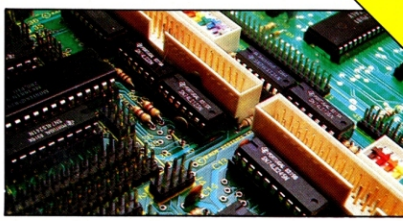
40p EVERY WEEK. No 88. NOV 24 1984

PERSONAL Computer NEWS

40p EVERY WEEK



THE BBC MICRO

Is there life in the old CPU?

COMMODORE COMMUNIQUE
The 64's own modem under review - p39

SPECTRUM COUNTS
Add a word count routine to Tasword II - p16

WINDOW ON AMSTRAD
Split your screen into three - p23

DOT MATRIX PRINTER
Smith Corona's Fastext 80 the affordable printer - p43

ICL's ONE PER DESK

Pre-View of the QL's business-like brother

The price tag. It's something rather special.

When you take a look at the new Goldstar MSX you'll find an asking price of around £240

Quite a bit less than most of the others. And since you're choosing a micro that's designed and built to one standard, that'll leave you a whole lot more for the super new MSX games or business software.

What is standard, of course, is the superb MSX specification.

There's one thing about this MSX that isn't quite standard.

State-of-the-art feature like 64K of 'user' RAM and 32K of ROM and 16K Video RAM place the Goldstar right at the top of the MSX league.

Sixteen vivid colours and eight octaves of sound make it a great games player's micro.

And there's a powerful Z-80A processor to take on a world of home office tasks.

Goldstar MSX. The brightest new star among micros that's unbeatable value for money.

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MENU

COVER STORY

Every desk could have one. 18

ICL's One Per Desk with its QL engine-room makes the headlines again in this exclusive preview. Will the alliance of ICL and Sinclair give you the best of both worlds or the combined shortcomings of each? Find out first in *PCN*.

OUTPUT

BBC Studio Editor 12

A professional approach to data entry programming.

Spectrum last word 16

With a Microdrive, Tasword II and these utilities, the word's your oyster.

Amstrad at speed 21

This utility to speed up your programming is small but powerful.

BBC by numbers 23

Selective renumbering adds that touch of gloss to your BBC programs.

QL kaleidoscope 26

Weaving patterns on your QL won't strain your eyes.

Commodore in space 28

It's kill or be killed in Star Drop for the 64.

HARDWARE

BBC Revisited 32

Three years old and going strong, the BBC micro is well worth a close look.

PERIPHERALS

Compunet à la modem 39

The world of Commodore's Compunet revealed through a modem.

Sparkling Corona 43

Fastext 80 comes in at the foot of Smith Corona's printer range, and gives a fair account of itself.

SOFTWARE

Gameplay 48

We rate the latest for the Spectrum, Commodore 64 and Amstrad.

Extended BBasic 55

Check out Basic Extensions for the BBC micro if your BBC Basic is growing tired.

QL monitored 56

Kat Software's QL Monitor comes under the microscope.

REGULARS

Monitor

Ugly duckling Electron turns into a swan, this page; COMPEC report, page 2; legal eagles take wing in America, page 3; One Per Desk assessed, page 4; Homefront, page 5.

PCN Charts 5

Ups and downs of the micro week.

Random Access 7

Routine Enquiries 9

Microwaves 10

Readers' hints on happier programming.

Dungeon 31

Dunstable comes to Borehamwood in our look at Macbeth.

Software Pre-View 46

Readout 58

Billboard 59

Quit/datelines 64

MONITOR

Electron wins its spurs

Acorn's Electron is about to emerge from the BBC micro's shadow as a fully-fledged system.

The Electron is to get a disk system, a modem, an Econet local area network connection, and the Tube. The disk units were demonstrated at COMPEC last week (see page 2 for a full report) and the other add-ons are due to follow soon.

In Acorn's parlance that could mean almost anything but the company has been building up support for the Electron in recent months and the timescale is likely to be short. One year old to the BBC's three, the Electron is almost ready to oust its older brother as Acorn's leading micro.

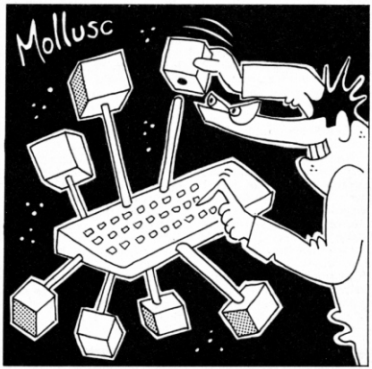
The additions follow the style and numbering system of the Plus-1 printer, joystick and cartridge software interface. The disk system is the Plus-3, Econet comes with the Plus-2, and the modem connection will be the Plus-4. The Plus-3 attaches to the Electron in the same way as the Plus-1, with the disk drive protruding around the side of the system box.

The Plus-3 will cause dismay by being incompatible with the BBC disk units. It gives 320K of storage on Sony 3½in floppies, with a new filing system — the Advanced Disk Filing System. This improves on the BBC equivalent, for example by overcoming the 31 file restriction, but it includes the * commands familiar to BBC users.

Acorn says that Plus-3 is available now. It costs £229. According to a spokesman the disk system will take a hard disk attachment in the future, but the possibility of adding 5¼in floppy drives à la BBC is more remote.

The Plus-2 and Plus-4 were previewed at the show. They will fit to the Electron through the system bus.

A Tube connection and RS232 will follow. The growth of the Electron could coincide with the Tube coming into its own at last.



Wafa-type system connects with 64

Following the introduction of the Rotronics Wafadrive for the Spectrum, the Spectrum Group has come up with a similar product for the Commodore 64.

The Entrepro Quick Data Drive is a wafa-type system that connects to the 64 via the cassette port. The claim is that the QC110, as it is also known, is three times faster than the ubiquitous 1541 disk drive. To see whether this is true, see issue 91 of *PCN* for a review.

The Entrepro is a small 6×2×2in box that comes with three wafas, one of which contains the QOS and the FMU (file manager utility), one with six pieces of software including versions of the games QIXX and Defender, and one blank. The unit bounds on to the market at £89.95.

Its major competitor will be a wafa system from Rotronics that includes two drives, a Centronics port, and an RS232 port. This version will also act as though it was a 1541 disk drive, and will cost around £170.

MONITOR: COMPEC REPORT

All work and no play at business show

Considering the number of 'revolutionary new products' hitting the streets today, COMPEC was relatively non-photogenic.

You might think, for example, that Apple's Big Mac would be worth a look, but it turns out that the beast is identical to the little Mac, or Maclet, as it might be known.

And IBM was keeping its powder dry — 'a wide range of IBM personal computer models with associated devices are on display' indeed. Digital Research was showing its GEM (Graphics Environment Manager), running on a range of machines that included the increasingly ubiquitous Apricot.

None of our three reporters who checked out the Microsoft stand had any clear recollection of what was being shown there. MS-Net would be the obvious guess, but we really shouldn't jump to conclusions.

Fortunately there were matters of interest a little further down the line. Olivetti announced a range of products for its M24 PC workalike, including Xenix, a mouse, 3270 comms software and 640K floppies. The Xenix is a product of Olivetti teaming up with software house Spinx, and allows the M24 to be used within a multi-user system — M24, hard disk and Xenix would make a decidedly nippy combination.

Olivetti's mouse is also noteworthy in that it doesn't need driver software. The mouse plugs directly into the keyboard, and operates as a sort of cursor cluster, so you can use it with programs that would ordinarily need modification to use a mouse.

The company also seems to be starting to make a go of supporting its M10 lap-held portable. Eight new applications have been launched, the most interesting being M10/Store, which allows 9600 baud file transfer to and from the M24. It could also work with the Tandy 100 and the IBM PC.

Brother had a couple of interesting ideas on its stand. There were Commodore versions of the HR5 and M1009 printers at the same price as the normal version (£180). F Smith and Company was also camping

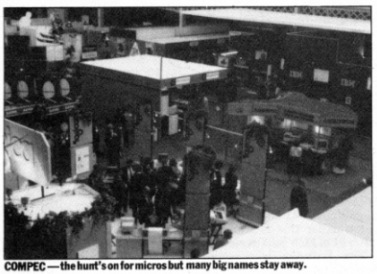
MSX — the quiet invasion.

on the Brother stand with a real CRT screen for the EP44 — no price yet, but ideal for people who resent using all that paper to print out Micronet menus.

COMPEC isn't exactly a home show, but as the MSX manufacturers also make more business-like things the new standard had arrived — in a way. Mitsubishi had one, but the stand operative couldn't confirm whether or not it was just like all the other MSX machines, and Sony and Sanyo were there. The Sanyo claimed to have more available memory than the rest of the pack.

Its stand also sported a portable version of the much underrated MBC 555. It may not be truly IBM compatible but it does lovely pictures.

Finally, on the QL front, ICL was being heartless and uninformative on One Per Desk (see pages 4 and 18) but Quest had a substantial range of add-ons up and running. These included CP/M on Microdrive and disk, the sensible one being the latter, memory expansion from 64K to 512K (a snip at £579), various items of business software, a baffling variety of floppy disks and one 7.5Mb Winchester.



COMPEC — the hunt's on for micros but many big names stay away.

Torch introduces an upgraded Unicorn

Perched on the corner of the Acorn stand at COMPEC — and almost blasted off by Acorn's synthesiser — Torch demonstrated a new version of its Unicorn add-on for the BBC.

Torch has redesigned the processor board so the 68000 chip runs at 10MHz and can address 512K of RAM. This means a noticeable improvement in speed when running Unix.

Torch has also implemented on-screen windows to view the several tasks that can be run concurrently.

An additional option turns the Unicorn into a multi-user device. A sideways Unix ROM turns a BBC into an intelligent terminal that can access the Unicorn over the Econet network.

Torch was also showing — yet again — its long promised Graduate IBMable for the BBC. 'Showing' is perhaps an overstatement. On the opening day it wasn't running. 'Someone forgot to pack the disks,' a harrassed Torch executive said.

And since it does not run Microsoft's Flight Simulator or

Acorn's synthesiser: drowning Torch.

Lotus' Symphony is it right to describe it as IBM-compatible? 'No,' he replied.

The good news is that the design problems have now been overcome, including a little difficulty caused by the two expansion slots being half an inch too close.

The bad news is that the first batch of 50 machines to roll off the production line had all the chips inserted the wrong way round so they promptly expired when the boards were tested.

Acorn displays its many new wares

As promised, the Acorn stand was overflowing with new products and hints of more.

Heading the line-up were the disk interface for the Electron (see page 1) and new languages.

A centre of attention was the Music 500 sound and music synthesiser.

What looked impressive was the comparative simplicity of the special control language, Ample, which programs the Music 500 to play a rich variety of music.

The synthesiser costs £199 and can be bought now. The music keyboard is an optional extra and is not yet available.

Elsewhere on the Acorn stand was the 32016 second

Plus-3 — starring for Acorn.

processor. This National Semiconductor chip is a 32-bit internal/16-bit external processor and runs at 6MHz. Acorn has packaged it with a floating-point maths co-processor and 256K of RAM.

Free software includes an operating system called PANOS, BBC Basic, C, Fortran 77, Lisp, Pascal and 32016 Assembler. It costs £899 and will be available 'in early 1985'.

On the storage front, Acorn has at last released a Winchester hard disk for the BBC. It comes in two sizes, 10Mb and 30Mb, costing £1,499 and £2,299.

TDI Pinnacle races to UK speed record

New micros were thin on the ground but one that did impress was the Pinnacle from TDI.

Built around a 68000 chip running at 12MHz it is claimed to be the fastest micro.

Starting at £4,995 for the 10Mb, 256K RAM version it is not cheap. But if you want high speed, eventual expansion to 6Mb of RAM, 32Mb hard disk and support for up to seven users it's worth checking out.

RML makes music and doubles 480Z disks

RML has announced an £100 sound box called Mynah for its micros.

It produces three music channels and noise channel through a built-in speaker. Where it really sounds impressive is reproducing the human voice.

Through a microphone connection and special circuitry, speech can be digitised, stored and replayed with near perfect enunciation.

RML has boosted the maximum disk capacity of its RML 480Z micro. With its increasing use as a file server on RML's Chain network, it is now offering an option of quad density disk drives, doubling the storage capacity.

MONITOR

NEC knocks bottom out of lap-held prices

NEC has brought lap-held portable prices down to the bargain basement as it opens a new front against the Tandy Model 100.

The NEC 8201A now costs £299 after the second price cut in as many months. Tandy started the downward spiral but was leap-frogged by NEC which has now gone much further, taking a lap-held micro below £300 for the first time. Not long ago, £450 was par for the course.

It is also offering much more software than previously — sales have suffered through the NEC's sparse software provision and because Tandy's dealer network is so much better organised.

The new applications software includes some word processors, spread/calc sheets, databases, planners, mailers, Forth and an assembler.

The company behind this software is Micro Time International Limited; it produces a word processor called The Journalist. This is very similar to Micropro's Wordstar. It uses the same dot '.' commands as the famous implementation, but unfortunately, they can be embedded in text. So, if you happen to be writing a piece on Wordstar, you cannot say 'using the. HE command in text causes a header' because the use of .HE gives you an instant header.

The £299 tag is a special offer to close on December 12. Tandy is unlikely to respond for such a short period, but at the time it cut the price of the Model 100 it didn't rule out further reductions, and Olivetti said that it would try to ensure that its M10 portable remained competitive.

Belligerent Atari cuts 800XL again

Battling Jack Tramiel has slashed the price of the Atari 800XL again. His Commodore killer now sells for only $120 in the US, a reduction of almost $60.

Still declaring that 'business is war', but now adding a promise 'to bring new life and new excitement' to the computer industry, Tramiel is going all out to pull the market out from beneath Commodore this Christmas. The 800XL is being turned out at the rate of 150,000 a month by a plant in Taiwan, and the company plans to bring production to half a million a month by the middle of next year.

Cheap utility software starts to Mushroom

The pocket-money software movement has invaded utilities — a new company called Mushroom Software has released a £5.50 Centronics interface for the Commodore 64.

Mushroom's Peter Griffiths said that the interface will read the normal Commodore character set to an Epson printer and will deal with user defined additions and high- or low-resolution screen dumps.

Mushroom is on 01-670 3533.

SHARP SPINDLE — A 3½in disk drive from Sharpsoft (01-739 8559) should give your MZ 700's memory a jolt. At £287 the MFD 700 has an inbuilt disk controller which means you don't need any further boxes. With 180K of memory, the Disk Basic that comes with the drive is compatible with Sharp S Basic and leaves 31K of user RAM. With the disk drive hooked up to your MZ 700 you will be able to use an extra 21 commands — a nice touch on a programmer's system.

VIEW FROM THE US

Network Nation tangles with the law

The growth of Network Nation among US micro owners is producing a variety of dramatic new legal problems.

In Detroit a microcomputer bulletin board operated by a 14-year-old ran a detailed explanation for the preparation of home-made nitro-glycerine and managed to make headlines and frighten parents.

Out west, extreme right-wing groups are using their micros and modems to disseminate their views. They're dialling into Canadian bulletin boards and posting up their electronic literature, much of it anti-semitic. The Canadians prohibit the import of such stuff when it's on paper, but as yet there are no rules governing electronic distribution.

In Los Angeles Thomas Tcimpidis, a 33 year old TV engineer who runs a bulletin board on his home micro, was raided last May on the instigation of the Pacific Bell Telephone Company. It seems that a Bell snooper found a purloined telephone credit card number posted on St Peters board. The case hinges on whether bulletin board operators are liable for everything that is entered on their systems over the phone.

Most boards have been open to the public. Thus for many hackers the St Peters case is a vital test of electronic free speech. For the phone company, however, it represents an effort to stem what they perceive as a rising tide of lawlessness.

Since Network Nation is noticably young and overwhelmingly male, the majority of bulletin boards exchange details about computers, other technical info, and quite a lot of cherry rude language.

Among the torrents of harmless stuff, however, are such items as phone company credit card numbers and the access codes to mainframes at NASA and major corporations and universities. Phoning for free, either either on a stolen number or with a 'Blue Box' which mimics the dial tone that controls the phone system, is called phreaking and has already become a moderate headache for the US phone companies.

As they battle each other furiously for market share in America's deregulated long distance phone market, the companies want to be able to expand their credit card business. But in recent years the growth of phone credit card crime has become phenomenal.

Horrified credit card customers, whose numbers have been sold or swapped all over the country, suddenly receive bills for several hundred thousand dollars. When this started happening quite frequently in 1983, the story hit the media and the phone companies got a fright.

At present the big network services, like the Source and Compuserve, call themselves libraries, not publishers. They don't even monitor what's going through their system very much. Of course, if they receive complaints they will act to remove a posted message and will even revoke a subscriber's membership.

It's hard to anticipate how the US legal system will cope with all these challenges but we should note a few pointers . . . '

Power of bulletin boards: After the raid, Tcimpidis called all the bulletin boards he knew of around the country. People read his messages for help and called more bulletin boards. Offers of support and legal help began to flow quickly from all over Network Nation. Says Tcimpidis: 'From all indications it was all over the country within three days.'

Power of the law: A chill is settling over the bulletin boards as many operators close up or restrict access to their micro systems. There's just too much fear or too much work involved in keeping illegal numbers off the boards.

Power of a related special interest group: When President Reagan signed into law the Telecommunications Act this year, he put the stamp of Government on an interesting comprise involving the 600,000-odd Americans who own dish antennas for picking up TV signals straight off the communications satellite. While the new law promised penalties of six months jail and a $50,000 fine for anyone who makes unlicensed use of satellite TV transmission for financial gain, it also specifically exempts home use of such TV transmissions from any penalty. This was a politically sensible solution in an election year.

If the courts begin to shut down or restrict Network Nation, the question will be whether America's home micro owners will become an effective lobbying force in time for the Congressional Elections in 1986.

Chris Rowley

MONITOR

Microdrive storage mars OPD concept

Great idea, shame about the execution. That was the first reaction to ICL's launch of its new One Per Desk.

As we reported last week, the OPD is designed to be the only box of electronic tricks you need on your desk, combining communications with functions previously only available through an unfriendly personal computer.

The ICL solution is to build a telephone and modem into a keyboard unit that also offers two Microdrives and a speech synthesis unit. ICL has suggested that the kind of person that the OPD is aimed at would not need or want the speed and storage capacities of a disk drive. The company is looking at adding disks as an option but refused to say when they would be available. In the meantime, any user requiring access to large amounts of data could use a mainframe or a mini.

But talking to a mainframe is only through the built-in modem which has a maximum speed of 1200 baud; tediously slow for large amounts of data.

ICL has put most of the operating software in ROM. The Microdrive would be used only to back up information you want to save from one working day to the next.

Communications software, including viewdata and teletype emulation, comes as standard. A phone directory is stored on Microdrive along with passwords and other log-on details.

Word processing, spreadsheets, database and graphics functions are handled by the Xchange packages from Psion in plug-in ROM form.

Optional ROM packs provide messaging software and protocols for talking to ICL mainframes. OPD can connect to one or two separate telephone lines; one for voice and one for data.

ICL's OPD — great in theory, but will it catch on?

Communication and networking is handled using the modem through a normal PABX system and the public telephone network. Built-in multitasking features include answering the telephone in your absence with a Dalek-like message made up from a fixed 152-word vocabulary.

The only other interface provided from the substantially re-designed QL board is an RS432 port. Remarkably, this can only be configured as an output device for printers. It cannot be used for input. One saving grace of the OPD is that it has not opted for the dreadful QL keyboard.

Deliveries are due to start in January. The basic model with 9in monochrome monitor costs £1,195 plus VAT. The colour model with 14in monitor costs £1,625. To this should be added £130 for the Xchange software, £50 for the messaging ROM pack and £30 for the ICL link.

Prices include OPD Basic (a development of Sinclair's SuperBasic supplied on Microdrive cartridge) and one year's subscription to ICL's Usercover maintenance agreement.

● Turn to page 18 for an exclusive preview.

SLEIGHT OF HAND — Magic seems to lose all its intrigue when it's pulled out of a computer instead of a hat. This certainly seems to be the case with The Paul Daniels Magic Show. One of three new home interest programs released by Acornsoft, it involves ten tricks for you to bore your friends with at Christmas parties. Of course you could jolly things along a little by first offering them one of the 300 cocktails detailed in another of these new releases, The Complete Cocktail Maker. However you will need several strong drinks before purchasing this pack at around £10 when you could so easily by a similar book for around £2.

It's the 'Why are we waiting?' department

Some familiar names and some new ones feature in our spotlight on malingering manufacturers this week. These products have been announced, advertised, widely discussed, or just promised — but haven't turned up yet.

Enterprise 64 — launched September 1983 for delivery April 1984, now due in the shops in January 1985.

Great Space Race — Legend's follow-up to Valhalla, advertised for some months as 'coming soon'.

MS-Windows — launched November 1983, may appear by June 1985.

Spectravideo — adaptor to turn non-MSX micros into true MSX systems; first hinted at in February 1984, no sign since.

Pro-Lite enters luggable market

Texas Instruments has stepped into the US briefcase sized computer market with a 10.5lb computer with 12in screen.

Pro-Lite is expected to reach Britain some time next year. It will sell for $2,995 in the US. The machine will come with a 3.5in floppy disk drive, 256K of RAM, and an 80×25 display.

Against stiff competition from the Hewlett-Packard and Data General briefcase computers, TI hopes that its machine will appeal to people on the road. But analysts and dealers in the US are sceptical about the market's potential, a feeling that can only be reinforced by the collapse of various luggable computer manufacturers.

First Word try-out designed to go phut

Software houses are continuing to home in on the 64 as a business machine.

The latest is First Publishing, purveyor of books and software to the Commodore-owning gentry. The company is distributing material from West Germany's Data Becker, but eventually it plans to produce more of its own.

The first releases include First Base, a database package, First Word for word processing, and an Ada training course — Ada is the language widely tipped to succeed Cobol as the high level language of the future.

The marketing of First Word introduces a new slant on the test-drive idea. The full package costs £35.99 but for £1.49 you can buy a version with a built-in time bomb. After a certain number of runs, to give you the flavour of the full system, it will go phut and return to its bottle.

The same approach is likely to be applied to First Base, also selling for £35.99, and to Powerplan, a combination of spreadsheet and graphics. If you feel like rising to the challenge of a time-bomb, First Publishing also sells books to guide you through advance machine code techniques and Pascal and Basic compilers. The company can be contacted on 07357-5244.

Will Plus/4 adapt to the 64 path?

Commodore is toying with the idea of an adaptor to make the new Plus/4 (issue 65) compatible with its 64.

The Plus/4, at £299.95, is pitched at home/business users, but it doesn't match some of the 64's popular features. It lacks the sound interface device and sprite graphics, for example.

This is where an add-on board would enable a vast selection of 64 software to be run on the Plus/4.

Commodore UK says the add-on would be quite feasible — but the idea is still in the air, as the company is not sure whether demand will be strong enough to justify it. But if compatibility is desired, Commodore will be ready to react.

If Commodore does produce the board, this would give Plus/4 users much more scope — but of course at extra cost.

Commodore is making light of suggestions that Plus/4 software from independent suppliers will be thin on the ground. Besides, it seems to have maintained incompatibility between its home micros as a matter of policy.

But it has in the past flirted with the idea of adaptors. In the early days of the 64 it went so far as to commit itself to provide an upgrade path for Vic 20 users wanting to move to the 64. It didn't however mention any dates, and nothing ever came of that.

HOMEFRONT

Just put your lips together and blow

As the year draws towards its close and Christmas leers at you from every shop window, an unusual sound can be heard coming from the micro makers — with a touch of nervous vibrato they are whistling to keep their spirits up.

Why should the micro builders need to keep their spirits up? Christmas, after all, is when they all expect to grow fat and bloated like the rest of us, except that with them it will be on the money coming in from seasonal sales.

But it's the new year that makes them nervous. The auguries for home micro makers in particular aren't good. The stagnation that hit the software industry this year may claim them next as the boom, obedient to whatever laws govern the business cycle, turns to bust.

So they whistle cheerfully to leave nobody in any doubt about their confidence. The whistling takes the form of talking openly about the machines they plan to release. Sometimes, to be sure, they whisper openly behind their hands — in the certain knowledge that somebody will hear, repeat and eventually report their small indiscretions.

One incredibly big manufacturer has been known to use this ploy; pre-announcing products is naughty, but there's nothing a company can do about leaks. Since this same manufacturer is said to have legitimised the personal computer (an indefensible slur on the likes of Apple) there is no reason why the tactic of selective leaking shouldn't be equally legitimate.

Those that have come out in the open include Oric, Apple, Atari, and of course the evergreen Enterprise, which may have to be hooded before it will go into the stalls. To a lesser extent Commodore and Sinclair have dropped teasing hints.

Oric has been the most talkative, probably because it would take the Dagenham Girl Pipers to raise Oric's spirits. It plans three new products and you could be forgiven for a fleeting feeling of déjà vu as you read about them again.

First the Stratos, a £250 home micro with a 6502 and vast amounts of ROM in cartridge form. Then there will be a 16-bit micro that lifts Oric into the business league with the promise of IBM-compatibility. The third project concerns European distribution rights to a book-size machine with a screen-sized LCD of 80 by 25 lines.

Atari has fuelled speculation about its future product range by continuing to tinker with the price of the 800XL. What is it clearing the decks for? A sub-$1,000 magic micro that will wipe the floor with the Macintosh, the PC, and the Cray 1, but not the Vic 20? You just put your lips together and blow . . .

Over at Commodore the response is ready. The Amiga will probably be launched at the Consumer Electronics Show next spring, the venue that two years ago saw another famous show-stopper tread the boards for the first time. Where are they now, number 57 — the Coleco Adam.

Apple is generally reckoned to have won the first round with the Macintosh. This machine has made such an impact that many people overlook the fact that it is the second round — in the third, the Lisa didn't even get off its stool.

But now it talks vaguely of a colour Macintosh, of Symphony on the Mac, and of a 16-bit Apple IIx.

Closer to home, and cards closer to its chest, Sinclair is expected to produce a portable machine. It will probably be black.

Manufacturers competing for sales never talk about their forthcoming releases without good reason. Normally they are guarded, on the grounds that loose talk alerts the opposition to whatever it is they are doing. In times of plenty, cheery beanspilling is a means of persuading prospective customers to hang on to their cash for a while. But in lean years it has a different purpose.

Taken at face value, all these plans point to a number of companies capable of riding out the doldrums and still spending on research and development. They keep morale high, among staff as much as among customers.

They flatter to deceive. The best response is to whistle back. It works for gypsies with skittish horses, perhaps it will soothe the poor overwrought micro makers. ***David Guest***

CHARTS

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

GAMES

TW	LW	TITLE	PUBLISHER	MACHINE	PRICE
1	1	Underwurld	Ultimate	SP	£9.95
2	9	Eureka	Domark	SP,C64	£14.95
3	3	Daley's Decathlon	Ocean	SP, C64	£7.90
4	—	Raid Over Moscow	US Gold	C64	£9.95
5	2	Elite	Acornsoft	BBC B,EL	£15.00
6	—	Knight Lore	Ultimate	SP	£9.95
7	4	Tir Na Nog	Gargoyle	SP	£9.99
8	—	Bruce Lee	US Gold	C64,AT	£9.95
9	6	Combat Lynx	Durell	SP, C64	£7.95
10	8	Pyjamerama	Micromega	SP, C64, AM	£6.95
11	10	Beach-Head	US Gold	SP, C64,AT	£9.95
12	11	Danger Mouse	CreativeSparks	SP, C64	£7.90
13	12	Battlecars	Games Wkshp	SP	£7.95
14	5	Jet Set Willy	Soft Projects	SP,C64	£5.95
15	7	Sherlock Holmes	Melbourne	SP,C64	£14.95
16	16	Avalon	Hewson	SP	£7.95
17	19	Chiller	Mastertronics	C64	£1.99
18	17	Zaxxon	US Gold	C64,AT	£9.95
19	—	Jasper	Micromega	SP	£8.95
20	13	Travel With Trash.	N. Generation	SP	£5.95

SPECTRUM

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6	Pyjamerama	£6.95
7	Combat Lynx	£7.95
8	Danger Mouse	£7.90
9	Beach-Head	£9.95
10	Battlecars	£7.95

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4	Daley's Decathlon	£7.90
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5	Televideo TS1603	£2,640
6	Wang Pro	£3,076
7	NCR Dec Mate V	£1,984
8	Apple 3	£2,755
9	HP 85	£1,917
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 **November 8**. The games chart is updated every week. The prices quoted are for the no-frills model and include VAT. Information for the top-selling micros is culled from retailers and dealers throughout the country and is updated every month. PCN Charts are compiled exclusively for us by RAM/C, who can be contacted on 01-892 6596.

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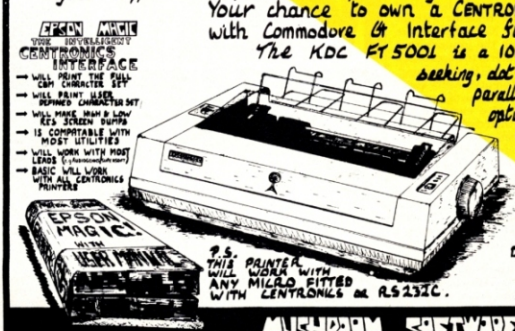

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Has anything we said struck you as outrageous or worth fulsome praise? Let us know how you feel about the issues covered in *PCN*. Air your views in this column — and you could earn £15 for the best letter of the week. Don't hesitate — send your words of wisdom to: Random Access, *Personal Computer News*, Evelyn House, 62 Oxford Street, London W1A 2HG.

Shop assistants: beware of this fan

Christmas is coming — and fast. You can always tell that it's close, the shops are actually switching on their computers for public infection by hordes of sticky schoolkids and wary adults who eye the disarray with knowing glances.

The real fun is to go into somewhere like the local Dixons store — where vital questions like 'Would you say the Jupiter Ace has the edge on the Commodore, Spectrum and Beeb?' get answers like 'Sorry, we only do cameras, videos, TVs and computers.'

Oh, the sheer joy of letting undefined sprites zoom around the screen in an endless program loop while the assistants spend hours trying to find the RUN/STOP key only to find a strategic POKE has rendered it useless!

A real stomach turner is this little stunner:

```
10 FORC=0 TO 1: POKE 53280,C:
NEXT
20 GOTO10
```

It's a bit like going up in a lift. Computer vandals rule, 64K?

Andy Clarke,
Baddesley Ensor, Warks

Amstrad chases Grand Masters

There you go again. Being the focus of *PCN*'s attention does seem to have some drawbacks. Quit in *PCN* 86 had another poke at the poor old Amstrad.

MikroGen's Master Chess has a fully redefinable colour set to enable players to set up the board exactly to their fancy. You can have sky blue and pink squares if you like.

Quit's comment implies that the colour set is not redefinable, thereby having doubtless lost us many hundreds of thousands of sales to Grand Masters and the like. You can expect the writs shortly. After all, we haven't spotted any caustic little nibbles at the heels of Toshiba after their unspeakably dreadful MSX ad.

William Poel, Amsoft,
Brentwood, Essex

Surely you'd never miss the odd hundred thousand sales. You certainly missed Quit's appraisal of the Toshiba ad in issue 84—Ed.

White Lightning strikes up a band

We are in the process of forming an official White Lightning user group, which is recognised by Oasis software. We hope to provide an information and help service for users of White Lightning on the Spectrum 48K, the Commodore 64, the Amstrad and the MSX machines. Anyone requiring information should send an SAE to our address below.

T Kelly,
353 Marville Garden Village,
Newtownabbey BT37 9TZ

MSX fan's angry brickbat

Why don't you praise the MSX system? The home micros are now on the market. Why no mention in recent issues of *PCN*?

You can change your format; lower your price (I wouldn't dream of paying so little for *PCN*); throw Apple IIc's at the competition doers; but *please* give MSX more than a cursory 2-inch column every third week, now that they are available.

I know, you know, anyone with an urge to find out knows — MSX is a winner.

If only MSX was British!

P D Bayes,
Malton, North Yorkshire

You might know — we don't. Nice though they are, they aren't dramatically better than the Memotech or the Amstrad — which are British—Ed.

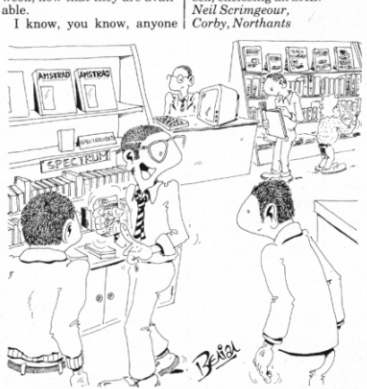
Roar together Dragon fanciers

With the help of your magazine, we have formed a national Dragon user group, of which I am software editor. I wish to contact as many companies as possible which produce material, either software or hardware, for our beloved Dragon so that I can compile a list for our members.

I want them to send me their names, addresses, phone numbers and what they actually produce. I also run the adventure corner so if anyone is releasing adventure games then let me know. All contributions welcome!

Anyone who wishes to join our club, or wants more information, should write to our chairman: Paul Grade, 6 Navarino Road, Worthing, Sussex, enclosing an SAE.

Neil Scrimgeour,
Corby, Northants



I wish they'd put as much effort into the graphics in the program as they do to the graphics on the box!

Troubled Lynx group feels sick

Thank you for supporting the Lynx during the time of its somewhat troubled existence. I believe, without fear of contradiction, that there will be no more machines produced in the UK. Whether or not some other buyer takes on the task is, of course, unknown to me.

The entire 400 members of the Lynx User Group feel sick and very saddened that such an incredible home micro is no longer going to be available.

Very few magazines have supported the Lynx to any extent; yourselves and *What Micro?* probably being among the best.

As an update, the group is now featured on Prestel pages 8008124a and b, and is a member of the Association of Computer Clubs.

R B Jones, Lynx User Group,
Harrow, Middlesex

Question of hexagon copyright

Your recent program, 'Hexplode', was delightful and its author, Ms Ansell, is to be congratulated.

At the end of the blurb about it you said, correctly, that it was better than a rehash of old programs and as far as you knew it was an original.

But I am sorry to say that the basics of the game (sorry about the pun!) are not copyrightable. A hexagon game with an 11 by 11 matrix of hexagons was invented by the Danish mathematician, Piet Hein, in 1942 and was called Polygon.

The idea for the 'catastrophic' explosion of a full 'box' is well known in catastrophe theory and the computer simulation algorithms are frequent in the various forms of life which simulate a growing population of a species. Such mathematical puzzles are no more copyrightable than Newton's algorithm for HCF or a program for converting decimal numbers to binary.

J Frank Hughes,
Denbigh, Clwyd

Glad you liked the program, Mr Hughes. But the copyright applies to the program code, not the mathematical principles—Ed.

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Cross-fertilising Tandy with Spectrum

Q Some four years ago I was introduced to computing with the TRS-80 Model 1. Following technical advances, about six months ago I bought a 16K Sinclair Spectrum.

Comparing the two computers I find the TRS-80 easier to work with than Spectrum, it having a preferable Basic and a nicer keyboard. My query, then, is how can I transplant the colour and sound-handling chips from the Spectrum to the Tandy?

Both computers are based on the Z80 processor, so can I bank the ROMs à la BBC? Will the Spectrum's modulator fit inside the Tandy case? Since I have (for the Tandy) 48K internal memory, can I page in the Spectrum's 16K to give me 64K switchable memory? Finally, will the Tandy high resolution character generator work in colour?

I Pandum
Address withheld

A You're doing this for a bet, aren't you? As crazy queries go, yours is pretty comprehensively crazy, and has the added bonus of allowing you to rub out both your machines in one fell swoop if you tried it.

But just in case you are serious, here's why you shouldn't be. As far as we can make out you seem to be proposing merging the operating systems of the two machines. You can't actually do this unless you tear apart both operating systems and start again, and if you had the expertise to do this you would become what we in the trade call a 'micro manufacturer'. . .

There is no point in putting the Spectrum's ULA into the Tandy — it would only confuse the poor beast, and the Spectrum doesn't actually have a sound chip, so you can scratch that one too.

So there are two things you can do. First, you could throw away your Spectrum and concentrate on your Tandy, using more conventional upgrade paths. Your favourite Tandy store should be able to give you information about upgrade paths, and with application it might be possible for you to produce your own add-ons. This isn't easy, but it's the sort of thing people did in the bad old days.

The other thing you could do is use an RS232 to set up some kind of communication between the two machines. You'd almost certainly have to write your own software for this, and the rewards wouldn't be immediately obvious, but you'd probably feel really smug when you'd cracked it. On balance, though, we suggest you go for option one.

Queries on the 64 Koalapainter

Q Your article and listing for the Commodore 64 screen dump (issue 79) was excellent. I have a Koalapainter and have been eager to get the pictures printed but I don't know how to load the pictures alone. How can I find out where the Koalapainter picture starts in memory? Can I incorporate the screen-dump into Koalapainter and call it when I need it?

A Vun,
Oxford

A From the bottom up, you can't incorporate the screen-dump program into another program because of likely memory clashes. However, that shouldn't be a problem. You can create your pictures, come out of Koalpainter, load the picture, load the dump routine, and away you go.

The latest version of the Koalapainter manual contains a program that allows you to load and display a picture without Koalapainter in memory. If you want a copy of this program try Audiogenic, which is handling the Koala range in Britain. It can be found at PO Box 88, Reading, Berks or by phone on 0734-664646.

What's up with disk drives for Oric 1?

Q I recently acquired an Oric 1 and would like to invest in a disk drive, but I cannot find any relevant information.

If I bought a disk drive, would it be 'dumb' or 'intelligent'? Would they be 3½in or 5¼in floppy disks?

Jon Robinson,
Eastbourne

A At the last time of asking, there were two alternatives that you might like to consider. One is from Oric Products itself, and the other is from an independent supplier called ITL Kathmill.

We'll take ITL first, because it managed to beat Oric to the draw with its Byte Drive 500 and Hybrid cable earlier this year.

The Byte Drive 500 uses 3¼in Hitachi disks with a capacity of 220K. The average access time is said to be 3 milliseconds, but who's counting? This is an intelligent drive in the sense that, when you buy it with the Hybrid cable (for £299 all in), it brings an Oric disk operating system with utility programs. The device that we tested (issue 52) could be used with all 3½in drives and most 5¼in units into the bargain.

Oric's own offering, first seen in January this year but not delivered until much later, is called the Microdisc. This is another 3½in unit, or rather pair of units, since the power supply comes separately.

The DOS resembles CP/M but it resides in memory rather than sitting in files on the disk. Our Pro-Test of the system came up with some reservations but found the plentiful error messages very helpful. It costs £270.

Oric can be contacted on 0990-27641. ITL Kathmill is at 0634-815464.

Wanted: users group for Sharp PC1500

Q Could you tell me if there is a users group especially concerned with portable computers? I have a Sharp PC1500.

R J C Broadbent,
Wanstead Park, London E12

A With portable computer makers such as Osborne, Gavilan, and Otrona going to the wall faster than you can count them, this could turn out to be the week's most urgent enquiry.

By way of a direct answer the best that we can propose is the Pocket Computer Users Club, which is to be found at 13 Sutherland Avenue, Leeds, LS8 1BY. If there are machine specific groups, we can only say that they are hiding under substantial bushels. But then, what use is a NEC 8201A Users Group likely to be to you?

If any operators of relevant user groups are reading this, they should write to *PCN* at 62 Oxford Street,London W1, and we'll forward their letters.

Help me choose my new micro

Q I am thinking of buying either the Electron, Amstrad on Enterprise computers and would be grateful if you would list the disadvantages and advantages of these machines. Is it worth buying the Electron just to play Elite? Can I use my Tandy four colour printer/plotter with all these machines?

I G Jackson,
Hull

A We like to think we can do most things, but make up your mind for you is not one of them. The three machines you mention are substantially different in both what they can do and how much they cost. First, you must decide what you want your micro to do. Then decide what facilities you need to be able to do that.

Third, you should collect all the information you can from dealers, magazine reviews, and friends, about the machines on your shortlist. Finally, you (and only you) should make up your mind.

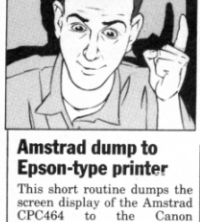
To get you going, here are a few pointers. The Electron has been around for a year and is reasonably well supplied with software. It uses the same Basic as used in the BBC micro. The fact that it does run Elite is a compelling reason to buy one but it should not be the only reason.

The Amstrad has been around for a few months and has been well received although software for it is still a little short. A monitor is included in the price.

The Enterprise has an impressive sounding specification on paper but won't be in the shops until January — at the earliest. For some months after that, there will be little software for it.

The Tandy printer/plotter uses an RS232 interface. It cannot be used with the Electron unless you buy a Plus One interface and an RS423 cartridge which doesn't yet exist. The Amstrad uses a seven-bit serial port and it is highly unlikely to work with the Tandy. The Enterprise will have an RS423 port but we can't say for definite that it will work with the printer/plotter.

MICROWAVES



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Amstrad dump to Epson-type printer

This short routine dumps the screen display of the Amstrad CPC464 to the Canon PW1080A or any Epson compatible matrix printer.

The absence of the most significant bit from the CPC464's interface creates the need to line feed in 7-dot increments (see the escape sequence in lines 190 and 290).

A resolution of 320 has been used and the sequence in line 210 tells the printer how many columns to expect. The WIDTH statement in line 130 is needed to stop the CPC464 outputting line feed and carriage return characters when they are not wanted.

Once entered it is best to renumber the routine from (say) 50000 before saving it. This will enable it to be merged above the main program.

R J Halsall, Wokingham, Berks.

```
100 REM " Screen Dump - CPC464 to Canon PW1080A or"
110 REM " Taxan/Kaga Dot Matrix Printer"
120 REM " By R.J.Halsall -  October 1984"
130 WIDTH 255
140 PRINT #8,CHR$(27);"l";CHR$(5);
150 DEFINT a-z
160 DIM b(12)
170 FOR a=0 TO 6
180 b(a*2)=2^(6-a):NEXT
190 PRINT #8,CHR$(27);"A";CHR$(7);:PRINT #8
200 FOR LIN=400 TO 1 STEP -14
210 PRINT #8,CHR$(27);"K";CHR$(64);CHR$(1);
220 FOR col=2 TO 640 STEP 2
230 FOR a=0 TO 12 STEP 2
240 byte=byte+(TEST(col,LIN-a)>0)*-b(a)
250 NEXT
260 PRINT #8,CHR$(byte);
270 byte=0
280 NEXT
290 PRINT #8,CHR$(27);"A";CHR$(7);:PRINT #8
300 NEXT
310 END
```

Word count routine for Spectrum

The following word count routine can be incorporated in Tasword II the Spectrum word processor.

First load Tasword in the usual way and drop into Basic. Merge the routine with Tasword's Basic program after ensuring that your version of Tasword has no line numbers less than ten or larger than 7999.

Then re-save the modified Tasword program as provided for in the manual and menu. If your version of Tasword has line numbers less than ten you will have to make the necessary adjustments to the line numbering.

To use the routine after you have written your file, drop into Tasword Basic and GOTO 8000. The screen will then display a running word count, first of words that start at the beginning of a line and follow on from a word at the end of a previous line, and second all the other words that are in the file.

When the word count stops ticking over you may either BREAK and GOTO 9000 to see the final word count, or wait for the routine to finish looking through a possibly large amount of empty space in RAM. GOTO 1 or RUN will return you to the Tasword text file.

The routine utilizes a defined logic function and two loops which are placed as low as possible in program memory to optimise speed.

Line notes

1 returns you to the Tasword text file.

2 defines a logic function which takes the valve 1 if its parameter represents an upper or lower case letter or a hyphen.

3-5 a loop that checks successive bytes in the text file and determines if the first is a non-alphabetic character and the second is an alphabetic character, in which case there is a new word.

6-8 is also a loop looking for a new word, this time at the beginning of each line

8030 and 8040 determine if the first byte in the file storage area at 32000 is a letter, and increments variable word count accordingly.

You may find it convenient to use an end-of-file marker in the text. If so, you could insert an appropriate conditional test in line 3 with a jump to line 9000.

T C Jennings, Ashton, Bristol.

```
   1>GO TO 10
   2 DEF FN z(x)=x>=45 OR x>63 AN
D x<91 OR x>96 AND x<123
   3 FOR i=32000 TO 52479: LET p
=PEEK i: LET q=PEEK (i+1)
   4 IF FN z(q) AND NOT FN z(p)
THEN LET wc=wc+1: LET i=i+1: PRI
NT AT 14,21;wc
   5 NEXT i: RETURN
   6 FOR i=32063 TO 52415 STEP 6
4: LET p=PEEK i: LET q=PEEK (i+1
)
   7 IF FN z(p) AND FN z(q) THEN
 LET wc=wc+1: PRINT AT 14,21;wc
   8 NEXT i: RETURN
8000 LET wc=0
8010 CLS : PRINT INVERSE 1;AT 7,
5;"COUNTING WORDS IN FILE"
8020 PRINT AT 14,0;"running word
 count = "
8030 LET p=PEEK 32000
8040 IF FN z(p) AND NOT (p=45) T
HEN LET wc=wc+1: PRINT AT 14,21;
wc
8050 PRINT AT 10,0;"Checking for
 first word in each line of text
": GO SUB 6
8060 PRINT AT 10,0;"Checking rem
ainder of text file": PRINT "
": GO SUB 3
9000 CLS
9010 PRINT "FINAL WORD COUNT = "
;wc
```

Reverse video Atari characters

This routine enables you to reverse video a block of up to 255 characters from any position on an Atari Graphics 0 screen.

The routine is stored in the string REV$ and is called by the USR function. The format is:

X=USR(ADR(REV$,XPOS,YPOS, CHARS)

where xpos is the horizontal position on the screen (0-39)

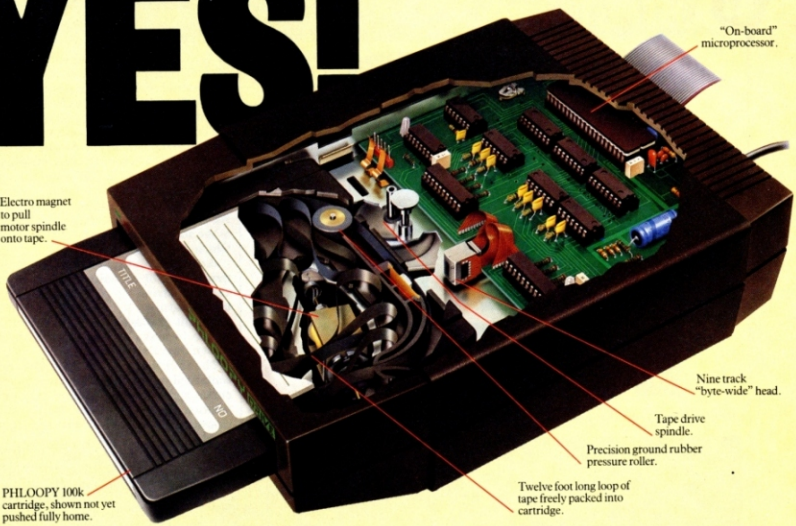
ypos is the vertical position on the screen (0-23)

chars is the number of characters (starting from xpos, ypos) to be reverse videoed (0-255) on the screen.

Nick Pearce, St Leonards, E Sussex.

```
100 GOSUB 900
200 GRAPHICS 0
210 POSITION 9,2:? "REVERSE VIDEO DEMO"
220 FOR I=0 TO 50
230 X=USR(ADR(REV$),9,2,18)
240 FOR J=0 TO 60:NEXT J:REM DELAY
250 NEXT I
300 LIST
310 FOR I=2 TO 14 STEP 12
320 X=USR(ADR(REV$),0,I,240)
340 NEXT I
500 END
899 REM *** REVERSE VIDEO ROUTINE -SETUP ***
900 DIM REV$(78):FOR I=1 TO 78:READ J:REV$(I)=CHR$(J):NEXT I:RETURN
920 DATA 104,104,104,133,207,104,104,133,208,173,48,2,133,203,173,49
930 DATA 2,133,204,160,5,177,203,133,206,136,177,203,166,208,240,10
940 DATA 24,105,40,144,2,230,206,202,208,246,24,101,207,144,2,230
950 DATA 206,133,205,104,104,168,240,21,136,177,205,170,41,128,208,5
960 DATA 138,9,128,208,3,138,41,127,145,205,152,208,235,96
```

YES!



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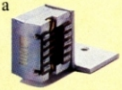

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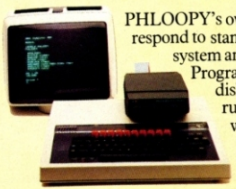

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Have you ever admired the data editing facilities seen on professional database programs? The BBC routine here can give you advanced facilities in your own programs.

The Data Input Function can be used to replace Input at any point where some control is needed over the type of data to be input, or where the editing features of FNedit are useful. The function returns a character string and has parameters which can control the maximum length of the string, and the type of characters which are acceptable.

It can also return either a completely new string, or an edited version of an existing string — perhaps its most useful feature.

FNedit displays a block cursor while in use to make a clear distinction on screen from a standard input.

The following extra facilities are contained under FNedit: cursor left; cursor right; delete character at cursor position (delete key); delete previous character (Control-H, or ↑H on a function

key); insert space at cursor position (Tab key); clear entire entry (Control-C or ¦C on a function key); and restore entry to what it was when function was entered (Control-R, or ¦R on a function key). Any other key will overtype the existing entry (or be ignored if it does not pass the selected validity test).

Any of the following will terminate input: Return key, Cursor down key, Control-Q (can be set up as ¦Q on a function key) or Cursor up key. If Cursor up is used, the variable UP is set to TRUE. If Control-Q is used, the variable QUIT is set to TRUE.

In use

FNedit can be incorporated into any program. It does, however, make use of the global variables UP, QUIT and Eb, which you should avoid using elsewhere in your program. You should also avoid using the names of the procedures within FNedit. Use of the function requires that a small editing buffer be reserved in memory with the statement:

DIM Eb nn

where 'nn' is a number one greater the maximum length of any string you may want to edit. DIM Eb 81 is adequate for most applications, but it must be given before you first use FNedit in a program.

The function must be given three parameters:

- The string for editing. This can be a null string (""), a string constant or a string variable.
- The maximum length allowed for the string. (This must not be more than allowed for in the DIM Eb .. statement.)
- A number which shows what checking is to be done on the characters as they are typed in, selected from the following:

0. Any printable character allowed
1. As 0, but any letters forced to upper case
2. Only numerals, or the characters '–' '+' or '.' allowed
3. Only letters or spaces allowed
4. As 3, but all letters forced to upper case.

Whatever you type will be displayed on screen, starting wherever the cursor was positioned when the function was called. (See the examples below where input will start immediately after the PRINTed text.) When the function is left, the cursor will be repositioned exactly where it was when the function was called.

The cursor can be anywhere in a field when one of the entry terminating keys is pressed. The string returned will be exactly what appears on screen, with any trailing blank spaces removed.

The function also sets two global variables which may be useful in programs. The variable QUIT is set to TRUE if Control-Q (or a function key generating this code) is pressed. The variable UP is set to TRUE if the Cursor Up key is pressed. The demonstration program shows how these may be used. Note that a string is normally returned whatever key is used to end input — whether or not you check to see if QUIT was pressed is up to you.

For example:

```
PRINT"What is your name? ";
  :name$=FNedit("",20,3)
```

—would result in 'name$' being restricted to alphabet letters only, and subject to a maximum of 20 characters.

```
PRINT"Todays date is? ";:date$=
  FNedit("01-10-1984",10,2)
```

—would return 'date$' as an edited version of that given.

```
PRINT"Please amend: ";:this$=
  FNedit(this$,25,0)
```

—would return 'this$' as an edited version of what it was before, subject to a maximum of 25 characters.

```
PRINT"What is 4 times 7? ";:answer
  =VAL(FNedit("",2,2))
```

—would return 'answer' as a numeric variable.

Try the example program to get the hang of using FNedit and to see how it could smarten up your programs. It shows how you can use FNedit to create a full screen data editing routine.

Listing

```
   10 REM  Demonstration of Full Feature
 Data Input Function
   20 REM  Nick Talbott - BBC BASIC - Oc
tober 1984
   30 :
   40 REM  Any 'REM's or lines with just
 a ':' can be ignored
   50 :
   60 DIM Eb 81 :REM enough for an 80-ch
aracter entry
   70 MODE 3
   80 :
   90 REM   The lines between here and F
Nedit are for demonstration only
  100 :
  110 PROCset_up
  120 PROCdraw_screen
  130 PROCenter_data
  140 END
  150 :
  160 :
  170 DEF PROCset_up
  180 :
  190 DIM test$(4), curpos$(4), max(4),
type(4)
  200 :
  210 REM read screen location, length a
nd type
  220 :
  230 FOR C=1 TO 4
  240 READ x,y :curpos$(C)=CHR$31+CHR$x+
CHR$y
  250 READ max(C)
  260 READ type(C)
  270 NEXT C
  280 :
  290 REM   Cursor  Max Len   Type
  300 DATA  12,4,      15,      4
  310 DATA  12,5,      15,      3
  320 DATA  12,7,      3,       2
  330 DATA  12,9,      5,       1
  340 :
  350 REM  Now set up f0 to 'QUIT', f1 t
o 'RESTORE', f2 to 'CLEAR'
  360 *KEY 0 !Q
  370 *KEY 1 !R
  380 *KEY 2 !C
  390 :
  400 ENDPROC
  410 :
  420 :
  430 DEF PROCdraw_screen
  440 :
  450 CLS:VDU 19;4;0;:PRINT'" [f0] Quit
 [f1] Restore  [f2] Clear"
  460 PRINT''"   Surname:"''"  Forename:"
'''"       Age:"''"Ref Number:"
  470 ENDPROC
  480 :
  490 :
  500 DEF PROCenter_data
  510 :
  520 field=1
  530 REPEAT
  540 PRINTcurpos$(field);
  550 test$(field) = FNedit(test$(field)
, max(field), type(field))
  560 IF UP field=field-1 ELSE field=fie
ld+1
  570 IF field=0 field=4
  580 IF field=5 field=1
  590 UNTIL QUIT
  600 :
  610 PRINTTAB(2,12)"Demonstration compl
eted"
  620 ENDPROC
  630 :
```

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The **set up** procedure sets the cursor address, maximum length and data type for each of the four fields we will be entering. Note the way cursor addresses are stored in a string array, 'curpos$()'. You will see in line 540 that this makes it very simple to position the cursor correctly for each field.

The **draw screen** procedure prints a simple screen layout. The statements must be copied accurately to ensure the cursor addresses given for each field fit the screen display correctly.

The **enter data** procedure allows you to repeatedly edit a screen of data until you are satisfied it is correct. Selecting QUIT by pressing [f0] will finish with the array 'test$', containing whatever appears on screen.

Lines 560 to 580 work out which field is to be edited next. If the Cursor up key was pressed, this means the previous field, otherwise the next field on. The previous field to field one is interpreted as being the last field, and the next field on from the last field is taken to be field one. The process repeats until the QUIT control key is pressed.

How it works

The function makes use of the string and byte indirection operators in BBC Basic to maintain an up-to-date version of the string being edited in a buffer.

Line 710 ensures the string is no longer than the maximum length specified, and then pads with spaces to the maximum length.

Line 720 initialises a pointer to the current position in the buffer PS to the start of the buffer, and sets Fb to the last place in the buffer available for use. The string for editing is then placed in the buffer.

Each press of a key is picked up in line 750, and the lines between 760 and 870 are where the key is checked and the appropriate action is selected.

The function is always left through lines 890 to 940, where any trailing spaces are stripped before returning the present string in the editing buffer as the result.

The procedures that follow have various tasks.

PROCi inserts a space at the current position (as given by PS) and moves any character after this position along by one, unless the cursor is at the end of the string. It then calls another procedure to print the amended buffer.

PROCd deletes the character at the cursor position, moves any characters after this back by one, inserts a blank at the end of the string and calls the procedure to print the amended buffer.

PROCl and PROCr move the cursor left or right, and adjust the pointer in the buffer PS accordingly. Checks are made to avoid the cursor moving out of the field.

PROCs restores the cursor to the start of the string being edited.

PROCp prints the string from the present cursor position to the end of the string, and then puts the cursor back where it was.

PROCo outputs a character to the screen. Any character at the present position is overwritten. If not at the end of the string, the cursor is advanced one space and the pointer is updated. It is here that a check is made to see if the character is within the limits specified in the type parameter of the function.

It is possible to add your own extensions to this program. Extra special key functions, such as a Help key, could be defined. This could be checked for in a re-write of line 760 to make this recognise the new control key. A new line, say at 905, would then check to see if the Help key had caused the exit from the routine, and set a variable HELP to TRUE or FALSE accordingly, rather like line 900 sets the variable QUIT. The program calling FNedit could then check the variable HELP to see whether to display help information or not.

New types of character checking could be added to PROCo. This could be done using line 1200 as a model.

Listing (cont)

```
  640 REM  End of demonstration part of
 program
  650 :
  660 :
  670 DEF FNedit(S$,ML,TYP)
  680 LOCAL L,C,Ps,Fb
  690 VDU 23;10,&60,0;0;0; :REM Select b
 lock cursor
  700 *FX4,1
  710 S$=LEFT$(S$,ML):L=LEN(S$):S$=S$+ST
 RING$(ML-L," ")
  720 Ps=Eb:Fb=Eb+ML-1: $Eb=S$
  730 PROCp($Eb)
  740 :
  750 P=GET
  760 IF P=13 OR P=138 OR P=17 UP=FALSE:
 GOTO 890
  770 IF P=3 PROCs:$Eb=STRING$(ML," "):P
 s=Eb:GOTO730
  780 IF P=8 PROC1:PROCd:GOTO750
  790 IF P=9 PROCi:GOTO750
  800 IF P=18 PROCs:GOTO720
  810 IF P=127 PROCd:GOTO750
  820 IF P=136 PROC1:GOTO750
  830 IF P=137 PROCr:GOTO750
  840 IF P=139 UP=TRUE:GOTO 890
  850 IF P<32 OR P>126 VDU 7:GOTO750
  860 PROCo(P)
  870 GOTO 750
  880 :
  890 PROCs
  900 IF P=17 QUIT=TRUE ELSE QUIT=FALSE
  910 IF ?Fb=32 ?Fb=13:Fb=Fb-1:GOTO 910:
 REM Trim trailing spaces
  920 VDU 23;10,&67,0;0;0; :REM Restore
 underline cursor
  930 *FX 4,0
  940 =$Eb
  950 :
  960 DEF PROCi
  970 IF Ps=Fb VDU7:ENDPROC
  980 FOR C=Fb TO Ps+1 STEP-1:?C=C?-1:NE
XT:?Ps=32:PROCp($Ps):ENDPROC
  990 :
 1000 DEF PROCd
 1010 FOR C=Ps TO Fb-1:?C=C?1:NEXT:?Fb=3
2:PROCp($Ps):ENDPROC
 1020 :
 1030 DEF PROCl
 1040 IF Ps=Eb ENDPROC
 1050 VDU8:Ps=Ps-1:ENDPROC
 1060 :
 1070 DEF PROCr
 1080 IF Ps=Fb ENDPROC
 1090 VDU9:Ps=Ps+1:ENDPROC
 1100 :
 1110 DEF PROCs
 1120 IF Ps=Eb ENDPROC
 1130 FOR C=Eb TO Ps-1:VDU 8:NEXT:ENDPRO
C
 1140 :
 1150 DEF PROCp(b$)
 1160 L=LEN(b$):PRINTb$;STRING$(L,CHR$8)
;:ENDPROC
 1170 :
 1180 DEF PROCo(P)
 1190 IF (TYP=1 OR TYP=4) AND P>96 AND P
<123 THEN P=P-32
 1200 IF TYP=2 AND INSTR("0123456789.+-"
,CHR$P)=0 VDU7:ENDPROC
 1210 IF (TYP=3 OR TYP=4) AND ((P AND223
)<65 OR (P AND223)>90) AND P<>32 VDU7:EN
DPROC
 1220 VDU P:?Ps=P
 1230 IF Ps=Fb VDU 8 ELSE Ps=Ps+1
 1240 ENDPROC
```

MAKING TASWORD COUNT

Mike Lewis adds a professional touch to Tasword by adding word count and paged format routines.

The combination of a Spectrum, Microdrive and Tasword II offers just about the cheapest usable word processing setup available. Tasword II is a very good example of a word processing system on a small computer. However, as with any budget version software, it does have its problems.

The first of these is the lack of a word count facility. Articles for magazines, for example, are generally paid for by the word, rather than by the page. It is therefore vital to have a rough check of the length of an article.

I overcame this problem by adding a word count estimation routine to Tasword. My initial attempt was in Basic, but this proved far too slow for all but the very shortest of text. Therefore, I use a very simple and inelegant machine code routine. It is not totally accurate, and could no doubt be improved. It does, however, have one redeeming factor. It works.

The routine is stored in the printer buffer, as this is the only place I can find where it will not interfere with Tasword's operation. However, this means that if you use the Tasword find/replace option you will have to reload the word count code, as this routine uses the printer buffer during its comparison.

Listing 1 gives the assembly language code for the routine. If you don't have access to an assembler, then Listing 3 may be used to create the object code. In both cases, once the object code has been compiled or loaded, it can be saved to tape or Microdrive by the command:

SAVE "wcount" CODE 28296,52 (or Microdrive equvalent).

This having been done, you must now amend Tasword itself. Do this by entering Basic, and then typing in the lines given in Listing 2.

Now RUN Tasword once again and save the amended copy using the SAVE Tasword option "t".

Save a copy of the word count object code on the tape after Tasword, or on the same Microdrive cartridge. Note that the lines given in Listing 2 assume that you are using Microdrives with Tasword — you will have to make very slight amendments for use with tape.

The word count routine works by counting all the spaces which are preceded by a non-space. This gives an approximate number of words — an adjustment is then made due to the fact that Tasword stores lines justified, and thus a word at the end of one line will run into the first word on the next line. This means that the number of lines divided by two must be added to give a more accurate total. The error rate by this method is less than one word in 100 for most files — though it does depend on the number of blank lines present.

It is accessed by pressing symbol shift and STOP, as with the other functions. You then press 'w'. There will be a short pause and then the word count is displayed. Pressing any key takes you back to the command screen.

The other major omission from Tasword is a facility to produce output with headed pages and page numbers. As manuscript format requires this, I have written a short Basic program which will list out a Tasword file in a paged format (Listing 4).

The program assumes that the first line in the Tasword file is the header, and that it contains a page number at the end of that line. The file is listed in pages consisting of a header and 30 lines of double spaced copy. The program outputs a form feed to reach the top on the next page.

Due to the routine being in Basic it is slow, as it has to create each line as a string before LPRINTing it. However, as this listing only has to be done once — for a final manuscript copy of an article — it is not too much of an inconvenience.

Listing 1

```
 10          ORG  23296
 20          LD   HL,32000
 30          LD   BC,(COUNT)
 40 START
 50          LD   A,(HL)
 60          CP   32
 70          JP   NZ,START1
 80          LD   A,(LAST)
 90          CP   32
100          JP   Z,START1
110          INC  BC
120 START1
130          LD   A,(HL)
140          LD   (LAST),A
150          INC  HL
160          LD   A,(LENGTH)
165          CP   L
170          JP   NZ,START
175          LD   A,(LEN2)
180          CP   H
185          JP   NZ,START
186          LD   A,C
187          LD   (COUNT),A
188          LD   A,B
189          LD   (COUNT2),A
190          RET
195 LENGTH   DEFB 0
197 LEN2     DEFB 0
200 LAST     DEFB 0
205 COUNT    DEFB 0
210 COUNT2   DEFB 0
```

Listing 2

```
  15 POKE 23609,2: CLEAR 31999: GO SUB 4000: LOAD *"m";1;"tasword"CODE :
LOAD *" m";1;"wcount"CODE : LET a=USR 59081: GO TO 5
  85 IF a$="w" OR a$="W" THEN  GO TO 5100
5100 CLS : LET z0=23296: REM address of wordcount routine
5110 LET a0=a+32000: REM end of text file
5120 LIST y0=INT (a0/256): LET y1=(a0/256-y0)*256
5130 POKE z0+49,y1: POKE z0+50,y0: REM poke text file end address into
routine.
5135 RANDOMIZE USR z0
5140 PRINT "Word Count=";INT (PEEK (z0+52)+PEEK (z0+53)*256+a/128)
5150 IF INKEY$="" THEN  GO TO 5150
5155 CLS : GO TO 25
```

Listing 3

```
  10 FOR i=23296 TO 23348
  20 READ a: POKE i,a
  30 NEXT i
  40 DATA 33,0,125,1,0,0,126,254,32,194,21,91,58,51,91,254,32,202,21,91,3,
126,50,51,91,35
  50 DATA 58,49,91,189,194,6,91,58,50,91,188,194,6,91,121,50,52,91,120,50,
53,91,201,0,0,0,0
```

Listing 4

```
  10 INPUT "file ";f$: LOAD *"m";1;f$CODE 32000
  20 LET h$="": FOR i=32000 TO 32063: LET h$=h$+CHR$ (PEEK i): NEXT i
  30 LET l=32000+(PEEK 23733+PEEK 23734*256)
  35 LET pn=1: LET p$="1"
  40 FOR i=32064 TO l STEP 1920
  50 LPRINT "              ";h$
  60 FOR j=i TO i+1856 STEP 64: LET a$="              ": FOR k=0 TO 63: LET
a$=a$+CHR$ (PEEK (j+k)): NEXT k: LPRINT : LPRINT a$: NEXT j
  70 LET pn=pn+1: LET p$=STR$ pn+"    ": LET h$(62 TO 64)=p$: LPRINT
CHR$ 12: NEXT i
```

ONE UP ON THE OTHERS?

The QL-based One Per Desk is designed to be the one and only piece of equipment you need. Geof Wheelwright gave it desk space.

What behaves like a Sinclair QL, costs close to £1,500 and does everything from answer the phone to sort your database?

The answer is ICL's QL-based OPD (One Per Desk) system. It will probably have already hit the front pages when you read this, but the headlines may not tell the whole story. That story includes a number of 'firsts' for mass-produced micros and some clever solutions to the QL's less-beloved features.

But first the 'firsts':

- The first British-built mass-produced micro to have a built-in telephone and modem.
- The first non-Sinclair computer to use Microdrives.
- The first major business computer hardware announcement in some time that doesn't use disk drives or offer any measure of IBM or MSDOS compatibility.
- The first sub-£2,000 mass-production business machine to offer full-specification built-in software in ROM (the Commodore Plus/4 software doesn't count).

Doubtless others will find more firsts to add to this list and others will disagree with some of the items in it. But it's also certain the OPD will find itself numbered among 'important machines' of 1984.

First impressions

I was immediately impressed by the scope and specification of this machine (although how far those specs go to making a business machine is another matter).

In a box about the size of a Commodore 64, you get a 68008-based machine, the full Psion *Xchange* software suite in ROM, a telephone, an auto-dial/auto-answer modem, two Microdrives, full terminal software in ROM, a speech synthesis system which can be used to answer phone calls, a monochrome display about the size and resolution of the Apple IIc (well, slightly larger — about 9in), CMOS RAM for storing phone numbers, an operating system which configures part of the 128K memory as a 'RAM-disk' and a real keyboard which doubles as a telephone dialler.

The system also claims to be fully multi-tasking. So, it not only constantly listens to the phone line and alerts you on screen when calls come in, but also allows print-spooling and other multi-tasking operations.

Keyboard

The keyboard is the first noticeable major departure from the QL configuration (aside from the telephone, the Microdrives sitting above the keyboard, the existence of ten function keys, the inclusion of a screen . . .). The keyboard is light to the touch and has a very 'positive' feel, reminiscent of the Olivetti M24.

My only real quibble with the keyboard design is the doubling-up of the function keys and the numeric keypad. Whenever you want to access a function-key you must hit the function-key 'shift' at the bottom right-hand side of the main keyboard cluster.

It would perhaps have been easier if

The QL-based One Per Desk machine from ICL — the answer to the British market's dreams or a sacrifice on the IBM compatible altar?

Opposite: the machine in action.

this 'shifting key' could have been lockable, so you could stay in function-key mode when you needed the function keys.

Storage

Storage is provided by the Sinclair Microdrives, making their appearance for the first time outside a Sinclair black box. The Microdrives are making that appearance without the QL's QDOS — ICL has rewritten the operating system to be easier to use and (it claims) more reliable. That reliability is a trade-off against speed — the ICL drives are reportedly slower than their QL counterparts.

The ease of use is demonstrated in the differences in Microdrive access syntax. To access the QL drives, you refer to them as 'mdv1—' or 'mdv2—', while the ICL versions use 'l:' or 'r:' for the left and right drives.

This change in syntax and operating system means the OPD will not be able to read formatted QL Microdrive cartridges, although it will be able to share unformatted blank QL and Spectrum Microdrive cartridges. The apparent slower access times on the ICL system could turn out to be pretty incidental due to the way the software and the RAM are handled — as a 'RAM-disk' of 50K or more.

The 'RAM-disk' facility in the operating system enables you to establish RAM-files in the same way as you would establish disk or Microdrive files and this feature really comes into its own with the Psion *Xchange* software.

Software

While it looks and acts much like the four software packages that make up the QL's bundled offering (*Quill, Abacus, Easel* and *Archive*), the *Xchange* software is of a different ilk.

First, *Xchange* has a 'task menu' which controls which packages you're using at any one time and allows you to swap data between them quickly and easily. That facility was useful — if a bit cumbersome — in its disk-based form on the IBM PC version of *Xchange* but in ROM it's lightning fast.

When *Xchange* boots up (if anything that's in ROM can ever be said to boot up) you can choose which package you want to use from a menu. The choice made, *Xchange* prompts you for a name for that task and a RAM-file is created — into which all the data that follows is stored. To switch tasks, you hit Function Key 6 and Escape and you're back at the main menu and ready to open another task and its associated RAM file.

As there's about 50K or so to play with (once various bits and pieces have been loaded into RAM — including the screen-resolution routines) and all the software in ROM, most people should be able to work with RAM-files all day before they have to look at saving anything to Microdrive. Then they'll find that a bulk-saving routine has been written to sequentially save all the RAM-files with one command.

So with the *Xchange* software in ROM and the tremendous capacity provided by the RAM-disk, any slowness in the Microdrive access times should be largely irrelevant.

The telephone is about the most sophisticated you're likely to see. Not only can you use the built-in phone in the OPD at any time to make phone calls, but you can also store a library of numbers and have the machine dial them for you — and continue working.

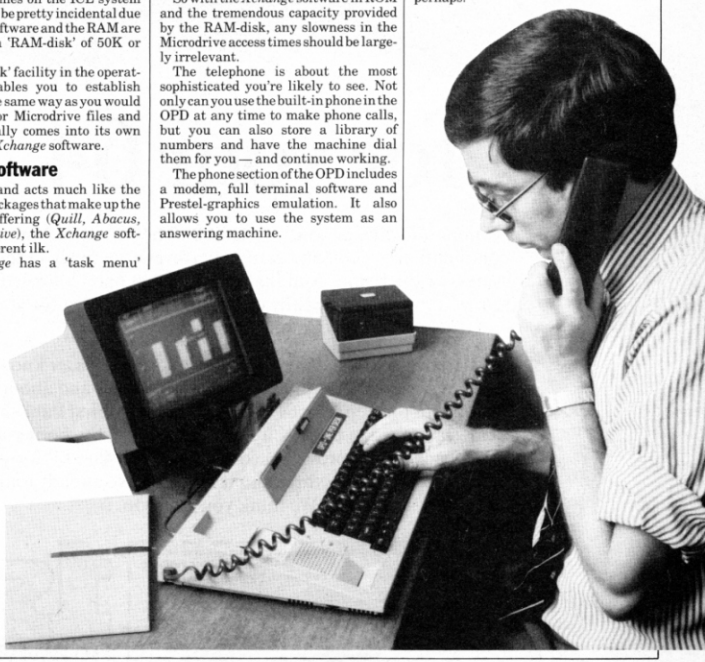
The phone section of the OPD includes a modem, full terminal software and Prestel-graphics emulation. It also allows you to use the system as an answering machine.

Verdict

It is non-compatibility with IBM which may prove to be the sticking point with this British 'dream-machine'. While the most has been made of the processing power of Motorola's cut-down wonder-chip and the integration of phone, software and computer hardware is excellent, the OPD doesn't run MSDOS. Neither does it have disk drives — much less IBM-compatible ones.

It may well be that ICL can sell the OPD in big numbers as a 'personal productivity tool' which may complement the IBM PCs a company already has or plans to buy. But buyers should remember that unless ICL can massively convert the business software market to write for the OPD and write on Microdrives, there isn't going to be much more software available than now.

The Psion *Xchange* software is good — and in its ROM form I would venture to say it borders on the excellent — but it is horizontal, general purpose software. Where does that leave the OPD user who needs something more specific? Reaching for his IBM/ACT/Olivetti, perhaps.



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AMSTRAD A LA MODE

Split up your Amstrad screen and speed up the entry of commonly used keywords. The utility is under 800 bytes long and as Simon Williams says, it's a small overhead in memory terms.

The Amstrad CPC464 is possibly the first home computer on which it is possible to edit programs using an 80 column display mode on the basic machine. The BBC micro can display to this resolution, but unless you have invested in a monitor, the result is something less than readable.

The Amstrad sports a monochrome monitor which is up to the standard of most good examples and even the colour version is quite usable if you select your display colours wisely.

To take full advantage of this mode, and provide an additional aid to programming, the following utility will speed entry of several commonly used keywords and offer the facility of splitting the screen into three independent text screens. These may be used, for instance, to list a section of main program plus two subroutines. This will speed program development considerably.

The utility is intended as a subroutine which is merged with the program under development and thereafter saved and loaded together with it. It is under 800 bytes long and therefore represents a small overhead in memory terms. It is structured as follows:

The screen is set up in Mode 2 (80 columns, two colours) to display bright green on black. This combination gives good contrast, but if you have your own favourite colour scheme, this is easily changed by altering the two INK commands in line 40000.

The ten numeric keys in the keypad are set up to provide the required functions, and these are displayed continuously in a strip along the top of the screen. The display is divided into three section, the left-hand one being 40 × 25, with each of the other two extending to 39 × 11. This means that the large window is almost equivalent to the area of a full Mode 1 screen, with the others available as half size additions.

The only variables used in the routines are z, zz and z$. These were selected because they are unlikely choices for variables in the main program, but they could be changed if there is a conflict.

One difficulty encountered when producing the utility was the property of the user keys to print the contents before executing them. This wasted a couple of lines in each window when swapping between them. It was finally overcome with the control codes in line 40178.

After typing in the listing, which is short thanks to the facilities of Locomotive Basic, it should be called by typing GOSUB 40000. The keys of the numeric pad will then be automatically set up and the display may be called up after that by pressing 0. The definitions will stay intact until CONTROL-SHIFT-ESCAPE is pressed, the machine is switched off or the keys are deliberately redefined. Keys one to nine peform the following functions:

Key 1 moves the cursor to window one in the left-hand half of the screen. The 'Ready' prompt and block cursor will show below any text already present in the window.

Key 2 moves to the top right-hand window (window two).

Key 3 moves to the bottom right hand window (window three).

Key 4 clears the currently selected window.

Key 5 displays the keyword LIST. If followed by ENTER, the whole program will be listed. Alternatively, line numbers may be inserted as parameters.

Key 6 displays the keyword AUTO, which may again be used with or without parameters (start line and increment).

Key 7 displays the keyword RENUMBER, to which parameters will need to be added (start line, increment begin and end lines of source block).

Key 8 displays the keyword EDIT, to which the required line number will need to be added.

Key 9 runs the program under development.

These main keywords could be extended by using one of the keys to toggle between two sections of code providing different options. The main restriction is the rather meagre 120 characters total for all the strings used in the key definitions. This would still leave the total length of the program comfortably under the 1K mark. It is left to you to develop the system to suit you

Listing 1

```
40000 INK 0,0:INK 1,18:PAPER 1:PEN 0:MOD
E 2:CLS
40010 RESTORE:FOR z=0 TO 9
40020 LOCATE z*8+2,1:PRINT"key";z;
40030 LOCATE z*8+2,2:READ z$:PRINT z$;
40040 DATA set up,win 1,win 2,win 3,CLS,
LIST n,AUTO n,RENUM n,EDIT n,RUN
40050 NEXT:PAPER 0:PEN 1
40060 WINDOW #2,42,80,15,25:CLS#2
40070 WINDOW #1,42,80,3,13:CLS#1
40080 WINDOW 1,40,3,25:CLS:z=0
40090 KEY 128,"GOSUB 40000"+CHR$(13)
40100 KEY 129,"zz=0:GOSUB 40170"+CHR$(13
40110 KEY 130,"zz=1:GOSUB 40170"+CHR$(13)
40120 KEY 131."zz=2:GOSUB 40170"+CHR$(13)
40130 KEY 132,"CLS"+CHR$(13):KEY 133,"LI
ST "
40140 KEY 134,"AUTO ":KEY 135,"RENUMBER"
40150 KEY 136,"EDIT ":KEY 137,"RUN"+CHR$
(13)
40160 RETURN
40170 PRINT CHR$(11);CHR$(18);CHR$(11)
40180 WINDOW SWAP z,0: WINDOW SWAP 0,zz
40190 z=zz:RETURN
```

PROCESSOR PRO

Key in the second half of Stuart Nicholls' word processing listing and create a semi-professional routine.

Listing 2 (cont)

```
2970 LET CC=C
2975 IF CC<>0 THEN  PRINT AT 0,0
;: FOR A=1 TO 24: PRINT  OVER 1;
 BRIGHT 0;S$(I TO CC-I): NEXT A:
 PRINT AT L,C;
2976 RETURN
3000 PRINT AT 23,0;"■ Line     /C
ol.    ■ Top Line     ■ W/Wrap
     ■";
3005 IF C$="_" THEN  PRINT " Nor
mal mode ■"
3006 IF C$=CHR$ 143 THEN  PRINT
 " Insert mode ■"
3007 PRINT AT 23,7;PI;AT 23,16;C
 ;1+I;AT 23,32;PS;: IF WW THEN  PRI
NT AT 23,45;"ON";
3008 IF NOT WW THEN  PRINT AT 23
,45;"OFF";
3010 IF INKEY$<>"" THEN  GO TO 3
010
3020 PRINT AT 23,0;A$(PE);AT 1,C
;: RETURN
3500 PRINT CHR$ 3;: LET ERR=PEEK
 23613+256*PEEK 23614: POKE ERR,
BAS1: POKE ERR+1,BAS1
3600 BRIGHT 1: PRINT AT 0,0;: FO
R A=PS TO PE: PRINT A$(A);: NEXT
 A
3603 IF SL>=PS AND SL<=PE THEN
PRINT  OVER 1;AT SL-PS,SC;"■";
3605 IF FL>=PS AND FL<=PE THEN
PRINT  OVER 1;AT FL-PS,FC;"■";
3610 GO SUB 2975: BRIGHT 0: BEEP
 .01,20: PRINT  FLASH 1; OVER 1;
AT L,C;S$
3620 PAUSE 25: BEEP .05,30: PRIN
T  FLASH 0; OVER 1;AT 1,0;S$
3630 PRINT AT L,C;: RETURN
3700 IF SL>=PS AND SL<=PE THEN
PRINT  OVER 1;AT SL-PS,SC;"■";
3710 IF FL>=PS AND FL<=PE THEN
PRINT  OVER 1;AT FL-PS,FC;"■";
3720 PRINT AT L,C;: RETURN
4000 IF C<64 THEN  LET A$(PL,C+I
)=I$: GO TO 4040
4010 GO SUB 2600: IF NOT WW THEN
  LET A$(PL,CC+I)=I$: GO TO 4040
4015 IF I$="  " THEN  RETURN
4020 GO SUB 4500
4040 PRINT I$;: IF NOT SL AND NO
T FL THEN  RETURN
4050 IF SL=PL AND SC=C THEN  PRI
NT  OVER 1;AT L,C;"■";1: RETURN
4060 IF FL=PL AND FC=C THEN  PRI
NT  OVER 1;AT L,C;"■";1: RETURN
4070 RETURN
4500 FOR A=64 TO CC+I STEP -1: I
F A$(PL-1,A)<>" " THEN  NEXT A
4510 IF A<CC OR A=64 THEN  LET A
$(PL,CC+I)=I$: RETURN
4520 LET A$(PL,CC+I TO 65+CC-A)=
A$(PL-1,A+1 TO )+I$: LET A$(PL-1
,A+1 TO )=S$: PRINT  OVER 1;AT L
-1,A;A$(PL,CC+1 TO 64+CC-A);  OVE
R 0;AT L,CC;A$(PL,CC+1 TO 64+CC-
A);: RETURN
5000 LET X$="LOAD": LET R=5007
5005 LET R$="NOTE:This mode will
 delete any existing text": GO T
O 7500
5007 LET A=USR 63420
5008 LET S=0
5010 INPUT "Document name ";D$
5020 PRINT AT 14,0;"Document nam
e ";D$
5030 PRINT AT 15,20;"START THE T
APE"
5040 IF NOT S THEN  LOAD D$CODE
: GO TO 5045
5042 LOAD D$CODE S
5045 PRINT AT 17,20; FLASH 1;"ST
OP THE TAPE"
5050 LET PL=I: LET PS=I: LET PE=
24: LET L=0: LET C=0: GO TO 3500
5500 LET X$=" MERGE ": LET R=551
0: LET R$="MERGE will be from bl
ock START. If block START is not
 set then  MERGE will be as SAVE
D. Please ensure that line 400 i
s NOT       exceeded."
5505 GO TO 7500
5515 IF SL=0 THEN  LET S=0: GO T
O 5810
5520 LET S=VAR+(SL-I)*64+SC: GO
TO 5810
6000 LET X$="SAVE": LET R=6004
6002 LET R$="You may save ALL yo
ur document OR a set BLOCK."
6003 GO TO 7500
6004 INPUT "Document name ";D$
6007 PRINT AT 15,0;"Document nam
e ";D$
6008 PRINT "(A)ll or (B)lock ":
LET Q$=CHR$ USR 64471
6009 IF Q$="A" OR Q$="a" THEN  L
ET ST=VAR: LET LEN=USR 63399: GO
 TO 6030
6010 IF Q$="B" OR Q$="b" THEN  G
O TO 6020
6015 GO TO 6008
6020 IF SL=0 OR FL=0 OR SL>FL TH
EN  GO TO 3500
6025 LET ST=VAR+(SL-I)*64+SC
6027 LET LEN=VAR+(FL-I)*64+FC+I-
ST
6030 SAVE D$CODE ST,LEN
6040 PRINT " VERIFY ?<Y><N>"
6045 LET I$=CHR$ USR 64471
6050 IF I$="Y" OR I$="y" THEN  G
O TO 6070
6060 IF I$="N" OR I$="n" THEN  G
O TO 3500
6065 GO TO 6045
6070 PRINT "Rewind then PLAY the
 TAPE"
6075 VERIFY D$CODE : PRINT " VER
IFY OK, Please wait": PAUSE 100:
 GO TO 3500
6500 INPUT "WORD ? ";F$
6510 LET E=USR 63399: LET E=INT
(E/64)+(INT (E/64)<>(E<0)64))
6520 LET W=C+I: IF PL>E THEN  GO
 TO 6580
6530 FOR A=PL TO E: LET W=I: LET
 X=I
6535 IF A$(A)=S$ THEN  NEXT A: G
O TO 6580
6540 FOR W=X TO 64: IF A$(A,W)="
 " THEN  NEXT W: NEXT A: GO TO 6
580
6550 FOR X=W TO 64: IF A$(A,X)<>
" " THEN  NEXT X
6560 IF F$=A$(A,W TO X-1) THEN
GO TO 6580
6570 GO TO 6540
6580 PRINT  PAPER 7; BRIGHT 1; O
VER 1;AT 22,0;S$;S$;: LET PL=A:
LET I=12: LET C=W-1: GO TO 9610
7000 LET X$="PRINT": LET R=7008
7005 IF PEEK (AA+16)=251 THEN  L
ET R$="2X printer MODE"
7006 IF PEEK (AA+16)<>251 THEN
LET R$="Ensure PRINTER is ON LIN
E"
7007 GO TO 7500
7008 INPUT "Line spacing ";ST
7010 PRINT AT 15,0;"(A)ll or (B)
lock": LET Q$=CHR$ USR 64471
7015 IF Q$="A" OR Q$="a" THEN  L
ET S=1: LET E=USR 63399: LET E=I
NT (E/64)+(INT (E/64)<>(E/64)):
GO TO 7050
7016 IF Q$="B" OR Q$="b" THEN  G
O TO 7020
7017 GO TO 7010
7020 IF FL=0 OR SL=0 OR SL>FL TH
EN  GO TO 3500
7025 IF SL=FL THEN  LPRINT S$( T
O SC);A$(SL,SC+1 TO FC+1): GO TO
 3500
7030 FOR A=SL TO FL
7035 IF A=SL THEN  LPRINT S$( TO
 SC);A$(A,SC+1 TO );: GO TO 7047
7040 IF A=FL THEN  LPRINT A$(A,
TO FC+1);: GO TO 7047
7045 LPRINT A$(A);
7047 FOR B=1 TO ST: LPRINT : NEX
T B: NEXT A: GO TO 3500
7050 FOR A=S TO E: LPRINT A$(A);
: FOR B=1 TO ST: LPRINT : NEXT B
: NEXT A
7060 GO TO 3500
7500 PRINT CHR$ 3;: PRINT AT 2,2
1; FLASH 1;" *|X%|* MODE "
7510 PRINT AT 4,20;"(Y) to CONTI
NUE";AT 6,20;"(N) to   RETURN"
7515 PRINT AT 8,0;R$
7520 LET I$=CHR$ USR 64471
7530 IF I$="n" OR I$="N" THEN  G
O TO 3500
7540 IF I$="Y" OR I$="y" THEN  G
O TO R
7550 GO TO 7520
8000 LET HI=INT (PL/256): LET LO
=PL-HI*256: POKE 63298,LO: POKE
63299,HI: RETURN
8300 IF C<63 THEN  LET A$(PL,C+1
 TO )=" "+A$(PL,C+1 TO 63): GO S
UB 1850
8310 IF C<64 THEN  GO TO 4000
8320 GO SUB 2600: GO SUB 8500: I
F NOT WW THEN  LET A$(PL,I)=I$:
GO TO 4030
8325 IF I$=" " THEN  RETURN
8330 GO TO 4020
8500 IF PL=400 THEN  RETURN
8505 GO SUB 8000: LET A=USR 6327
9: IF SL>=PL THEN  LET SL=SL+(SL
<>0)
8507 IF FL>=PL THEN  LET FL=FL+(
FL<>0)
8508 GO TO 8530
8510 GO SUB 8000: LET A=USR 6326
5: IF SL>=PL THEN  LET SL=SL-(SL
<>0)
8515 IF FL>=PL THEN  LET FL=FL-(
FL<>0)
8530 PRINT AT L,0;
8540 FOR B=PL TO PE: PRINT  BRIG
HT 8;A$(B);: NEXT B
8545 IF SL>400 THEN  LET SL=0: L
ET SC=0
8547 IF FL>400 THEN  LET FL=0: L
ET FC=0
8550 IF SL>=PL AND SL<=PE THEN
PRINT  OVER 1;AT SL-PS,SC;"■";
8560 IF FL>=PL AND FL<=PE THEN
PRINT  OVER 1;AT FL-PS,FC;"■";
8570 PRINT AT L,C;: RETURN
9500 LET PL=I: LET PS=I: LET PE=
24: LET L=0: LET C=0: GO TO 3600
9600 LET Z=USR 63399: LET PL=INT
 (Z/64)+(Z<64*PL): LET PL=PL+1-(
Z<64): LET C=Z-64*PL: LET PL=PL
+1: LET C=C-(C<>0): IF C=-1 THE
N  LET C=63: LET PL=PL-(PL<>1)
9610 LET PS=PL-L: IF PS<1 THEN
LET PS=1: LET L=PL-PS
9620 LET PE=PS+23: IF PE>400 THE
N  LET PE=400: LET PS=377: LET L
=PL-PS
9630 GO TO 3600
9700 IF PS=1 THEN  RETURN
9710 LET PS=PS-24: IF PS<1 THEN
 LET PS=1
9720 LET PE=PS+23: LET PL=PS+L:
GO TO 3600
9800 IF PE=400 THEN  RETURN
9810 LET PE=PE+24: IF PE>400 THE
N  LET PE=400
9820 LET PS=PE-23: LET PL=PS+L:
GO TO 3600
9900 LET X$=" DELETE": LET R=991
0: LET R$="": GO TO 7500
9910 LET A=USR 63420: GO TO 9500
9990 CLEAR 63264: LOAD ""CODE :
GO TO 10
9999 SAVE "SPECWORD" LINE 9990:
SAVE "Specword"CODE 63265,2271
```

ONES + TENS

Renumber small units to separate subroutines from your BBC programs with these routines from D Pilling.

You're nearing completion of a program on your BBC. Now you want to separate the lines containing subroutines from the main program by a few hundred lines, which is where the powerful BBC Basic RENUMBER command comes in. Except that you can specify only the start line and the step and the whole program gets renumbered in one go. What you really need is a selective renumbering program.

Ideally, any new renumbering program should be contained on one of the user defined keys rather than a vast Basic program which must be loaded in every time it's needed.

The main program sets up function key f0 as just such a selective renumbering procedure.

To set the function key definition up, type in Listing 1, then save the program and run it. Take care not to change the numbering of the lines. If everything is correct f0 should now do a selective renumber. The soft key definitions use up 224 of the maximum 239 characters that the soft key buffer can hold, so don't add extra spaces to the program. Once you have a working function key definition, it can be saved by typing *SAVE KEYDEF B00 C00. In future, the selective renumber definition can be set up by simply *LOADing this file. This doesn't affect the program in the computer.

To use

First, press f0. Several lines of what appear to be random characters appear on the screen; under them will be a question mark; the Basic INPUT prompt. You must now enter three numbers separated by commas. First, the line number where renumbering is to start in the program; second, the new value for this line number and last, the step to be used in renumbering. The program is renumbered from the line specified to the end. The correct combination of such renumbers means any desired pattern of numbers in the program is possible.

To pack all the necessary Basic commands into the soft keys, Basic tokens must be used in their definition. The program in Listing 1 is in two parts to make this simple. The first consists of lines 20 to 140. Lines 20 to 130 are the definition of f0 and line 140 is the definition of f1.

The second part of the program (line 10 and lines 150 to 300) examines the memory used to store the first part of the program and then uses the OSCLI call to program f0 and f1 with the correct strings. So, the function key definitions are indeed in terms of tokens.

Selective renumbering

When you press f0, a search of the program is carried out to find the line where renumbering is to start (lines 50 to 80). When this is discovered, B% is set to the difference in bytes between the address of the start of the line number and the page boundary.

The FOR loop (line 100) then moves the program upwards until the line begins on a page boundary. Then PAGE is reset (line 110) and a string for the appropriate RENUMBER command is constructed. This is then put into the keyboard buffer in line 120 using OSBYTE with A 138. The effect is to renumber only the section of the program above the new value of PAGE. The last character in the string, CHR$129 causes f1 to execute and this is set up to move the program back down to its original position (line 140).

If the line number selected for the start of renumbering does not exist, the renumbering process will go ahead with no harm. However, if you press Escape in the middle of renumbering you will probably destroy your program.

Listing 1

```
  10 GOTO 150
  20T%=TOP:P%=PAGE
  30INPUTZ%,F%,G%
  40X%=P%
  50REPEAT
  60X%=X%+X%?3
  70L%=256*X%?1+X%?2
  80UNTILL%=Z%ORX%?1=255
  90B%=256-X%MOD256
 100FORI%=T%TOP%STEP-1:B%?I%=?I%:NEXT
 110PAGE=X%+B%:LOMEM=T%+B%
 120A$="REN."+STR$F%+","+STR$G%+CHR$13+
CHR$129
 130A%=138:X%=0:FORI%=1TOLENA$:Y%=ASCMI
D$(A$,I%,1):CALL&FFF4:NEXT
 140FORI%=P% TO T%:?I%=B%?I%:NEXT:PAGE=
P%
 150Z%=PAGE:Z%=Z%+Z%?3
 160*FX18
 170DIMOS%300:A$=""
 180REPEAT
 190L%=256*Z%?1+Z%?2
 200IFL%=140THEN230
 210A$=A$+$(Z%+4)+";"
 220Z%=Z%+Z%?3
 230UNTILL%=140
 240CLI=&FFF7
 250$OS%="KEY 0 "+A$+"|M"
 260X%=OS%MOD256:Y%=OS%DIV256
 270CALLCLI
 280A$=$(Z%+4)
 290$OS%="KEY 1 "+A$+"|M"
 300CALLCLI
 310END
```

The main program listing for selective renumbering.

Listing 2

```
  10 GOTO 150
  20T%=TOP:P%=PAGE
  30INPUTZ%,F%,G%
  40X%=P%
  50REPEAT
  60X%=X%+X%?3
  70L%=256*X%?1+X%?2
  80UNTILL%=Z%ORX%?1=255
  90B%=256-X%MOD256
10000FORI%=T%TOP%STEP-1:B%?I%=?I%:NEXT
10001PAGE=X%+B%:LOMEM=T%+B%
10002A$="REN."+STR$F%+","+STR$G%+CHR$13+
CHR$129
10003A%=138:X%=0:FORI%=1TOLENA$:Y%=ASCMI
D$(A$,I%,1):CALL&FFF4:NEXT
10004FORI%=P% TO T%:?I%=B%?I%:NEXT:PAGE=
P%
10005Z%=PAGE:Z%=Z%+Z%?3
10006*FX18
10007DIMOS%300:A$=""
10008REPEAT
10009L%=256*Z%?1+Z%?2
10010IFL%=140THEN10013
10011A$=A$+$(Z%+4)+";"
10012Z%=Z%+Z%?3
10013UNTILL%=140
10014CLI=&FFF7
10015$OS%="KEY 0 "+A$+"|M"
10016X%=OS%MOD256:Y%=OS%DIV256
10017CALLCLI
10018A$=$(Z%+4)
10019$OS%="KEY 1 "+A$+"|M"
10020CALLCLI
10021END
```

The program, after being used on itself with 100,10000,1.

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Mortgage – monthly repayments
Cash Flow – net present value, internal rate of return
Investment – bond redemption yield, equity price to earnings ratio estimates
Compound Interest – payments, present value, capital appreciation, savings
Depreciation – straight line, reducing balance, lifetime estimate, depreciation charge schedule, book value schedule

SCIENCE

Physical Constants – Planck, electron mass, electron charge, Rydberg, Gravitation, Avogadro, speed of light, sound. Gas constant, permeability, permittivity, earth radius, Bohr radius, Astronomic unit, etc.
Conversion Factors – UK to MKS etc.
Formulae – LC circuit, Lenses, Bohr energy levels, Larmor, plasma, etc.
Integration Under a Curve
Least Square Fit
Solution of Polynomial Equations

UTILITY

LOG, ALOG, LN, SQRT, EXP, SIN, COS, TAN, ATN, ABS, INT, DEG, RAD, MOD, MIN, MAX, FAC, SGN, ROUND, MEAN, STDEV, PI, RND, RAND, ENG, FIX, POWER FUNCTION AND COPY.

MATHEMATICS

Bessel – functions
Polynomials – solutions of equations
Matrices – solution of matrix equations, Eigenvalues
Integration – under a curve
Curve-fitting – least squares
Statistics – mean, standard deviation, Chi-squared

LINK-UP COMMUNICATIONS

– Industry standard RS232 with ribbon cable plugs into a solid-state drive.
– Configuration module sets the Organiser to transmit and receive programs and data. Options are selected using the cursor keys including:
BAUD RATE : 150-9600
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PSION

PATTERN-MAKER

Creating pretty patterns on your QL is not at all difficult with these simple programs from Alan Turnbull. And by using the QL's colour commands, you can fill them in to make delightful designs.

For the first time on a Sinclair computer, the QL provides user defined procedures, local variables and comprehensive, fast graphics capabilities.

Of course, the QL enables the programmer to produce complex graphics patterns with the many useful commands available. But, using the new features of DEFINED PROCEDURES and local variables the QL programmer may also produce startling results in only a few program lines. How is this done?

The answer lies in the programming concept known as recursion. A recursive object is one which is defined partially in terms of itself; as an example, think of factorials in mathematics.

Recursion needs local variables in procedures to be implemented satisfactorily, and this is where the QL is quite amenable.

How do we design a suitable pattern? Think, first of all, of a square. That's simple enough to draw on the QL screen. If we were to draw a similar square on each of the four corners of the original square, but with a side the length of which is half the length of the original's, we could go on forever.

We could say a square defined in this way could have an 'order' associated with it. The first case would be of order 1, the second case order 2, and so on.

Listing 1 shows a QL SuperBasic program to draw such a shape with a given order. The output is shown in Figure 1. The output is impressive, and what's more you could try experimenting with different order values.

The same process may be applied to any shape. As a further example, Listing 2 shows a similar program to that in Listing 1, but using a circle as its 'base' shape. This time smaller circles are drawn on the previous circle's circumference (see Figure 2).

Finally we may make — dare I say it — a quantum leap by using colour-filled shapes rather than just 'wire' diagrams using the QL's FILL command. Try the program in Listing 3 — you will be amazed at the output.

It's exciting to see such complicated patterns produced by just a few lines of simple SuperBasic code, and those with other computers which support the concepts of procedures and local variables will find the routines easily translate.

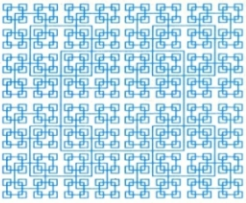

Figure 1

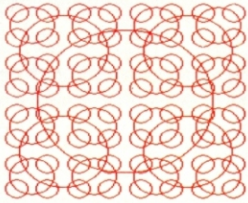

Figure 2

Listing 1

```
100 REMark Recursive Square Program for the QL
110 REMark   (c) October 1984, Alan Turnbull
120 :
130 MODE 256:PAPER 0:CLS
140 SQUARE 74,50,48,5
150 :
160 DEFine PROCedure SQUARE(x_origin,y_origin,side_length,order)
170   IF order>0 THEN
180     LINE x_origin-side_length/2,y_origin-side_length/2 TO x_origin+side_leng
th/2,y_origin-side_length/2 TO x_origin+side_length/2,y_origin+side_length/2 TO
x_origin-side_length/2,y_origin+side_length/2 TO x_origin-side_length/2,y_origin
-side_length/2
190     SQUARE x_origin-side_length/2,y_origin-side_length/2,side_length DIV 2,o
rder-1
200     SQUARE x_origin+side_length/2,y_origin-side_length/2,side_length DIV 2,o
rder-1
210     SQUARE x_origin+side_length/2,y_origin+side_length/2,side_length DIV 2,o
rder-1
220     SQUARE x_origin-side_length/2,y_origin+side_length/2,side_length DIV 2,o
rderK1
230   END IF
240 END DEFine SQUARE
```

Listing 2

```
100 REMark Recursive Circle Program for the QL
110 REMark  (c) October 1984, Alan Turnbull
120 :
130 MODE 256:PAPER 0:CLS
140 CIRC 80,50,32,4
150 :
160 DEFine PROCedure CIRC(x,y,radius,order)
170   IF order>0 THEN
180     CIRCLE x,y,radius
190     CIRC x-radius/SQRT(2),y+radius/SQRT(2),radius DIV 2,order-1
200     CIRC x+radius/SQRT(2),y+radius/SQRT(2),radius DIV 2,order-1
210     CIRC x-radius/SQRT(2),y-radius/SQRT(2),radius DIV 2,order-1
220     CIRC x+radius/SQRT(2),y-radius/SQRT(2),radius DIV 2,order-1
230   END IF
240 END DEFine CIRC
```

Listing 3

```
100 REMark Recursive Square Program for the QL
110 REMark       'Colour-filled' version
120 REMark   (c) October 1984, Alan Turnbull
130 :
140 WINDOW 512,256,0,0
150 MODE 256:PAPER 0:CLS
160 SQUARE 74,50,48,5
170 :
180 DEFine PROCedure SQUARE(x_origin,y_origin,side_length,order)
190   IF order>0 THEN
200     INK order
210     FILL 1
220     LINE x_origin-side_length/2,y_origin-side_length/2 TO x_origin+side_leng
th/2,y_origin-side_length/2 TO x_origin+side_length/2,y_origin+side_length/2 TO
x_origin-side_length/2,y_origin+side_length/2 TO x_origin-side_length/2,y_origin
-side_length/2
230     FILL 0
240     SQUARE x_origin-side_length/2,y_origin-side_length/2,side_length DIV 2,o
rder-1
250     SQUARE x_origin+side_length/2,y_origin-side_length/2,side_length DIV 2,o
rder-1
260     SQUARE x_origin+side_length/2,y_origin+side_length/2,side_length DIV 2,o
rder-1
270     SQUARE x_origin-side_length/2,y_origin+side_length/2,side_length DIV 2,o
rder-1
280   END IF
290 END DEFine SQUARE
```

MACBETH

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SPACE DROP

It's kill or be killed in Andrew Clarke's space game, Star Drop, written for the 64.

Be prepared to take on a veritable onslaught of alien ships. They may come at you only one at a time, but each attack is made with renewed vigour. You are in your own ship at ground level and can move back and forth taking pot-shots at the enemy space ship. It's kill or be killed — you must shoot down your adversary before it reaches you.

The title screen adds an original touch and demonstrates to good effect the Commodore's keyboard graphic capabilities. It doesn't use redefined characters — they are all accessible from the keyboard. A TV screen flicks through the various channels until it reaches what is on the Commodore 64 tonight.

After the title page you go straight into the game. Use a joystick in control port one to fire down a level one alien. A hit summons a level two alien to move into attack. And so on until the alien contingent overwhelms you and your level and score are displayed along with the highest level reached and the highest score.

There is no high-score table but this could easily be included between lines 640 and 699.

Program notes

3	Sets border and screen colour
4	Gosub for the title screen
5-9	Reads in the sprite data
10	Sets variables
11-22	Gosub for the score display and sound routines and sets up sprite pointers and position sprites
30-50	Main loop: gets the joystick input, moves the alien and checks for life loss
100-199	The title screen
100-146	Produces the TV controls etc
148-156	Produces the interference wiggles on the TV screen
158-179	Prints title and author on TV screen
180-199	Produces the

Listing

```
0 REM###  S#P#A#C#E##D#R#O#P  ###
1 REM#### BY ANDY CLARKE 1984 ###
2 REM##############################
3 PRINT"{CLEAR}":POKE53280,0:POKE53281,0
4 GOSUB330:FORS=200TO205:FORT=0TO62
5 READA:POKES#64+T,A:NEXT:NEXT
6 FORT=0TO62:POKE206#64+T,0:NEXT
7 FORT=0TO62:POKE207#64+T,0:IFT=0ORT=30R
T=60RT=97THENPOKE207#64+T,4
8 IFT=20RT=50RT=80RT=11THENPOKE207#64+T,
32
9 NEXT:GOSUB100:HS=0:BL=0
10 FL=3:SC=0:HL=0
11 LE=0:PRINT"{CLEAR}":V=53248:GOSUB620:
GOSUB500
12 IFFL=<0THEN650
13 POKE2040,200:POKE2041,201
14 POKE2042,207:POKEV,150:POKEV+1,230
16 GOSUB600:POKEV+41,1
18 POKEV+39,6:POKEV+40,15
20 POKEV+28,2:POKEV+38,10:POKEV+37,6
22 POKEV+21,3:POKEV+30,0:X1=150:W=3
30 JS=PEEK(56321)
32 IFJS=247THENX1=X1+10
34 IFJS=251THENX1=X1-10
36 IFX1=>255THENX1=255
38 IFX1=<30THENX1=30
40 IFJS=239ORJS=2350RJS=231THENGOSUB200
42 X2=X2+W:IFX2>=2500RX2<=30THENW=-W:Y2=
Y2+10
44 IFX2>255THENX2=255
46 IFX2<30THENX2=30
48 IFY2>=220THENFL=FL-1:GOSUB520:GOTO640
50 POKEV,X1:POKEV+2,Y2:POKEV+3,Y2:GOTO30
100 PRINT"{CLEAR}":LF=54272:FORT=1234TO1
251
102 POKET,224:POKET+360,224:POKET+LF,9:P
OKET+360+LF,9:NEXT
104 FORT=1274TO1554STEP40:POKET,224:POKE
T+17,224
106 POKET+LF,9:POKET+17+LF,9:NEXT
108 FORT=1276TO1286:POKET,67:POKET+280,6
7:POKET+LF,14:POKET+280+LF,14:NEXT
110 FORT=1315TO1515STEP40:POKET,66:POKET
+12,66:POKET+LF,14:POKET+12+LF,14:NEXT
112 POKE1275,85:POKE1287,73:POKE1555,74:
POKE1567,75
114 POKE1275+LF,14:POKE1287+LF,14:POKE15
55+LF,14:POKE1567+LF,14
116 FORT=1329TO1449STEP40:POKET,87:POKET
+LF,2:NEXT
118 FORT=14BBTO1490:POKET,61:POKET+40,61
:POKET+LF,15:POKET+40+LF,15:NEXT
120 PRINT"{YELLOW}{HOME}{DOWN}{DOWN}{RIG
HT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}            (
c O}{c O}{c O}{s *}{s *}{s *}{s *}{s *}"
122 PRINT"{RIGHT}{RIGHT}{RIGHT}{RIGHT}{R
IGHT}              {RVSON}{s -}{RVSOFF}
"
124 PRINT"{RIGHT}{RIGHT}{RIGHT}{RIGHT}{R
IGHT}          {s O}{s P}{s O}{s P}{s O}{
s P}  "
126 FORT=1716TO1729:POKET,224:POKET+LF,1
2:NEXT
128 FORT=14BBTO1490:POKET,61:POKET+40,61
:POKET+LF,15:POKET+40+LF,15:NEXT
130 PRINT"{HOME}{DOWN}{DOWN}{DOWN}{DOWN}
{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOW
N}{DOWN}{DOWN}{DOWN}{DOWN}";:S#="{RIGHT}
{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGH
T}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}"
132 PRINTS#;"{c 4}{RVSON}  {RVSOFF}
    {RVSON}  {RVSOFF}"
134 PRINTS#;"{RVSON} {RVSOFF}
 {RVSON} {RVSOFF} "
136 PRINTS#;"{RVSON} {RVSOFF}{RIGHT}{RIG
```

	borders of the TV on the screen	**300-330**	Title screen information: whats on TV tonight?		prints the score, lives etc
200-212	Fires missile, checks for a hit and moves the alien	**500-526**	Sound routines	**640-684**	End of game, prints your score and asks do you want another go?
250-256	Routine for when hit, shrinks alien	**600-610**	Position and re-energize alien	**30000-30059**	Sprite data
		620-632	Screen display —		

Listing

```
MT)[RIGHT]RIGHT)[RIGHT]RIGHT)[RIGHT]RIGHT)RIGHT)[RIGHT]RIGHT)[RIGHT]RIGHT)[RIGHT]RIGHT)[RIGHT]RIGHT)[RVSON]
 [RVSOFF) "
138 PRINT#8:"[RVSON] [RVSOFF)
 [RVSON) [RVSOFF) "
140 PRINT#8:"[LEFT)[LEFT)[RVSON] [RV
SOFF) [RVSON) [RVSOFF)"
142 J#="[RIGHT)RIGHT)[RIGHT)[RIGHT)[RIG
HT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[R
IGHT)[RIGHT)":D#="[HOME)[DOWN)[DOWN)[DOW
N)[DOWN)[DOWN)[DOWN)[DOWN)":R=0
144 FORW=1TO7:B=B+11:ONB60SUB302,304,306,
308,310,312,314
146 PRINT#8:FORT=1TO6:PRINTJ#;A#:NEXT:G
OSUB300:NEXT
148 FORS=1TO30:PRINT@#1:FORT=1TO6
150 PRINTJ#;"[WHITE)[s N)[s M)[s N)[s M)
[s N)[s M)[s N)[s M)[s N)[s M)[s N)":NEX
T
152 PRINT@#1:FORT=1TO6
154 PRINTJ#;"[s M)[s N)[s M)[s N)[s M)[s
N)[s M)[s N)[s M)[s N)":NEXT:NEXT
156 GOSUB316:PRINT@#;FORT=1TO6:PRINTJ#;
A#:NEXT
158 GOSUB300:GOSUB300:GOSUB322:PRINT@#;I
FORT=1TO6:PRINTJ#;A#:NEXT
160 GOSUB300:PRINT@#;FORT=1TO6:PRINTJ#;
"              ":NEXT
162 PRINT@#;J#;"[c 3)ON THE "
164 PRINTJ#;"[c B)COMMODORE "
166 PRINTJ#;"[YELLOW)SIXTY-(CYAN)FOUR"
168 PRINTJ#;"[PURPLE)HERE IS...":GOSUB30
0
170 PRINT@#1:FORT=1TO6:PRINTJ#;"[PURPLE)
#(WHITE)STAR DROP(PURPLE)#":NEXT:GOSUB3
00
172 PRINT@#1
173 PRINTJ#;"              "
174 PRINTJ#;"[c 3]     BY     "
175 PRINTJ#;"(WHITE)ANDY CLARKE"
176 PRINTJ#;"              "
177 PRINTJ#;" [c 3)(WHITE)C[c 3)) (YELL
OW)1984 "
178 PRINT@#;"              ":GOSUB300
179 PRINT@#8;
180 PRINTJ#;"(WHITE)[c A)[s #)[s #)[s #)
[s #)[s #)[s #)[s #)[s #)[c S)"
181 FORT=1TO4:PRINTJ#;"[s -)          [s
 -)":NEXT
182 PRINTJ#;"[c Z)[s #)[s #)[s #)[s #)[s
 #)[s #)[s #)[s #)[c X)":GOSUB324
183 PRINT@#1
184 PRINTJ#;"              "
185 PRINTJ#;"[c A)[s #)[s #)[s #)[s #)[
s #)[c #)[c S) "
186 PRINTJ#;" [s -)          [s -) "
187 PRINTJ#;" [s -)          [s -) "
188 PRINTJ#;"[c Z)[s #)[s #)[s #)[s #)[
s #)[s #)[s #)[c X) "
189 PRINTJ#;"              ":GOSUB324
190 PRINT@#1:"[DOWN)"
191 PRINTJ#;"              "
192 PRINTJ#;" [c A)[s #)[s #)[s #)[s #)
[s #)[c S)  "
193 PRINTJ#;" [c Z)[s #)[s #)[s #)[s #)
[s #)[c X)  "
194 PRINTJ#;"              ":GOSUB324
195 PRINT@#1J#;"[DOWN)[DOWN)      [c P]
  "
196 PRINTJ#;"              ":GOSUB324
197 PRINT@#1:FORT=1TO6
198 PRINTJ#1;"
199 NEXT:RETURN
200 X3=X1:Y3=PEEK(V+1):POKEV+30,0
202 POKEV+4,X3:POKEV+5,Y3:POKEV+2,X2:POK
EV+3,Y2
204 POKEV+21,7:Y3=Y3-10:X2=X2+W
206 IFX2>250ORX2<30THENW=-W:Y2=Y2+10:I
FY2>220THENFL=FL-1:GOSUB520:GOTO640
207 IFX2>255THENX2=255
208 IFX2<30THENX2=30
209 IFY3<20THENRETURN
210 IF(PEEK(V+30)ANDB)=6THENGOSUB250:GOS
UB600:RETURN
212 GOTO202
250 B=201:SC=SC+100:GOSUB620
252 POKE2041,B:POKEV+21,3:GOSUB512:B=B+1
:IFB=207THENGOSUB500:RETURN
254 FORT=1TO100:NEXT
256 GOTO252
300 FORT=1TO2000:NEXT:RETURN
302 A#="[PURPLE)AND ON [YELLOW)BBC1":POK
E1329+LF,7
303 RETURN
304 A#=" [YELLOW)THE [WHITE)NEWS ":RETU
RN
306 A#="[c 6)AND ON [YELLOW)BBC2":POKE13
69+LF,7
307 POKE1329+LF,2:RETURN
308 A#="[WHITE)  ARENA   ":RETURN
310 A#="[PURPLE)AND ON [YELLOW)ITV ":POK
E1409+LF,7
311 POKE1369+LF,2:RETURN
312 A#="[WHITE)  MINDER   ":RETURN
314 A#="[c 6)AND ON [YELLOW)4    ":POKE14
09+LF,7
315 POKE1409+LF,2:RETURN
316 A#="[WHITE)BROOKSIDE?":
318 FORT=132TO144STEP4O:POKET,81
320 POKET+LF,7:NEXT:RETURN
322 A#="BUT NOW....":RETURN
324 FORT=1TO400:NEXT:RETURN
330 PRINT"[CLEAR)[HOME)[DOWN)[DOWN)[DOWN
)[DOWN)[DOWN)[DOWN)[DOWN)[RIGHT)[RIGHT)[
RIGHT)[YELLOWJLET'S SEE WHAT'S ON TV TON
IGHT.....":GOSUB300:RETURN
500 FORC=54272TO54296:POKEC,0:NEXT
502 VO=54296:AT=54277:WA=54276
504 SU=54278:HF=54273:LF=54272
506 POKEAT,32:POKESU,255
508 POKEHF+14,5:POKEWA,19
510 POKEVO,143:RETURN
512 POKEHF,B-200:RETURN
520 GOSUB500
522 FORT=10TO15TEP-1:POKEHF,T
524 POKEV+39,7:NEXT
526 GOSUB500:RETURN
600 X2=INT((250-50)*RND(1))+50:Y2=50
602 POKEV+3,Y2:POKEV+2,X2
604 B=206:W=ABS(W):W=W*2:LE=LE+1:GOSUB62
0
606 POKE2041,B:GOSUB512:B=B-1:IFB=200THE
NGOSUB500:RETURN
608 FORT=1TO50:NEXT
610 GOTO606
620 PRINT"[HOME)[RIGHT)[RIGHT)[RIGHT)[RI
GHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[
RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT
)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIG
HT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[R
IGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)
3)SCORE:"
622 PRINT"[HOME)[DOWN)[RIGHT)[RIGHT)[RIG
HT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[R
IGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)
[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGH
T)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RI
GHT)[RIGHT)[RIGHT)[YELLOW)"!SC
624 PRINT"[HOME)[DOWN)[DOWN)[RIGHT)[RIGH
T)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RI
GHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[
RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT
)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIG
HT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[R
IGHT)[YELLOW)"!HI
626 PRINT"[HOME)[DOWN)[DOWN)[DOWN)[RIGHT
)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIG
HT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[R
IGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)
[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGH
T)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[YELLOW)"!
FL
628 PRINT"[HOME)[DOWN)[DOWN)[DOWN)[DOWN)
[DOWN)[DOWN)[DOWN)[DOWN)[DOWN)[DOWN)[DOW
N)[DOWN)[DOWN)[RIGHT)[RIGHT)[RIGHT)[RIGH
T)[WHITE)******[c 3)LEVEL "!LE:" ALIEN(WH
ITE)******"
630 PRINT"[HOME)[DOWN)[DOWN)[DOWN)[DOWN)
[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGH
T)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RI
GHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[
RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT
)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[c 3
)BEST LEVEL:"
632 PRINT"[HOME)[DOWN)[DOWN)[DOWN)[DOWN)
[DOWN)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT
)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIG
HT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[R
IGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)
[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGH
T)[YELLOW)"!HL:RETURN
640 IFLE)HLTHENHL=LE
642 POKEV+21,3:GOTO11
650 POKEV+21,1:PRINT"[CLEAR)"
652 PRINT"[HOME)[DOWN)[DOWN)[DOWN)[DOWN)
[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[WHIT
E)GAME OVER"
654 PRINT"[DOWN)[DOWN)[RIGHT)[RIGHT)[RIG
HT)[RIGHT)[RIGHT)[YELLOW)SCORE(WHITE)"!S
C
656 PRINT"[DOWN)[RIGHT)[RIGHT)[RIGHT)[RI
GHT)[RIGHT)[YELLOW)BEST LEVEL(WHITE)"!HL
657 POKEVO,0:IFSC)HSTHENHS=SC
658 PRINT"[DOWN)[RIGHT)[RIGHT)[RIGHT)[RI
GHT)[RIGHT)[YELLOW)BEST SCORE(WHITE)"!HS
659 IFHL>BLTHENBL=HL:PRINT"[DOWN)[RIGHT)
[RIGHT)[RIGHT)[RIGHT)[RIGHT)[RIGHT)WELL DONE!!!
"
660 PRINT"[DOWN)[RIGHT)[RIGHT)[RIGHT)[RI
GHT)[RIGHT)[YELLOW)BEST EVER LEVEL(WHITE
)"!BL
662 PRINT"[DOWN)[DOWN)[DOWN)[RIGHT)[RIGH
T)[RIGHT)[RIGHT)[RIGHT)[RIGHT)[c 3)ANOTHER GO?"
664 PRINT"[DOWN)[RIGHT)[RIGHT)[RIGHT)[RI
GHT)[RIGHT)[c 6)MOVE STICK FOR (WHITE)NO
"
666 PRINT"[RIGHT)[RIGHT)[RIGHT)[RIGHT)[R
IGHT)[c 6)PRESS FIRE FOR (WHITE)YES"
668 JS=PEEK(56321):IFJS=239THEN674
670 IFJS()255THENSYS64738
672 GOTO668
674 FORT=1TO200:NEXT:PRINT"[DOWN)[RIGHT)
[RIGHT)[RIGHT)[RIGHT)[RIGHT)[WHITE)VIEW
TITLES?"
676 PRINT"[DOWN)[RIGHT)[RIGHT)[RIGHT)[RI
GHT)[RIGHT)[c 6)MOVE STICK FOR (WHITE)NO
"
678 PRINT"[RIGHT)[RIGHT)[RIGHT)[RIGHT)[R
IGHT)[c 6)PRESS FIRE FOR (WHITE)YES"
680 JS=PEEK(56321):IFJS=239THENPOKEV+21,
0:GOSUB330:GOSUB100:GOTO10
682 IFJS()255THEN10
684 GOTO680
30000 REM*******LAUNCHER
30001 DATA0,56,44,4,124,64,4
30002 DATA108,64,4,238,64,7,239
30003 DATA192,4,238,44,4,238,64
30004 DATA0,238,0,0,238,0,0
30005 DATA238,0,0,238,0,65,239
30006 DATA44,65,109,4,71,109,196
30007 DATA4,71,196,71,125,228,95
30008 DATA125,244,125,171,124,253,125
30009 DATA126,221,69,118,213,1,86
30010 REM*******ALIEN #1
30011 DATA0,0,0,0,0,0,0
30012 DATA0,0,128,0,8,32,0
30013 DATA32,8,0,128,1,85,0
30014 DATA1,255,64,85,255,208,85
30015 DATA85,84,85,80,64,102,100,85,85
30016 DATA84,31,255,208,7,255,64
30017 DATA1,85,0,0,0,0,0
30018 DATA0,0,0,0,0,0,0
30019 DATA0,0,0,0,0,0,0
30020 REM*******ALIEN #2
30021 DATA0,0,0,0,0,0,0
30022 DATA0,0,0,0,0,32,0
30023 DATA32,8,0,128,2,2,0
30024 DATA1,85,0,5,85,64,21
30025 DATA253,80,22,170,80,21,253
30026 DATA80,21,85,80,1,85,0
30027 DATA0,0,0,0,0,0,0
30028 DATA0,0,0,0,0,0,0
30029 DATA0,0,0,0,0,0,0
30030 REM*******ALIEN #3
30031 DATA0,0,0,0,0,0,0
30032 DATA0,0,0,0,0,0,0
30033 DATA0,8,0,128,2,2,0
30034 DATA0,136,0,128,85,0,5
30035 DATA85,64,5,253,64,5,85
30036 DATA64,1,85,0,0,0,0
30037 DATA0,0,0,0,0,0,0
30038 DATA0,0,0,0,0,0,0
30039 DATA0,0,0,0,0,0,0
30040 REM*******ALIEN #4
30041 DATA0,0,0,0,0,0,0
30042 DATA0,0,0,0,0,0,0
30043 DATA0,0,0,0,2,2,0
30044 DATA0,0,0,0,32,0,0
30045 DATA84,0,1,117,0,0,84
30046 DATA0,0,0,0,0,0,0
30047 DATA0,0,0,0,0,0,0
30048 DATA0,0,0,0,0,0,0
30049 DATA0,0,0,0,0,0,0
30050 REM*******ALIEN #5
30051 DATA0,0,0,0,0,0,0
30052 DATA0,0,0,0,0,0,0
30053 DATA0,0,0,0,0,0,0
30054 DATA0,0,0,0,136,0,0
30055 DATA32,0,0,84,0,0,0
30056 DATA0,0,0,0,0,0,0
30057 DATA0,0,0,0,0,0,0
30058 DATA0,0,0,0,0,0,0
30059 DATA0,0,0,0,0,0,0
```

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- *All four languages can be used interactively with each other, and with the user*

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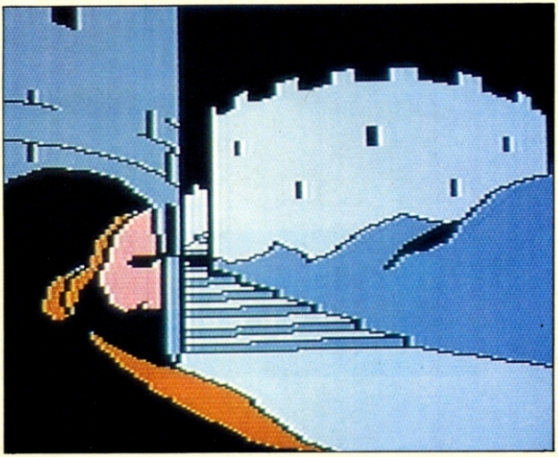
BIG MAC RULES OK!

Mr and Mrs Macbeth are in residence at Cawdor Castle. Bob Chappell enjoys some superb adventures with the doomed pair.



Double, double, toil and trouble — is this a dagger I see before me? No, 'tis an adventure. But is't done well? Aye, cousin, and that right so.

Sorry about that, but I am well and truly absorbed in *Macbeth*, a superb new adventure for the Commodore 64 from Creative Sparks (0252-54333). *Macbeth* oozes atmosphere and is so totally enthralling that you can't help talking like a cream-faced loon.

Based on Shakespeare's play, the entire package is the work of Oxford Digital Enterprises. The *Macbeth* package is handsomely boxed and includes two cassettes containing four separate, differently-styled yet connected adventures, an instruction booklet and a full scholarly edition of the play (edited from the 1623 original text) complete with notes and sundry essays.

As well as all this, the cassettes also contain four 'psychoanalysis' programs. I'll come back to these later, but you can see that for £14.95, you are getting a whole heap of material for your money — and it's all high quality, make no mistake.

Scots wha' hae'

The title sequence of the first adventure is most impressive. To start, you hear a chorus of *Amazing Grace* — played on the bagpipes. Cawdor Castle appears, lightning playing around the ramparts.

Then cut to the blasted heath where, with the wind howling and moaning, the three witches (sorry, Will, weird sisters) huddle and converse before changing into their familiars (animals to you). All that, and the adventure proper hasn't even loaded yet.

Don't think these adventures are just for serious minded Shakespeare buffs. While they contain plenty of educationally sound material, there is also some delicious tongue-in-cheek humour. Early in the adventure you'll find a newspaper — it turns out to be the first edition of the *The Scotsman* dated April, 1040. The newspaper is simply a device for giving you updated progress reports. You can play any of the adventures in any order but you'll need to succeed at the first three to reach the final dénouement in part four.

Adventure one is a mixture of text and graphics, the latter being most impressive and faithful to the atmosphere of the play. Sound effects (the creak of a trapdoor, the croak of a toad) add to the enjoyment. As Macbeth, you must soil your hands with the blood of the enemy. You must outwit or slay your adversaries and then discover a letter which is coded in 11th century runic script.

Take one gall of goat

Part two has you undergoing a swift sex change — you are now Lady Macbeth. In text only, you must mastermind the murder of the King. The play itself holds many clues. What weapons and route will you choose? Can you persuade Macbeth to do the dirty deed? You have one hour to accomplish your fiendish plan.

You'll love reading Lady Macbeth's cook-book — actually her Theatrum Botanicum written by the King's Herbalift. An extract on the herb Camomill: 'Haf many small trayling branches, set with very fine leaves. A decoctation taketh away all paines and stitches in the sides'. Beats deadly nightshade in your soup!

Adventure three is all graphics, though responses and commands are given textually in a small window. The stunning pictures hold all the information and clues. You must find and collect the ten ingredients mentioned in the final incantation of scene 18 (you know, charming things like eye of newt and toe of frog).

The final part is text only and has you trying to defend beleaguered Dunsinane Castle. If the castle falls, escape is still possible. Can a final challenge from Macduff, who has the light of vengeance in his eyes, be averted? Provided you complete the first three parts successfully, you're promised a final treat when emerging victorious from part four.

Help is on hand throughout the adventures, either in the form of riddles (and there's plenty of these) or by referring you to an appropriate scene in the play.

A light mac

And so to the 'analysis' programs which parallel the four adventures. These are interesting, educational and often downright hilarious. The idea is that, lying down on a moth-eaten couch in Cawdor Castle, you submit yourself to the analysis of Sigmund, Scotia's top alchemist and psychiatrist. Sigmund analyses and prompts, you answer as requested. The analysis will take different courses, depending on your answers. As well as being extremely funny in places, these programs enable you to gain valuable insights into the characters in the play. I can see English Literature teachers and students falling over themselves to get their hands on these — they are superb.

Macbeth breaks new ground by combining adventure, scholarship and entertainment in one brilliant package. I cannot praise it too highly. Macbeth is THE adventure of the year.

Dungeon aid

All prisoners in Phipps' Colditz — Achtung! You sink you haf ways of making me talk, Britisher pigdogs? So, you cannot find ze grate leading to ze sewer, nein? Ha! Vell, I varn you, it is not, repeat not, absolutely not, vizzin ein thousant miles of ze crypt coffin, and ze scribblings below are nussink but ze mere demented ravings of ein lunatic. Iz zat clear? (rabw orch tiw) DILR EVEL (revi rdwe rcsh tiw) ETAR GWER CSNU.

STAYING POWER

Since its launch the BBC has proved to be a popular micro, despite competition from such giants as Commodore and Sinclair. With a further four year contract to supply the BBC, Acorn looks secure. David Janda takes a retrospective look at the Beeb.

Three years since it was launched on the market the BBC micro is still one of the most popular machines, despite competition from Oric, Commodore and Sinclair.

Acorn, which produces the Beeb, must be confident of its continuing success because it hasn't even made a single price reduction. If you add to this the fact that Acorn has been granted a further four year contract to supply the BBC micro as the official computer for the Computer Literacy Project, you can be sure the Beeb will be around for some time.

When the BBC announced the Computer Literacy Project, it tendered proposals for the sort of machine which would be used in the series. Acorn stepped in with the BBC micro, which has features similar to its earlier Atom machine. Sinclair also stepped in — with the ZX Spectrum. Acorn won the contract. As a result of this, the BBC micro is the most popular computer for schools and colleges, and a lot of its success must be due to Acorn getting the contract.

Features

The machine's many features contribute a lot to its popularity. But is the Beeb outdated now? As far as features are concerned, there is no other machine at the price which can beat it. Some consider the Beeb to be too expensive for a games machine, and too cheap for use in a business, yet many people are using it in both areas.

The Beeb is designed for expansion: 'obsolescence is built out' you could say. Some of the items that can be added are disks, various filing systems, second processors, ROM-based software, A/D converters and so on. But the BBC has a lot to offer as a package on its own.

As far as graphics are concerned, the BBC is well catered for. Different resolutions of graphics with different amounts of colours are available. These are called Modes and the BBC micro has eight — five for graphics and three for text.

Eight colours are available with a further eight which alternate between two, *ie* flash. Each graphics mode has a number of set colours which can be used, but these may be changed.

The problem with using a high-resolution mode on the BBC is the amount of memory used: the higher the resolution, the greater the RAM used up and unfortunately, the Beeb has only 32K RAM which is one of its major drawbacks.

One Mode on the BBC has a chip all for itself. It's called Teletext Mode and it has proved popular among many programmers because it offers colour and graphics, all for a mere 1K of memory. It is also used to display information sent out on services such as Prestel and Ceefax.

Sound is available with four channels and is reproduced through the internal speaker; unfortunately, this has no provision for connection to an external amplifier.

The ability to accept ROM/EPROM chips containing software was quite new when the BBC was launched and Acorn provides four sockets to accept this type of software. The company probably

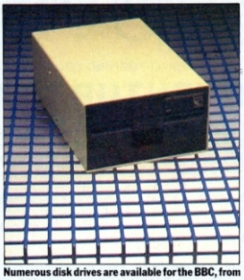
would have included more if it had known how popular the idea would be.

Hardware

The Beeb has a 74-key pitched keyboard which includes ten function keys, with a badly situated break key next to them. Three red LEDs next to the space bar give status on the cassette, caps and shift locks. To the left of the main key grouping is a small rectangular cutout nicknamed 'the ashtray'. Its real purpose is to accept a ROM-pack interface which allows Beeb users to use cartridge software, but this idea has never taken off. Above the function keys is a removable transparent plastic strip under which you can put labels for the function keys. To the left of the strip is the speaker grille but no external volume control which would have been welcome.

All micros need to communicate with the outside world, and the BBC is no exception. Five male-type pin sockets on the underside of the micro are used for attaching disk drives and a printer. There is an 8-bit user port which allows digital I/O to various devices, including bits-pads; a 1MHz bus for specialist hardware, and a 2MHz bus, called the 'tube', used to connect the BBC to second processors such as the 6502 and Z80. Finally, there's a 5 volt auxilliary power supply socket for powering external devices such as disk drives. This socket is not very well designed, is insecure in its fixture, and using it with disk drives can sometimes 'freeze' the Beeb due to the severe power drain.

A further seven sockets at the back



Numerous disk drives are available for the BBC, from dual 80-track drives to single 40-tracks.

provide more I/O, including three methods for connecting the BBC to a VDU: ordinary UHF, composite video (which gives only a black and white signal) and RGB. A five-pin RS432 serial port is provided which is similar to the RS232 standard but is not as complex. Because of its bad design it's possible to insert a plug into the socket the wrong way up.

The socket for the four A/D converters enables the BBC to be connected to various bits of equipment, and voltages from zero to 1.8 volts can be read from Basic or machine code. The last socket is empty and reserved for the Econet socket. Econet is Acorn's network system which allows Beebs locally to communicate with each other.

Removing the lid of the BBC reveals a large circuit board covered with dozens of ICs including the 6502 and ULAs. Some are spare and are reserved for software chips, disk filing system, speech ROM and so on. Small 'links' scattered about the main PCB alter characteristics, such as changing the RGB to negative sync, or they can allow faster access to certain ROMs, and so on. A pity Acorn does not give details of these links in the manual.

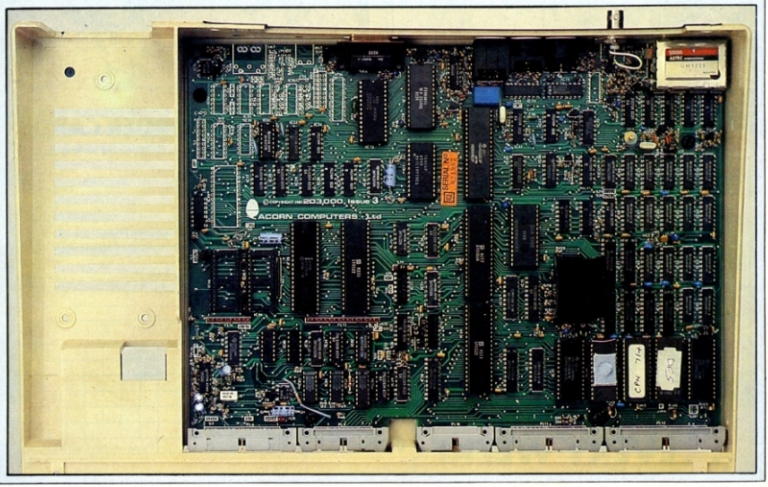
In general the BBC's hardware is well designed, but its internal power supply is an exception. After a couple of hours' use, the inside of the BBC and its case become very hot — ventilation is inadequate. Later versions of the BBC run with 'cool' chips and do not require a heatsink, but this does not cure the problem.

Firmware

The internal software (firmware) supplied with the BBC micro is just as sophisticated as the hardware. The Machine Operating System (MOS) is a separate chip from Basic and controls such things as reading and writing to the standard filing system (tape), printing characters, and controlling I/O. Many of these features can be controlled from Basic, machine code or another language.

From Basic (and other languages) operating system calls can be made with *FX followed by a number. From machine code OSBYTE calls are made with registers loaded with particular values, an excellent method of separating the MOS from Basic which makes it easier to develop machine languages and machine code and makes life easier

35►



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Do you use it for home/work/education? _____

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Address

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Please use block capitals

for the Basic programmer. The MOS has been written so that later versions will be compatible with all machines — an excellent marketing ploy.

The second part to the Beeb's firmware is the ROM holding BBC Basic — probably the most recognised (and controversial) item of the machine as it contains features not found on any other micro; it has more than 120 keywords and is one of the fastest to be found on any micro.

BBC Basic is differentiated by its control structures — the standard IF . . . THEN . . . ELSE are included and can be indented by many levels —and by the fact that it supports procedures, more common in languages such as Pascal. They also allow the programmer to write code in a very modular manner.

A procedure in BBC Basic is a group of lines accessed not by line number as with GOSUB, but by name. It is also possible to pass parameters to and from procedures, and local variables can be used within the procedures. In effect, it means a program can be written without clashing variable names or redirecting GOTO/GOSUB line numbers.

Another structure is the REPEAT . . . UNTIL loop which takes the form REPEAT statements UNTIL condition. This type of loop continues not for a specified number of times, but until a certain condition has been met. It gives greater flexibility over the standard FOR . . . NEXT loop and is very handy when testing.

Although BBC Basic has many useful commands and functions, not all are sensibly named. GCOL is a statement which sets the colour to be used by graphical statements; to inform the BBC that I wish to plot in red I would have to use GCOL 0,1. And if, on the VDU, I want to change logical colour one to yellow I would have to enter VDU 19,1,3,0,0,0. It seems rather long-winded.

Peripherals

Upgrading the BBC micro via disk drives involves two costs — the disk interface and the drive(s).

The disk interface contains a number of chips which need to be plugged into some spare sockets on the main PCB. One of these chips is the disk filing system (DFS) which provides commands to access and maintain disk files. The disadvantage of using disks on the BBC micro is one of compatibility: it is very hard to transfer programs between tape and disk. This is because the area of RAM used by the DFS is at low memory, so the program area gets 'pushed' up which means some programs (especially machine code) won't run because they aren't loaded back at the proper address.

The disks themselves come in a number of shapes and sizes. Up to four drives may be used, and if they are double density 800K of storage is possible; if a double density filing system is used this is increased to 1.6Mb. Hard disks are also available.

The BBC has provision for an analogue joystick. This one's from Acorn.

Two 'official' second processors are available — the 6502 and Z80. Each connects to the BBC micro via the tube and each has a suite of software to complement it. For the business side the Z80 is recommended because a suite of business programs is thrown in with the package and so is good value for money.

Communications are very much in vogue and there are numerous hard wired modems that can be attached to the user port or the RS423. The modem usually comes with software to drive it and, more than likely, will be supplied on EPROM.

Software

Education and the Beeb seem to go together very well. There are a number of software houses that produce educational software only for the BBC micro ranging from teaching toddlers how to read, to A-level studies and beyond.

Games software is well catered for even though the BBC micro supports no sprites. Shoving things about the screen is a little difficult, but it seems this has not deterred many. Acorn is committed to releasing any new games on disk as well as cassette — a good thing because of the difficulty transferring stuff from tape to disk.

Various companies supply second processors. This Acorn one fits outside the case.

On the business side is a complete range of software. Databases, spreadsheets — you name it you can get it. The BBC is very nifty at calculating and this has persuaded many software houses to produce business software. One of the limitations is the amount of memory available for program and data, but the experienced programmer can get round this in many ways.

ROM-based software has proved so popular that there are more than 30 ROMs available for the BBC. The software is mainly for the programmer (utilities) and business, and in each case there are two definite advantages in using ROM: the software is 'on tap', with no need to load anything (except data perhaps), and using ROM-based software leaves RAM free for data.

In use

For programming the BBC micro is a joy to use. The only real problem is it's possible to squash listings and this coupled with some of the weird keywords can make a listing hard to understand. The AUTO, RENUMBER and TRACE help a lot, but I would recommend some of the utility toolkits on ROM if serious programming is to be done.

The built-in assembler practically encourages you to learn machine code — it's so easy to use. Again, if very long machine code programs are to be tackled a macro assembler such as ADE would come in handy.

The other side to using the BBC micro is when applications such as word processing are done. Here, a lot depends on the software you get, but a lot also depends on the hardware. The choice of monitor and disk drive is critical for tasks such as these.

Verdict

No doubt Acorn will eventually drop the price and the BBC may become even more popular. Even so, it is still one of the best micros available today.

SPECIFICATIONS

Price	£399
Processor	6502A
RAM	32K
ROM	32K split into 16K MOS (machine operating system) and four sideways 16K ROMs selectable
Display	Seven Modes with teletext, 20, 40, and 80 column by 32 lines
Graphics	Varies from 640×256 with two colours to 160×256 with eight
Storage	Cassette
Interfaces	RS423, Centronics, four analogue plus two on/off for fire buttons, light pen, video, cassette, disk (needs additional chips), user port, 1MHz bus, tube, sideways ROMs
Software	BBC Basic + built in assembler
Distributors	High street stores

The new Mitsubish

For those in the know

Anyone conversant with home computers will know precisely why MSX was worth waiting for.

The sheer proliferation of computer and software systems flooding the market loudly underlined the need for a unified standard.

So the major companies jointly developed a single computer and software system. The result – MSX – the format that will be standard for all time.

And those in the know will not be surprised that Mitsubishi are in the vanguard of the MSX movement. For, with the F-series, Mitsubishi offers everything that MSX is and more.

GRAPHICS

Maximum resolution of 256 x 192 pixels with all 16 colours available on the screen at the same time. 32 sprites in two sizes and two magnifications allowing easy creation of '3D' graphics. 255 pre-defined characters all of which can be used as straight text or easily mixed with graphics.

SOUND

Three independent channels which can be output through the TV loudspeakers at any volume, individually or simultaneously, at any of the available 8 octaves. All three channels can use the 'noise' generator for stunning sound effects.

KEYBOARD

73 moving keys, ergonomically designed for many hours of fatigue free use. Large cursor control keys which are excellent for both programme editing and game playing. 5 function keys giving 10 pre-defined functions which can easily be redefined from 'BASIC' using the 'KEY' command.

BASIC

MSX BASIC is possibly the most comprehensive version of the original language. There is a complete set of commands for creating graphics and sounds, manipulating text and moving sprites. In addition to this there are 'built-in' interrupt routines for detecting sprite collisions, function key selections and joy-stick fire buttons.

EXPANSION

The Mitsubishi 64k ML-F80 and 32k ML-F48 are both equipped with 2 cartridge ports, 2 joy-stick ports and a centronics compatible parallel interface. It is through these devices that the MSX system can be expanded for use with disc-drives, printers, serial interfaces, modems and other peripherals.

SOFTWARE ON CASSETTE

The MSX system can load and save data onto cassette at 1200 or 2400 baud and unlike certain other home computers, the Mitsubishi F-series can be used with a normal domestic tape recorder for this purpose.

When you put all of these features together, with the knowledge that Mitsubishi is the largest manufacturer of Mainframe computers in Japan, those in the know will immediately recognise the true potential of the Mitsubishi F-series.

i MSX Computers

For those who aren't

The Mitsubishi MSX family computer is everything you wanted to know about computers, but didn't know who to ask.

It's friendly, it's fun and so simple, a grown man can use it. Yet so versatile even his computer-versed children would be hard-stretched to over-tax it.

It operates with any colour TV set. Just plug it in, and the full power of the computer is instantly at your fingertips.

FOR FATHER

The Mitsubishi MSX can do many things, from keeping a simple check on the bank balance to running a complete business with customer account files, stock control programmes and word processing. It is just as much at home keeping control of your record or stamp collection or playing 'strategy' games such as chess, othello or contract bridge.

FOR MOTHER

There is the opportunity to store recipes and other household information or keeping record of the children's progress at school. Household accounts can also be recorded so that savings can be planned for holidays and other seasonal expenses.

FOR THE CHILDREN

There is education, particularly computer education. In a world where computer literacy is now of foremost importance, MSX offers a broad base of educational software. With simple programmes for the very young through to complex programmes for older students like language learning.

Also, the graphics system of the Mitsubishi computer ensures that the MSX versions of your favourite games are reproduced with incredible speed and accuracy.

Undoubtedly, MSX is the format for the future, and will become the byword for computer education and entertainment.

And you can be secure in the knowledge that regardless of future developments, any investments made in MSX hardware, software and peripherals today will always be compatable with the Mitsubishi F-series.

So if you've waited until now to buy a computer, you couldn't have timed it more perfectly. Get to know one today.

MITSUBISHI COMPUTERS

Mitsubishi Electric (UK) Ltd., Hertford Place, Denham Way, Rickmansworth, Herts WD3 2BJ. Tel: 0923 770000.

SPECIFICATIONS

CPU: Z80A (3.6 MHz)	Special keys for screen editing
Memory: ROM: 32 KB	**Sound:** 8 octaves
RAM: 64 KB (F80)	3 channels for sound or 'noise'
RAM: 32 KB (F48)	Output by TV sound
Video Ram: 16 KB	or External Audio Amplifier
Screen Displays: *Text Mode: 40 columns x24 lines	**Cassette Interface:** 1200-2400 baud Motor controlled by CPU
*Graphics: 256 x 192 pixels	**Parallel Interface:** Centronics
Colours: 16 (15+transparent)	**Joy-Stick:** 2 x 9 pin connectors
Sprites: 32	**Rom-Cartridge:** 2 x 50 pin connector
Output: RF, Composite Video	
Keyboard: 73 moving-key keyboard	
5 function keys	
Cursor control keys	

*Subject to Scan of Monitor

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INFORMATION EXCHANGE

Stuart Cooke hooks up the Commodore Communications Modem to his 64 and gets online to Compunet to find out the latest tips and gossip.

Computer communications is definitely an 'in thing' in computer circles. Not to be left out, Commodore has now released its own modem for use with the Commodore 64. Launched together with the modem, Compunet is a service which Commodore owners can use to send letters to friends, buy programs, read news pages and more.

The modem itself is a nondescript black box that plugs into the cartridge port on the rear of the machine. The only item coming out of the box is the lead which plugs into your telephone socket. One of the new style BT plugs is on the end so if you are thinking of getting the modem and you have an old-style telephone, you will have to get British Telecom in to fit a new wall socket.

Commodore's modem offers only 1200/75 baud, the standard for use with Prestel-type services, and the rate at which your modem transmits data to the service in use. This is fine for normal work as you generally send only small amounts of information, and select only the page you want to look at. The service sends the data to your computer at 1200 baud. Many services, including Compunet, allow you to send material up to the computer, programs, etc, and for this 75 baud is extremely slow — after all, it's your telephone bill the call is on.

Included in the purchase price of your modem is a 'free' one-year membership of Compunet. In the blurb given out by Compunet it is claimed: 'It's the most advanced communications system designed for home computer users.' In fact, it is very similar to the Prestel service run by British Telecom, except that at the moment, Compunet is exclusively for Commodore users.

In order to use Prestel you have to be a registered user (to contact Prestel, dial 100 for Freephone 2043) and you will need to have the correct software. Compunet is extremely helpful here, as a program is available that you can download into your 64 to facilitate this.

Connecting to Compunet is easier. Once your modem is plugged in to the computer a number of new commands are added to Basic. One of these is the word CONNECT, and once it's entered you will be asked for the number of the Compunet service you wish to access.

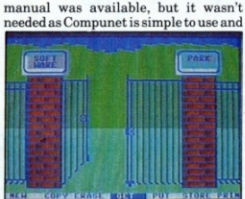
Once connected, the software to control Compunet is downloaded into your

Membership to Compunet is free for the first year.

system and you are asked for your user name and your password. The name and password are checked against the modem so you can use your name only with your modem.

Documentation

When the modem was first delivered no manual was available, but it wasn't needed as Compunet is simple to use and



This area is where you can buy commercial software.

a comprehensive manual is included within the Compunet service. A thin manual is now available together with a leaflet that tells you how to connect your modem and how to get started. The manual explains all the commands, how to download software from the system and edit your own screens. It's not intended as a teaching guide but all the information is there.

In use

All the commands are listed on a line at the bottom of the screen, the command in the centre being in reverse text. By pressing the cursor keys the band of text rotates. When the correct instruction is in the centre (*ie* highlighted) just press return. Compunet calls this the Duck Shoot.

Above this line is the current directory showing the pages you can access. Pressing the up/down cursor keys moves a band over these names, any instructions entered from the Duck Shoot that cause an action to be taken on a directory entry will take place on the one highlighted by the bar

There is plenty to keep you occupied on Compunet: numerous news pages, a hints and tips section, and quite a few software houses are also contributing with software you can buy and download onto tape or disk. If you do download software and it is a protected program it will run only with the modem connected that was used to download it. This means that if you wish to take your latest downloaded version of space invaders to play on a friend's 64 you'll have to take your modem too.

The only problem with Compunet is the speed at which it works — it is very slow. However, while using it no problems with the screen display were found. When using Prestel with the Compunet software (and when using it with Prestel systems) spurious characters were often printed on the screen, probably due to noise on the line, but Compunet seems to detect and correct this.

The area of greatest interest to the user is a section called the Jungle. In this area you can upload your own programs and let other people use them. You can even charge for downloading them. However, Compunet accepts no responsibility for what is on this area so you should buy items only if you know what they are, or if they have a favourable vote.

It is possible to vote on the quality of most things in Compunet and to find the average vote of a piece of software. Obviously, if it has a vote of only one, it's not worth buying.

Verdict

Compunet provides an excellent service for Commodore users, who can find news, gossip and buy programs. Software will be provided to connect two 64s together without actually going through Compunet, which could be useful for sending programs to friends.

It's a pity the modem doesn't offer a few more facilities (different baud rates, etc) so you could use it with other systems, but, unfortunately, this would only bump up the price.

If you own a Commodore and you don't mind sticking a little extra on your phone bill then it's worth the price, it's useful and it's fun.

REPORT CARD: 1 TO 5

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

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Normal, **EMPHASIZED**, CONDENSED and ENLARGED print.

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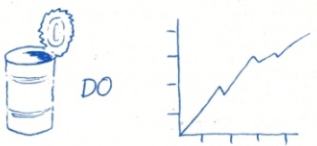

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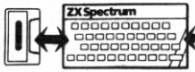

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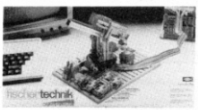


CONTROL THEM WITH THE NEW MICRO ROBOTIC SYSTEMS INTERFACE

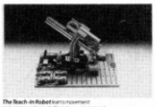
Micro Robotic Systems of Great Britain and Fischer technik of Germany have co-operated to bring you a unique offer – the versatile Fischer technik robot builder kit together with Micro Robotic System's interface package for just £ 115. The most exciting low-cost robotic system currently available to the enthusiast or educational user.

The Fischer technik kit contains detailed instructions and all materials, including microswitches, motors, relays and potentiometers required to build any of the 6 robots described. Once built the device can be broken down and made into another. With a little imagination many other exciting projects can be developed with this kit.

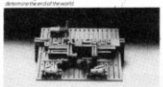
Micro Robotics System's easy-to-connect interface package, compatible with most popular home and educational computers including BBC, Apple, Spectrum, Commodore and Oric, adds the exciting new dimension of computer control to the Fischer technik kit. Supporting software and a comprehensive instruction manual together with suggested experiments are included.

This unique and flexible package introduces the fundamentals of mechanical engineering, practical software applications and provides an ideal medium for teaching robotic concepts and simple control theory.

Robot Tower of Hanoi an adaption of the task set, according to Buddhist tradition, to determine the end of the world



The Teach-in Robot learns movement sequences and repeats them on your command



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Telephone _____

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Signature _____

Date _____

MONEY BACK GUARANTEE

ON THE DOTTED LINE

A basic but reliable dot matrix printer from Smith Corona is plugged into Leah Batham's computer.

Fastext 80 is the name of a dot-matrix printer from Smith Corona that represents the bottom end of its new range of printers. At £224.25, it is definitely rock bottom.

The printer has the standard off-white plastic casing with a black front panel to break the monotony. It is compact, long and narrow, and leaves plenty of desk-space free in front of it.

Setting up

The review Fastext 80 came with the power cable and a paper guide. It had a parallel interface port, but an RS232C serial port can be obtained as an optional extra — at a price, of course.

After plugging in the power cable and connecting the interface, all you need do is check the two dip switches. One sets the automatic line feed and the other doesn't appear to do anything. What were they thinking of?

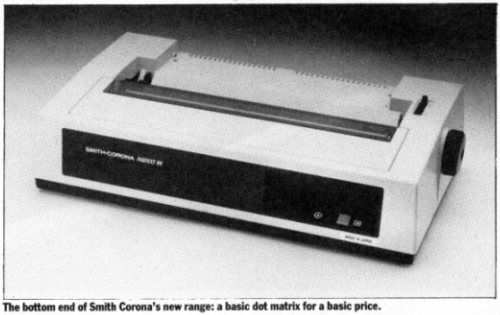
Friction feed is the standard on this printer but a tractor feed attachment will soon be available for an extra £17.25. However, the friction feed was quite reliable, even with fan-fold paper. I had to keep the bail lever back so it wouldn't snag on every other crease in the paper, but when it was aligned correctly it ran true. The maximum width of paper Fastext takes is 10in.

Installing the ribbon was a most unusual procedure. It comes in a tiny square cassette and the small stretch of ribbon outside the cassette must first be hooked around two ribbon guides to the left of the printing area. The cassette is then pulled over to the right of the printing area, thereby pulling out a length of ribbon. When the cassette has been slotted into place the ribbon must be tightened using a knob on the top. I defy anyone to complete this process without getting ink on their fingers. And at £8.20 a shot these awkward ribbons are also rather pricey.

Documentation

A sheet of unpacking instructions and a 15-page A4 manual were the only documentation supplied. The manual does a reasonable job of explaining how to set up the printer and covers paper feeding and ribbon replacement in detail.

Unfortunately, the writers apparently then realised they had only another eight pages to go. The control codes, printing modes and other features are covered in such scant detail that only a diligent computer buff could hope to make proper use of them. I never did manage to get a pound sign out of it.



The bottom end of Smith Corona's new range: a basic dot matrix for a basic price.

```
This is normal mode
with 1/6 inch spacing.

This is normal mode
with 1/8 inch spacing.
Quite a difference, isn't it.

This is compressed mode
with 1/6 inch spacing.
The lines look much shorter.

This is underlined mode.
Have you spotted the bug?

This is enlarged mode,
obviously.
```

In use

I thought Fastext noisier than other dot-matrix printers I've used, though this may have been because it is a demonstration model and had taken a few knocks. There is no bell to indicate when the paper is running out but the printer stops automatically before the platen is revealed.

The print quality is reasonably good. The descenders are not pronounced but adequate, and the result is even and clear. The matrix is 9×8 and the maximum speed is 80 characters per second.

The functions that can be selected via software commands are: condensed print, underlined print, compressed print, enlarged print, 8-pin bit image mode, line spacing of any multiple of 1/72in and national changes in the character set.

The only button on the front panel is the on-line button — no form feed or line feed. Line feeds can be incorporated into the software, but otherwise you simply have to feed the paper through manually by rotating the platen. Unsophisticated, but not really a problem.

Verdict

The Fastext 80 is a basic machine at an appropriate price. The competition at this end of the market is very fierce but this printer stands as good a chance as any of success. Smith Corona is a well-established company which claims to have an extensive service network, attributes that many buyers look for.

One thing I would like to know is how did that bug in the underlining mode slip through?

REPORT CARD: 1 TO 5

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

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SOFTWARE PRE-VIEW

We take a look at new appearances on the software scene and outline the shape of things to come.
Note to publishers: If you wish your company's product to be included in this round-up, please send only the very latest releases to *Bryan Skinner*, PCN, *62 Oxford Street, London W1A 2HG.*
Don't forget to include prices and telephone numbers.

AMSTRAD

Amsoft must have now turned out more Roland games than there are starring Cuthbert. Latest is *Roland Ahoy!*, and it's not a platform game like some of the others. You control Roland, or his ship. The aim is to collect as much treasure as you can, and avoid the mines, monsters and human malevolence. The graphics are fairly smooth, if chunky, but the game lacks complexity.

Rollaball is a curious little number — you must move a weight around a pivoted table, causing a ball to follow the maze-like path. It's a bit like those pocket ball-bearing and hole games, but with an unlikely price-tag of £6.95.

Roland Ahoy!	**£8.95**	**Amsoft 0277-230222**
Quack a Jack	**£8.95**	**CCS 01-858 0763**
Vampire Killer	**£1.99**	**Gamesworld 061-834 2292**
Rollaball	**£6.95**	**Timeslip 05016-262**
The Moor's Challenge	**£6.95**	**Timeslip 05016-262**
The Royal Quest	**£6.95**	**Timeslip 05016-263**
PCW Games Collection	**£4.95**	**Century 01-434 4241**
War Zone	**£6.95**	**CCS 01-858 0763**

BBC

If you've never got round to hacking in the listings in *Personal Computer World*, you could try the *PCW Games Collection*. It's a compilation of the best games published in the magazine. It will save you hours of frustration and costs a measly £4.95. The programs are also available in a book of the same name. It has instructions on playing the games, the program listings and detailed descriptions on how the programs work — so you can pick up hints on programming.

Jet Boot Jack	**£7.95**	**English Software 061-835 1358**
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The Horse Lord	**£7.95**	**Century 01-434 4241**
Jack & The Beanstalk	**£7.95**	**Superior Software 0532-459453**
Space Pilot	**£7.95**	**Superior Software 0532-459453**
Star Warp	**£7.95**	**Superior Software 0532-459453**

COMMODORE

Ghostbusters is here at last — and before the film goes on general release. The story line is simple: a group of parapsychologists set up a service busting ghosts which plague the city. Your aim is to prevent a demonic invasion of New York. With the money from destroying ghosts you equip yourself with devices like a Ghost Vacuum, Ghost Traps and a Laser Confinement System. The final battle begins when you can get two ghostbusters to the Temple of Zuul. The graphics and sound (the hit song theme) are good, and the game is compulsive and far from easy, though it may lack long-term appeal. It's a possible chart topper but strong competition is likely before Christmas.

If you fancy struggling through a jungle you'll like *The Search for King Solomon's Mines*, an adventure with graphics. The images are drawn quickly, but they're simple and chunky. Your task is to find the fabulous mines — but can you survive the perils of the jungle? Armed with five items selected from Trader Jim's Outpost you set off . . .

Skyline Attack is from the new software branch of Century Publishing. It's a variation on the Defender theme, and would have been pretty good if released around March or April. Now it looks dated, the graphics are nothing to write home about and although it's a competent and difficult version there just isn't the variety we've come to expect.

As a programming toolkit, *Superbasic* looks useful. It has all the normal commands like AUTO, RENUM, POP, DEEK and DOKE, as well as commands for sound and graphics. There are 36 extra commands, but Interceptor Micro's toolkit has 72 commands and also costs £9.95 . . .

Ghostbusters	**£9.99**	**Activision 0628-72448**
King Solomon's Mines	**£9.95**	**Severn Software 0594-43352**
Phase 4	**£6.95**	**Channel 8 0772-53057**
Borzak	**£6.95**	**Channel 8 0772-53057**
Time Zone	**£6.95**	**Channel 8 0772-53057**
Bruce Lee	**£9.95**	**US Gold 021-359 3020**
Fighter Pilot	**£9.95**	**Digital Integration**
PCW Games Collection	**£4.95**	**Century 01-434 4241**
Superbasic	**£9.95**	**Century 01-434 4242**
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Mr Wiz	**£7.95**	**Superior Software 0532-459453**
UK Geography	**£7.95**	**Superior Software 0532-459453**
World Geography	**£7.95**	**Superior Software 0532-459453**
Jungle Quest	**£7.95**	**Solar Software 061-761 1770**

SPECTRUM

Skooldaze is among the most original games we've seen for some time. And the graphics are incredibly detailed while the whole thing's a hoot from start to end. As Eric your aim is to hit shields hanging on the school walls and find the code for the staffroom safe so you can nab your school report.

However, life is complicated by the lines you're given for every misdemeanour — 10,000 and you're expelled. The attention to detail is fantastic: uniformed children can be seen writing on blackboards, you can knock teachers down with well-aimed catapult shots, then bounce pellets off their heads while they're sitting on the floor and much, much more. Incredibly difficult, original — a real winner.

Ultimate's hero Sabreman features again in *Underwurlde*. You come across a host of furniture and beings in your underground quest. It's basically a maze/platform game, with superb animation, fast, amusing action, and a plethora of rooms. Another potential smash for Christmas and after.

Of course, Christmas sees a rush of software, as publishers try to snaffle a slice of the Christmas cake. Some new games are excellent, some not so good. Among the latter are some of Century's. Take *Tachyon Command*, for example: a space shoot-em-up where you control a small formation of white triangles, called space ships, at the foot of the screen. These can turn (in unison) and fire at waves of incoming aliens.

Best of the bunch is *Warlords*, a sort of Spectrum version of Dragon game *Buzzard Bait*. It's a platform game where your ostrich can be made to fly you to the different levels (but aren't ostriches one of the few flightless birds)? These games look and feel like budget games, so why are they sold at £6.95?

Skooldaze	**£5.95**	**Microsphere 01-883 9411**
Skyranger	**£6.95**	**Microsphere 01-883 9411**
Potty Pigeon	**£6.95**	**Gremlin Graphics 0742-753423**
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Pyzmies	**£5.95**	**Electric Abacus 0372-376072**
The Open	**£5.95**	**CCS 01-858 0763**
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Tachyon Command	**£6.95**	**Century 01-434 4241**
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GAMEPLAY

COMMODORE 64

MYCHESS

Mychess not only plays a darned good game of chess but has more features than any other chess program I know.

The most startling innovation is the presentation of the board and pieces. As well as the usual two dimensional display, there is a 3D option. This gives you an eye-level view (human's as opposed to bird's) of the board. Not only that, but you can rotate the board to view it from any one of the four edges.

Remarkable as this is initially, in practice some pieces tend to obscure others in certain positions. Most players will probably prefer to use the traditional 2D mode, reserving the 3D mode to impress their friends.

You cannot flip between 2D and 3D on the cassette version (instead, you get two separate programs). The disk version does have this facility and a few other extras — demo mode, saving and loading games, plus 128 of the best games ever played.

There are two screens which you can toggle between at the touch of a key: one screen displays the board (2D or 3D), the other, the move record and options selected. A number of help screens can be called up at any time — which summarise the many commands and options at your disposal. Although *Mychess* comes with a comprehensive manual, the help screens are a boon.

There are nine levels of play, each controlling the time the program has to make a move. A mate-problem mode finds any mate up to a staggering nine moves ahead. You can instruct it to highlight all the legal moves available to a particular piece or you can pick a square and ask it to indicate which pieces are attacking and defending it.

The hint option is superb — an instant indication of your best move is given but the longer you wait the deeper *Mychess* continues to search, altering the hint accordingly. From this it is clear that the program thinks during the opponent's time, borne out by the fact that if you play a move that was recommended after a fairly deep search, *Mychess* usually responds instantly.

There is no room to mention all the features but included are a board set-up mode, action replay, swapping sides and a computer vs computer mode.

This program is amazing value for money. It is beautifully presented and plays a high standard of chess. **Bob Chappell**
Price Cassette £8.95, Disk £11.95 **Publisher** Beyond Software 01-837 3699.

SPECTRUM

CHINESE JUGGLER

Fancy your hand at feckless feats of prestidigitation? Well here's your chance. If you've ever played *Chinese Juggler* on the Commodore 64, then you've probably been waiting for the Spectrum version, and you won't be disappointed.

Chinese Juggler is one of the few truly original games. None of your platforms or shoot-em-up variations here. The idea is quite simple, the game itself difficult and appealing.

You control a rather nicely animated Chinaman, complete with pointed hat. The action takes place on a stage and there are eight stands at the front, some of which have a coloured plate resting on them. There are also two rows of white canes.

All you have to do is take

plates from the front stands and keep them spinning on the canes. You have to be right next to a stand to pick up a plate. Positioning is equally tricky. Actions also include rocking canes to speed up the spinning plate and thus keep it aloft.

There are tricks you can perform with the plates, like throwing them over your head and making them change colour, thus earning bonus points — the white plate gets the most points and spins longest.

The animation throughout is superb, with very few attribute problems and smooth movement. There's a time limit so you can't take it easy, and as time passes the plates slow down, becoming increasingly unstable and eventually falling off.

The first screen is really for practice. You're through it as soon as you manage to get plates spinning on all eight canes. The second and subsequent screens are essentially the same, but harder. For a start, the action's faster, and the Chinaman makes more mistakes.

It gets to be quite a feat of attention, keeping an eye on the canes, dashing for another plate and getting in as many tricks as possible. It's fantastic fun at first, but this tails off as all the screens are more or less the same and all that changes is the speed and difficulty. Even so, the animation's good, the theme original, the game difficult — what more could you ask? **Bryan Skinner**

Rating 9/10
Price £15.90 **Publisher** Ocean 061-832 6633

SPECTRUM

AZTEC

This is initially an impressive package. There's cassette, booklet, wall-chart and keyboard overlay, all in a large colourful box for £7.95.

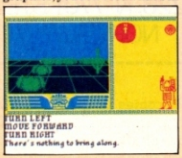
Your part in the game is that of Quick-lizard, a young Aztec coppersmith. You rush into your village after a strange dream and you find it deserted save for a humming bird, which stops humming long enough to tell you its name is Hwee-Tsee, and that it has been sent to help you.

'While you were in the forest, evil condors attacked and took the villagers into the east,' it tells you.

You alone escaped that but you must hurry to help save your fellow villagers. Speed is vital as the sun is sinking slowly down the right-hand side of your screen, alongside which is space for pictures of the objects you are carrying. The remainder of the screen shows the way forward with a small text window beneath.

After the promise of 'beautifully drawn scenes' it's disappointing to discover they are mostly black squares in the same style as the first crude attempts at 3D graphics mazes. These spread before you, with the occasional cactus and a few walls blocking your view in certain directions. Your village is a 10×10 grid, and you're meant to map out for yourself what you find in each square, where the walls are, etc. As you're not told in which square you start out, it's difficult to begin mapping. You'll need eight such grids in all (they could have been provided as the maps don't alter), because if you successfully leave the village you'll move on to the River Valley, the Aztec City and so on.

Apart from background graphics, you don't see what's in



a square until you land on it, and these objects when they pop up are poorly done as block graphics . . . so called because they block out what's behind them. Perspective is confusing as you can always see the square you're actually on, so what appears to be slightly ahead of you to the right is in fact next to you, and switching viewpoint or moving forward is clumsily and jerkily done too. Using single key presses to move forward or turn left or right through 90 degrees. The adventure for the most part is little more than a succession of forward moves until, from time to time, you stumble across an object such as a key, a copper pot or some maize. There have been similar efforts from several publishers recently and *Aztec*, along with the similar and simultaneously released *King Arthur's Quest*, is not of the best. It doesn't live up to the blurb, which promises 'an imaginative quest.'

Mike Gerrard

Rating 5/10
Price £7.95
Publisher Hill MacGibbon 01-353 6482

GAMEPLAY

SPECTRUM

MAGIC ROUNDABOUT

Games for micros are borrowing increasingly from other forms of the media. The latest of these is CRL's *The Magic Roundabout*, in which you control Dougal, trying to build a home before it's time for bed.

Dougal has to keep up his strength, so as he shoves sugar about he also has to eat some of the many white blocks scattered around. The sugar has to be loaded onto a train, which will transport 12 lumps from the platform to the Magic Toadstool. Hazards include most of the other MR characters — Florence, Brian *et al* — who float round the forest, but who can be deterred with a quick bark. Contact with them damages Dougal's delicate nose and in the process you lose one of your three lives.

The graphics aren't at all bad. Dougal's shown as a large yellow character, made up from six or eight UDGs. The animation's very smooth, but he does look odd sliding sideways, up, or down the screen. The action takes place on a blue background, dotted with many red trees, which scrolls jerkily as Dougal approaches the limits of the current screen.

There are a few attribute problems, such as when Dougal passes behind or in front of the trees, but overall it is good.

Toggling F turns on the 'music', a staccato rendition of a vaguely familiar air, but I

couldn't quite work out what. A two-tone goes when Dougal's immediately next to a sugar lump, indicating he can eat it or push it. It's very handy, but the bark's ineffectual.

There are a few good touches, such as the way the sugar bag at bottom right waxes and wanes as an energy gauge, and Dougal turns to bark at you if you're careless enough to lose him a life (nose?).

Far from an arcade addict's taste, *The Magic Roundabout* is more for the younger user. But the game's not as easy as it sounds. It can be tricky piling sugar to shove, barking at or dodging Mr McHenry and his pals, rushing to make the train, keeping an eye on the sugar bag and hoping Zebedee won't appear with his favourite phrase.

Bryan Skinner

Rating 7/10
Price £6.95
Publisher CRL 01-533 2918

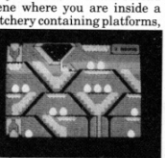
COMMODORE 64

STAR EGGS

A familiar mixture of space shoot-em-up, platforms and ladders, this release from Mirrorsoft brings nothing new to the games scene.

The game has two main scenes. The first has your space fighter zooming around the heavens in search of alien craft known as Guardians. Controlling your fighter takes some skill since it can fly fast, even going right off the screen.

Once you've scored a direct hit you move on to the second scene where you are inside a hatchery containing platforms,



escalators, one ladder and one lift. On the platforms are large white eggs. The action starts with a spaceship descending to the bottom of the hatchery. Pressing the fire button has your spaceman popping out ready for work. This preliminary struck me as superfluous, as is the title page at the start of every game.

The idea is to move your spaceman to an egg, give it a few taps (by pressing the fire button) to stop it hatching, and then move on to the next egg. The eggs don't immediately disappear when tapped so you must try to remember which have already been patted.

If untapped, an egg will hatch into a manta ray-like alien which does a quick twirl round the hatchery, fires a few missiles and then exits via an open window. Once you've dealt with the eggs, it's into the spaceship and back to shooting down the aliens.

The game lacks originality and has few saving graces — the graphics are fairly simple, the sound average, and the excitement non-existent. Not bad but there have been better games.

Bob Chappell

Rating 4/10
Price £6.95
Publisher Mirrorsoft 01-822 3800

AMSTRAD

ASTRO ATTACK

Astro Attack combines shoot-em-up with maze, but the mix doesn't make much of a game.

The maze is a pretty straightforward affair, dull grey walls, blocks at the intersections and the occasional pulsating barrier which shouldn't be touched.

Alien ships appear in the maze, up to three at a time on the first level. You clear the screen of nasties and move onto greater things.

This is not too difficult, partly because the ships don't defend themselves. You just latch onto one at a time, follow it round the maze and blast it from behind — unsporting but effective.

The aliens aren't completely dozy, however, and there is some strategy behind how they move, and you must take care to avoid any would-be Kamikaze pilots. I managed to gain an entry in the high score table after just a few attempts and I really don't think the game would pose much of a challenge for your average games freak.

Battle details such as your current score, the high score and elapsed time (counting down from 1000) are shown at screen right. Each alien ship nobbled notches you ten points towards stardom and as you progress the nasties start firing

back, just to get even for the first screen. Control is joystick or keyboard, but you can't redefine keys to your own preference.

There are some neat graphics touches — the shimmering barriers and the rotating mother ship are handled under interrupt, giving a neat effect, and movement is very smooth.

What a pity then that the programmners use what are little better than block graphics for the ships and the maze.

What a pity too that a little more applied imagination wouldn't have gone amiss. Compared to many a Spectrum game, this just isn't good value at £8.95.

Sandra Grandison

Rating 5/10
Price £8.95
Publisher Amsoft 0277-230222

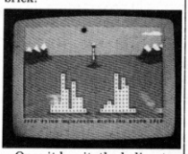
COMMODORE 64

CATASTROPHES

It's tempting fate to bring out a program called *Catastrophes* but that's what Mirrorsoft has done.

The aim of the game is to erect a larger hotel than your opponent, the computer, or another player. You each control your own helicopter with which you transport bricks from a barge to your island building. Pressing the fire button on your joystick picks up or releases a brick.

Your barge chugs back and forth fetching one brick at a time. The helicopter has to be positioned precisely over the barge in order to pick up the brick.



Once it has it, the helicopter is flown across to the island where it must be manoeuvred into position before dropping the brick. Inaccurate positioning has the brick falling. To enliven things there are a variety of catastrophes that can occur.

A low-flying plane can result in a collision with the loss of one of your five helicopters; earthquakes may bring some of your building tumbling down, as will electrical storms.

Hurricanes make it difficult to position your 'copter which gets blown about in the teeth of the gale — your building suffers from the battering of the storm, too.

The game has attractive graphics — the scene shows not only the two island hotels but a lighthouse, cliffs, sea and sky. The sun moves across the heavens denoting the passage of time.

The helicopters respond well to joystick movement and are pleasingly animated. Sound, too, is used effectively, though the theme tune gets wearing after a time.

The trouble is, the game concept is too simple and lacks variety of challenge. It's fun to play at first, but I doubt you'll find it addictive. More suited to younger players, I'd say.

Bob Chappell

Rating 6/10
Price £6.95
Publisher Mirrorsoft 01-822 3800

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SPECTRUM

D-DAY

When we hit the beaches we knew it was just the start of a long hard slog. Peering through the gloom I could make out hazy shapes — but what were they? Were they Allied or Axis? It was no good, I would obviously have to use the colour telly . . .

D-Day from Games Workshop bills itself as 'the only true tactical wargame for the 48K Spectrum.' As a computer game it's something of a rarity, as its ancestry is the board game rather than the arcade, and although I'd dispute Games Workshop's outrageous-ish claim, there's no question that it's a serious attempt to simulate WW2 combat.

Just loading the beast is a yomp. First load a bit of it, stop the tape, press a key for the scenario you want to play (a choice of the landing, breakout, pursuit to Arnhem, and Arnhem itself), load deployment data, stop tape, deploy, load last bits.

Fortunately, there are clear on-screen instructions, so it's relatively easy to sort out. The screen display is split into three sections, the main one being a window on the computer's 'playing board.'

This shows details of the terrain, which consists of beach, rough ground, road, woods, towns etc, and scrolls over a full map 63 units square.

To the left of this is a window showing the phase you're in, and below there's space for details of the unit the cursor is

over. I'd say this was a mistake, as there's no useful information in it most of the time, and the main window really is a bit cramped.

The full map of the landing scenario gives a reasonable impression of the countryside around Caen, and you have two ways to populate this landscape. The slow way is for the two players to take turns distributing their forces, Allies at the top of the map, Germans at the bottom, while the fast way gets the computer to do it for you.

This latter can make for some weird results, but considering the historical precedents there's a certain amount of logic in having the opposing forces thrown into combat any old how. They consist of infantry, tanks and armoured cars with the odd extra thrown in, and the objective for both sides is to knock off two thirds of the opposition.

As a victory condition this strikes me as unsubtle — after all, wasn't the operation about establishing a beach-head in the short term, and liberating Europe in the long? The way the map's laid out, however, you tend to be sucked into a slogging match rather than being allowed to use cunning to take towns and road junctions.

I'm also not too impressed by the way combat takes place. The procedure is as follows — first you place the cursor over the firing unit, then over the target, and all being well a little blob chugs its way across the screen in Basic. This isn't particularly slick, and quite often the program decides that things that seem to be in clear sight aren't.

As an experiment I tried using a tank to fire on infantry, and to my surprise it appeared to kill off the lot. Now Games Workshop, with 'a decade of wargaming experience' behind it, should know that tank shells are relatively ineffective against infantry. Simulation schimulation.

I'm also not too happy about the fact that the game's written mainly in Basic. Some excellent games have been written in Basic, and tactical games of this sort don't really need the speed of machine code, but a little compression might have allowed space for the computer to play one side, and this would have broadened the game's appeal.

That said, it's not a bad try, and if you and a friend enjoy board games and fancy trying one implemented on a computer it's well worth buying.

John Lettice

Rating 9/10
Price £7.95 **Publisher** Games Workshop 01-965 3713

COMMODORE 64

SPACE ACE 2101

Hot on the heels of *Elite* and Bug-Byte's *Space Trader* comes another space strategy game requiring you to become the Arthur Daley of the Mhiyken Galaxy, and find yourself a nice little earner or two.

There are four planets in the system orbiting a sun; the fourth planet is beyond an asteroid belt 'in the lonely depths of space'. The galaxy is threatened by hostile, alien beings and your aim is to clock up the credits.

There are three main screens, plus others containing information that you access at various stages. You begin by choosing a difficulty level on the f1 to f8 keys, then you must choose to land on, or escape the orbit of the planet Mhiyken. As you've precious little fuel, landing seems a good idea. This screen is vaguely *Defender*-like, and the joystick allows you to zip around in either direction over the surface until you find a fuel supply. You choose how much of your $2000 to spend on fuel units, then take off again in search of a shop or a port. Shops sell a variety of weapons and defence systems, food, fuel (pricier here), while in ports you can find passengers looking for a one-way ticket to another planet. You can take only one at a time, and they sensibly insist on cash on safe delivery.

The planet surfaces are patrolled by hostile craft and you can collect bounty from shooting these down, although it's tricky to do so because you can gain height only when moving fast. To turn round you must slow down before being allowed to change direction. Best to head for the heavens.

Once on your way out of the orbit you can press M for a map

of the solar system, allowing you to estimate the bearing you need, while S will give you a status report any time. Heading for the next planet sends you into a typical 3D arcade game, with meteros and ships coming out of the screen at you, and you firing away through your cross-hair sights.

Successful trading and brilliant blasting builds up your cash in hand, and maybe one day you'll be able to afford the $50,000 Zadron Bomb so temptingly displayed in the shop.

While the game's absorbing, the graphics could have been better; the scrolling landscape of the planet is simple and the hostile craft lack detail. They've certainly crammed a lot into the 64, though, and you'll certainly need the SAVE feature that's incorporated.

Mike Gerrard

Rating 7/10
Price £7.95
Publisher Ozi-Soft (07356-71163)

COMMODORE 64

JAVA JIM

If you go down into the jungle today I'm afraid you won't find any teddy bears. Instead, you'll find our intrepid explorer Java Jim battling it out with flying lava, gods, spiders and snakes.

Java Jim was out excavating in the jungle when a horrid old harpy flew him to the sacred volcano of Hogbarnofu to face the magma god Onesh. In order to return to the outer world Jim has to find a number of icons for Onesh. He will then be given parts of a vessel which will allow him to escape.

You control a robot that has been given to Jim to do the actual searching for the icons. Most of the action for the game takes place on a rectangular

island with a volcano in the centre. Each robot has a number of 'digs' and the number remaining is indicated at the top of the screen. As you move around the screen a neat hole will be dug revealing any icons buried there. You must then pass back over the item and press the fire button in order to collect it.

Of course, it isn't made easy for Jim as the volcano is constantly spitting lava which heads straight for the robot; there's also a spider which chases you around the grid.

Once your robot has run out of digs it is given the chance of gaining some more and is transported to another room with a floor of squares that flash. Stepping on a flashing square will give your man another dig. Oh, and of course, wriggling snakes are moving from side to side on the screen a little too realistically for comfort.

Once you have collected enough icons you can go and trade them with Onesh. The price Onesh gives you for the icons seems to depend on how many of each type of icon you have. Once you have your money you can then buy parts of your vessel from the god.

Easy to learn, fun to play but difficult to master. **Susan Cooke**

Rating 7/10
Price £6.95 **Publisher** Creative-Sparks 0252-543333

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

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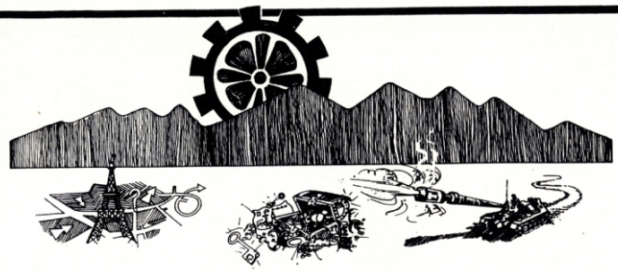

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STEP UP YOUR BASIC

Kenn Garroch plugs in the Basic Extensions ROM and adds more power to his BBC.

Hailed as something of an advance when it was first launched BBC Basic has since fallen a little behind. There are now a few Basics that provide some of the facilities available on the BBC and some with even more, such as QL SuperBasic.

The Basic Extensions ROM from Micro Power upgrades the BBC Basic to provide more power and make it a great deal more structured.

Features

The commands break down into a series of functional groups. The filing set — MERGE, JOIN, and VERIFY — are all used to access the files on the current filing system. In general, these are all meant to be used with Basic programs, although VERIFY can be used to compare sections of memory with any file.

The editing set — CHANGE, COMPACT, FIND, REPLACE, SHIFT and WILDCARD — are all used as aids to program writing. The COMPACT command can confuse the Beeb's interpreter because it removes spurious spaces. A line such as *LOAD TEST 1900 compacts to LOADTEST1900 which the filing system can no longer swallow.

The FIND, REPLACE, and CHANGE commands are all very similar but with options to locate a string, replace the string with some other string and ask before changing it. There is a wildcard, normally'?', but it can be changed to any other character via the WILDCARD command. SHIFT allows you to copy sections of your program to other line numbers.

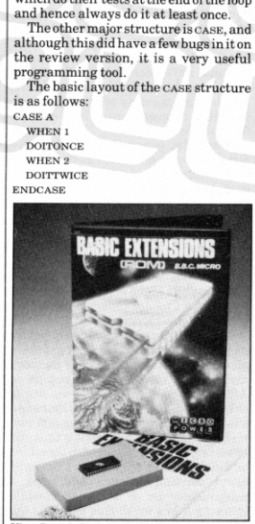
The rest of the direct commands are generally status and control commands and include BTOD, DTOB, STATUS, SECURE, DUMP, and CONT. The most interesting of these is SECURE which, when entered, asks you for a password. The computer will then wait until you retype this password before resuming operation. The command locks up the computer, not even CTRL break will allow you in unless you know the password. Unfortunately, this command can be used only in immediate (direct) mode so you cannot lock programs in while they are running. This is a disadvantage found also in the decimal binary conversions, DTOB, and BTOD.

As well as the direct commands the package includes a number of new program statements and structures. These are the WHILE ENDWHILE, CASE ENDCASE, LOOP ENDLOOP, and a multiple line version of IF known as FIF. The first two of these rectify their omission from BBC Basic's specification, and make it much more like Pascal and Algol. The WHILE structure is pretty straightforward and is a loop structure that does its exit test before executing the loop. This is the opposite of REPEAT and FOR, both of which do their tests at the end of the loop and hence always do it at least once.

The other major structure is CASE, and although this did have a few bugs in it on the review version, it is a very useful programming tool.

The basic layout of the CASE structure is as follows:

```
CASE A
  WHEN 1
  DOITONCE
  WHEN 2
  DOITTWICE
ENDCASE
```



Micro Power's Basic Extensions: a good buy.

Note that the Basic extension allows procedures PROCDOITONCE and PROCDOITTWICE to be called without including the PROC prefix.

The CASE structure also implies the variable to be tested, the equals, and any of the Basic inequalities can be used.

Two other very useful commands are FPOP and GPOP. These allow BBC Basic to run FOR NEXT loops and subroutines efficiently but, at the expense of bad programming techniques. The FPOP command allows the FOR loop to be escaped without upsetting the BBC and the GPOP does the same thing for subroutines.

The LOOP structure deserves some mention at this point since it seems to be a little redundant. It appears to be a structure that is similar to the DO loop found in some other, larger, languages. Unfortunately, its layout is cumbersome. For instance:

```
LOOP
some lines of program to be repeated
EXITIF some condition THEN do something if this is the exit part followed by
ENDEXIT
some line of program to be repeated along with the section after LOOP but not after the exit condition is met.
ENDLOOP
```

This is a curious layout and need be used only if you want a loop you can jump out of. Bad practice.

In use

The ROM normally boots up on its own with the Basic Extensions coming up below BBC Basic 32K and above Acorn DFS. Typing *HELP EXTENSIONS gives fairly detailed information on the new commands available. If, from Basic, you want to turn off the extensions, you simply use KILL to restore Acorn Basic.

If you are a shorthand freak, and use CH. instead of CHAIN you'll have to be careful because some of the shorthand commands now mean something different. CH becomes CHANGE but RU. becomes R. A useful command that crops up is LPRINT which has the same meaning in Microsoft Basic.

Micro Power is considering a number of ways to distribute this software. The first and most obvious is on ROM with a run time module on cassette, to allow programs written in this extended Basic to run on machines without the ROM.

The other way to get the extensions is on disk. The software is then loaded into a sideways RAM such as the Solidisk. Micro Power thinks this is quite a neat idea since it should discourage pirating.

Verdict

Overall, the Basic Extensions ROM from Micro Power is well worth the money. Its extra commands are useful and the structures should enable people to move from BBC Basic to another language such as Algol 68 or Forth.

The present bugs should be fixed by the time the product hits the streets leaving as the only drawbacks the lack of a few extras — LLIST, DTOB etc — inside programs, but apart from these it's a good kit.

REPORT CARD: 1 TO 5

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

Name Basic Extensions ROM **Price** £19.95 **Distributor** by mail order from Micro Power, 0532-458800.

RUNAWAY KAT

The QL Monitor is designed to help machine code programmers develop and debug programs. Tim Maddrell gives it a test run.

The QL's SuperBasic is a powerful version of the language but it is not fast and it cannot exploit one of the Sinclair QL's most attractive features — multi-tasking. But neither of these restraints really apply to programs written in machine code which are compact, fast and run concurrently with other processes. *QL Monitor* by KAT Software is intended to help software producers and others keen to get stuck in to develop and debug such machine code programs.

Features

QL Monitor is loaded into RAM at $2F000 hex (192512 decimal), and occupies 6.5K — KAT suggests that the safest place to load your own programs is above this, in the range $31000 to $3F000 *ie* 56K. This should avoid such problems as Microdrive buffers and stacks corrupting your code.

The monitor offers options to display any area of memory, to change any location in RAM — including the ability to fill a specified range with a given byte, and to copy and compare areas of memory. You can also save any area of memory to Microdrive, load from Microdrive into RAM, list directories and delete files from Microdrives. You may execute machine code from within the monitor with or without trace and/or breakpoints. There is also a simple calculator built in — working only in hexadecimal.

Unfortunately there is no disassembler supplied with the monitor so those brave souls who hand-assemble code have no easy confirmation that they have formed their instructions correctly.

Presentation

The KAT QL Monitor comes on a Microdrive cartridge with a slim A5 manual, which carries dire warnings about misuse of Microdrive cartridges and tells you to make an immediate back up of the program as your working copy. It would have been helpful if the text could have shown a worked example of a simple machine code program, including entry, debugging and final successful execution.

When the monitor is loaded the display (on a domestic TV set) is rather crude using white characters on a black background and is also updated fairly slowly. Although a monitor is merely a means to an end, a little more effort here could surely have improved the presentation.

In use

I tired rapidly of the default display and used a short loader program, changing paper, ink and character size.

Commands are simple and easily memorised (even if I could not get them all to work). Program entry or memory modification can be carried out using ASCII strings or strings of bytes, words or long words. As a word is two bytes and a long word four, I found these last two largely redundant, preferring to enter bytes separated by spaces with the added advantage that I did not have to worry about starting at even addresses. I mispunched an o for a zero while entering a hex word; this froze the QL and the only way out was reset. The monitor is quick to load and its file handling is easy to use, so this was not too great a mishap but served to remind me that I was not protected by QDOS. Given a machine code source in hex, program entry is simple.

It is most exciting for budding machine code programmers to see their own program working and the registers actually holding their expected values. Unfortunately, you cannot insert or delete bytes automatically but blocks of memory can be copied, verified and filled instantly. Any area of memory can be searched for ASCII strings or hexadecimal patterns. If this area includes a keyboard buffer, you will find at least one match.

Memory can be displayed in hex, in ASCII or both combined. Output listing to the screen can be paused by pressing virtually any single key — press again to continue. Pressing CTRL-A or Enter abandons the listing and returns to the prompt. The monitor also displays the values of the program counter, the stack pointers and the registers. You may also easily set or clear registers.

Code can be executed with or without automatic return to the monitor. Up to eight 'transparent' breakpoints can be set and listed — when your program meets a breakpoint, control is transferred back to the monitor which displays the registers and the address at which execution halted. To carry on from here, you must remove the breakpoint and jump to this address (not very user friendly . . .). Programs can also be traced, with register display after every instruction or only until control is passed to a subroutine — these traces can operate over an optional range (but when I tried this, it always flagged the end address as erroneous).

Quite often I found myself loading the monitor for no other reason than to use its Microdrive directory listing which shows the length, in hex as always, and the name of each file on the cartridge. This is handy, but again I should have liked extra facilites such as total bytes used and remaining.

There are sundry other commands of varying utility — ON echoes all output to the printer connected to serial port 1 ('This can be altered by changing the ASCII string . . .'). Apart from changing printer end-of-line characteristics successfully, any other attempt I made crashed the computer — more examples please, KAT. BR word sets the serial port baud rate — presumably word is in hex? I could not get this to work, and somehow generated "ADDRESS ERROR", so preferred to use the command Basic to switch to QDOS and change the rate there.

Verdict

If I've been hard on this package, it's because I'm used to the excellence of the Hisoft *Devpac* and Picturesque *Monitor* packages — both for the Spectrum. The KAT QL Monitor is undoubtedly a useful tool for the machine code programmer — especially in combination with an assembler, and if it gets fully sorted out.

REPORT CARD: 1 TO 5

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

Name QL Monitor **Price** £19.95 **Publisher** KAT, 4a, Grosvenor Place, London W1 **Format** Cartridge **Other versions** None **Outlets** Mail order.

Table

Some of the commands.
NB byte=8 bits, word=16 bits, longword=32 bits

Command	Comments
start.end	display memory in hex
start,end	display memory in ASCII
start;end	display memory in hex and ASCII
start::word	change words (start must be even)
start"string"	enter ASCII string
SSR:word	set status register
ON	echo all output to printer
X	display values of registers
RZ	reset registers to zero
DRd	directory of drive d

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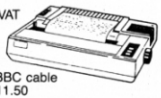

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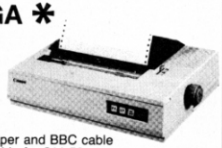

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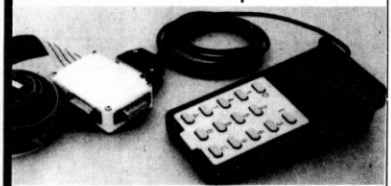

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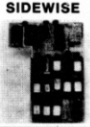

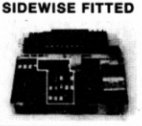

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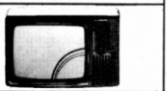

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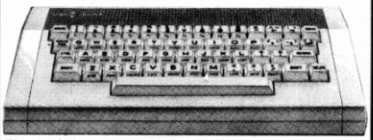

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READOUT

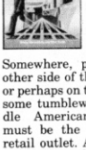
'The Master Memory Map For the Vic 20' by Sherer & Patchett, published by Prentice-Hall at £17.25 (paperback, 233 pages).

If Commodore doesn't kill off the Vic, the price of this book might well do the trick. It's a pity that the publisher has seen fit to charge such an extortionate price in the UK for what is really quite a useful book.

It begins rather oddly, listing sources. A glossary follows the preface, but then we get down to the nitty-gritty of explaining precisely how the Vic works. The authors have divided the Memory Map (the name, in typical American fashion, is copyrighted) into two sections: beginners need only read the words set in bold type, while more advanced programmers can read the lot.

The book descends into some childish tactics with characters such as Professor Von Chip and his robot Prototype, but it is comprehensively written and clearly laid out, with plenty of cartoons.

Once you have mastered the different locations, the book takes you through interfacing the Vic, apend routines, sound effects and colour graphics. For those too lazy to type in the listings given in the book, Mr Sherer will even send you a disk or tape of the programs — for a price. **LT**



'The Business Computer Guide' by Horenstein and Tarlin, published by Sunshine Books at £8.95 (paperback, 192 pages).

Somewhere, possibly on the other side of the looking-glass or perhaps on the main drag of some tumbleweed-blown Middle American town, there must be the ideal computer retail outlet. All possible systems are stocked. Software is readily available on hot and cold running disk units.

Sales assistants of perfect impartiality remain discreetly in the background until they are needed, at which time they will step forward and answer questions with omniscient clarity.

It's about as likely as a duff bottle of Hirondelle, you might well say. In its absence you could immerse yourself in this book, which divides neatly into two halves. The section dealing with business computing in general can't decide whether it's a dictionary of terms or a plain man's guide. The second section names names — it constitutes a guide to hardware, software, and publications.

But machines come and go, prices and specifications change, relationships alter. It's a good try, and the publisher has also attempted to turn around its original US orientation for UK readers. But it can hardly be of lasting value. **DG**

'Learning with Adventure Programs' by Rosetta McLeod, published by Melbourne House at £5.95, (paperback, 86 pages).

The micro seems to be a particular victim of the Puritan work ethic. It can't be good unless it's being useful. This book indicates how non-expert parents or teachers can ensure children have some ulterior purpose to their game-playing besides just having fun.

Three adventures — *The Hobbit*, *Valhalla*, and *Snowball* — are covered before a chapter on writing your own. A fifth chapter deals with *The Quill*.

The author, an English teacher, first used *The Hobbit* with a class of low-ability third year pupils and discovered — surprise, surprise — that they showed unusual initiative and enthusiasm. In fact, they even wanted to take the book home with them. (Unheard of.) No advice is offered on setting up etc, but the author managed and so, presumably, can you. Especially if you don't mind taking advice from your 'low ability' pupils who may know more about computers than you.

Each chapter covers the learning skills required and developed, as well as how learning objectives worked out in the classroom. A nice touch is the reproduction of pupils' reports on the adventures and snippets of their written work. **HA**

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Oric 1/Atmos, software, Author wordprocessor £8, French language £6, toolkit (extended basic) £3, Xenoni £2, Centipede £2, Chess £3. Tel: John Wright, Ripley 860653.

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Spectrum wanted, pen pal to swap ideas and programmes. Write: Thielens Frere, Orbanstraat 173 8400 Oostende, Belgium.

Wanted, for 48K Sinclair Spectrum, microdrive interface 1, £40 offered. Patrick McMenemy. Tel: Blantyre 3050 62 after 6pm.

Spectrum, five months guarantee, two 48K RAM packs, all leads and manuals supplied. The lot for £135 ono. Tel: 01-891 0496 after 4.30pm.

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Spectrum 48K, plus ZX printer, DK tronics keyboard, speech Synth, cassette recorder, magazines, manuals, tapes, software, books, printer paper, £220. Tel: Doug, Horndean 595555 after 6pm.

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Spectrum 48K, joystick, printer, 4 rolls paper, software all vgc. Sell for £180 ono. Tel: 01-445 4349 evenings only.

Spectrum, software to swap, all the latest. Your list for mine. Chris, 5 Crossway, Littleworth, Stafford ST16 3TR.

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Spectrum 48K, Currah microspeech, 4 games, Quickshot 1, faulty interface. Guarantee ends November 5. The lot for £200 and onwards. Wanted: Specmanipulator Commodore program, will pay £50. Tel: 01-904 2056.

Spectrum 48K, Fuller box, Quickshot, interface cursor/Kempton. Lots of progs, and books, worth £££'s, £155. Swop Raleigh Bomber 16" and wash or Hi Fi stack. Tel: H. Wycombe, (0494) 443184.

Spectrum 48K, joystick, interface, Currah Speech. Zonx sound box, £50. Software books, offers around £250. Casio MT65 keyboard, £75. Tel: David 01-508 5717 after 6.30pm.

Atari pack: Spectrum originals, Avenger, Orbiter, 3D Desert Patrol and Black Hole, £2 each. S. Smith 2 Knights Close, Pembury, Tunbridge Wells, Kent TN2 4EL.

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Spectrum 48K, games to sell or swap, Pystron, Fighter Pilot, Combat Lynx, Braxx Bluff, TLL, Scuba Dive, Bugaboo and many others. Tel: Nottingham 580915.

ZX Microdrive and interface 1 package, untouched, £75. Tel: 01-568 5247 evenings.

ZX81 64K, joystick plus interface games including 3D, Monster Maze, Asteroids, books and magazine articles, £60 ono. Tel: Mark, (0392) 217988 after 6pm.

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QUIT

The all-seeing eye of *PCN* travels around the world this week, from Silicon Valley to Japan, from Merthyr to Birmingham.

In Silicon Valley, a doctor has struck another blow at the micro-electronics industry, this time in its political role as the job provider of the future. Apparently it is providing not just jobs but also toxic gases, strong acids, and dangerous solvents with the result that workers are suffering a variety of exotic health problems.

As occupational hazards go, acid burns and lung disorders are too extreme to be overlooked. It will be interesting to see how much publicity the news gets in the Silicon glens and valleys around the UK.

Closer to home, a company called Learned Information (to distinguish it from the cowboy outfit Learned Horsefeathers) has attempted to put a figure on the amount of information held by all the computers in the world. 'The figure of 100 million,' it concedes, 'is impossible to conceive.'

So it makes things easier. 'Put another way, if the information was printed in the form of an average Bible, it would need around 50 football pitches on which to lay them all out.'

Birmingham steps into the limelight this week as the home of US Gold. This software supplier for Commodore and Atari has apparently caught the anti-Russian bug sweeping the US at the moment.

Its latest release is called Raid over Moscow, which it claims that nice Mr Reagan was playing when he announced that US forces had been dispatched to drop nasty things on the Soviet Union.

Back in Japan, Casio has come up with a product that was invented in UK schools at about the time of Tom Brown — the wrist-held crib sheet. In the old days, you had to scribble essential details on your shirt sleeve before going into the examination room. Now, thanks to Casio, you can record it on Data Bank 500.

Outwardly it is a conventional digital watch. But 50 sets of six letters lurk within — plenty to store the flax production figures for Bangladesh for 1968 for those troublesome geography exams.

COMMERCIAL BREAK — Not for Cosi-dry non-drip diapers, but for Ericsson's personal computer. We thought of making a competition of it: What is the connection between this charming nursery scene and a personal computer? There are numerous possibilities but we'll spare you the trouble. The caption is ' "We'll hold your hand," and suddenly you're up and running!' Our Toddlers correspondent points out that the next thing you know you'll have come to earth with a bump, sustaining multiple bruises and skinned knees.

SYNTAX ERROR

The phone number for Adapt Electronics, manufacturer of the RGB adaptor for the Spectrum (issue 86), was incorrect. Adapt cn be contacted at 20 Starling Close, Buckhurst Hill, Essex. Telephone 01-504 2840 or 01-309 1175.

Sorry, our news story about Opus disk drives and disk operating system (issue 86) was just a little confusing. To put the record right, the £119.95 disk drive available through Boots is a 5.25in drive with a 100K capacity. The drive included in the £299.95 disk interface and drive package has a capacity of 800K with software selectable 40/80 track operation, and it costs £199.95.

NEXT WEEK

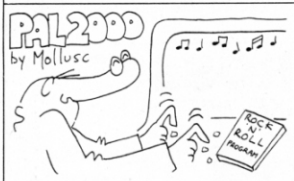
Spectrum overdrive
Exclusive to *PCN*, we review a comprehensive Spectrum disk system from Timex Portugal.

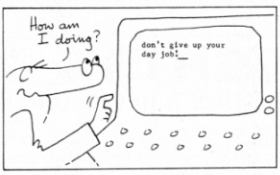
BBC on show
Put yourself in the picture with a kaleidoscopic look at displays on the BBC.

64 for hires
Take up your pen and write machine code routines to produce graphics for your Commodore 64.

Buyers guide
Arm yourself against the Christmas marketing drive with our seven-page look at what the micro makers have to offer.

BBC bonus
We look at the Discmaster for the BBC, another option for students of storage.





PCN DATELINES

Event	Dates	Venue	Organisers
Penwith Computer Club Exhibition	November 24	St Pauls Old School, Penzance	Jeremy Hewitt, 0736-787159
Computer China	Nov 25-Dec 1	Xiamen, China	Beta Exhibitions, 01-405 6233
Intl Exposition for Technology Transfer	Nov 27-30	Metropole Hotel, Brighton	Concorde Services, 01-749 6171
Electron & BBC Users' Show	Dec 6-9	New Horticultural Hall, Westminster, London SW1	Database Publications, 061-456 8383
DEXPO WEST	December 11-14	Anaheim, USA	CGP 01-582 9256
CADCAM Intl Show	Jan 8-10	NEC, Birmingham	EMAP Intl Exhibitions, 01-837 3699
Which Computer?	Jan 15-18	NEC, Birmingham	Clapp & Poliak 01-891 5051
High Technology & Computers Education	Jan 23-26	Barbican, London	Computer Marketplace Exhibitions, 01-930 1612
PC Trade Show	February 26-28	Barbican, London	EMAP Intl Exhibitions, 01-837 3699
DEXPO Europe, 1985	March 6-8	Olympia, London	CGP 01-582 9256
Info '85	March 26-28	Olympia, London	BED, Michael Hewitt 09328-65525
Softcon	March 31-April 3	Georgia World Congress, Centre, Atlanta, USA	Northeast Exhibitions 617-739 2000

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