR$225;
170 NEXT
180 FOR T=1 TO 29 STEP 2
190PRINT TAB(0,T):CHR$224:CHR$224
200PRINT TAB(18,T):CHR$224:CHR$224
210PRINT TAB(0,T-1):CHR$225:CHR$225
220PRINT TAB(18,T-1):CHR$225:CHR$225
230NEXT T
240 VDU 31,0,0
250 FOR T=0 TO 19
260PRINT:CHR$225;
270 NEXT
280 FOR T=0 TO 19:PRINT:CHR$224;:NEXT
290#SAVE SCREEN 3000 8000
300END
310DEFPROCBRICK
320VDU 23,224,0,127,127,127,127,127,127,127
330VDU 23,225,0,251,251,251,251,251,251,251
340ENDPROC
350DEFPROCBSY

```

```

360COLOUR 130
370CLS
380MOVE 0,600
390MOVE 1280,600
400GCOL 0,4
410PLOT 85,0,1024
420PLOT 85,1280,1024
430ENDPROC
440DEFPROCCLD(X,Y)
450MOVE X,Y
460 FOR T=PI/2 TO 3*(PI/2) STEP .6
470R=ND(50)+50
480 XD=SIN(T)*200+X
490 YD=COS(T)*200+Y
500 FOR S=0 TO 2*PI STEP .1
510MOVE X,Y
520 GCOL 0,7
530PLOT 85,SIN(S)*R+XD,COS(S)*R+YD
540 GCOL 0,0
550NEXT
560 NEXT
570ENDPROC
580DEFPROCROAD
590MOVE 400,0
600MOVE 700,600
610GCOL 0,0
620PLOT 85,700,0
630PLOT 85,800,600
640ENDPROC
650DEFPROCBUILDLFT
660MOVE 0,64
670MOVE 380,64
680GCOL 0,1
690PLOT 85,0,500
700PLOT 85,380,500
710GCOL 0,6
720PLOT 85,0,600

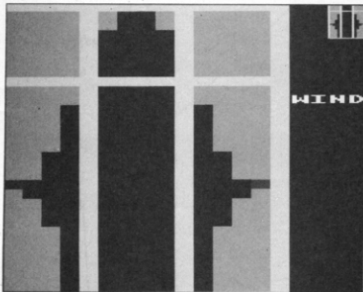
```

```

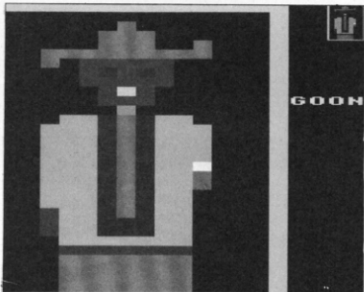
730PLOT 85,380,600
740MOVE 557,680
750PLOT 85,380,500
760PLOT 85,557,600
770GCOL 0,1
780MOVE 557,376
790PLOT 85,380,500
800PLOT 85,380,64
810MOVE 0,670
820 MOVE 520,670
830PLOT 85,0,600
840PLOT 85,380,600
850MOVE 380,600
860GCOL 0,0
870DRAW 380,64
880ENDPROC
890DEFPROCBUILDRIT
900MOVE 780,50
910MOVE 1280,50
920GCOL 0,1
930PLOT 85,780,180
940PLOT 85,1280,180
950GCOL 0,6
960PLOT 85,780,210
970PLOT 85,1280,210
980GCOL 0,1
990MOVE 800,210
1000PLOT 85,1280,400
1010PLOT 85,800,400
1020 MOVE 1280,400
1030GCOL 0,1
1040PLOT 85,900,600
1050PLOT 85,1280,600
1060MOVE 800,400
1070GCOL 0,0
1080DRAW 1280,400
1090ENDPROC

```

Program used to set the scene, should be run first.



The window rolls up to reveal the targets.



The body and head of this flashing goon make him an easy target.

## LISTING: DEFINER

```

10 MODE 2
20 C=8000
30 PLACE=C
40CHR=T+572
50CHDEST=470
60PTAB=674
70DIM CHAR 512
80 CHST=483
90 VDU 23,224,5FF,5FF,5FF,5FF,5FF,5FF
,5FF,5FF
100 PROCROAD
110 PROCASPL
120 PROCPL
130 PROCED
140DEFPROCPL
150LOCAL T,S
160FOR S=0 TO 31
170FOR T=0 TO 15
180 COLOUR 7:(S+16)+T+CHAR)
190PRINT TAB(T,31-S):CHR$224;
200NEXT
210NEXT
220 PROCPL 0,1280-(16*S),1024-(32*4)
230 PROCPL 1,1280-(16*S),1024-(16*4)
240ENDPROC
250 DEFPROCASPL
260 *LOAD FLDCE A00
270 *LOAD 35CODE
280TCHDEST=PTAB MOD 256
290TCHDEST=1+PTAB DIV 256

```

```

300TCHAR=T+CHAR MOD 256
310TCHAR=T+CHAR DIV 256
320 ENDPROC
330DEFPROCPL(CN,X,Y)
340 TCHAR=T+(CHAR+(CN*256)) MOD 256
350 T(CHART+1)=(CHAR+(CN*256)) DIV 256
360T(PTAB+1)=X MOD 256
370T(PTAB+2)=X DIV 256
380T(PTAB+3)=Y MOD 256
390T(PTAB+4)=Y DIV 256
400TCHST=X MOD 256
410T(CHST+1)=X DIV 256
420 CALL PLACE
430ENDPROC
440DEFPROCED
450 LOCAL X,Y,A,C
460FX 4 1
470FX 225,224
480FX 226,140
490 VDU 31,X,Y
500#GET
510IF A=136 THEN X=X-1
520IF A=137 THEN X=X+1
530IF A=138 THEN Y=Y+1
540IF A=139 THEN Y=Y-1
550 IF X<0 THEN X=1:GOTO500
560 IF X>15 THEN X=15:GOTO500
570 IF Y<0 THEN Y=0:GOTO500
580 IF Y>31 THEN Y=31:GOTO500
590 IF A=223 AND A=232 THEN COLOUR A-2

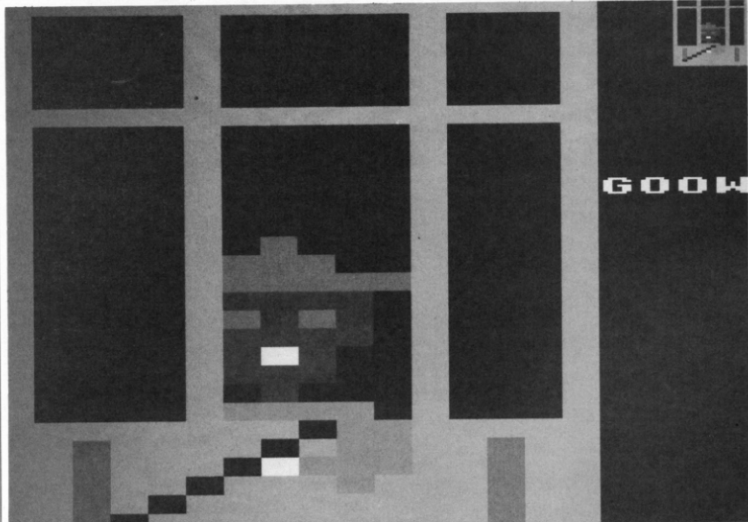
```

```

24:CHA=224
600 IF A>139 AND A<148 THEN COLOUR A-1
32:CHA=132
610IF A=0 THEN PROCBSAVE
620 GCOL 0,C:PLDT 69,1280-(16*6)+(X*8)
,1023-(Y*4)
630T((31-Y)*16)+X+CHAR)=C
640 PRINT TAB(X,Y):CHR$224:CHR$81
850GOTO 500
660ENDPROC
670DEFPROCBSAVE
680 LOCAL F#
685 PRINT CHR$201;
690 INPUT TAB(16,10) F#
700 IF F#="" THEN ENDPROC
710X=OPENOUT(F#)
720FOR T=0 TO 511
730PUT#X,TCHAR
740NEXT
750CLOSE#X
760ENDPROC
770DEFPROCROAD
780INPUT "FILE " F#
790 IF F#="" THEN ENDPROC
800X=OPENIN(F#)
810FOR T=0 TO 511
820TCHAR=GET#X
830NEXT
840CLOSE#X
850ENDPROC

```

This program is used to set up the user defined characters.



The face and arm of the man holding the rifle are flashing colours.

## LISTING: ASMCH

```

10C#5A00
20CHAPT#572
30CHDEST#570
40FTAB#374
50PTAB1#578
60XL#PTAB1+1
70XH#PTAB1+2
80YL#PTAB1+3
90YH#PTAB1+4
100J#5B0
110JY#5B1
120JF#5B2
130JCODE#5B00
140CHSTX#5B3
150PROCASPL
160PROCASB
170 #SAVE FLCCODE A00#A0
180 #SAVE JBCODE B00#C0
190END
200DEFFPROCASPL
210FDR T#0T2 STEP2
220P#C
230OPT T
240.PLACE
250.DX
260LDA #PTAB MOD 25#1STA CHEST
270LDA #PTAB DIV 25#1STA CHEST+1
280LDA#69
290STAPTAB
300LY #0
310STY #0E
320.NFLC
330LY #0E
340LDA (CHAPT),Y
350JSR PCOL
360JSR FLT
370 LDV#0E
380LDA #B1CLC:ADC PTAB+1STA PTAB+1
390BCC NB
400.LDA#0:STA PTAB+1
410INC PTAB+2
420.NB TYA
430 CPH#0:BED PLNX
440AND #15
450 CPH#15
460BNE PLNX
470 JSR JCDE
480 LDA CHSTX:STA PTAB+1
490 LDA CHSTX+1:STA PTAB+2
500LDA #1:CLC:ADC PTAB+3:STA PTAB+3
510BNE PLNX
520INC PTAB+4
530.PLNX
540INC #0E
550 BNE NFLC
560.FINL RTS
570
580.PCOL
590PHA
600LDA #18:JSR MFFEE
610LDA #0:JSR MFFEE
620PLA :JSR MFFEE
630RTS
640
650.PLT
660LDA#25:JSR MFFEE
670LDY#0
680.PLT1
690LDA (CHEST),Y
700JSRMFFEE
710INY
720CPY#5
730BNE PLT1
740RTS
750J
760NEXT
770ENDPROC
780DEFFPROCASB
790FDR T#0T3STEP3
800P#JCDE
810OPT T
820 P#P:PHA:TXA:PHA:TYA:PHA
830LDA #PTAB1 MOD 25#1STA 570
840LDA #PTAB1 DIV 25#1STA 571
850LDA #12B
860LDX #0
870JSR MFF4
880TXA
890AND #1
900.NHOLD STA JF
910LDY #2
920.LDA#12B
930JSR MFF4
940STY JY
950LDX #1
960JSR MFF4
970TYA
980 EDR#255
990STA JX
1000JSR.CROSS:JSR CROSS
1010 LDA #PTAB MOD 25#1STA CHEST
1020 LDA #PTAB DIV 25#1STA CHEST+1
1030PLA:TXA:PLA:TXA:PLA:PLA
1040RTI
1050 .CROSS LDA#0:STA XH:STA YH
1060-STA YL:STA-PTAB1
1070LDA JX:STA XL
1080RSL XL:RDL XH
1090.XA ASL XL:RDL XH
1100.YI LDA JY:STA YL:ASL YL
1110RDL YH
1120.Y4 ASL YL:RDL YH
1130.CO LDA #4:STA PTAB1:JSR FLT
1140LDA #0:STA XH:STA YH:STA YL:STA PTAB1
1150LDA #20:STA XL:JSR FLT
1160LDA #2:STA PTAB1
1170LDA #21#1STA XL
1180DEC XH:JSR FLT
1190LDA #0:STA PTAB1
1200LDA #20:STA XL
1210INC XH:JSR FLT
1220LDA #0:STA XL
1230LDA #20:STA YL
1240JSR FLT
1250LDA #2:STA PTAB1
1260LDA #21#1STA YL
1270DEC YH:JSR FLT
1280 RTS
1290J
1300NEXT
1310ENDPROC
1320 7#220#JCDE MOD 25#
1330 7#221#JCDE DIV 25#
1340 MODE 2
1350 #FX 14,3
1360 VDU 19,15,7,0,0,0,0,0
1370 END
1380 REM
1390 CALL JCDE
1400 GOTO 1380

```

This program is used to assemble the machine code for scanning the joystick and printing the characters. It should be run second.



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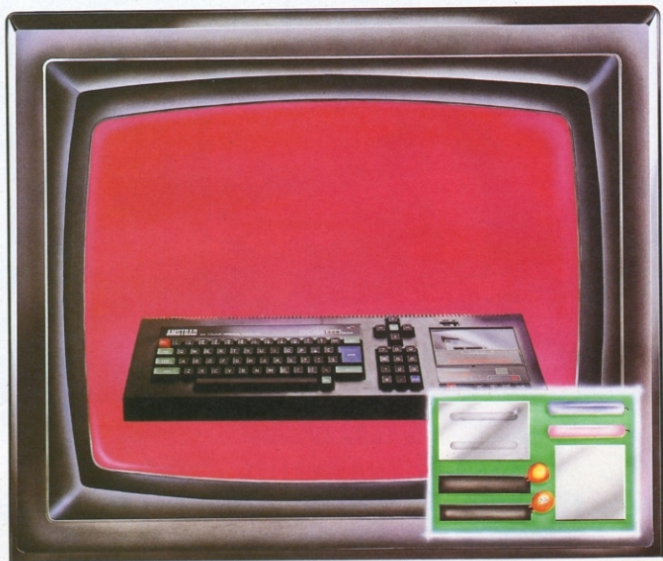
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UTPUT: AMSTRAD

# WINDOW ON RSX

Pete Johnson shows you how to write and use Resident System Extension routines on your Amstrad.



**A**mstrad Basic, a Microsoft lookalike written by Locomotive Software, provides a very useful facility for calling machine code subroutines. Most Basics provide something of this kind — the CALL statement and USR function of BBC Basic are an example. These take an address to jump to and parameters may be passed to the routine either in the registers or in a 'parameter block' in memory.

The Basic on the CPC464 also provides a form of the CALL statement, but where it really scores is in the provision of calls to external commands. To use these a machine code program which contains the names and addresses of the routines, and the routines themselves, has to be written. The Amstrad operating system then has to be informed of the

command's presence by calling a special 'logging routine'.

## Using the routines

This article describes how to write and use the RSX (Resident System Extensions).

Once the external commands have been logged, they may be accessed simply by preceding the name by a vertical bar: (SHIFT @ on the keyboard). The command name may be followed by parameters. Examples of statements containing calls to external commands are:

```
1000 CIRCLE,X,Y,R
4350 FOR I=200 TO 400 PEEK,@A%.I:PRINT
A%:NEXT
```

The first example calls a routine called CIRCLE, which takes three para-

meters x, y and r. In fact, these may be any arbitrary expressions which are evaluated and stored as two-byte quantities in a parameter block. The second example uses the @ operator to get the address of a variable.

This is required because the routine PEEK will actually store a value in the variable A%.

When Basic gets a | command, it finds the address of the routine named and then evaluates the parameters following it. These are stored in a parameter block. The Z80 register IX is set to point to the parameters.

The parameter block is set up in the reverse order to the expressions in the statement. Thus, the parameter blocks for the two examples on the next page would be:

**Example 1**  
(IX+4) Value of X  
(IX+2) Value of Y  
(IX+0) Value of R

As usual, integers are stored as low-byte first, high-byte second. Note that the address of an array may be passed by giving the address of the first element. For example:

```
SORT,@TEST$(6)
```

In addition, when strings are passed as parameters, it may only be by address. The address given in the parameter block is of a three-byte string descriptor. The first byte of this is the string's length and the next two bytes are the address of the actual characters in the string. The contents of a string may be altered by an external routine, but the string descriptor should not be changed in any way.

## Using the program

This typical machine code program will implement external commands. To keep things simple, only two short commands are given: PEEK which takes an address then outputs the contents of that location in an integer variable and SWAP which swaps the contents of two integer variables. PEEK is useful, as it peeks from the ROM if the address given is in the top or bottom 16K of memory; Basic's own PEEK function will only ever peek from RAM.

The program is in the form of a HiSoft Devpac source listing. It is assembled to run at address &A000. To make room for it, Himem must be moved down from its default of &A07F using the command MEMORY &AAFF.

In the listing here, the addresses of some operating system calls are defined first, then the code origin is set to &A000. The code at label START should be called

from Basic (ie CALL &A000 after the object code has been loaded). It uses the operating system routine KL LOG EXT to tell the OS about the external commands. BC is set to point to the command table and HL points to four bytes of memory for use by the OS, reserved at line 12.

The command table is in two parts. The first consists of a pointer to the second, followed by a list of JP instructions. The destinations of these jumps are the entry points of the external command routines. The second part of the table, which doesn't have to follow on from the first, consists of a list of strings which are the command names. These strings are in upper case ASCII and the last letter of each command has its top bit set. The table is terminated by a zero byte.

Next come the two routines themselves. As mentioned above, upon entry to the routine, IX contains the address of the first byte of the parameter block (the low byte of the last parameter). The A register contains the number of parameters passed. My examples don't check for a valid number of parameters, but A could be used by routines which can accept a variable number of parameters.

The PEEK routine starts by enabling the ROMs so that they may be read instead of the RAM. After the upper ROM (Basic usually) is enabled, the old status is saved (line 31) so that it may be restored later. The lower (operating system) ROM is also enabled. Next HL is loaded with the first parameter (ie I in the command PEEK,@A%,I), which is the address to be peeked. Line 35 loads A with the contents of this address. Then HL is loaded with the address of the variable (@A% above) and A is stored

there. Before returning, the high-byte of the integer is set to zero and the previous upper ROM state is restored.

The SWAP command takes two addresses of integer variables and exchanges their contents. HL points to one variable and DE to the other. The subroutine GET-ADDRES loads these registers and SWAP1 swaps a pair of bytes and increments the pointers. As noted in the comments in lines 66-73, other types may be swapped by altering the number of calls to SWAP1.

The method for assembling and running the program is as follows (assuming you are using Devpac): Load the assembler/editor and type in the source as listed above. Assemble the program using the A command. Save the object program using the o command. Re-enter Basic with the B command.

Once you are back in Basic, you can see the effect of the new commands. First install them by:

```
CALL &A000
```

To see the effect of SWAP, try:

```
A%=1:B%=-123
```

```
SWAP,@A%,@B%
```

```
PRINT A%,B%
```

This will print 123 followed by 1 — the variables have been swapped. To see the effect of PEEK, try this:

```
FOR I=&C000 TO &C100:
```

```
PEEK,@A%,I:PRINT A%,PEEK(I):NEXT
```

The first number printed comes from the Basic ROM and the second from the screen RAM. To use the commands when the machine if first turned on or after a reset, you need these commands:

```
MEMORY &AAFF : REM Sets new Himem load "OBM" : REM Assuming you called object "OBJ"
```

```
CALL &A000 : REM Log the commands
```

```
PEEK,@A%,123:REM etc.
```

## Listing

```

1 ; *- ; Disable listing
2 LOG RS EQU #BCD1
3 IN UPF EQU #B900 ; Enable the upper ROM to be read
4 IN LWR EQU #B906 ; Enable the lower ROM to be read
5 RES_UP EQU #B90C ; Restore the previous upper ROM state
A000 6 ORG #A000
7 START
A000 0100AB 8 ID BC,COM_TAB ; Address of the command table
A001 2109AB 9 ID HL,WORK ; 4 bytes of workspace for the OS
A006 C3D1BC 10 JP LOG_RSX ; Tell the OS and return
11
A009 0000 12 MORG ;
A00B 0000 13 DSWN 0 ; Four bytes for the OS
14 DSWN 0
15
16
17 COM TAB
A00D 15AB 18 DSWN NMSZ ; Pointer to the commands
A00F C31FA0 19 JP PEEK ; Peek a byte of ROM/RAM
A012 C33AAB 20 JP SWAP1 ; Swap two integers
21
22 NMSZ
A015 504545CB 23 DSWN "M","E","X","K" + #B0
A019 535741D0 24 DSWN "S","W","A","P" + #B0
A01D 00 25 DSWN 0
26
27 PEEK
28 ; PEEK,@intvar,addr
29 ; Pokes the value at address addr into intvar
30 CALL IN_UPPER ; Enable the upper ROM
A021 F5 31 PUSH AF ; Save the ROM state
A022 CD06B9 32 CALL IN_LOWER ; Enable the lower ROM
A025 D06600 33 LD L,(IX+0) ; Get addr in HL
A028 D06601 34 LD H,(IX+1)
A02B 7E 35 LD A,(HL) ; Get the byte in A
A02C D06602 36 LD L,(IX+2) ; Get the var addr
A02F D06603 37 LD H,(IX+3)
A032 77 38 LD (HL),A ; Store the low byte
A033 23 39 INC HL ; Zero the high byte
A034 3600 40 LD (HL),0
A036 F1 41 POP AF ; Get the ROM state back
A037 C30CB9 42 JP RS_UPPER ; Restore the upper ROM state
43
44 SWAP1
45 ; SWAP1,@int1,@int2
46 ; Swaps the values of the two integers
A03A CD4BAB 47 CALL GET_ADDRS ; Get the addresses of the parameters
A03D CD40AB 48 CALL SWAP1 ; Swap low bytes
49 SWAP1
A040 1A 50 ID A,(DE) ; Swap a byte
A041 4E 51 LD C,(HL)
A042 77 52 LD (HL),A
A043 79 53 LD A,C
A044 12 54 LD (DE),A
A045 23 55 INC HL ; Auto increment HL
A046 13 56 INC DE ; Auto increment DE
A047 C9 57 RET
58
59 GET_AD
A048 D06600 60 LD L,(IX+0) ; Get @int1 in HL
A04B D06601 61 LD H,(IX+1)
A04E D05802 62 LD E,(IX+2) ; Get @int2 in DE
A051 D06603 63 LD D,(IX+3)
A054 C9 64 RET
65
66 ; SWAPS to swap strings could be:
67 ;CALL GET_ADDRS
68 ;CALL SWAP1
69 ;CALL SWAP1
70 ;JP SWAP1
71
72 ; Likewise swapping reals could be done with
73 ;five calls to SWAP1

```



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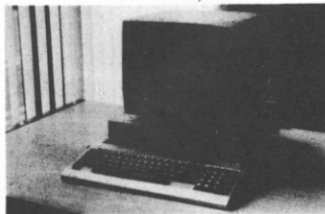
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## BLOCK AND STRIPE

Using Amstrad graphics can be tricky, but Clare Gurton's machine code routines reduce filling in blocks of colour and using stripy inks to child's play.

Filling boxes and using stripy ink on the Amstrad are not easily achieved in Basic. But they are in machine code, and the routines here are not difficult to implement.

### Filling boxes

Using windows to create blocks of colours on the Amstrad is a clumsy technique. You must define the window, define a colour for the paper, clear the window and so on.

However, there's a ROM routine, SCR FILL BOX, which begins at address &BC44 and fills boxes of character cells with the colour code held in the A register. SCR FILL BOX also needs four other values to specify the left, right, top and bottom character positions of the box to be filled.

You will find that these values are taken from the H, D, L and E registers respectively.

The machine code routine allows you to define the box colour and the corners of the boxes with five POKES. The advantage of using your own machine code routine is that it acts independently of any windows on the screen, allowing you to define and use windows for text as well as filling boxes with plain colour or even textured colours — which you cannot do from Basic.

The routine itself is very simple (see Figure 1). All it does is load the relevant registers with the appropriate values and call the ROM routine at &BC44. Lines 30 to 100 of Figure 2 are the Basic loader. Lines 130 to 180 give the

Figure 1: Box-fill routine

Address	Mnemonic	Op-code/Data	Decimal
43898	LD A,n	3E	42
43891		09	09
43892	LD H,n	2A	38
43893		09	09
43894	LD D,n	1A	22
43895		09	09
43896	LD L,n	2E	46
43897		09	09
43898	LD E,n	1E	30
43899		09	09
43898	CALL &BC44	CD	285
43891		44	68
43892		3C	180
43893	RET	C9	281

addresses to POKe to define the colour to fill the box and the addresses for the top, bottom, left and right text locations for the box. The limits on these are defined by the screen mode. The demonstration assumes that the screen is in Mode 1. If you POKe a column value greater than the upper limit available, (eg POKING 43885 with a number greater than 20 in Mode 0) you'll get wrap-around. The demonstration also shows the colour textures available. To discover which numbers give plain colours you must experiment by POKING 43881 with different values.

### Striped inks

The ROM routine, SCR CHAR INVERT, XORs character ink colours. On entry it assumes the B and C registers contain the two colours to use, while the H and L registers hold the screen location of the character in terms of rows and columns — H is used as the column, L as the row.

Figure 3 gives the addresses, mnemonics, opcodes and decimal equivalents. You'll see that you can POKe address 43891 with the colour of one ink, POKe 43893 with the other. The row and column values have to be POKed into addresses 43895 and 43897 respectively, and you must remember to take into account the screen mode, as you did in the first program.

Curiously, you can load values of zero into the H and L registers quite happily before CALLING the program. Figure 4 is the Basic loader and includes a demonstration.

The demo prints up strings of the characters A to X and applies the character invert routine to each character position in the row according to two colours chosen at random.

The two numbers displayed at the left of each row are the random numbers for the colour codes, so when you see a combination you like, press Esc to pause the program and write down the values. As you'll see, the routine gives you access to unusual colour textures such as striped ink and paper.

Figure 4: Character inverter

18	' Character Inverter
20	' Basic Loader
30	DATA 0,0,14,0,38,0,46,0,285,74,180
40	DATA 201
50	MEMORY 43889:address = 43889
60	FOR I=1 TO 12
70	READ W
80	POKE address + I,W
90	NEXT
100	'
110	'POKE 43891 with 1st colour
120	'POKE 43893 with 2nd colour
130	'POKE 43895 with column
140	'POKE 43897 with row
150	'CALL 43898 to invert character
160	'
170	'***** DEMONSTRATION *****
180	DEF FN(n)=INT(RND(1)*255)+1
190	MODE 0
200	CALL = 65
210	LINE=43897:position = 43895

Figure 2: Basic loader

18	' Basic Loader
20	' For box filling
30	MEMORY 43879
40	address=43879
50	DATA 62,255,30,0,22,0,46,0,38,0,285
60	DATA 68,180,201
70	FOR count = 1 TO 14
80	READ value
90	POKE address + count,value
100	NEXT
110	'***** All Done *****
120	'
130	' POKe 43881,colour
140	' POKe 43883,left column
150	' POKe 43885,right column
160	' POKe 43887,top row
170	' POKe 43889,bottom row
180	' CALL 43888 TO fill box
190	'
200	'***** Demonstration *****
210	MODE 1
220	colour = 43891
230	left = 43893:right = 43895
240	top = 43897:bottom = 43899
250	fill = 43888
260	'
270	texture = 255
280	TLHC = 0
290	' TLHC is Top Left Hand Corner
300	dc=1
310	' dc is TLHC decrement/increment
320	'
330	' Set up registers to define box
340	POKE colour,texture
350	POKE left,TLHC
360	POKE top,TLHC
370	POKE bottom,24 - TLHC
380	POKE right,39 - TLHC
390	' Now change texture
400	texture = texture - 10
410	IF texture < 0 THEN texture = 255
420	' Call box fill
430	CALL fill
440	TLHC = TLHC + dc
450	IF TLHC = 12 OR TLHC = 0 THEN dc=-dc
460	GOTO 340

Figure 3: Ink inverter routine

Address	Op-code	Hex	Decimal
43898	LD B,0	06	6
43891		09	9
43892	LD C,0	0E	14
43893		09	9
43894	LD H,0	26	38
43895		09	9
43896	LD L,0	2E	46
43897		09	9
43898	CALL &BC4A	CD	285
43899		4A	74
48998		3C	180
48991	RET	C9	281



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**'Women and Computing' by Rose Deakin, published by MacMillan at £5.95 (paperback 149 pages.)**

It is with Julius Caesar that Ms Deakin begins. Paraphrasing Shakespeare she compares computers to a tide that women must take at its flood to lead them on to fortune. Shakespeare was obliged by the strictures of meter to refer to 'a tide in the affairs of men', and there's the rub.

The book explores the reasons for computers being a male preserve, and suggests remedies. It is a serious matter, and the book is completely devoid of humour. Men should read it as well as women, says Ms Deakin; men should visit the dentist, too, but they shouldn't expect it to be fun.

The author's central argument is that pairs (men and women, whites and blacks, Jews and gentiles etc) are not better or worse than each other, just different. Hence they respond to computers in different ways. Ms Deakin ropes in the glorious dead (John Stuart Mill) to support her as the champions women's essential practicality — if micros could seem more worthwhile, she says, women might be more attracted to them. That is as good as accusing the rest of us of frivolity, and who would deny it?

Reasons and remedies revolve around social attitudes, schools, marketing and various male prejudices. One remedy Ms Deakin offers is to make computing the fourth R in schools.

The second section of the book looks at case studies of women and computers, mainly micros. There are eight case histories and they include Ms Deakin herself.

But the final part of the book, where the writer puts forward some worthwhile micro-based occupations for women at home (or for anybody wanting to use a micro at home) is genuinely valuable. It begins discouragingly — typing and book-indexing are not alluring occupations — but opens out into a prospectus of opportunities.

This is a dull book packed cover to cover with worthy sentiments. If party manifestos are your taste in reading, buy it. **DG**



**'Simple Music and Sound Effects' by Jonathan Inglis, published by Dragon Hardbacks & Granada at £1.95 (paperback 63 pages.)**

This highly-coloured slim volume comprises 63 pages of extremely simple advice on getting sound out of your BBC or Electron.

After a quick survey of the machines and using Basic, it eventually gets, by page 15, on to mentioning the sound command. To make the text a little more interesting, there are screen shots dotted around. As is becoming the unfortunate norm these days they disappointingly have no programs related to them. They are rather nice pictures and it would have been nice to have seen how they were done.

The book also appears to have been printed using a dot matrix printer. None of your NLQ stuff this, its straight 8 by 8 matrix. Anyhow, back to the book; a few chapters on, we still have not learned much. This leads me to believe that the book is aimed at younger readers or perhaps beginners, either of whom will probably be bored stiff by the time they are half-way through.

One thing conspicuous by its absence is any reference at all to the ENVELOPE command. This is somewhat strange since it turns the BBC and Electron's simple SOUND command into something special. There is also no mention of such subtleties of the SOUND command as synchronising the channels or interrupting on-going sounds. The author either hasn't read the User Guide or thinks that such things are far beyond your average BBC/Electron user. I doubt whether he's correct. **KG**



**'Data Management for Professionals' by Bryan Lewis, published by Prentice-Hall at £14.55 (paperback, 153 pages.)**

This is a straightforward attempt to get doctors, dentists, pharmacists and lawyers to smarten up their operations. It first aims to win them over to the idea of computerisation and then sets out how to do about it.

Probably because doctors, dentists, pharmacists and lawyers are usually reckoned not to be short of a bob or two, the book's US price tag of \$15.95

translates to £15.45 in this country. For this, progressive professionals will acquire a large glossy volume in which the text never fills more than two-thirds of the page. Opticians will appreciate this thoughtful touch.

But what of the content? The sight of Ashton-Tate's name at the foot of every page won't fill you with confidence, if it's impartiality you're looking for, but Dr Lewis deals skilfully with the problem of having a prominent business software publisher as a backer. He uses dBase II to produce examples but acknowledges that there are other possibilities.

As this is a US publication, you must expect expressions like 'bottom line' and 'trade-off'. Dr Lewis occasionally betrays a background in mainframe computers — or do all Americans sprinkle everyday speech with computer jargon now?

His approach to the matter of computer applications is a lesson in subtlety. Having described how businesses work and where computers apply, he moves on to specific occupations. His style leaves the user with a large element of choice — 'if your office runs this way, you might like to try this approach'. But to his credit he commits himself to what he believes is the best method, and a pox on how your office runs. This may not be a bad thing.

There is some over-simplification (most businesspeople/professionals will already know what a general ledger is). But on the whole it is a useful book, covering an area that the computer manufacturers have tended to neglect. **DG**



**'Sensational Games for the Amstrad' by Jim Gregory, published by Granada at £5.95 (paperback, 200 pages.)**

Whatever the general view of books of programs they have one invaluable use — for owners of recent machines they are well worthwhile as a source of instruction and software.

While the software houses gear up for program conversion to the Amstrad, you could fill a few weeks with entering and amending the programs offered here. There are 27 listings covering text and arcade games, with a smattering of utilities for good measure.

All are accompanied by a short introduction and a screen shot but no notes on how they work (a minus point for that). There's nothing startling or particularly sensational — on the other hand most look worth-

while and there must be something for all tastes.

To round things off there's a collection of useful appendices on character sets, screen maps and so on. Go to be worth the money. **PW**



**'Animation, Games and Sound for the Vic 20' by Tony Fabbri, published by Prentice-Hall at £14.50 (paperback, 217 pages.)**

Prentice-Hall does it again — another one for the glass-fronted bookcase. You certainly wouldn't want to use this book... you might spill coffee on it, or get a page creased and at nearly 15 quid you'd be upset, wouldn't you?

Pity because it's a great book with loads of example programs, helpful diagrams and a clearly written, chatty text. If you dared risk a thumbprint on page 137 you'd find a complete example of a space game covering features like random motion, keyboard control and animation.

Open it to page 177 (careful!) and you find an amusing routine of a dancing figure.

Yes, it's all good stuff. But never mind — there are lots of good, cheap books on the Vic. **PW**



**'The Times Book of Computer Puzzles and Games' by Bradboer & Gale, published by Sidgwick & Jackson at 16.95 (paperback, 160 pages.)**

Two titles — for Commodore 64 and Spectrum — although most of the programs are the same. Even by computer book prices this is a little steep — presumably to pay for the prestige of The Times and the publishers, relative newcomers to the computer field.

The games are a little on the thin side, most of the programs being computerised versions of those puzzles that litter the pages of Christmas annuals and the like. You know the sort of stuff — break the code, get the sheep and the chicken and the dog across the river, how long would it take half a man to dig four holes?

If you have that perverse turn of mind that enjoys this sort of stuff, or you're tired of saving the universe, slaying the dragon and digging your way out of that mine, you just might enjoy this.

On the other hand, £6.95 will buy a cracking good new program. **PW**

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# SHADOW WORLD

Bob Morgan
has a whole
host of
extensions for
you in the 8K
Shadow ROM
in the ZX
Interface I

Spectrum users who come across the commands OPEN # and CLOSE # (extended mode, symbol shift, keys 4 and 5 respectively) on the keyboard, will wonder what they're for.

Reference to page 115 of the Spectrum manual lists these two commands, along with MOVE, ERASE, CAT and FORMAT, pointing out that they can only be used with 'the extra attachments' — namely the ZX Microdrive and Interface 1.

The reason for this is that the routines necessary for the implementation of these commands are to be found not in the standard 16K ROM present in every Spectrum — but in the additional 8K 'Shadow' ROM located in the ZX Interface 1. The shadow ROM also houses routines which extend the operation of the standard Spectrum commands: SAVE, VERIFY, LOAD, MERGE, LIST, PRINT, INPUT, INKEYS, CLS and CLEAR.

These extensions to Spectrum Basic open up a wonderful world of communications with other devices, including the option of networking groups of Spectrums. In addition, it also offers a sophisticated file-handling facility comparable to those available on larger more expensive systems.

## Channels

The significance of the OPEN # and CLOSE # commands thus becomes apparent. Before a file, or a device, can be used it is first necessary to 'open' it so that it can provide input or receive output. Then the file or device must be 'closed' so that input may be received from a different source, or output directed to an alternative destination. The terminology adopted by Sinclair for the Microdrive and Interface 1 is to refer to the file or device as a channel.

Thus a Microdrive file, the ZX printer, the keyboard, another Spectrum in the network, the display screen, the RS232 interface — all these are channels. Information passes to or from these channels along streams. There are 16 available, designated by the numbers 0 to 15 preceded by the hash symbol/#. Streams #4 to #15 are free for the user to set up his own stream-channel links.

Streams are linked to channels by means of the OPEN # command, for which the appropriate syntax is: OPEN # channel number; 'channel specifier'. For example: OPEN #7; 'm'; 2; 'datafile' associates stream seven with the file named datafile on the cartridge currently in Microdrive 2.

Subsequently, a command such as PRINT #7; a\$ may be used to print the string a\$ to the file. Alternatively, the file might be used to supply numerical data to the current program by including a statement like: INPUT #7; a;b;c.

In this example, 'm' is used to denote a Microdrive channel; other types of channel are denoted by 'n' for the network, 't' and 'b' for the RS232 interface. There are also three established channels 'k', 's' and 'p' denoting the keyboard, display screen and ZX printer port respectively.

For these established channels, the separators in the OPEN # statement must be commas rather than semicolons. These and other details are in the Sinclair Microdrive and Interface 1 Manual.

## Insight

Those still saving up for their interface and Microdrives can gain some insight into the use of channels and streams by playing a few tricks with a standard Spectrum. These are possible because streams #0 to #3 are available without Interface 1, and are already dedicated to particular channels.

Streams #0 and #1 output information to the lower part of the display screen (reports, input prompts, etc) and input data from the keyboard. Stream #2 outputs information to the upper part of the display screen (program output, screen listings, etc). Stream #3 outputs information to the ZX Printer port (for hard copy of listings, screen displays, etc).

On a standard Spectrum, those Basic commands which are concerned with input and output have a default stream which is implicit in their use.

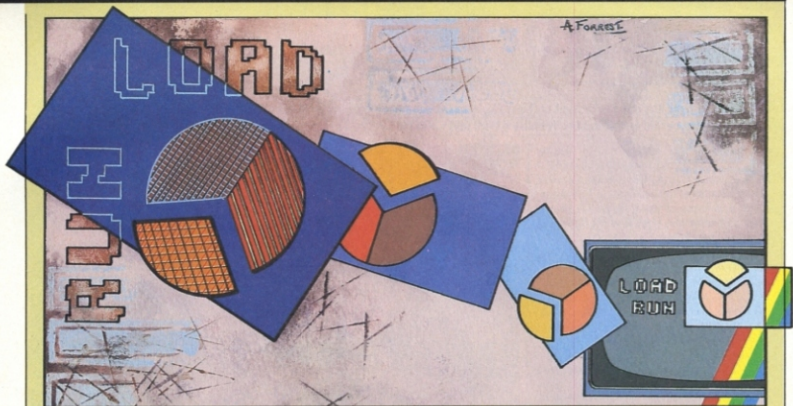
Thus, INPUT is equivalent to INPUT #1 since input normally comes from the keyboard. PRINT and LIST are equivalent to PRINT #2 and LIST #2 since the normal destination for the information output by these commands is the upper part of the display screen. However, LPRINT and LLIST normally output text to the printer so these instructions are short for LPRINT #3 and LLIST #3.

In fact, if the trouble is taken to specify a stream, then there is no longer any

## Listing 1: streams

```

10 BORDER 0: PAPER 0: INK 9: C
LS
20 LET a$="PCN week!! for the
latest news!"
30 FOR n=0 TO 3: REM IF NO PRI
NTER, CHANGE 3 TO 2
40 IF n=3 THEN PRINT #2; PAPER
n; FLASH 1; "PRINT TO STREAM ";
n
50 PRINT #n; PAPER n; FLASH 1;
"PRINT TO STREAM ";n; FLASH 0;
a$;a$a$
60 PAUSE 1+30*(n<>3)
70 IF n=3 THEN LPRINT #2; PAPE
R n; FLASH 1;"LPRINT TO STREAM "
;n
80 LPRINT #n; PAPER n; FLASH 1
;"LPRINT TO STREAM ";n; FLASH 0;
a$;a$a$
90 PAUSE 1+30*(n<>3)
100 NEXT n
110 PAUSE 100
120 FOR n=0 TO 3: REM IF NO PRI
NTER, CHANGE 3 TO 2
130 BORDER n: PAPER n: CLS : IF
n=3 THEN PRINT #2; FLASH 1; LI
ST TO STREAM ";n
140 PRINT #n; FLASH 1;"LIST TO
STREAM ";n: FLASH 0: LIST #n,14
0+(n=3)*60
150 PAUSE 1+100*(n<>3): CLS
160 IF n=3 THEN PRINT #2; FLASH
1;"LIST TO STREAM ";n
170 PRINT #n; FLASH 1;"LLIST TO
STREAM ";n: FLASH 0: LLIST #n,1
40+(n=3)*60
180 PAUSE 1+100*(n<>3)
190 NEXT n
200 BORDER 0: PAPER 0: INK 4: C
L: LIST #2,120
210 PRINT #0; INK 6; FLASH 1;"T
O RUN AGAIN, PRESS ANY KEY ..."
220 PAUSE 0: RUN
230 SAVE "streams" LINE 10
    
```



## Listing 2: windows

```

10 BORDER 0: PAPER 0: INK 9: C
L5
20 LET b$=" OUTPUT TO LOWER PA
RT OF SCREEN "
30 LET t$=" OUTPUT TO UPPER PA
RT OF SCREEN "
40 FOR n=0 TO 21
50 CLS
60 FOR j=0 TO n
70 PRINT #1; PAPER 1; b$
80 NEXT j
90 FOR j=0 TO 21-n
100 PRINT #2; PAPER 2; t$
110 NEXT j
120 PAUSE 20
130 NEXT n
140 PAUSE 0: RUN
150 SAVE "windows" LINE 10
  
```

distinction between the commands PRINT and LPRINT, nor between LIST and LLIST. Thus PRINT, PRINT #2, LPRINT #2, LIST, LIST #2 and LLIST #2 all direct output to the upper part of the display screen, while LPRINT, LPRINT #3, PRINT #3, LLIST, LLIST #3 and LIST #3 all produce hard copy on the printer.

Stream #0 is normally used to display reports to the lower part of the screen, but in fact it is quite possible to PRINT or LIST to stream #0 and also to stream #1. Both give the same effect of lines of output scrolling up from the bottom of the screen. The only snag is that once generated, the output text is normally wiped out by the immediately following report and this happens so fast that it is impossible to read the text.

This problem can be circumvented by delaying the report by incorporating a futile loop; PRINT #0; a\$: FOR j = 1 TO 1000: NEXT j allows sufficient time for reading the output. A more elegant solution is to use PRINT #0; a\$: PAUSE n where n is a large number to introduce a

delay which can be discontinued by depressing any key; if PAUSE 0 is used the delay is infinite and the computer simply awaits a key depression before executing the following statement.

This is by far the simplest method of printing on the bottom two (or more) lines of the Spectrum screen and obviates the need for memory POKES. An illustration is provided by statements 210 and 220 of listing 1.

There are several ways in which PRINT #0 can make an effective contribution to programming. For example, it is sometimes necessary to use the entire "normal" screen of 22 lines to display a picture, graph or text to be viewed for as long as the user requires before the program moves on to the next task. Here the bottom lines can be used to invite the appropriate keyboard prompt to signal that the user is ready to continue.

Another example is where a screen is to be displayed during the loading of program or code; again, the bottom lines can be used to display an appropriate

message such as 'please wait 30 seconds'.

The accompanying program streams, which will run on any Sinclair Spectrum, illustrate the effects of unconventional stream — channel linkages. The results are mostly frivolous, although it makes a pleasant change to see listings or other text pouring up the screen instead of down.

## Windowing

The program also shows that it is possible to split the Spectrum screen display into upper and lower regions of any size as long as the total number of lines does not exceed 23.

The accompanying program windows (listing 2) give a simple demonstration of the use of screen windows.

This brief excursion into channels and streams may stimulate you to conduct a few experiments of your own. A word of caution is necessary here, for it is all too easy to 'hang' the machine, particularly during attempts at using INPUT # or INKEYS # with unconventional streams; it will then be necessary to switch off to free the machine, losing your program.

Some insight into the uses, and limitations, of channels and streams can only enhance your understanding of your machine. Just think what you could do with Interface 1 and a couple of Microdrives. ▀

## Further Reading

*Sinclair ZX Spectrum Basic Programming* by Steven Vickers, edited by Robin Bradbeer, Sinclair Research.  
*Sinclair ZX Interface 1 and ZX Microdrive* by Cambridge Communication, Sinclair Research.  
*Spectrum Microdrive Book* by Dr Ian Logan, Melbourne House.

## TOKYO SHOWS

One year on from the announcement of the MSX, John Lettice finally gets his hands on the fabled machine, or machines as the case may be. He subjected the Toshiba HX-10 and Goldstar FC-200 to rigorous scrutiny to see how they measure up.

**A** tidal wave? A volcano ready to blow its top? Or a Japanese invasion? All of these things have been thought about the ever-impending MSX standard, and some of them have even been said, but over the past few months this particular volcano has given a distinct impression of being full of eastern pumice.

It's well over a year now since MSX was first announced, and since spring it's been difficult to open a magazine without tripping over another article about the blessed things. If you read magazines with your feet, that is...

In effect the position was that you could have practically any MSX machine you liked, provided that it wasn't actually going to be sold in this country.

So for months, journalists and programmers have been hunched over Japanese market machines, trying not to notice the exotic styling that seems to go down well over there, and suspending operations only long enough to phone up the manufacturers and ask when the real thing was arriving.



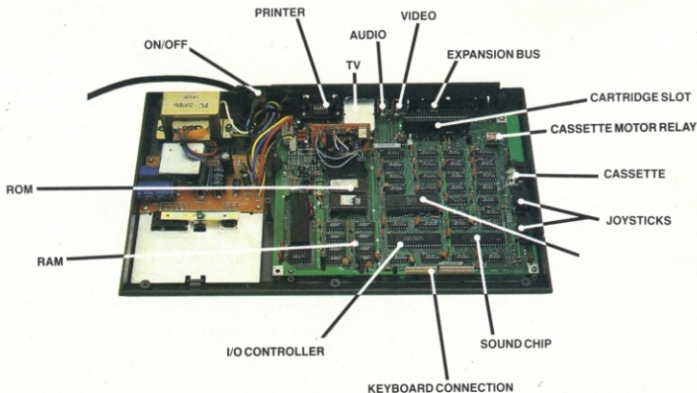
Note the pen holder to the right of the cartridge slot — this isn't really designed to hold your biro.

what, how'd you like a UK case with Japanese insides? Ah... it's just a question of them wiring in a couple more keys...

And so it comes about that the most reviewed machines in the history of microcomputing haven't actually been

HX-10 and a Goldstar FC-200.

The Toshiba's main claim to fame is that it's the first MSX machine to appear in the shops in this country. The Goldstar is still a rarity, but has added novelty value because of its Korean origins.



The manufacturers themselves got more and more sheepish as deadline after deadline came and went, and started offering consolation prizes of 'um... hand-built prototype — er... tell you

reviewed yet in the UK, if you see what I mean.

But just when I thought it was safe to go back in the office the tidal wave broke over my desk in the shape of a Toshiba

If Goldstar and Microdealer (the UK distributor) can get their act together in fairly short order they'll probably embarrass a few members of Japan Inc on two counts: they'll have beaten a

number of manufacturers to the punch, and their £230 price-tag will look more realistic than the rest of the MSX pricing, which is liable to be up nearer the £300 mark.

## Presentation

Because they're built to a standard MSX

star manual is peculiar enough to make it practically unintelligible. This will however be replaced by a fully English version when the machine hits the shops.

## Documentation

There seems to be a basic format for MSX

provisional Goldstar documentation has a certain amount in common with both of them.

The Microsoft aspect of MSX probably accounts for the similarity between the Toshiba manual's format and that of Tandy manuals. From an educational point of view this is by no means the best way of presenting a machine, but the plus point is that most of the information is there if you want to look for it.

One major flaw in the Toshiba manual is that there's no documentation of the pinouts of the interfaces. The Goldstar manual has these, and this more than compensates for the fact that it's written in Korean script.

## Construction

The similarity in the appearance of the machines extends to construction quality. They're both solidly cased in rigid plastic with an internal power supply and liberal use of grilles for cooling purposes. There are also fairly large heat-sinks visible through the base of the machines, with the monster heat-sink award going to Toshiba.

The keyboard displays where the similarities are most obvious. The legends on the keys are slightly different, but the keys themselves look like they've come out of the same mould, never mind the same factory.

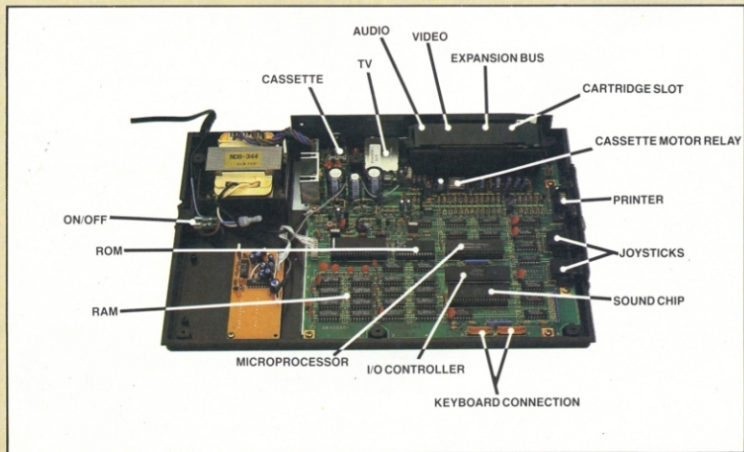
Part of the MSX idea is that it provides a basic specification that manufacturers



All the MSX machines will have a standard ROM cartridge socket. Power is automatically switched off while inserting a cartridge.

specification you'd naturally expect the Goldstar and the Toshiba to look a bit like one another. But the resemblance is so close it's spooky. The cases are both two-tone grey, with the various control, shift and function keys dark grey

manuals, consisting of alphabetical reference sections, a couple of shortish chapters dealing with how to get started, and an excellent reference section giving you memory maps, ASCII codes and I/O maps.

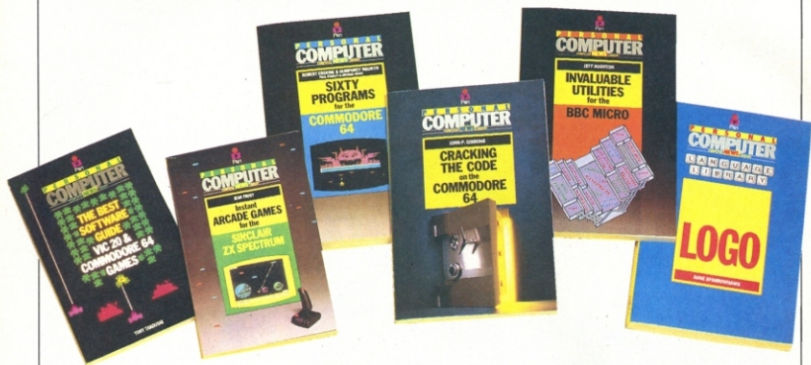


arranged round an off-white main keyboard. Red stop keys, green graphics shifts and blue cursor clusters on both machines complete the sense of déjà-vu.

Both machines came with English manuals, but the English in the Gold-

I'm making an assumption here, as the only other MSX manual I've seen is for a Japanese Hitachi, and I'm afraid I've been letting my Japanese slide a little recently, but the format looks similar to the Toshiba manual, and the

can improve on if they wish. So, provided the machine can operate as MSX, the individual manufacturer can add in facilities that exceed the specification. Yamaha, is producing a machine that is at least 50 per cent music synthesiser.



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# ARDWARE PRO-TEST: MSX

◀ 33

The Toshiba and the Goldstar, however, are pretty much standard; the Goldstar's claim to individuality being a quaint little light pen holder on the right of the cartridge slot. Both machines' cartridge slots have automatic cut-out switches so that you can put in cartridges while they're powered up, and the expansion ports are simply jump-lead affairs connecting the cartridge slots' lines to buses at the back.

At the launch of MSX in this country earlier this year there was something of a controversy about expanding the system. The earlier Japanese systems seemed to all have different expansion facilities, so effectively they seemed incompatible. It was difficult to see how they could use standard MSX peripherals.

It took some heavy third degree questioning before an MSX spokesman confessed that they were intended to be run from the cartridge slot, and considering the guffaws that greeted this, his reticence was understandable.

Back to my Japanese Hitachi manual. I don't understand the words, but a diagram shows some funny stuff coming out of the cartridge slot. This explains why some of the machines have two slots.

Some smart person, however, must have worked out that running peripherals from a cartridge slot would strike the warped western mind as hugely funny — so the extra slot has been transmogrified into a full bus.

The bus itself is a male plug while the cartridge socket is female, so I imagine peripherals sold in the Japanese market will have their connectors inverted to allow them to work with UK machines, but I'm willing to be corrected on this one.

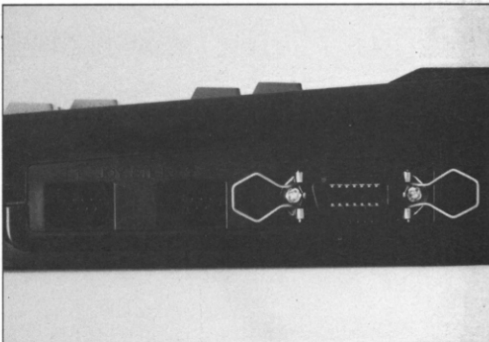
Alternatively, the bus may not be MSX standard at all, as it's difficult to see if all the lines from the cartridge slot are connected. I wait with bated breath.

Another improvement is the presence of a Centronics interface on both. This is marred slightly by the exotic nature of the socket, which is a small and very alien looking D plug. Other sockets present are video, audio (nice touch), TV, cassette and twin D-type joystick ports.

The Goldstar has another jolly little extra. You can remove the fuse through a hole in the back, so you can replace it without opening the case.

The PCBs of both machines are fairly tidy, as indeed they should be considering the length of time the MSX companies have had at their disposal for designs and redesigns. The Toshiba has one of those wires that shout loudly: 'Oh dear, shouldn't we have connected these two?' But apart from that it's clean.

One little oddity about the review Goldstar was that the ROM was on two EPROMs rather than the Toshiba's one ROM chip. The memory map in the manual shows an 8K Korean character



The presence of two joystick ports on the Toshiba means that it should be possible to have two player games and the non-standard printer seems to be an MSX standard.

set above 8000, which may partially explain this. No doubt Goldstar will be editing this out as the Japanese have removed the Kanji lock from their machines.

### In use

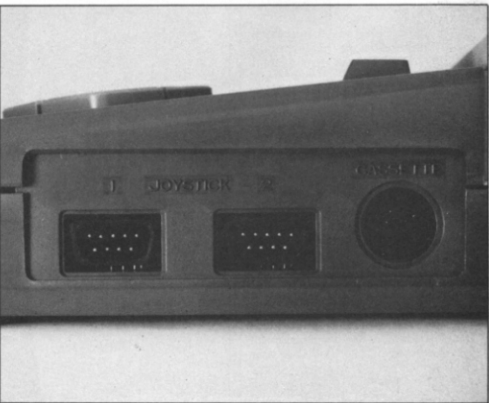
Functionally the Toshiba and the Goldstar are identical. The differences in keyboard feel and layout are negligible, and the Basic's exactly the same, so at this point I suppose I could just as well be reviewing a machine called the Goldshiba.

But before I do, a short digression. Economic imperialism being what it is, we in the UK are continually running up

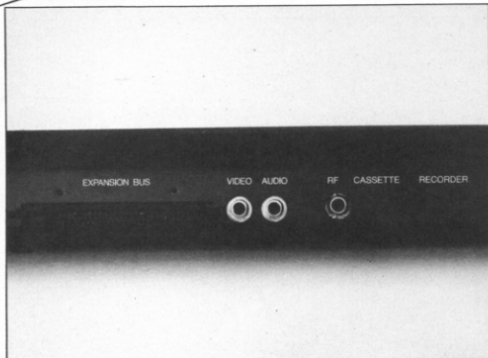
against the 'no pound sign' problem. These foreign machines come over here, take the typewriters off our desks and then spit hash signs at us, to the point where I never really know what # will come out of the printer looking like.

Some manufacturers stick a pound sign on the keyboard which produces a hash sign on screen and goodness knows what on the printer. But Toshiba, although the company clearly realised the problem late only in the day, has kindly cludged a pound sign key in. The bottom right-hand side of the keyboard may not be the most ergonomic place to put it, but it's the thought that counts. However, I haven't got a printer cable, so

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Standard Atari type joystick sockets are used as can be seen on the Goldstar; no problems should be encountered when trying to buy a joystick. But can you spot the difference between the two?



The expansion bus will take a ribbon cable connector similar to the BBC. You should be able to annoy your neighbours by connecting the audio socket of the Toshiba to your hi-fi.

I'm in no position to tell you what the printer thinks it is.

Back to the Toshistar. Both machines slot into the MSX logo screen/commercial break before dropping you into Basic on power up, and although it doesn't do this for long, I can see it getting irritating.

The Basic is of course beautiful, virtually ideal for the beginner to computing, but as I used the machines I started to get an impression of plodding slowness. Switching to a graphics screen takes the machine just enough time for you to think: 'Why has the screen gone blank?' There are other instances in Basic where the machines seem to be snoring gently between bursts of activity.

Fortunately, interrupts are fairly easy to handle on the machines through the built in ON INTERVAL command, which allows you to call subroutines at intervals based on the 1/60th of a second interrupts generated by the display chip.

This would make it relatively easy to speed up the parts of a program that count, so it may be a little unfair to criticise the machines on speed.

A few more compensating jollies include sprites using a similar interrupt facility, and are relatively easy to use. You can have up to four of them or one line, and up to 32 on screen. Graphics have their own graphics macro language, which allows you to draw on the basis "U10L50D30" — this translates as up 10, left 50, down 30.

I made a desultory effort to turn these into full-fledged turtle graphics, but it turned out to be more complicated than it looked.

The other major feature is the music macro language, which uses a similar system to produce eight octaves' worth on three channels. All in all, these babies

can sing and dance quite competently.

## Verdict

If you want to learn about programming, the MSX machines are well worth considering along with the BBC B and the excellent value Amstrad. If you just want to bang your head — and despite the abuse that's heaped on the heads of games players, I see nothing wrong with this maligned activity — the price of an MSX machine is liable to be a bit steep.

It is of course possible to use MSX machines for business, and upgradeability is one of their main selling points. But so far I've only heard about the peripherals, not seen them, and you'd

have to be pretty reckless to lock yourself into a business system before you saw the price and capabilities of the add-ons.

Price-wise, the machines don't look all that attractive. The Goldstar looks good at £230, but the 64 is checking in at around £190. The latter's vast library of software provides an effective counter balance to its gruesome Basic. Further up-market, however, the Toshiba's £280 is competitive with the Plus 4, and if either of those machines can cut it in the small business market the Toshiba's looks competitive.

Except for one thing. As I've said, the Toshiba and the Goldstar are functionally identical, and if the Goldstar can sell for £50 less, I can't see any logic in buying a Toshiba. It's unlikely that this will be the only such case, so the interesting prospect of the MSX companies getting into a price war with one another unfolds. ▣

## SPECIFICATIONS

Price Goldstar £230 Toshiba £280

Processor Z80A

RAM 64K, 29K free for Basic

ROM 32K

Display 40×24 text, 256×192 graphics

Keyboard No. of keys 73, full travel, five function keys, cursor cluster

Sound Three channel, eight octave

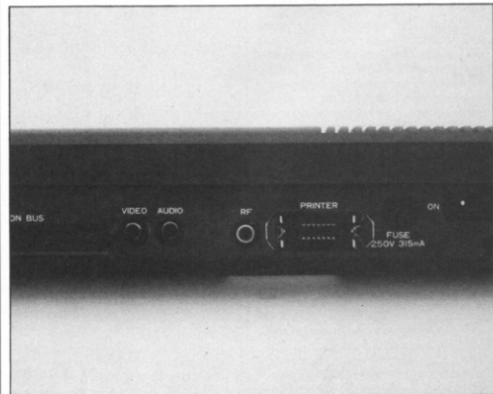
Interfaces Expansion bus, ROM

cartridge slot, Centronics, TV,

Composite and audio

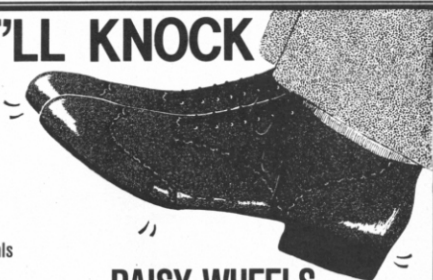
Storage Tape

Language MSX Basic



Note the non-standard type of Centronics printer socket (at the rear of the Goldstar); it is much smaller than the standard socket. The audio output is, however, a useful addition.

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# CANDID CAMERA

**Budding film producers, take note**  
**Kenn Garroch explains how your**  
**BBC computer, combined with an**  
**EV1 camera, can turn you into a**  
**Steven Spielberg.**

The advent of high-resolution graphics screens on home micros has brought the possibility of interfacing electronic cameras to them. The BBC is pretty lucky in having a number of camera systems available as well as good high-resolution graphics. The EV1 from Micro Robotics is one of the cheaper systems available and, for your shekels, you get the camera, a manual and some software on cassette or disk.

## Presentation

The camera consists of a small black box with a lens fixed to the front, an eight way cable for connecting to the computer, and a tripod mount on the bottom.

Opening the box reveals a number of chips, including the light sensitive section used to obtain the picture. This chip looks somewhat like a memory IC with the front cut off. It is actually a purpose-built array of light sensitive elements, onto which the image from the lens is focused.

The other chips on the circuit board are used to encode the data into a form that can be sent down the eight wires to the BBC's user port.

## Setting up

Connecting the camera is quite simple — just a matter of plugging it into the user port. Once in, the Beeb can be switched on, the lens cap removed and the starter program EV1 chained. After a little thought, the computer reveals a picture of whatever the camera is looking at. That is, after you have focused it, adjusted the contrast, and figured out that the resolution is not the same as your eye.

With a little care, it is possible to get quite reasonable monochrome images. Included in the EV1 program are a screen dump routine and a freeze facility, so stopping the action and reproducing the results is easy.

## In use

The scanning time, for the standard picture, is about one second — ie the picture updates every second or so producing fairly good moving images. The only problem is that it is split into two halves, upper and lower, each with a slightly different contrast. This is more



The camera includes an eight way cable for connecting to the computer and a small tripod.

obvious on some shots, mainly those with large bright objects in them.

A number of other programs come with the system, including Movie, Grey, Secure, Arty, and Animal. Movie allows a sequence of shots to be remembered and then played back producing a short film. The limitation of this program would seem to be lack of any memory for storing the pictures.

The second program, Grey, produces a larger, full screen picture that is constructed from a series of images, each at a different light level, giving a shaded image or 'grey scale' picture. Eight levels of brightness are used. As a result, the picture takes eight times longer to produce. This means that a shot of someone's face necessitates them sitting very still for about ten seconds. The image produced is, however, well worth the wait, since a lot more detail can be seen.

The rest of the programs get away from pure and simple picture production. The Secure program, for example, is used to form the basis of a burglar alarm. The camera is used to detect changes in a scene; if it is more than a certain amount, the alarm sounds.

The program does have a certain amount of intelligence, as it scans the scene when setting up, to see what is already moving. These are then ignored. As well as beeping the changes, the routine produces a graph of any activity over an eight hour period. The biggest drawbacks of the program are the fact the camera takes up the user port, so you can't attach a larger alarm bell, and the

problem of leaving the BBC on permanently, which is virtually guaranteed to cause it to overheat.

The Arty program was a little difficult to use, since the manual gives the controls as 'Unknown at this time'. Presumably, the revised, state-of-the-art user-friendly manual will correct this.

The final program is Animal, which is more complex than the others. The camera scans the image, singling out any objects the computer doesn't know. You are then asked to name these. The program will then try to name them when they are shown again.



Its size and the number of software programs make it a sophisticated addition to your BBC.

## Documentation

The manual, printed and laid out with an Apple Macintosh, consists mainly of descriptions and instructions for the software. Towards the end, there is a section describing the industrial applications of electronic vision, ie robots that are able to see their cups of tea as well as pick them up and drink them. Following this is a list of suggested projects including attaching the camera to a robot and producing colour images.

The final two chapters give the principles of operation and outline how the camera is interfaced to the computer. The amount of detail here is quite surprising with the pin outs, waveforms, and machine code entry points including the screen dump routine, given in full.

## Verdict

The EV1 Snap camera is a system that can be made as sophisticated as you wish. All the details needed to adapt the programs to your own needs, if you get bored with the included software, are included and the only real limit, apart from the resolution, is your imagination.

Overall, for £129.95, it is quite a nice system. ▣

## REPORT CARD: 1 TO 5

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

Product EV1 Snap camera Price £129.95  
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PeachCalc, Multiplan, dBase II and even Wordstar into graphics. HP and Watanabe emulation is planned, which allows you to plot using popular software e.g. Lotus 1-2-3.

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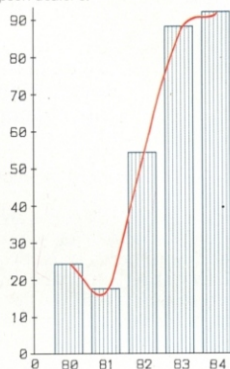
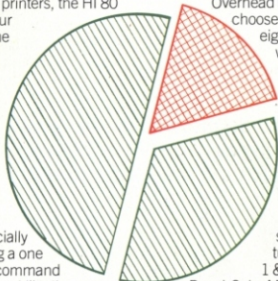
Since it's a printer too, the HI 80 is absolutely brilliant for producing

illustrated documents, because you do everything on this one machine.

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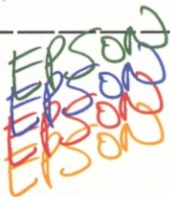
Finally, the Epson HI 80 costs just £400 plus VAT, it's nearest rival costs around £1,600 more. That's probably why you never knew such a thing existed.

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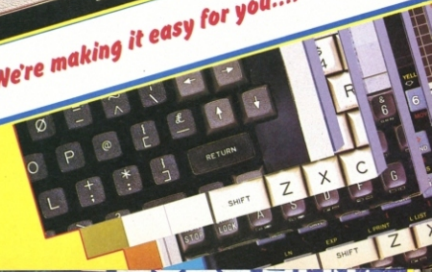
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# FAST LOADER

The Sprint is intended as a challenge to the usual Spectrum cassette recorders but does it make the grade? Francis Jago puts it to the test.

The Sprint fast tape loader by Challenge Research is intended to replace the usual cassette recorder and in some cases will undoubtedly be used as a cheaper and slower alternative to a Microdrive.

## First impressions

The Sprint tape recorder at first glance looks just like any other tape recorder, the only really apparent difference being the thick ribbon connector protruding from the left hand side. As with most add-ons for the Spectrum it connects straight into the back and in turn it has an expansion port.

In introducing the Sprint, Challenge Research has made an attempt to halt the ever-growing tide of quasi disk-drives, such as the Rotronics Wafadrive, by introducing a form of media storage with no more commands than a normal tape but noticeably faster.

## In use

Having plugged in the Sprint I immediately attempted to load a game bought only three days previously, Sabre Wolf, and for the first ten seconds all went well; but soon after the screen cleared, the computer hung, for no immediately apparent reason.

Having tried both sides of said tape at least three times, with only slight variations in tape loading errors, I became a little frustrated and tried one of my own programs of a little over 6K which I had never known not to load. Much to my surprise this also failed to load.

I then proceeded to telephone the company concerned which said that in some cases Spectrums had been known not to work as the quality varied so greatly in production.

To ensure that this was not the case with my Spectrum I attached my Interface 1 and Microdrive which worked perfectly first time. In my view the most likely reason for this poor performance was the fact that most commercially-bought programs were not designed to load at this extremely high baud rate and as such the quality of reproduction by most software was insufficiently high for the demands of the Sprint.

This was backed up by the fact that when I saved the program I wrote to test the Sprint for joystick compatibility, it loaded without fault every time, even though it had been saved at four times speed.

The next major problem I encountered was the lack of compatibility with a Ram

Turbo interface for joysticks. When connected either in front or behind the Sprint, it failed to register any inputs from the joystick.

The lack of an autostop at the end of a tape when fast-forwarding or rewinding came as a real surprise, as did the lack of a pause. These facilities are usually found on normal cassette recorders, and one as expensive and supposedly sophisticated as this should have had them.

Altogether, the Sprint gave the feeling that it had not been put together very professionally. Physically, it felt as if it was not likely to last all that long.

The provision of a switch to cut out the Sprint and allow the use of a Microdrive or other peripheral was thoughtful, but the reality of having both is beyond the means of most Spectrum owners.

Even when Challenge Research managed to achieve perfect reliability in loading commercial programs, the new TurboLoad programs by companies such as Ocean will not work as the TurboLoad facility uses operating system calls that mean that the Sprint cannot load them.

Reliability of loading apart, at £69.95 the Sprint hardly can be called value for money. Even given the fact that it loaded programs four times as fast as a normal cassette recorder, this would be of use only to people who never purchase a commercial cassette.

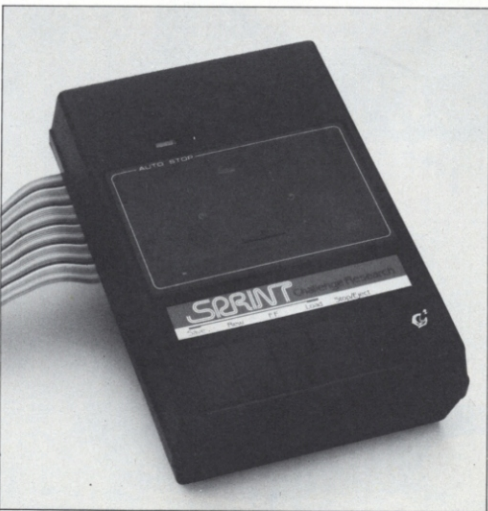
## Verdict

There is no question that a machine which would load reliably all commercial cassettes four times faster than normal, and remain totally compatible with all add-ons for the Spectrum would be guaranteed a place as a top-selling alternative to a Microdrive. But unfortunately the Sprint does not represent the challenge its manufacturers intended.

## REPORT CARD: 1 TO 5

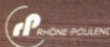
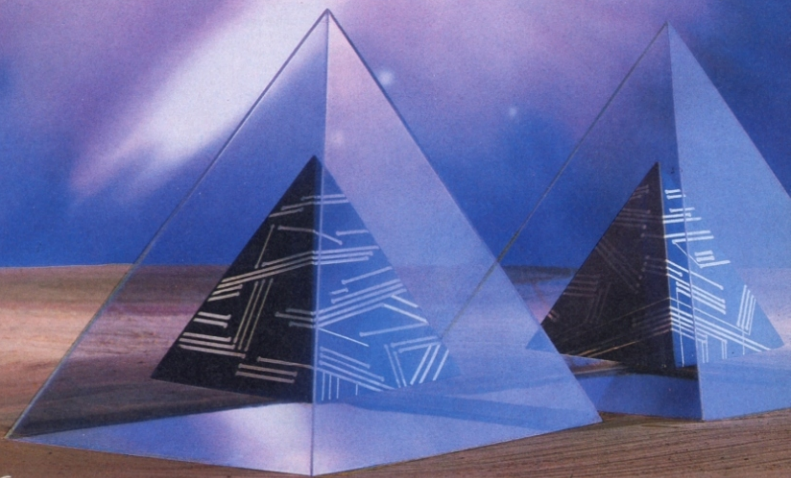
Features	●●●●
Documentation	●●●●
Performance	●●●●
Overall value	●●●●

Product Sprint Price £69.95 Availability mail order from Challenge Research, 218 High St., Potters Bar, Herts. Tel: 0707-44063.



The Sprint, illustrating the large ribbon cable on the left.

# R.P.S. THE MEM

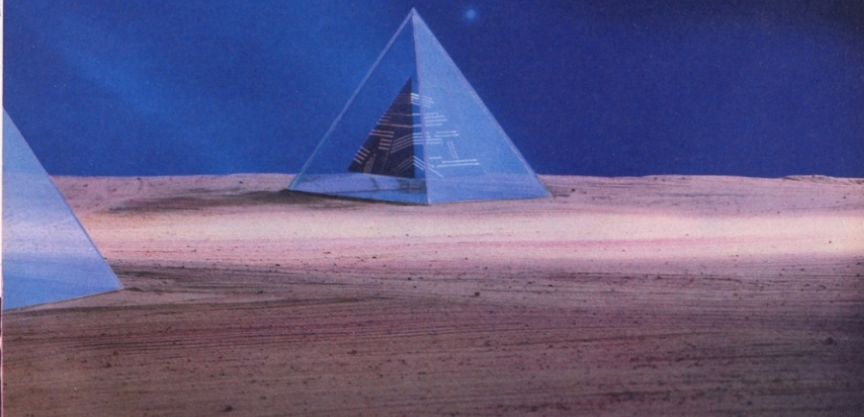


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# SOFTWARE PRE-VIEW



We take a peek at the new software packages, and give you a taste of things to come. Note to software publishers: If you wish your company's product to be included, please send only the very latest releases to **Bryan Skinner, Software editor, PCN, 62 Oxford Street, London W1A 2HG.** don't forget to include prices and telephone numbers.

## AMSTRAD



The best title of the week award goes to *Nemesis* for *Arnold Goes to Somewhere Else*. Arnold Blackwood faces yet more perils in the form of a British Rail Buffet, a burial at sea and a Greek tragedy as he scours the underworld for the wife of Lord Erebus. Mixed scenarios and a healthy sense of the ridiculous make for plenty of fun.

*Message from Andromeda* has the best graphics of any software yet for the Amstrad, but the some of the backdrops are drawn rather slowly. Interceptor claims it's been specially developed for the seasoned

adventurer. As captain of a space patrol cruiser you receive a distress signal from a previously unknown planet and set off to investigate. . . .

*Return to Eden* features 200 pictures and more puzzles than *Snowball*. Curious that so many of the first packages for this micro are adventures. It's also available for the BBC, Commodore 64 and Spectrum.

If you want to use your micro for plotting graphs, then you might consider *Grasp*. It's the first such package for the Amstrad and will also construct graphs of mathematical functions. It can handle 100 data points per graph, will produce labelled pie charts, line and bar graphs and offers a hard copy facility.

<i>Grasp</i>	£8.50	Camel Micros 03057-70092
<i>Arnold Goes to Somewhere Else</i>	£5.50	Nemesis 0933-623967
<i>Return to Eden</i>	£9.95	Level 9 0494-26871
<i>Message from Andromeda</i>	£6.00	Interceptor 07356-71145

## COMMODORE 64



Joining the new idea of compendia of old games comes *Alligata* with its *Chartbuster* package. Featuring games like *Blogger*, *Eagle Empire*, *Killeruatt*, *Panic Planet* and *Bugblaster*, it's a good deal at £9.95.

Aren't graphics programs popular? It all started with *Paintpic*, and then came *Panorama (H)*, *Doodle*, and now two art programs from Commodore itself. The latest is *Tony Hart's Art Master* which has some interesting features not found in others — like a duplicate screen on which effects can be tested before being committed to paper, 'ghosting' of shapes to judge size and position and shape repetition.

*The Designer's Pencil* isn't just a graphics package, it also allows you to create tunes, but no review copy was supplied and the press release is somewhat vague as to the program's features.

With the demise of the *Dragon*, Shards has been busy converting its Pettigrew programs for the 64, and all four adventures are now available as a single package on two cassettes.

With the success of *Scrabble* and other board games, it comes as no surprise that someone has now produced a version of *Cluedo*. Well-packaged and with a set of tear-off clue cards to mark up as the game progresses, this is just the job for those long winter nights, and it joins the growing ranks of games that involve more than one or two players.

<i>Empire</i>	£6.95	Shards 01-591 7666
<i>The Pettigrew Chronicles</i>	£9.95	Shards 01-591 7666
<i>Cluedo</i>	£12.95	Leisure Genius 01-935 4622
<i>Gun Dogs</i>	£5.95	Hill MacGibbon 01-353 6482
<i>Tony Hart's Art Master</i>	£11.99	Commodore 01-930 6711
<i>Chartbuster</i>	£9.95	Alligata 0742-755005
<i>The Designer's Pencil</i>	£11.99	Activision 0628-2448
<i>Transylvania (Geneva)</i>	£34.95	Penguin 312-232 1984
<i>Expedition Amazon</i>	£34.95	Penguin 312-232 1984

## BBC



It's nice to see Acornsoft delivering a whole range of professional software to support owners of 6502 second processors. *P-system* is the latest version of the UCSD Pascal project and includes a filer, editor, utilities and compilers for both Pascal and Fortran 77.

Also from Acorn comes a family of 'View' programs to extend the word processor's facilities. *ViewSheet* is a ROM-based spreadsheet with 255 by 255 cells, with windowing, multiple model merging and up to

30K of RAM. *ViewIndex* creates an index from marked words in View files, and will automatically amend the index should the document be altered. The printer-driver generator constructs data files to allow you to make full use of facilities such as boldface, subscript etc.

For those of you lost in morass of badly labelled disks, *Disced* could be a sanity and time saver. It catalogues disks and saves the data in alphabetical order.

*Frantic Fingers*, from Power Software, will save a small machine code patch program onto cassette to reconfigure your control keys and allow you to play games with a joystick.

<i>P-System</i>	£299.00	Acornsoft 0223-316039
<i>Viewindex</i>	£14.95	Acornsoft 0223-316039
<i>ViewSheet</i>	£59.80	Acornsoft 0223-316039
<i>Printer Driver Generator</i>	£9.95	Acornsoft 0223-316039
<i>Hi-View</i>	£59.80	Acornsoft 0223-316039
<i>Disced</i>	£15.00	Clares 061-236 4414
<i>Chartbuster</i>	£9.95	Alligata 0742-755005
<i>Frantic Fingers</i>	£3.99	Power Software 0384-263401

## SPECTRUM



If you're looking for a holy grail you might fancy the latest arcade/strategy game from Melbourne House.

*Galilee* is the sequel to *Jericho Road* and Peter Good-

lad, the programming vicar, has set the graphics adventure in the villages which surround the sea of Galilee in the first century BC.

*Project-X*, the *Micro Man* is a text-only adventure written in machine code and with 150 locations. The game demands that you make full use of your imagination.

<i>Sir Lancelot</i>	£5.95	Melbourne House 01-940 6064
<i>Galilee</i>	£5.75	Shards 01-591 7666
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## STAR GAME



## SPECTRUM

### SHERLOCK

I was just smoking my Stradivarius and playing a snatch of Baker Street Blues on the old merschaum when Melbourne House popped *Sherlock*, their latest adventure, through my letter-box.

It's been worth the wait. *Sherlock* has all the features of its illustrious predecessor, *The Hobbit* and then some. The graphics may be fewer and simpler but in every other respect I take my deerstalker off to it—a winner if ever there was.

You take on the role of Sir Arthur Conan Doyle's famous detective, Sherlock Holmes, out to solve some inexplicable murders. Faithful Dr Watson, a dim old butler as ever, is on hand and you also get the opportunity to meet another famous character from the Holmes canon—Inspector Lestrade of Scotland Yard.

Having a large brain obviously puts extra strain on the legs—you move between most locations by taking a hansom cab or train. You have to first hail and then direct the cabbie to the required destination or, if letting the train take the brain, go to the right station and platform. Being a world-famous sleuth doesn't entitle you to free travel either—try sneaking off the cab without paying and your ears will burn. En route, you can use the time



for quiet reflection or engage a fellow passenger in conversation.

Yes, you can talk and give orders to other characters, just as you could in *The Hobbit*, but *Sherlock* is far more sophisticated.

First, you can make remarks to other characters for them to mull over or respond to in their own good time. In this way, you can discuss aspects of the case with another character. Heaven help you if you pick Watson. I confronted the saintly codger with "YOU KILLED BROWN" and was told "That is brilliant Holmes, I do not know how you do it!"

Was Watson doing his usual impersonation of two short planks or had he discovered a subtle method of blowing a raspberry at Holmes?

Second, you can interrogate characters, asking them to tell you about certain objects or other characters. As a hypothetical example, you might say to Lestrade "TELL ME ABOUT THE GUN" or "TELL ME WHAT HAPPENED."

As you might deduce from the examples, input can be quite complex. Just like *The Hobbit*, *Sherlock* makes full use of 'English,' a set of about 800 words with which over 53 different actions can be performed.

You can use adjectives to distinguish similar objects from each other (EXAMINE THE PLAIN DOOR), adverbs to qualify a particular action (READ THE DAILY CHRONICLE CAREFULLY) and prepositions to make your commands more specific (PUT THE BAG IN THE CUPBOARD).

The adventure takes place in real time, so while you are sitting staring at the ceiling for inspiration, the other characters are getting on with their lives. You may elect to wait and can even do so until a specific time (WAIT UNTIL 9.30AM). Day eventually turns to night and there are some places even Holmes wouldn't go without a light. You can also take naps—if you need one, perhaps some of the others might.

Two scrolling windows are used in the screen layout. The top three-quarters provides the narrative window while the bottom quarter displays your commands. The two areas are separated by a thick band, decorated with pistols and displaying the day and time. Some locations are represented graphically, such pictures occupying one side of the top window. Judging by the few I have seen, they are fairly simple depictions.

If you've ever played Infocom's *Deadline* or *Witness*

then you'll have a good idea of the basics of *Sherlock* for there are marked similarities. It doesn't quite manage to come up to the very high standard of those two adventures but to be fair, they are disk-based and so effectively have a lot more memory to play around with. Nevertheless, in terms of sophistication, *Sherlock* is a long way ahead of the rest of the competition.

*Sherlock* is tough, perhaps one of the hardest adventures currently available. If this program doesn't train you to acquire a Homesian genius for observation and deduction, nothing will. It took me a while just to get out of my lodgings in 22b Baker Street, and that's where the adventure begins. I wasted valuable time fiddling (sorry, Holmes) with windows, armchairs and pipe racks before stumbling on to what was after all a startlingly obvious solution.

It's a pity that if you stop the game, you have to reload it once more from the beginning. Given the complexity of the program, perhaps it was unavoidable but it's still a pain.

At times, you may find yourself wondering just who the heck you are. The program allows you to preface objects with 'your' or 'my' (but not 'Holmes'—it isn't recognised). Just a mite confusing, that. Watch out if you decide to don a disguise—for example, a china mans (sic); the program starts referring to a Chinaman (it's you). Thus, taking an inventory reveals: "The china man is carrying your money".

There's no doubt in my mind that *Sherlock* is a superb program and will provide many hours (hours? months more likely) of stimulating entertainment. Elementary, my dear Watson? Well, Holmes never did utter those immortal words—and I doubt whether you will, either.

Bob Chappell

Rating 10/10

Price £14.95 Publisher Melbourne House 01-940 6064

## MISS SPECTRUM KOKOTONI WILF

According to the inlay, you're *Kokotoni Wilf* of the title sent on a mission to pre-history by Ulrich, a great Magician. Thanks, Ulrich. Your task is to collect fragments of the Dragon Amulet.

The game kicks off with *Kokotoni Wilf* descending from the skies behind a large head-nodding, tail-wagging yellow dinosaur. A blue meteor fragment oscillates from left to right at the top of the screen and

other nasties are scattered around. Wilf is a white UDG.

To gain points Wilf must collect the white stars from each screen. Simply passing over them accomplishes this, but touching anything nasty loses one of his lives. At least when you're reincarnated you don't have to start from scratch—you're dumped back in the current screen, but unless you're quite prepared, this can mean you're dead on arrival.

The second screen has two dinosaurs spitting at each other, but so slowly that avoiding their trails is a doddle. Then

on to the third screen, where a diamond awaits beneath a tree. Getting past the pterodactyl isn't too tricky—it moves in a predictable pattern, as does the bird which blocks your way to screen four. Screen four is underground, bats descend and ascend, and don't bang your head on the purple blobs. Down to the fifth floor, more birds, bats, snakes and a sabre tooth tiger.

It's one of those games where at first you think it's quite tricky, but you soon get the knack. I'm afraid I lost interest very quickly.



Bryan Skinner

Rating 6/10

Price £5.95 (Commodore 64, £6.95) Publisher Elite 0922-611215

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## STAR GAME



## SPECTRUM DARK STAR

Nosweat at all this one. In *Dark Star* you're the pilot of the spaceship Liar, and your goal is to 'liberate your galaxy from domination by the Evil Lord's tyrannical Empire'. The galaxy's divided up into a 16 x 16 grid of sectors, each sector containing an indeterminate number of planets.

Now the planets in the lightly defended sectors have a couple of alien bases, the odd fuel dump, and maybe a spaceport. The bases are crawling with air defence towers, and all you've got to do to knock them out is fly through a skyful of flak, a particularly nasty force field and knock out the planetary defence system in the centre.

Then it's on to the next base, and so on until you've liberated

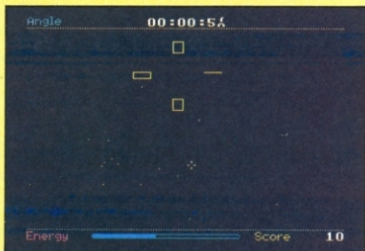
the planet. Then you deal with the other 200 or so planets in the galaxy — no problem...

Having dealt with the pipedream section I suppose we'd best move on to the truth. The Liar is a relatively nippy but simple little point and shoot style ship. Your basic controls are up, down, left, right and fire, with the addition of a speed control and a toggle switch that allows you to view a map of the galaxy or the planet you're currently on.

The initial screen display is a forward view of the space you're flying through, and you'll meet the odd enemy spacecraft here, but generally they're nothing to worry about. Your two major concerns at this level are the planets which you fly past and the hyperspace gates. You get to the surface of a planet by pointing the Liar at it, whereupon your flight computer does the rest.

You then consult your tactical map and head for the nearest enemy concentration. Broadly speaking, these aren't really much of a problem — it's just a matter of flying low, dodging the missiles and knocking out the air defence towers. But the nasty part is the force field.

You can't see the field, but your computer identifies holes in it. These are presented as rectangles through which you must fly, and if you don't the field drains your power. Mean-



while, as you're holding a steady course you're a sitting duck for the aforementioned ack-ack. You seem to score extra points for flying through the field, but it's so hairy I counted myself lucky if I came out the other side at all, never mind in one piece.

So really it's all still to play for. I've managed to wipe out one small planet, and I reckon an hour's hard flying might just be enough to liberate the whole of the planet. Once you've done this it's back into space, find a hyperspace gate and fly through it to the next system. This is just as easy as the rest of the game — a series of rectangles forms a tunnel, and you lose

energy points if you stray off course, but with practice I'm confident that I can survive the ordeal some of the time.

If you've ever played *Time Gate*, you'll have some idea of what *Dark Star* is about, but *Dark Star* is more complicated, and much more difficult. It'll keep you busy for a long time, and try as I may I can't think of a better arcade game for the Spectrum. Right now I'm off to see if I can check out a heavily-defended system without getting killed.

**John Lettice**

**Stop press:** John Lettice disappeared into *Dark Star* last Friday. He has not been seen since.

**Rating 10/10**

**Price £7.50 Publisher Design**

HIT

## COMMODORE 64

### STRONTIUM DOG



Straight from the pages of the weekly comic, 2000 RD, and into this shoot-em-up game comes Johnny Alpha, aka Strontium Dog, a search-and-destroy agent. Strontium Dog is not some form of super-mutt but the name given to a powerful human mutant.

Alone and on foot, Johnny is tracking two rebellious dogs, Wulf and Gronk, aka the Stix Brothers, across the planet of renegades. He has to fight off a variety of dastardly aliens and vicious vegetation. Luckily, he hasn't come unprepared — his zipper, time bombs and electro flares help stump the enemy.

Most of the screen is taken up with a side-on view of the planet which seems to be split into three horizontal bands. Mountain, boulders, vegetation and a host of strange stationary ob-

jects proliferate. Johnny, attired in natty space-suit, ambles (or sprints) east while the planet surface scrolls west.

The aliens, consisting mainly of Dalek-like robots, scorpion-clones and spacemen, head relentlessly across the surface, firing as they go. When Johnny is hit by an enemy blast or trips over an alien vegetable, he falls to his knees where he remains stunned and helpless for a few seconds. A panel at the bottom of the screen provides info on Johnny's remaining strength, flares and bombs, as well as displaying a cross-section of the entire planetary surface.

By moving over certain objects such as a Quicksilver logo, Johnny can top up his reserves of strength. When his strength gives out, so does Johnny's luck.

The graphics are simple but effective with scrolling and animation well up to par. By far the best feature is the explosive battle sound dominating the game. Though hardly original, Strontium Dog will give you plenty of action for your money.

**Bob Chappell**

**Rating 7/10**

**Price £7.95 Publisher Quicksilver 0703 20169**

## COMMODORE 64 MISS

### HIGH NOON



'Deco not fawsake me, oh mah dahlin!' So burbles the theme of this wild west game tune.

Out from the jail house and down into the centre of main street moseys the sheriff. The town is quiet — almost too quiet. On cue, strangers hit town — some making for the bank, others heading for Saucy Sal's saloon. These ornery critters have trouble on their minds and start blasting.

The sheriff (yep, that's you, pardner) lets them have it with his six guns. As soon as one of the gang bites the dust, Riga Mortis, the undertaker scampers out and drags the body away. The gang are interested in two things — dames and dough. When a robber emerges from the bank, he is clutching a bag of gold.

Those making it as far as

Saucy Sal's try to kidnap the bar-room floozies.

If you manage to stop one gang, a meaner bunch hits town. Some arrive on horseback and some come armed with dynamite. Should you prove too fast on the draw for this lot, the game promises a final showdown with the outlaws in the hideout.

The idea is good but there's not enough in the game to keep you glued to your saddle in front of the screen. All you do is move and fire, move and fire. It all becomes a mite boring after the initial novelty. Given the 64's sound capability, the gunfire should have crackled, the bullets whining and ricocheting. Instead, all the guns sound like naff cap pistols.

The animation of the cowboys is neat and there are some novel features while the game loads. A clock and block count-down stays on screen and you're treated to 'A policeman's lot is not a happy one'.

Not bad but not one of Ocean's more addictive offerings.

**Bob Chappell**

**Rating 6/10**

**Price £7.90 Publisher Ocean 061-832 6633**

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# GAMEPLAY

## SPECTRUM

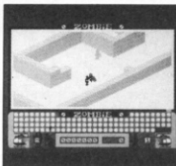
### ZOMBIE ZOMBIE

Quicksilver's *Ant Attack* by Sandy White was a smash hit. This follow-up, *Zombie Zombie*, looks set to do even better.

At first glance, I thought I might have loaded up an old copy of *Ant Attack* by mistake. Did my rheumy old eyes deceive me or wasn't that the blue-walled city of Antescher? Didn't the tiny hero and heroine look strangely familiar?

But wait — what was that red object sitting on a raised block in the City Centre? If that was an ant then my name is David Bellamy. No, it was obviously a helicopter. And those marching green bipeds — what were they? By the teeth of Michael Jackson, they were (dramatic chord) ... zombies!

True to Quicksilver tradition, the cassette inlay is silent on the objectives and several features of the game but it seems you must seek out and destroy all the zombies in the city.



Although the game has a marked similarity to the ant adventure, there are several innovative features. For a start, you can zoom around this new city in a chopper as well as scampering around it on foot.

To fly, you simply move the hero (or heroine — it's a cast of one and you choose the sex) into the copter, press the firebutton and off whirrs whirlybird. And unlike its predecessor, this game offers the option of total joystick control.

To move the hero push the joystick in any of the four main directions and he'll run that way. Should he meet a step or

wall, he'll either jump onto it automatically or, if it's too high, continue futilely leaping at it until you take pity and send him off on another course.

A stab on the fire button and you immediately see one of four differently-angled views of the scene.

Stay on foot for long and you'll confront some green zombies who don't seem to worry about you too much. But, should one of them turn red, you're in trouble. It will make a sudden rush and attempt to grab you in a deadly embrace. Give it a quick puff of purple talcum powder (joystick and firebutton together) and it'll retreat — but not far.

Purple zombies also join in the chase. The walking dead have an aversion to leaping from heights — they have an unfortunate tendency to turn into tomato sauce on landing.

When in the chopper, the four views are not available as the fire button is used for keeping it aloft while the joystick controls direction.

Beware of flying smack into a wall — your hero will survive the impact but the chopper won't. The helicopter has one further function — and this feature really distinguishes *Zombie Zombie* from other games I've seen. Using the chopper, you can build a new city.

Each quick press of the fire button while in the chopper picks up or releases a block. You can pile up to four blocks on top of each other. Takes a little practice, but once you're in the swing, you'll be building structures that would have had Le Courbusier laughing his socks off.

What's more, it appears you can save them to tape for future reloading. How you do this is anyone's guess, since the between-game menu offers only a load option while the instructions say nowt. **Bob Chappell**



Rating 9/10  
Price £6.95  
Publisher Quicksilver  
0703-20169

## COMMODORE 64

### HEADACHE

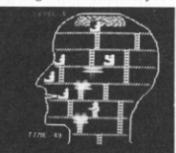
Firebird, British Telecom's new software arm is putting out games for the 64, Spectrum and others at £2.50. This neatly bridges the £1.99 and £5.95 price gap, but how does the game match up?

To begin with, the game comes with the now mandatory fast-loader and has been programmed by the software house, Software Shed. It's essentially a rather simple, but not easy, levels and ladders game.

The field of play is a head in profile, divided into seven levels, each linked by a ladder or two. Right at the top sits part of a grey brain. Your task is to move Ned, a blue-trousered, cloth-capped figure, around the head to collect impulses which appear at what seem to be little figures sitting up. The impulses are little more than coloured squares but they have to be carried up to the brain. If an impulse appears at the brain, it has to be carried down to the neck.

All the time objects descend, traversing levels at random. These are Throbs which should

be avoided at all costs because the slightest contact loses you a



life as Ned plummets to the foot of the screen.

There are eight levels, and the Throbs may look like flying jellyfish, rotating shreddies or

revolving diamonds. Throbs can be atomised, but this isn't always too easy as their movement can be tricky to predict. Worse is the little head banger who appears from time to time, scuttling about rather too quickly and carrying a hammer.

Control of Ned is not very easy using the keyboard, but apart from that the game is infuriatingly difficult.

**Bryan Skinner**



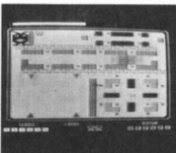
Rating 7/10  
Price £2.50 Publisher  
Firebird  
01-357 3814

## VIC 20

### MEGAULT

*Megaault*, from Imagine, is one of those cute little games which show not only just how far 3.5K can be stretched, but also that predicting what makes a winner is virtually impossible.

There's very little to the game, but it's so infuriating you just have to have another go. You're a bobbing head on legs — the graphics are very simple



throughout. You're at the left hand end of a tunnel at the top of the screen. To the left there's a wall behind which a monster

lurks, to your right the ways to the key. But the way is barred by two four-legged spiders bouncing between the walls, and not very far apart. Touch one of these and it's curtains. Seems impossible at first, but you soon pick up the knack of getting past them — move down and next to the vertical path of one of them, wait for it to rise, and then dash under both.

Next there's a narrow corridor, down which another purple spider hurtles back and forth. There are four bits of blue foot

to be taken down this one, but the grub raid has to be timed to perfection — these spiders don't hang about — and if you're not placed correctly there's a hair-tearing moment to get into a food ladder and safety.

You get four lives per game. Definitely a classic for the unexpanded machines.

**Bryan Skinner**



Rating 7/10  
Price £5.50 Publisher  
Imagine (Beau Jolly) 01-567 9710

## DRAGON

### BACK TRACK

Here's a natty little number from Incentive for stricken Dragon 32 and 64 owners.

Eddie, the red-headed hero of the piece, has been captured by an evil professor and you must

help him escape by passing increasingly difficult tests.

As Eddie moves, his feet do a sort of soft shoe shuffle. The corridors and rooms of the labyrinth are very cleverly depicted in good colours. The maze is divided into small square compartments linked by portals and as you move the 3D perspective changes smoothly.



You'll need a good memory for this game. The graphics are clever and among the best we've seen on the Dragon, but the game itself is rather wanting.

**Bryan Skinner**



Rating 6/10  
Price £6.50 Publisher  
Incentive  
Software 0734-591678

## SOUPED-UP BASIC

Stuart Cooke takes a peek at Interceptor Micro's latest programming package for the 64 and concludes that it's a programmer's dream.

Numerous Basic extensions for the Commodore 64 have appeared on the market, all of which have also been expensive or have only added a few new commands. Interceptor's new utility package *Supabasic* is priced at only £9.99 and adds no fewer than 72 new keywords to the 64's Basic.

## Features

Just about every type of command that is missing on the 64 is present in *Supabasic*. There are numerous commands for graphics including line drawing, point plotting and changing the colour of the screen and ink. The `HIREX` command will clear the high-resolution screen, the `GRAPH` command will then turn this screen on. This is much easier than having to use `POKE` commands.

Programs that have split text/graphic screens are becoming much more popular—almost every adventure game now works this way—and Interceptor has included the `WINDOW` command which will split the screen at a specified point. The top of the screen will now be in high-resolution mode, the lower section in text mode. There is one weird feature to this command though, you have to enter

to use. The `CSET` and `CBRT` commands enable the user to redefine a specified character on an 8x8 grid in the same way as the `CBRT` command allows you to define a sprite.

Budding musicians are catered for with commands to define the `ADSR`, select waveforms, volume and pulse width. The `PLAY` command will play a note of specified frequency on a certain voice. Unfortunately there seems to be no way of controlling the length of a note, so transferring your favourite piece of sheet music onto your 64 may turn out to be a little difficult.

A collection of numeric and string functions have been added, prefixing a number with a \$ will turn it into a hexadecimal number. This is extremely useful if you are using graphics or machine code. `HEXS` will convert a decimal number into hex.

For maths wizards `DIV` and `MOD` have been added together with an `EOR` in-

At long last there is a command that allows you to program the function keys. Strings of up to ten characters can be stored on each key, so you could store the commands you use most often on one of the 16 function keys. Yes, 16 function keys are provided, the eight that are normally available are extended by using the Commodore key and Control key as extra shifts.

The `JUMP` command provides the 64 with the ability to have computed `GOTOS`. It is not possible to type a line such as `GOTO 100^A` on a 64 but you can now type `JUMP 100^A`.

Error trapping is now provided with the `ERROR` command. When an error occurs you can now make the program jump to a specified line and interrogate the error by using the `REPORT`, `ERL` and `ERN` commands. These return the error message, the line the error occurred in and the error code number. Couple these commands with the `BREAK` command which disables the `STOP` key and you have a crash-proof program.

The `LOAD` and `SAVE` commands have been extended and now allow you to specify the start and end addresses for the save and a load address when reading the program back into the machine. Disk users no longer have to load in a directory either as the `CAT` command will display it on screen for them, without destroying the program in memory.

## Documentation

A 40-page manual is supplied with the disk or tape, which is brief but extremely clear and well planned. Commands are broken down into sections with all related commands together.

It would have been nice to see a few more examples in the manual, but you'll just have to list out the demonstration program if you want to see how the commands work together.

## Verdict

*Supabasic* can only be described as the 64 programmer's dream. Okay, so there are a lot of commands that could have been added and weren't, but the overall value is excellent.

## REPORT CARD: 1 TO 5

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

Name *Supabasic Application Programming Utility Price £9.99 Publisher Interceptor Micro's 07356-71145/3711 Format Cassettes/disk Outlets Retail.*

## Listing

```
10 REM THIS IS A DEMONSTRATION OF
20 REM SUPABASIC
30 REM
40 REM TRAP ANY ERRORS.
50 ERROR: PRINT "YOU'VE MADE A MISTAKE"
60 REM TRAP THE STOP KEY
70 BREAK: PRINT "THAT KEY IS TRAPPED"
80 INPUT "NAME : "; IN$
90 REM CLEAR THE HIGH-RESOLUTION
SCREEN
100 REM BLACK PAPER, ORANGE BORDER.
110 HIREX 0,0
120 REM TURN ON HIGH-RES. SCREEN
130 GRAPH
140 REM POSITION TEXT CURSOR
```

```
150 PRINT CHR$(147);STRINGS("LCD");24)
160 REM NOW PRINT ON TEXT SCREEN
170 PRINT "I'M ON THE TEXT SCREEN "IN$
180 REM NOW PRINT ON HI-RES SCREEN
190 CHR$(1,0);"THIS IS IN HIREX";7,0
200 REM NOW MOVE GRAPHICS CURSOR ON
210 REM ON HIGH-RES. SCREEN.
220 MOVE 40,0
230 REM NOW DRAW A LINE IN WHITE
240 DRAW 199,319,1
250 REM NOW DISPLAY THE BOTTOM THREE
260 REM LINES OF THE TEXT SCREEN AT
270 REM THE SAME TIME AS THE HIGH-RES.
280 WINDOW 32; WINDOW 32
290 GOTO 290
```

it twice. Interceptor points out that the first time it is executed the screen may fail to engage. So why doesn't *Supabasic* execute the machine code twice, freeing the user from having to remember this little idiosyncrasy?

Commands for controlling sprites are in abundance. No longer will you have to produce numerous `DATA` statements and more than a few `POKES`. The `BIT` command followed by a string of 24 characters allows you to define a row of a sprite. A dot means that the corresponding bit should be a 0 and any other character means it should be a 1. 21 `BIT` commands will produce the data for a whole sprite.

Typing out 21 `BIT` commands could be rather tedious so the `GRID` command will display a grid onto the screen consisting of 21 `BIT` commands complete with line numbers, all you have to do is edit the lines and press Return over each one to have it accepted into your program.

Collision detection is catered for by the `CHECK` command. This will allow you to check if two sprites have collided or if they have hit the background.

User defined characters are also easy

struction to complement the `AND` and `OR` instructions which already exist. `STRINGS` will create a string of a specified length consisting of one character.

`DEEK` and `DOKE` have been implemented. These are commands that a number of machines have and they allow you to `PEEK` the contents of two consecutive memory locations and express the result as a 16-bit number, and to `POKE` a 16-bit number into two consecutive memory locations. If you've ever used machine code you'll know what life savers these two commands can be. As well as commands to `poke` 16-bit numbers into memory, `CEEK` and `COKE` will store and retrieve strings in consecutive memory locations. You could use this as an alternative to string arrays and it certainly takes up much less memory.

An extremely useful series of utility commands are included. There is, of course, the extremely important `RENUMBER` command, and the `OLD` command which will retrieve a program if you accidentally new it. `DUMP` will print a list of all the variables used and their values.

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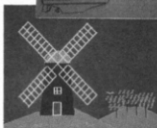
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## Tandy

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**TRE50** level II Tandy tape recorder leads games and business software manuals and books. £75. Ideal first micro. Tel: Ruislip 38287.

**T199-4A** computer plus expansion unit with two hard drives, 32K RAM, RS232 and full assembler cartridge, will sell separately. Offers? Tel: 01-625 8455 (eves).

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**Torch 280** second processor for BBC complete with 'Perfect' software cost £40 sell for £210. Tel: 0761-71675 after 6pm.

**Brother EP22** printer, typewriter, 16 character correction, ZK memory, simple editing functions, portable mains/battery, RS232 interface, thermal plain paper, £1110no. Tel: Cooper 01-998 0354.

**Swap** introductory Homebase CB K40 power mike, silver rod aerial, coax cable, and SWR meter, for Interface I and Microdrive. Tel: Gerrards Cross 888857.

**Comtronics compatible** works for any Atari computer. Printer with Epson, Star, Juki etc. All cables included, £30. Tel: Furtmouth 731639.

**DK Tronika** assembler/monitor for Tandy color computer with manual and Zak's 6809 book. Cost £50 + sell for £20. Tel: Tyne-side 091 2761031 after 5pm.

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**MSBach 62** printer for Commodore 64. Also 10 rolls of paper £70. Write A. Forester, Sunnyside, Agincourt Rd, London NW3.

## Others

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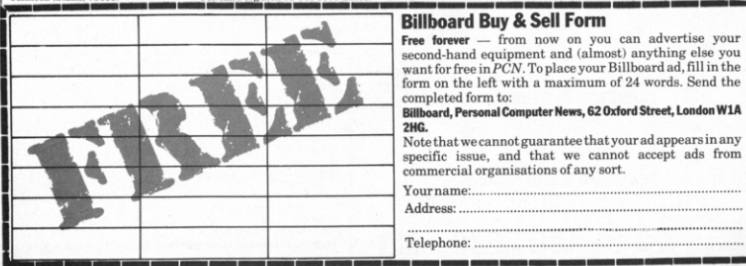
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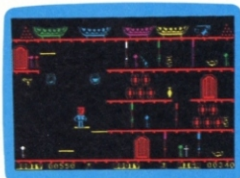
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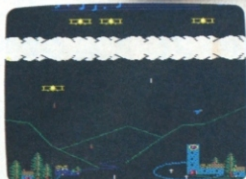
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## SPECIFICATIONS

### Processor:

Processor — Z80A microprocessor operating at 4MHz  
Memory — 64K bytes of RAM; 4K bytes of ROM  
Serial Ports — Two RS232C compatible ports for terminal, modem or serial interfaced printer. Baud rates from 75 to 38.4K baud.  
Printer Port — Centronics-compatible

### Software:

Operating Systems — CP/M 2.2 with enhanced BIOS and CCP  
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### OMEGA SCSIPLUS ADAPTER

### FEATURES:

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Oh well, it's a nice machine which is why we're giving one away this week.

Elsewhere in the field of computer publishing you may find at your newsagents a monthly magazine with a picture of Mr Spock on the cover. Try as you may you won't find a listing for a Star Trek game but you might come across a 'Benchtest' of the new Enterprise computer.

In fact, it's so new you



Amazing, some of the peripherals you can buy now. Like this fabulous 'CompuDesk'. According to manufacturer Jagger and Co, it's easy to assemble and provides 'neat, flexible work surfaces and shelves' as well as 'the answer to operating and storage problems'.

With remarkable modesty, the press release made no mention of CompuDesk's most remarkable feature. But the accompanying photograph revealed all and we're happy to share it with you. CompuDesk, apparently, allows your Apple II to run Commodore software — including Vic cartridges!

won't be able to buy one for months yet. At the PCW Show, Enterprise was talking about January delivery dates. The reason is that it doesn't work properly — trouble with the video chip. So how do you Benchtest a machine that doesn't work? Perhaps it was a Benchtest of bits...

Lots of people think that educational software is going to be big, but how valuable is it? A recent press release for a spelling aid told us about this interesting piece of 'software'. In the same week the cassette inlay on a new game boasted that it used the Currah 'speech' synthesis unit.

## SYNTAX ERROR

In last week's review of the Raven-20 expansion board we reported a bug when using a VDU21 command. Unfortunately, this happens on an ordinary BBC as well. And if that's not enough, we also gave the wrong telephone number — it's 0733-268853. Sorry, Raven.

The Cheetah review in issue 83 implied that London Microtech was virtually giving away their keyboard for a stunning £5.95. In fact, we must admit to a little error on our part as the keyboard costs £59.95. Whoops.

## NEXT WEEK

### Spectrum facelift

Is Uncle Clive's QL look-alike worth the extra £50? Fingers plunge on to the 'fully professional keyboard' and PCN comes up with a controversial verdict.

### ITT XTRA

This latest arrival on the IBM-compatibles scene looks set to take on the master itself. Will it succeed?

### Sinclair Specials

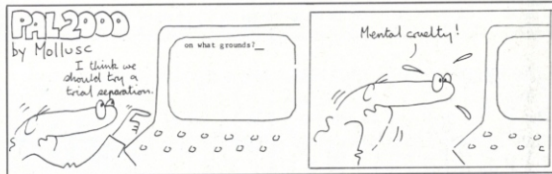
Talking of the QL, we tell you how to manipulate windows — the easy way.

### C64 Survival

The latest of PCN's epic adventures for you to key in.

### BBC Symphony

We take up LVL's invitation to tinkle the ivories with its £99.95 keyboard and software package.



## PCN DATELINES

Home Tech '84	October 26-29	Exhbn Complex, Bristol	Nationwide Exhibitions, 0272-650465/15
Computer Security Conf & Exhbn	October 29-30	Conf Centre, Nottingham	Elsevier Int Bulletins, 0865-512242
Computers in Action	Oct 30-Nov 1	Anderson Centre, Glasgow	Trade Exhibitions, 0764-4204
Personal Computer Fair	Oct 30-Nov 1	Town Hall, Bournemouth	Mike Schofield Promotions, 0202-36899
Computer Conf & Exhbn — Mini/Micro West	Oct 30-Nov 2	Anaheim, USA	Electronic Conventions Inc, 8119 Airport Blvd, Los Angeles, CA 90045
Texas Instruments Owners Conv	November 3	Ritz, Manchester	T199/4A Exchange UK, 0273-503968
Schools Computer Fair	November 6-7	Bloomsbury Crest Hotel, London WC1	EPC 01-580 6321
Australian Computer Exhbn	November 6-9	Sydney, Australia	Riddell Exhbn Promotions Pty Ltd, 137-141 Burnley Street, Richmond 3121, Australia
Yorkshire Business Computer Fair	November 7-8	Pembroke Halls, Manchester	Business Computer Fairs, 0202-513829
Scottish Home Computer and Electronics Show	November 9-11	Anderston Show, Glasgow	Trade Exhibitions Scotland, 0764-4204
COMPEC	November 13-16	Olympia, London	Reed Exhibitions 01-643 8040
COMDEX	November 14-18	Las Vegas, USA	Interface Group Inc, 300 First Ave, Needham, MA, 02194, USA
Videoex Europe Exhbn & Conf	November 20-22	Amsterdam, Holland	Online Conferences, 01-868 4466

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