

40p EVERY WEEK • No 86 • NOV 10 1984

PERSONAL

Computer

NEWS

**EXCLUSIVE
REVIEW**

3D chess on the QL

**ONLY
40p**



COMMODORE TALK

Teach your 64
to converse - p39

C FOR SPECTRUM

A powerful language
under Pro-Test - p20

BBC EXTRA

Add new commands
to your Model B - p12

BUSINESS PICK-UP

Zenith unveils its
PC-like portable - p32

WIN AN APPLE IIC-FREE

Seeing is believing

See the pack – see the screen – see the game.
See the difference the moment you pick up one
of the games from Firebird's new Silver Range.

The difference is that our packs show the high
quality you'll see on the screen when you play,
so you know exactly what you're buying.

The same high standard applies to all twenty
games in the range and all are available at the
remarkably low price of

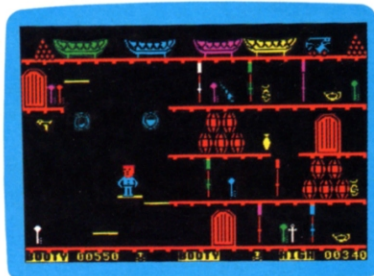
£2.50



FIREBIRD

SOFTWARE

Here's a sneak look at three of the NEW games:



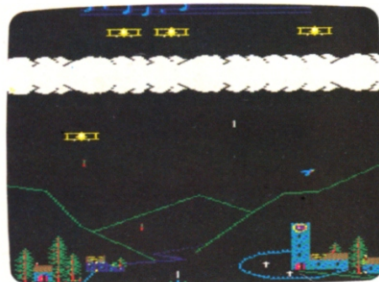
BOOTY

Feast yer eyes on the BOOTY-ful treasure
stored in 20 holds.
There be pirates, parrots and fun galore!!!



THE WILD BUNCH

Can you survive life on the run in this Wild
West adventure???



BIRD STRIKE

Dodge the planes and shoot the pigeons to
complete the tune –
then move to the next level.

Look out for these games in the FIREBIRD silver range at selected high street stores.

SPECTRUM: THE WILD BUNCH · BOOTY · MR. FREEZE · TERRA FORCE · VIKING RAIDERS · MENACE · EXODUS · RUN BABY RUN · CRAZY CAVERNS. **VIC 20:** SNAKE BITE · MICKEY THE BRICKY
COMMODORE 64: BOOTY · MR. FREEZE · EXODUS · HEADACHE · ZULU. **BBC MICRO B:** BIRD STRIKE · GOLD DIGGER · ACID DROPS · DUCK!

The new range from British Telecom.



You'd better believe it!!!

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

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

COVER STORY

QL Checklist 18

Pison's new chess program for the QL is designed for home computers, but can compete with the best of the professionals. We offer an exclusive preview of what promises to be an exciting development for computer chess fans.



OUTPUT

BBC's command performance 12

Add three extra commands to your Beeb with this program which uses only 1K of memory.

Circling around Amstrad 20

You can draw circles with your CPC 464, with this listing.

Going ape on Spectrum 24

Try your hand at wresting a fair maiden from the hands of a hairy ape in this challenging game for you to type in.

Surviving in the 64 jungle 28

Key in the second half of our dramatic adventure for the 64 and see if you have what it takes to survive in our jungle.

Spectrum's Vu-File unchained 33

Vu-File to runon your Microdrive with this easy program.

HARDWARE

Weighing up the Zenith Z160 36

This latest addition from the Zenith stable could be a prize fighter in the portable IBM compatible market.

PERIPHERALS

Multiple modem 41

The Telemod 3 comes with three speeds, auto and manual answer and that vital BT approval certificate. How does it rate against other modems?

Commodore conversation 45

Hook up the Voicemaster to your 64 and it will talk back to you.

SOFTWARE

Gameplay 53

Playing the game 58

Budding games designers could find help in the form of this package for the 64.

Spectrum with a C 63

Spectrum users can now use C language for their programs, with this version by Hisoft

REGULARS

Monitor 0

Semi-official disk drives for the QL, this page; Acorn to launch music synthesiser for the BBC, page 2; Coleco Adam on offer at a bargain price, page 3; Boots' £120 disk drive, page 4; new weapon against the pirates, page 5.

PCN Charts 5

Check the latest movements in the weekly games chart.

Random Access 7

We want to hear from you—share your views with us and you could win £15 for the best letter.

Routine Enquiries 9

Solve your programming problems by consulting our experts.

Microwaves 10

Gotta brainwave of a program?

Dungeon 35

Mike Gerrard tries to save the world from a group of Nazis.

Readout 48

Software Pre-View 51

Billboard 64

The long good buy.

Quit/datelines 72

QL to get disk interface

QL users standby to throw away your Microdrive cassettes. A semi-official disk interface should be available in December.

The interface has been developed by Cambridge Systems Technology with the cooperation of Sinclair's technical staff.

Unlike the disk system announced by Quest (issue 85), the CST interface has been designed to work with QDOS.

Although the interface won't be carrying a Sinclair label, the involvement of the company in the design will ensure support for the proposed disk data format.

The interface will support 5.25in disk drives but will be sold mainly as a package with Teac 3.5in microfloppy drives.

CST refused to comment officially about the product or its price on the grounds that it does not want to make a formal announcement until the product is ready to be delivered to the shops.

But the company will be giving a sneak preview of the interface at this weekend's Independent QL Users Group meeting in Swindon. (Further details of the meeting can be obtained from Leon Heller on 0908-613004.)

Apple offers 'test-drive' on Macintosh

For all those people who think a computer could run their business and their lives but are still frightened by the prospect, Apple has launched its Test-Drive-a-Macintosh.

The scheme, which will run until the end of December, allows Apple dealers to have up to four Macintoshes to be lent out overnight to anyone interested in purchasing one.

The test-drive Macintosh comes with a cassette tape which guides you through the computers facilities and a suite of programs. For the more adventurous, a booklet is provided which guides the user through the development of a new baby food marketing operation down to the company logo using MacPaint.

You can explore how you'd make contact with potential backers using MacWrite, and impress them by producing forecasts of costs (Microsoft's Multiplan) and a graphical

representation (Microsoft's Chart).

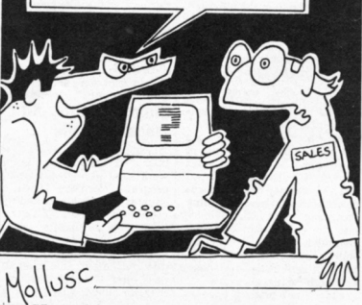
Apple is also expected to launch a laser printer early next year. Apple claims that this printer will offer full graphic facilities and produce a full page of text quicker than a photo copier.

There's no indication of the price yet, but looking at Apple's past performance it should cost considerably less than those already available.

Meanwhile, Apple remains coy about speculation that it will launch a colour version of the Macintosh early next year. Apple traditionally uses its shareholders meeting in January to make new product announcements. At this year's meeting it was the Macintosh and rumours are rife that a colour version, a logical next step, could be revealed soon.

If all Apple announces at the meeting is a laser printer there'll be some grim faces.

CAN YOU CHANGE IT FOR ANOTHER COLOUR??



Acorn plugs in Beeb music synthesiser

Acorn is all set to launch itself into the music business. It is due to unveil a music synthesiser at COMPEC next week.

The Music 500 is a plain box that plugs into the 1MHz bus on the Beeb and can send its stereo sound output to a hi-fi system.

At £199, it consists of a 16-voice polyphonic sound generator that can be controlled from the Beeb's keyboard.

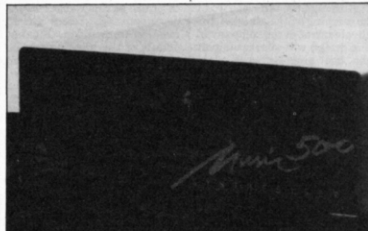
With the device comes a

high-level structured language called AMPLE which allows you to control wave forms, pitch and volume envelopes and use cross modulation techniques.

You can also create octaves, cords and simulate a variety of musical instruments.

Conspicuous by their absence from the system are a Midi interface to link it to other synthesisers and musical equipment and a music keyboard.

Acorn says the facility to plug in a keyboard will be offered as an add-on 'at a later date'.



Beeb alive with the sound of music.

IBM wants change of gear in Advance

It looks as though Advance will have to go into reverse, if IBM has its way. Advance's £1,500 PC compatible has been selling in WH Smith for some time, but now IBM has issued a statement claiming that part of the Advance's ROM is an unauthorised copy of a program from the IBM PC's BIOS.

Last Friday Advance replied to IBM. An IBM spokeswoman told PCN that having been informed of the infringement, Advance, Ferranti and WH Smith have agreed to cease the infringement. 'As the infringement is in the Advance's ROM, this can only mean that the current version of the machine is being withdrawn.'

As it now seems that Smith's entire stock will have to be withdrawn in any case, things must be looking bleak for Advance.

Meanwhile Advance's friends are showing a suspicious lack of enthusiasm. Ferranti, which manufactures the machine, admits to being in discussion with IBM, but won't say what it's discussing. We put it to a spokesman that there was a possibility of Ferranti ending its arrangement with Advance, but the spokesman wouldn't comment. WH Smith is still selling the Advance for £1,499, in its in-store computer shops, although Advance has dropped the machine's price. It appears

the price of the 86b has dropped by £300, although an Advance spokesman told us he didn't think it was that much.

Sales of the machine in WH Smith have been 'satisfactory', according to a Smiths spokesman, but while elaborating on this he made a curious distinction. WH Smith has a business computer sales arm in addition to its in-store shops, and while Advance sales have been good by the lights of the business section, they have been 'disappointing' by the standards of the in-store shops, where they're displayed alongside Spectrums, QLs and Acorns.

Logically then, the Advance might be better placed alongside the business machines, rather than taking up valuable floor space in high street stores. While WH Smith says it hasn't withdrawn the Advance, it won't comment on the possibility of the machine being moved out of the in-store shops.

Micropro gives old stager new life

Micropro has announced an upgraded version of its old workhorse word processing program, Wordstar. It will be shipped in by January and will retail at £440 (plus VAT).

Managing director Robin Oliver insists it is not a replacement for the widely used Wordstar, although the company does offer a direct swap plus £200 for all who wish to change

their current version for the update (this offer holds for originals only).

Wordstar 2000 will be available only for the IBM PC, XT, and AT. Micropro says it will be converted for other machines but couldn't say when.

Micropro claims for Wordstar 2000 that 'it will redefine the state-of-the-art for micro-computer applications software'.

Special features, or as Micropro calls them, the 'bells and whistles of the new package' include on-screen windows, so that you look at several documents at the same time and transfer sections from one document to another, a built-in arithmetic calculator and spelling corrector, so you don't have to leave the current document each time you wish to carry out a calculation or spelling check, and a typewriter mode which means you can type directly to the printer.

Micropro seems confident that this time its product is fully protected with a software protection algorithm which will allow only up to three backup copies, so any one trying to avoid the rather hefty sum of £400 is likely to be unlucky!

Prestel hacker may force ID change

It was egg-on-face time for Prestel at the end of last week after a computer hacker broke into Prestel and ran amok through the system.

As a result Prestel is considering changing all Prestel users' identity numbers and

advising them to change their passwords.

The major security breach occurred after the personal ID and password of a Prestel system manager was printed on a frame on one of Prestel's development computers.

Armed with the ID and password any hacker could have access to any part of the Prestel system.

In the break-in last week the hacker was able to read the mailbox belonging to the Duke of Edinburgh and private pages belonging to a firm of stockbrokers.

He also put a frame up on the pages belonging to the *Financial Times* that announced the pound was worth \$50.

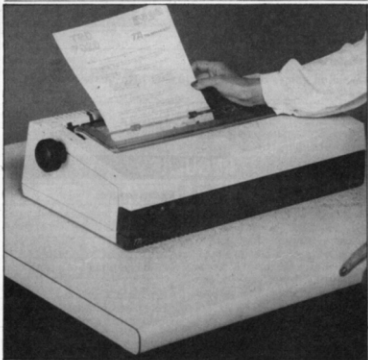
The break-in was organised as a stunt by the *Daily Mail* to prove how vulnerable Prestel is.

In the story in Friday's *Daily Mail*, Peter Sheridan, who wrote the article, claimed: 'I ensured that all erroneous messages were removed from Prestel screens after proving what could be done.'

In fact, the fake *Financial Times* frame was still in place when PCN checked, suggesting that some of the other efforts of the hacker also remained.

Prestel refused to comment on the extent of the break-in, apart from saying that it was carrying out a full investigation.

It is a very complicated matter which Prestel is taking very seriously,' a spokesman said. 'The investigation will be a thorough look into the allegations made in the *Daily Mail*.'



TECHNOLOGY TRIUMPH — Triumph Adler is taking on the Japanese with this new low-cost daisywheel. The 7020 is £375 plus VAT and comes with serial and parallel interfaces. It's not particularly fast at 20cps but it does give you 10, 12 and 15 characters per inch and proportional spacing. More details from the distributor, Westrex, on 01-578 0957.

Coleco Adam is cut to a remainder

Coleco Adam, the machine that looked as though it would be a trend-setter, is now remaindered at £299 from Silica Shop, London (01-309 1111).

Originally the Adam sold for £700, then it came down to £499 and now another £200 has been knocked off. As well as buying the machine, you may want the games machine adapter which is now selling at £49.

The Z80-based machine, which comes with a daisywheel printer, digital tape drive and a built-in word processor called Smart Writer, has had some troubled times.

The system was plagued with reliability problems last year due to its word processing system which slowed sales down of the machine. This could be one of the reasons why Coleco Industries in the US last week slashed the price of the Adam from \$650 to \$475.

Speculators in the US are saying that this drop in price is a sign of Coleco abandoning the system after Christmas and withdrawing from the home computer market (see below).

However, CBS Electronics, sole distributor of the Adam in Britain has no plans to abandon it.

Philip Gibbs, marketing manager said: 'The Adam has been badly affected by earlier

technical problems and the lack of software. Now software for it is beginning to emerge and it's doing moderately well. And as far as we're concerned we'll go on supporting it.'

Einstein gets a boost with more capacity

Einstein users who want to boost their computer to a full one Mb disk capacity can now do so with a second disk drive unit.

The TK01, which comes in kit

form, costs £149 and can be fitted inside the Einstein's housing. The Einstein, with its 3in floppy disk drive holding 500K, 64K of memory and a separate 16K for graphics was designed from the outset with a view to expanding its storage considerably.

British manufacturer Tatung has cut down its production costs and has passed this saving on to the user. The unit is available now from retail shops.

IN BRIEF

As **PCN** predicted, Osborne (0908-615274) has cut the price of the Osborne 1 from £695 to £499 (plus VAT) for the 52 column screen version (issue 85). The 80 column screen version is also down in price. It costs £695 (plus VAT) instead of £870.

No need to wear out your feet queuing up for those theatre tickets. Edwards & Edwards (01-734 6767), the London ticket agency, has just launched a theatre ticket booking service on Prestel. With no less than 52 different productions to choose from you can now book, and pay for, tickets from the comfort of your home. It also provides details of theatre times and ticket availability.

What can be worse than to be separated from your beloved micro while it is down at your local computer shop waiting to be repaired? Enter stage right Thorn EMI's Computeraid Services (0252-548888). It is now guaranteeing a three-day turnaround service.

Faster execution and significant new facilities are promised in Prolog-2 from Expert Systems (0865-242206). Running on an IBM PC or Sirius, the company says that this new version 'is believed to be the world's most sophisticated implementation of the AI language'.



PICTURE FRAMES—Do you think you could produce a picture better than this? If so, you could win a colour monitor for your efforts. Compunet (01-637 0942) has organised a competition for young artists to put their ideas on screen. First prize of a Commodore 1701 monitor will go to the entrant who designs the most original frame to introduce one of the many services available or planned for Compunet.

To get an idea of what you can create call up the Compunet advertisement page, design your own picture and when you've finished your masterpiece simply upload it. The competition, which is open to anyone who has access to a Commodore 64 and modem, closes on 14th December.

VIEW FROM AMERICA



Baby boomers cause consumer chaos

America's baby boom generation is heading into middle age. The ramifications of this are widespread and unpredictable.

Although the microcomputer scene has always been in flux, the current drum roll of bankruptcies is echoing in every sector. Hardware firms like Gavilan, Otrona and Convergent have all found it impossible to crack the market with fancy machines.

Dozens of software companies — most recently Ovation — have folded their wings in the past months. Others are

holding back products developed for the promised boom-time in the fall. Suddenly no one is sure what the people want.

In addition we are in an odd kind of economic boom. Canny US consumers (the Baby Boomers are the pickiest of all) have slowed spending to a trickle. For micro manufacturers this showed up as a 30 per cent drop in sales in one month (from June to July). Nor was this just the summer time blah.

The fact is that the US micro market has hardened in terms of market share. A survey of 654 computer stores (which don't sell Commodore 64s) found things split thus: Apple 45 per cent, IBM 34 per cent and Compaq 9 per cent. Still out in the cold are all those IBM compatibles from the likes of Texas Instruments and AT&T, as well as the Japanese and remnants of the 8-bit CP/M world.

IBM has a good lock on the US business market and Compaq has developed a portable compatible that IBM can't kill.

Meanwhile Apple demonstrated that, yes indeed, it has bounced back from the dark days of autumn 1983. For the quarter ending September 28, Apple sales jumped 75 per cent over last year to \$477.4 million. Earnings climbed to \$30.8 million. John Scully, Apple's chief, said 'Apple has chosen the industry role of innovator and survived the shakeout as an industry leader.'

And for next year? Well, one option that Apple is considering involves the 65816 true 16-bit, which is compatible with the venerable 6502. The 65816 can address more than 16Mb — even the IBM PC AT can only address 3Mb.

Elsewhere Commodore posted a 14 per cent increase in profits and net income rose to \$27.7 million on sales of \$244.2 million in the last quarter. This Christmas is likely to bring further confirmation of the Commodore 64's position.

Coleco effectively slashed the price of the Adam system to \$475. Analysts believe no more than 250,000 Adams have been

built and that Coleco is trying to cut its inventory on its way out of the risky microcomputer market. They also note that although Coleco's profits surged 65 per cent in the last year, 85 per cent of the company's sales were from Cabbage Patch dolls.

The story of Amiga Corporation is a good example of the state of the market. Amiga spent two years developing a powerful graphics computer based on the 68000 chip.

Amiga planned to market the machine with 128K RAM (expandable to 512K), one double density disk drive, built-in modem and software for about \$1500. It also planned to make it compatible to a certain degree with existing IBM software. It thought venture capital firms would be impressed, especially with the support it had lined up with outside software firms.

But venture capitalists have learned a thing or two about microcomputers and after months of fruitless searching Amiga finally sold out to Commodore.

Chris Rowley

Aries patent drama continues to simmer

While the patent drama simmers between Aries Computers, Watford Electronics and Raven Micro Products (*PCN*, issue 85), the threat of more legal action is in the air.

In a statement Aries said: 'We are certainly going to take legal action against infringement of our patent. Damages mount up from the publication date of a patent, not from when it is finally granted. So, Watford and Raven are already in trouble. ... Raven and Watford's boards are both covered by the patent, despite variations of detail.'

According to a spokesman from the London Patent Office, Aries' case is questionable. The spokesman said: 'After publication of the patent application, the applicant then has to file a request for examination.'

'It can take up to a year or more after the application has been published before a patent is granted. During this time the applicant has no rights whatsoever in saying his product has been patented.'

'However, if the applicant feels that his rights have been infringed by the time he has been granted the patent — it can be backdated.'



SPEED OF LIGHT — All right, we know it is expensive at around £3,000 but wouldn't you just like to own a laser printer like this. The EPS LaserJet prints at eight A4 pages per minute, can mix up to four typefaces on a single page and has a print resolution of 300 dots per inch. Prices of laser printers are starting to tumble, so who knows, it may not be long before you can buy one for £1,000. Meanwhile carry on with your dot matrix and dream.

W H Smith homes in on good prices

If you're hunting around for good deals on home computers, W H Smith has a couple of attractive offers.

For £149.95 you can buy a 48K Spectrum, a Kempston Pro joystick interface and a Pro

5000 joystick in one package.

In addition the Beeb's baby brother, the Electron, is being sold with £46 worth of free software.

The Electron costs £199 and comes with the five-game Electron Playmate Pack. There is a choice of two packs and the offer is open while stocks last.

Opus Christmas offer tempts at Boots

Disk drive supplier Opus has some pleasant surprises in store for Christmas.

Boots has agreed to sell the Opus 100K 5.25in disk drive at a tempting £119.95. And Opus' disk operating system, D-DOS, has been rewritten so it can run Acornsoft's Elite mega-game.

An Opus spokesman said the disk drives should appear in Boots' high street shops 'within seven days'. They come with an exceptional two-year guarantee, user manual and utilities on disk.

The rewriting of D-DOS was done in conjunction with Acorn to ensure full compatibility with all of Acornsoft's latest software, including Elite.

The D-DOS interface kit costs £129.95 but Opus dealers will sell you D-DOS and a single drive for £299.95.

This is something of a major turnaround by Acorn. It has traditionally followed a policy of non-cooperation with suppliers of alternative operating systems.

And Acornsoft has included in its up-market disk software routines that check whether a pukka Acorn DFS is fitted. No Acorn DFS and the software hangs up on the user.

H OMEFRONT



Games image suffers hit parade hype

With its budget labels, compilation cassettes, hyping of new products and continuous complaints about piracy and counterfeiting, the games software business is becoming more and more like the pop record industry. It began when record companies like Virgin set up their own software houses.

Virgin's first foray in games publishing came when it hired the Rainbow Room at the top of the old Derby and Toms building in Kensington High Street

for a launch overflowing with razzamataz, free drinks and waitresses dressed up as spacemen.

The software industry had not seen anything like it but it set a trend.

Then along came Mastertronic. Its budget label and £1.99 price tag was a straight rip-off of the budget album idea that helped sell classical music to thousands.

There was nothing classical about Mastertronic's original offerings but they certainly set the Pac-man among the ghosts.

The initial standard was rather low, but has improved and the ranks of budget games have been joined by the big names such as Software Projects, publishers of *Manic Miner* and *Jet Set Willy*, both chart toppers.

And respectability has been given to pocket money games by British Telecom whose Firebird label leapt into life with games selling at £2.50.

It was only a matter of time before someone published K-tel — like compilations of old hits.

Beau Jolly was one of the first to wade in with bargain six-packs of old Imagine numbers.

It has been joined by Alligata with its own-brand Chartbuster offering five games for £9.95. And then there is Select 1 which contains a dozen best sellers from top names such as Ocean and Bug-Byte for £12.95, and is marketed in conjunction with Tel-Star Records.

There is no doubt that the borrowing of ideas like these from the record industry has benefited the consumer. Unfortunately, other ideas have been borrowed as well.

The worst of these is undoubtedly hype — expensive advertising campaigns and promotional ploys to keep the name of a game in the public's mind. The aim is to create such a following that no self-respecting punter can walk into a shop and not come out with a copy.

Some software houses go to incredible lengths to promote a run-of-the-mill game. Calling it a 'megagame' is no longer enough. A favoured technique is to offer a prize of unbelievable value or beauty. It started with *Pimania*, and the golden sundial that has yet to be won.

Since then we have had the original Golden Hare of Kit

Pedlar fame, and a golden sceptre on offer from the Edge for solving the riddle of *Quo Vadis* (the latter also comes with £30,000 in cash).

Another promotional ploy is the pseudo-award winner. A recent press release from a software house told *PCN* about a programmer being presented with a gold cassette for 50,000 sales of the program he wrote. To add credence to the event a well-known personality was hired to present the award.

But the real prize in this category is chart-rigging. It is a fact of life in the pop business and is making itself felt in the games charts.

PCN pioneered software charts and we like to think that our weekly list is the most objective assessment of over-the-counter sales. But of chart can be immune.

In the course of a casual conversation in a pub, a director of a software house (which shall stay nameless) offered to prove the point. 'Give me £2,500 and I guarantee to get any game into your charts', he said.

The moral of this story is: 'let the buyer beware'.

Ralph Bancroft

Pirates face banknote challenge

Software houses are turning to advanced printing technology in a bid to reverse the tide of piracy.

Dataview Wordcraft is making a welcome switch from the use of dongles and taking the lead.

Dataview, which publishes the Wordcraft word processing package for Commodore micros, has been among the keenest advocates of dongles as a means of combating illegal copying.

It has now switched to a printing system called The Beeewe used by banknote printers Bradbury, Wilkinson.

'A not insignificant factor is that The Beeewe is 20 times cheaper than the dongle,' said Paul Handover, Dataview's chairman.

'In addition, it does not entail any inconvenience to our customers in terms of having to adapt their hardware to this security device. It also allows them to change programs without having to disconnect

or reconnect anything,' he added.

The Beeewe system consists of a set of self-adhesive labels. One goes on the disk, one on the manual, one on the licence agreement and one for a spare disk.

The labels are produced by a process similar to that used for printing banknotes, including a latent image and individual numbering.

The latent image can be seen only when viewed from a particular angle, which makes it easy to spot forgeries.

From a legal point of view, The Beeewe has full protection against copying.

● Another printing company to jump on the anti-piracy bandwagon has been set up by ex-Imagine marketing manager, Michael Crofton.

The company, Leisure Art Productions, uses a number of techniques to foil counterfeiters, including printing in a fifth metallic colour.

Once Imagine adopted this technique the company claims, it suffered from no further professional large-scale counterfeiting.

CHARTS

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

GAMES

TW	LW	TITLE	PUBLISHER	MACHINE	PRICE
1	2	Jet Set Willy	Soft Projects	SP, C64	£5.95
2	1	Daley's Decathlon	Ocean	SP, C64	£7.90
3	4	Elite	Acornsoft	AC	£15.00
4	9	Combat Lynx	Durell	SP, C64	£7.95
5	6	Pyjamerama	Microgen	SP, C64, AM	£6.95
6	5	Sherlock Holmes	Melbourne	SP, C64	£14.95
7	8	Avalon	Hewson	SP	£7.95
8	3	Beach-Head	US Gold	SP, C64, AT	£9.99
9	7	Zaxxon	US Gold	C64, AT	£9.95
10	—	Kentilla	Micromega	SP	£6.95
11	15	Dark Star	Design	SP	£7.50
12	20	Delta Wing	CreativeSparks	SP	£7.95
13	10	Kokotoni Wilf	Elite	SP, C64	£6.95
14	11	Full Throttle	Micromega	SP	£6.95
15	13	Lords of Midnight	Beyond	SP	£9.95
16	14	Intl Soccer	Commodore	C64	£9.99
17	—	TLL	Vortex/Ocean	SP, C64	£5.95
18	—	River Raid	Activision	SP, C64	£9.95
19	16	Battle Cars	Games Worksh	SP	£7.95
20	—	Havoc	Dynavision	C64	£9.95

SPECTRUM

TW	TITLE	PRICE
1	Combat Lynx	£7.95
2	Pyjamerama	£6.95
3	Daley's Decathlon	£7.90
4	Sherlock Holmes	£14.95
5	Avalon	£7.95
6	Beach-Head	£9.99
7	Kentilla	£6.95
8	Dark Star	£7.50
9	Delta Wing	£7.95
10	Full Throttle	£6.95

COMMODORE

TW	TITLE	PRICE
1	Jet Set Willy	£6.95
2	Daley's Decathlon	£9.90
3	Zaxxon	£9.95
4	Intl Soccer	£9.90
5	Sherlock	£14.95
6	Havoc	£9.95
7	Falcon Patrol II	£6.95
8	Pitfall II	£9.99
9	Kokotoni Wilf	£6.95
10	Summer Games	£9.95



PRECISION CONTROL — The Mach III joystick from Hayes is a deluxe joystick for Apple and IBM users. It includes a fine trim adjustment along with a self-centering mechanism. A hose to users who find that when the joystick is centred, the cursor on the screen is not. Just twist the rotary controls to tune the joystick in. The Mach III is distributed by P&P Micro Distributors on 01-677 7631 at £46.95 plus VAT.

Sinclair seeks out new horizons

Sinclair is spreading its wings in an attempt to increase overseas sales of the ZX81 and Spectrum.

The company is setting up subsidiaries in France and Italy and has appointed a business development manager for Eastern Europe.

Sinclair products already sell well in France and Italy and the new companies, set up in conjunction with Sinclair's local distributors are aimed, as

Sinclair puts it, to 'further reinforce Sinclair's position as Europe's number one supplier of personal computers'.

There are probably other companies which would challenge that claim but there can be no doubt that increasing sales abroad can only be healthy for Sinclair users in the UK.

The sales push in Eastern Europe follows on from the lifting of the US government's restrictions on high technology exports to communist countries.

MICROS

BELOW £1,000

TW	MACHINE	PRICE
1	Commodore 64	£199
2	Sinclair Spectrum	£125
3	BBC B	£399
4	Amstrad	£330
5	Electron	£199
6	Vic 20	£140
7	Atari 800 XL	£169
8	Oric	£99
9	Memotech	£199
10	Einstein	£499

ABOVE £1,000

TW	MACHINE	PRICE
1	IBM PC/XT	£2,390
2	ACT Apricot	£1,760
3	Compaq	£1,795
4	Sirius	£2,525
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 1. 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.

THE **sinclair** VISION QL MONITOR

£299.00
INC VAT



Developed in conjunction with Sinclair Research Ltd., the Sinclair Vision QL monitor is based on proven Taxan monitor technology.

Its black angular design and 12" non-glare tube result in a remarkably compact unit that complements the QL in looks and performance – including 85 column text display.

The Sinclair Vision QL is the ideal monitor for high resolution colour graphics and professional business applications.

Comes complete with cable and full 12 months warranty.

Specifications:

Input form:	RGB
Amplifier type:	Linear
Video Bandwidth:	More than 18MHz
Dot (Slot):	0.38 mm
Display area:	214 mm (H) x 158 mm (V)
Dot resolution:	640 (H) x 440 (V)

**Recommended by Sinclair Research Ltd.
for use with the Sinclair QL computer.
Manufactured for and sold, guaranteed
and serviced by MBS Data Efficiency Ltd.**

AVAILABLE FROM SELECTED BRANCHES OF MAJOR RETAILERS NATIONWIDE

DE

MBS Data Efficiency Ltd

EXCLUSIVE UK DISTRIBUTOR

Computer Peripherals Division, Maxted Road, Hemel Hempstead, Herts. HP2 7LE Tel: (0442) 60155 (20 lines) Telex: 825554 DAIEFF G

MBS

DE is a member
of the Micro Business Systems plc
group of companies.

'Sinclair' and 'QL' are registered trademarks of Sinclair Research Ltd.



Easy answer to a pointed query

In answer to John Lettice's problem with *FlightPath* (issue 82), the chances will depend on the cross sectional area of the back of the dart. Then, assuming that the darts do not hit the board at an angle the chances equate to:

π (radius of the dartboard)²
to 1. area of the back of the dart
Mark Dunn
Bingley, W Yorks

PS — If the dart could only stick in the hole for the flights, the 'area of the back of the dart' will be replaced by the cross sectional area of the hole.

Time Warp heading causes confusion

We have been selling a Real-Time clock/calender unit for the last year, called *Time Warp*. We were surprised when prospective customers began to ask whether it was just software and not hardware.

I have traced the source of confusion to a small program that you published (issue 81). This program is a simple clock needing the program permanently in the computer, and assuming that the edit keys are not pressed.

We are upset that *Time Warp* has been used as a name for this program. Technomatic has been using this name for its own hardware unit since the beginning of the year — this unit has been widely advertised in most computer magazines. While we are sure that you have used the name inadvertently, we are certain that the writer of the article has 'borrowed' the name for this own use.

I therefore feel that it would be fair for *PCN* to print some comment regretting the accidental use of the name *Time-Warp*, and possibly including brief details of our unit.
Michael Lerner,
Technomatic, London NW 10

Happy to clear up any misunderstanding. Time Warp was not a name given by the author of the article, but a headline written by us. We were unaware of the existence of Technomatic's product — Ed.

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.

Lack of support will mean Oric's decline

Mr Bolter (issue 84) seems to have missed the real thread of my argument and I think criticises me unfairly. First, I am mad keen on my Oric and use it avidly. Second, I too attempt to write programs for it and crude as they are, I enjoy doing so. Third, he is naive to consider software support to be so unimportant.

It is a fact (sad, maybe) that many judge a micro's success largely on the quality and quantity of software available for it. In this respect Oric lags behind. At least three prominent computer outlets in my town have either dumped the Oric/Atmos and software, have chosen to ignore it completely, or treat it with little or no enthusiasm.

As shops continue to ignore it, fewer people will buy Oric/Atmos, less money will return to Oric Products and future investment will decline. Software houses will probably withdraw support and the hardware development put into production will drop. Servicing and repairs of the machine could also be difficult, and Oric owners will be left with a lame duck.

How many prominent adverts do you see for Oric add-ons and software? I don't see many and I look constantly. Without enthusiasm and active

support from the professionals, Oric faces a tough time in a cut-throat industry. If Oric succumbs, we amateurs will pay the price. My letters are intended as a spur to Oric products. This machine *deserves* support.

Matthew Hisbet,
Kirkcaldy.

Why BT goes after pirate modems

C Haine's letter (issue 82) has prompted me to write to you on the subject of modems. In principle I would agree with the ideal offered by Mr Haine. However, it is evident that there is a lack of appreciation of communications among computer operators — demonstrated by this letter and others which appear from time to time in computer magazines. I would like to bring to your attention the reasons why British Telecom is so keen to search out illegal modems.

Safety: Any modem operated from the public electricity supply must be checked to ensure that in the event of an electrical fault in the power supply the 220 volts mains cannot be accidentally connected to the BT line.

Transmission: British Telecom has its own transmission standards, ie the level at which signals may be transmitted. Signal levels in excess of these

may cause interference with other channels.

A further aspect to this problem is that the number of channels in a given system carrying telegraph and data signals must be limited to prevent intermodulation or over loading of the modulators. As the telephone network uses its channels for telephones in a random manner, carrying signals from different parts of the system, it is necessary to control the quantity of data users.

This is also why large computer systems perform their data transfers over the Public Switched Network during the night.

In Germany a system such as Mr Haine suggests is available. But the data signal is separated from the telephone networks and passed over high speed data channels.

D Herring,
Shape BFP 026.

Spectrum Plus — too little too late

Sinclair's new Spectrum Plus is a case of too little too late. It was released because of the Spectrum's falling sales and at £180 is not good value for money. The only difference from the 'old' Spectrum is a QL-type keyboard. You can get a much superior keyboard for £50!

The launch of the Spectrum Plus is merely a sign of Sinclair's panic over new machines (such as the Amstrad) pinching its share of the market.

Neil Olnor
Doncaster, S Yorks

Whether Sinclair has cause to panic remains to be seen. Perhaps it just want a slice of the add-on keyboard market? — Ed.

Help for the Aquarius user

Brett Emms of Rainhay complains he is unable to obtain programs and equipment for his Aquarius. We carry the range of add-ons and tapes and so can supply anyone with similar problems. A phone call on Ryde (Isle of Wight) 63437 is the best approach.

Bill Stock,
The Children's Shop
and Tackle Box



Cash & Carry COMPUTERS

**TOP
SHOWROOM
SERVICE
ROCK
BOTTOM
PRICES**

**PERSONAL CALLERS WELCOME AT OUR EXTENSIVE SHOWROOMS
MOST EQUIPMENT ON DEMONSTRATION**

The UK's Best Printer Prices

Only a sample of our massive range of printers shown here - phone for further details

DAISYWHEEL LETTER QUALITY

Smith Corona TP1 (P or S)	£189.00 + VAT	£217.35
Juki 6100 (P)	£335.00 + VAT	£385.25
Brother H815 (P or S)	£325.00 + VAT	£374.35
Daisytype 2000 (P)	£238.95 + VAT	£275.94

PRINTER/TYPEDRIVERS

Brother EP22 Dot Matrix (S)	£119.00 + VAT	£136.85
Brother EP44 (S)	£189.00 + VAT	£217.35
Moderns available for Easylink and Telecom Gold		
Juki 2200 Daisywheel (P or S)	£239.95 + VAT	£275.94

DOT MATRIX PRINTERS

Brother HRS (P or S)	£125.00 + VAT	£143.75
Canon 1080A NLQ (P)	£289.00 + VAT	£332.35
Canon 1155A NLQ (P)	£349.00 + VAT	£401.35
EPSON RX80 (P)	£195.00 + VAT	£224.25
EPSON RX80 F T PLUS (P)	£225.00 + VAT	£259.75
EPSON FX60 (P)	£264.00 + VAT	£307.80
EPSON RX100 F T (P)	£339.95 + VAT	£390.95
EPSON FX100 F T (P)	£439.00 + VAT	£504.85
Seikosha GP100A (P)	£129.50 + VAT	£149.39
Seikosha GP50A (P)	£79.50 + VAT	£91.89
Seikosha GP30S (Spectrum)	£79.50 + VAT	£91.89
Seikosha GP50A (P)	£179.50 + VAT	£206.89
Seikosha GP700A Colour (P)	£279.50 + VAT	£321.89
Shewa CT180 (P)	£175.00 + VAT	£201.25

Smith Corona range of printers **Now in Stock** -
Phone or write for details

INSTANT CREDIT Up to 36 months to pay

All items over £150 available on our easy credit terms
Written details available on request.

SUPERDISKS

LONDON'S LOWEST PRICES ON FLOPPY DISKS

Prices per box of ten ex VAT

	SS00 40TR	DS00 40TR	SS96TP1 80TR	DS96TP1 80TR
BASF 5 1/4"	£10.95	£18.20	£19.80	£22.50
3M 5 1/4"	£13.55	£19.50	£20.05	£24.00
VERBATIM 5 1/4"	£15.50	£23.50	£22.50	£30.50
DYSAN 5 1/4"	£16.80	£24.90	£24.90	£32.00
TDK 5 1/4"	£17.50	£25.50	-	£33.00
BASF 3 1/2"	£34.90	-	-	-

Add 70p for P&P per box of 10 disks

CASH & CARRY COMPUTERS
53-59 High Street,
Croydon, Surrey CR0 10D.

12" MONITORS - GREEN SCREEN

Sanyo 1111 Med Res	£65.00 + VAT	£74.75
Sanyo 1112 High Res	£86.00 + VAT	£101.20

14" MONITORS - COLOUR

Commodore 1201 Composite/Sound	£120.00 + VAT	£138.95
Foley CM 14 RGB Colour Board	£120.00 + VAT	£138.95
Microvise: 1431MS North Res RGB	£120.00 + VAT	£138.95
Microvise: 1431M2 for ZX Spectrum	£120.00 + VAT	£138.95
Microvise: 1451MS Med Res RGB	£200.00 + VAT	£230.39
Microvise: 1451M2 for Sinclair	£120.00 + VAT	£138.95
Microvise: 1441MS High Res RGB	£279.00 + VAT	£320.39
Sanyo 1116 North Res RGB	£120.00 + VAT	£138.95
Sanyo 1117 Med Res RGB	£265.00 + VAT	£307.75
Sanyo 1115 High Res RGB	£355.00 + VAT	£406.95

Consumers

Plus 4 NEW B&K Computer	£243.43 + VAT	£279.95
CTB Starter pack inc. cassette deck	£113.00 + VAT	£129.95
Commodore 64	£165.17 + VAT	£189.99
8034 Portable inc. D. Drive and Col. Monitor	£252.51 + VAT	£294.99
CS3 Cassette	£25.51 + VAT	£29.50
1041 Disk Drive	£165.17 + VAT	£189.99
1041 Disk Drive	£165.17 + VAT	£189.99
801 Fractor Printer	£165.17 + VAT	£189.99
803 Fractor Printer (by Juki)	£165.17 + VAT	£189.99
1500 Colour Printer Plotter	£300.00 + VAT	£345.99
1501 Colour Monitor	£173.00 + VAT	£199.00

Amstrad

Amstrad CPC484 (Green Monitor)	£189.00 + VAT	£220.80
Amstrad CPC484 Colour Monitor	£289.00 + VAT	£332.35
SANYO MCB 555 Business Computer		
128K including Wides: Calstar. Instalar	£795.00 + VAT	£914.25

BBC

BBC Model B	£339.09 + VAT	£389.95
Model B one Disk II	£299.95 + VAT	£345.95
Cumans 1400K DD CSX100	£126.50 + VAT	£144.95
Cumans 1400K DD CSX200	£101.00 + VAT	£116.95
Cumans 1400K DD inc PSU	£126.50 + VAT	£144.95
Cumans 2400K DD inc PSU	£247.78 + VAT	£289.95
Cumans 2400K DD inc PSU	£244.74 + VAT	£289.95

All above Cumans Disk Drives include Cable, Manual + form, disk.

Sinclair

NEW Spectrum 48K PLUS inc. 6 Free Programs	£147.78 + VAT	£169.95
Spectrum 48k + 6 Free Games (worth £25)	£106.81 + VAT	£122.95
Microdrive + interface 1 + 4 Free Programs	£95.50 + VAT	£109.00
16k 48k Upgrade	£21.70 + VAT	£24.95

MSX Computers - In Stock Now

Toshiba HX10 64K	£226.04 + VAT	£259.95
Sanyo MRC 10 64K	£243.43 + VAT	£279.95
Sony HB75B 64K	£252.13 + VAT	£289.95
JVC HC7GB 64K	£226.04 + VAT	£259.95

Full range of MSX accessories available

Mail Order + Export + Trade Hot Line Phone 01-686 6362

Delivery by Securicor (3 day) please add £5.00 + VAT per item.
Delivery by T.N.T. (overnight) please add £9.50 + VAT per item.

Send off the coupon or order by phone quoting your Access, Barclaycard No. Phone 01-686 6362. Immediate despatch on receipt of order or cheque clearance.

Or you can Telex your order on: 946240 Attn 19001335

We accept official orders from PLC's, Government Departments and educational establishments.

These prices correct until superceded by next advertisement.

To: Cash & Carry Computers, 53-59 High Street, Croydon, Surrey CR0 10D.

Please supply _____

I enclose my cheque for £ _____ including delivery by Securicor/T.N.T.*
or charge my Access/Barclaycard No _____

Name _____ Signature _____

Address _____

*Please Delete _____ PCN 7/11

ROUTINE ENQUIRIES



Here's an end to the hair-tearing nail-biting keyboard-pounding frustration of programming your computer. Whatever your problem call on PCN's panel of experts and we'll come up with an answer. Remember we cannot reply personally, so no stamped addressed envelopes please. Address your problems to Routine Enquiries, PCN, Evelyn House, 62 Oxford Street, London W1A 2HG.

Where can I obtain supplies for my Adam?

Q Recently I bought the Adam expansion module for the family's Colecovision TV system. I was assured that the formatted blank tapes would be readily available but I can't find any. Can you give me the address of a supplier?
R Hammond, Great Linford, Milton Keynes

A Try Silica Shop which is supporting the Adam like is crazy. You'll find them at 1-4 The Mews, Hatherley Road, Sidcup, Kent. You might give them a call first to make sure on 01-309 1111.

Choosing a modem for the 64

Q I am thinking of buying a modem for my Commodore 64. Can you give me some information?
S Cash, Alveston, Derby

A Your first choice should be Commodore's own modem which requires no special interfaces and, for the moment, comes with a free year's subscription to Compunet, Commodore's own bulletin board and database.

The problem is that it is somewhat limited compared to other products and runs only 1200/75 baud. Independent products offer multi-rate communication which you'll need for full use of the equipment.

The catch is that these modems generally require an RS232 interface since the 64 does not fully support that standard. Although there are a number of interfaces around which can cost up to about £60.

Also watch out for suppliers selling non-approved equipment. While it is not against the law to sell modems which have not been approved by British Telecom, it is an offence to use them (cute, huh?)

The best solution would be to find a good computer dealer and discuss what you need. Then buy the equipment there.

How can I make the connection?

Q I took delivery of my QL in August during a trip to England and also treated myself to a super, high-

resolution colour monitor. Do you know of anyone making a cheap RGB socket/plugin/interface or whatever so I can connect my Spectrum to the monitor too?

A If you have room perhaps you could print my address so anyone who makes them could contact me?

Dave Kurthe, Langgasse 51, 3292 Busswil, Switzerland

A Funny things people. They go splashing out on an RGB monitor then start asking for information about cheap interfaces... There are actually a number of these about, most of them fairly expensive but there is one cheap one from Adapt Electronics.

This checks in at just under £30, and you can get more information on 01-589 5111 extension 5027.

The Spectrum is a very open machine in that practically every line you're likely to need comes out of the edge connector. It isn't that simple with RGB because, although you can get a composite signal out of the back with no trouble, you've got to do a certain amount of signal decoding to produce RGB, and this means money and/or clever electronics.

Adapt also makes a composite interface for the Spectrum, should you ever feel skint enough to have to hock your RGB monitor. As it's also possible to get a composite signal out of the QL (QV and video in the diagram in the manual), it's relatively easy for most people to achieve monitor compatibility between the QL and the Spectrum.

Take care when clearing out

Q I've written a program for my Spectrum, but I can't get it to work, and it always stops with a variable not found error.

A I've checked repeatedly but all the variables I use are defined. Can you help?
Andy Trafford, London E16

A The most common cause of the problem you describe is so obvious you'll probably kick yourself.

If you habitually define your variables in the first line then CLEAR, you'll find you're clearing out your variables too. It's a pity not everything is so simple.

Slick shortcuts tell age of BBC

Q I own a BBC B without disk or any extras fitted. I recently bought *Elite* and have hit trouble.

The program loads all right but the machine immediately goes to a hard reset. My other tapes work fine. The *Elite* tape loaded on the retailer's BBC. At this rate, I think I will remain 'harmless' forever.

E Waller, Harlow, Essex

A Loops are familiar to all computer users but the hardest one of all is the 'it's your hardware... no, it's your software' loop. Breaking out can be tougher than taking on a pack of Thargoids.

However... just because the program loaded on the shop's BBC doesn't mean the tape is blameless.

Suspicion then falls on your BBC and the first suspect is the operating system ROM. You don't say how old the machine is, but if you've got one of the original ROMs, that might be the cause of the trouble. *Elite* uses some slick shortcuts and corner-cutting which may be incompatible with older versions of the operating systems.

If we're wrong we're stumped. Get in touch with Acorn and go for the jugular...

Commodore 64 communications

Q I have a Commodore 64, disk drive and printer and intend to buy Dacon's Buzz Box modem. Is there a 'telephone book' of public computers available? Is there a book which will tell me how to use the more advanced disk commands? Is it true that Softset has converted the Microsoft flight simulator for the 64? Can I re-ink my ribbon cartridges?
S Lock, Northfleet, Kent

A Working from the back, you can re-ink ribbons if they're of the fabric type but we suggest you'll need an old sou'wester, wellies and an expanse of open space... or cough up for a new one.

The flight simulator you mean is published by SubLogic (Microsoft licensed it for the IBM PC) and Softset is the wholesale distributor. The 64 version is available now and your local software specialist

should be able to order it from Softset. Price varies between £30 and £40.

We'd recommend the Commodore Disk Companion (£7.95 from Sunshine Books) as an excellent all-round guide to using disks with the 64.

As a starting point for communications get hold of a recent copy of Computer Answers (PCN's sister magazine) where you'll find a list of public bulletin boards and other useful information.

Back copies are available from Back Issues Service, VNU, 53 Frith Street, London W1.

Should I wait for a better machine?

Q I have been considering buying a BBC Micro but am put off by a couple of points. First, the amount of RAM available is small compared with other systems; second, I would like to continue with Fortran and other high level languages.

The cost of expanding the BBC with the graduate costs more than a real 16-bit machine such as the Sanyo MBE. I am prepared to wait a couple of years for the production of an 8088 micro aimed at the home user, but am I wasting my time? Should I rush out and buy a BBC?

Neville White, Portsmouth

A You don't sound like the kind of man to do anything in a rush. But your hesitation is due to one of the great traps of computing — the 'real soon now' syndrome.

You can wait around for ever for better products and in your case assuming an 8088 micro at a low price does materialise, even more incredibly fantastic 32-bit machines will be waiting for release.

So the answer is: yes, you are wasting your time. Buy a machine now, learn and enjoy, then sell it and upgrade when you find a better machine has come onto the market.

Micro versions of Fortran are a bit thin on the ground but you'll probably be able to track one down running under CP/M (possible on a Beeb with either a Torch disk pack or Acorn's Z80 second processor).

As to the memory problems, we would suggest you check out Acorn's 6502 second processor which comes with an extra 64K of RAM.



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

Amstrad screen read routine

This routine adds a new command GET X,Y,CA% to Locomotive Basic. It positions the cursor at X, Y and places the

character at that location into A%. It will then print CHR\$(A%). The program is presented as hex dump and as an assembly listing.
*M Hankins,
Southampton.*

```

10 REM *****SCREEN READ*****
20 REM SYNTAX IS "IGET ,X,Y,BA%"
30 REM THIS WILL READ CHR$(A%)
40 REM AND PLACE THE RESULT IN A%
50 REM *****
60 CLS
1000 MEMORY 39999
1010 FOR I=40000 TO 40065:READ @I:POKE I,@I:NEXT I
1020 CALL 40000
1030 A%=0
1040 LOCATE 10,10:PRINT"HELLO"
1050 IGET ,10,10,BA%
1060 LOCATE 1,23:PRINT CHR$(A%)
1070 END
1080 DATA 601,644,69C,621,677,69C,6CD,6D1,6BC,6C9,64F,69C,6C
3,655,69C,647,645,6D4,600,6CD,670,68B,67C,632,67E,69C,67D,63
2,67D,69C,6DD,666,604,6DD,666,602,6CD,67D,68B,6CD,660,68B,6D
4,666,600,6DD,666,601,677,63A,67E,69C,667,63A,67D,69C,667,6C
D,675,68B,6C9
1090 DATA 0,0,0,0,0
1100 ORG 40000
1110 ENT $
1120 SETCUR: EDU EBB75
1130 SETCUR: EDU EBB60
1140 SETCUR: EDU EBB78
1150 LD BC,CONTAB:SET UP RIX
1160 LD HL,BUFF
1170 CALL EBCD1
1180 RET
1190 CONTAB: DEFN NMETAB
1200 JP GET
1210 NMETAB: DEFN "GE"
1220 DEFB "I"+E00
1230 DEFB 00
1240 SET:
1250 CALL SETCUR 'GET CURSOR POSITION
1260 LD A,H
1270 LD (COL),A 'SAVE COLUMN
1280 LD A,L
1290 LD (ROW),A 'SAVE ROW
1300 LD H,(IX+4) 'GET NEW COLUMN
1310 LD L,(IX+2) 'GET NEW ROW
1320 CALL SETCUR 'POSITION CURSOR
1330 CALL SETCUR 'SEE WHAT'S THERE
1340 LD L,(IX+0) 'GET LOW BYTE
1350 LD H,(IX+1) 'AND HIGH BYTE
1360 LD (HL),A 'OF VARIABLE & SAVE
1370 LD A,(COL) 'GET OLD COLUMN
1380 LD H,A
1390 LD A,(ROW) 'GET OLD ROW
1400 LD L,A
1410 CALL SETCUR 'RESTORE CURSOR
1420 RET 'AND REST.....
1430 ROW: DEFB 00
1440 COL: DEFB 00
1450 BUFF: DEFB 0
1460 DEFB 0
    
```

```

10 MODE 0
20DIM C 100
30FOR T=0 TO 3 STEP 3
40P%=C
50I.C OPT T
60PHA:PHA:TXA:PHA:TYA:PHA
70LDX &73 ; GET UPPER COLOUR
80LDY &71 ; COLOUR NO TO CHANGE
90JSR SCR ; PUT IT ONTO SCREEN
100 \ DO DELAY USING COUNTER VALUE IN
&70
110LDX &70:.LP1 LDY &255:.LP2 DEY:BNE
LP2:DEX:BNE LP1
120 \
130LDX &72 ; GET LOWER COLOUR
140LDY &71 ; COLOUR NO TO CHANGE
150JSR SCR ; PUT ONTO SCREEN
160PLA:TAY:PLA:TAX:PLA:PLP
170RTS
190LDA &19:JSR &FFEE
200TYA:JSR &FFEE
210TXA:JSR &FFEE
220LDA &0:JSR &FFEE
230LDA &0:JSR &FFEE
240LDA &0:JSR &FFEE
250LDA &0:JSR &FFEE
260RTS
270J
280NEXT
290?&72=1:REM LOWER COLOUR RED
300?&71=1:REM FOREGROUND
310?&70=15:REM SCREEN POSITION
320?&73=4:REM UPPER COLOUR BLUE
330?&220=C MOD 256
340?&221=C DIV 256
350*FX 14,4
    
```

More colours for BBC Modes

One drawback to BBC screen Modes 0, 3, 5 and 6 is that they allow only a single foreground or background colour on the screen at one time.

Here's a program that provides a simple way of getting around this and allows the screen to be split into two colours.

Using the screen update event (*FX14, 4), the interrupt routine changes the logical colours of the foreground or the background. Locations &72

and &73 specify the lower and upper colours respectively. &71 specifies the physical colour to be split ie in Mode 0, &71=1 splits the foreground, and &71=0 does the background. The position of the split is set with the value in &70. Note that if this value is too large, the screen is updated twice before the colour is changed, causing it to flash.

This routine plays havoc with the editing cursor and clear screen commands but you can turn it off with *FX 13.3.
*Kenn Garroch,
Peripherals editor.*

A tidy QL screen for clear editing

Debugging a program on the QL can be awkward if it redefines the screen windows. This short routine initialises the screen to the start-up format with borders to keep the output on the screen.

Save it as a separate procedure and merge it with the program you are working on. When the screen is full of windows scrolling all over the place, you simply type: (enter). Note: all £ signs should be typed in as # (hashes).
*Alan Wharton,
Earlsdon, Coventry.*

```

10000 DEF PROC is
10010 WINDOW £0,512,50,0,206
10020 BORDER £0,8,0
10030 PAPER £0,0: CLS £0
10040 INK £0,7
10050 WINDOW 256,206,256,0
10060 BORDER 8,3
10070 PAPER 3 : CLS
10080 INK 7
10090 WINDOW £2,256,206,0,0
10100 BORDER £2,8,7
10110 PAPER £2,7 : CLS £2
10120 INK £2,0
10130 END DEF
    
```

How to write for Personal Computer News

PCN WANTS YOU!

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

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

What we want

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

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



programs to illustrate the article.

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

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

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

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

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

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

GET MORE FROM YOUR MICRO



GRANADA-COLLINS

COMPUTER

BOOKS AND SOFTWARE

Alan Toothill and David Barrow 6502 MACHINE CODE FOR HUMANS

Many new ideas for beginners and the more experienced 6502 coder alike.
ISBN 0 246 12076 2 Price £7.95

David Barrow 6809 MACHINE CODE PROGRAMMING

An introduction to 6809 machine code - powerful - effective - attainable!
ISBN 0 246 12532 2 Price £7.95

Boris Allan INTRODUCING LOGO

Teach yourself LOGO with this easy-to-follow and comprehensive guide.
ISBN 0 246 12323 0 Price £5.95

Randall McMullan WORDSTAR PROMPT

Master the world's most popular word processing package with ease.
ISBN 0 246 12446 6 Price £5.95

M de Pace WORKING WITH dBASE II

A must for all users of this popular database package.
ISBN 0 246 12376 1 Price £7.95

Susan Curran WORD PROCESSING FOR BEGINNERS

All you need to know - in one indispensable guide.
ISBN 0 246 12353 2 Price £5.95

Available through W H Smith & Sons, larger Boots stores and major booksellers.

COMMANDING PERFORMANCE

Your BBC gets three useful extra commands with Stephen Grigg's program. It uses Basic II and takes up 1K of memory, and there is a commentary on how the program does its stuff.



Have you ever wanted to have extra commands at your disposal and found you couldn't afford expensive utility ROMs? Well, this utility program for a BBC computer with Basic II adds three new commands to the Beeb's repertoire.

The extra commands which are available are as follows:

*APPEND <fsp>

*TAB

*GDUMP

The commands may be abbreviated and used as if they were part of the resident star commands and stay resident until the power is turned off. The new commands take up 1K of memory.

The commands

*APPEND <fsp>

The file following this command is joined on to the end of the program currently resident in memory. Care should be taken that the two files can be

APPENDED together in memory without overwriting the screen. The file to be appended should also have higher line numbers than the program in memory. However if problems occur RENUMBER might take care of the resulting mix up.

*TAB

This command expects a line to be input, and all non-space characters are regarded as tab-stops. On pressing Return this line is remembered. When Tab is pressed the cursor will im-

mediately move along to the next nearest tab-stop. A maximum of thirty-two characters between tab-stops is allowed.

*GDUMP

This command will dump any Mode 1 screen out to an Epson printer. It also works on other printers that use the Epson control character format.

How it works

Lines 100 to 110 store the location of the star command for future reference.

Lines 130 to 170 find where the start of the text of the command is. If the command is being passed through the Basic II OSLCI command no star is needed.

Lines 200 to 240 compare the command being interpreted with the one stored in the data table. If a complete match is found, *ie* it is the same all the way along, a branch is made to the MATCH label at line 460. If, however, the command is not a match then the routine goes to line 250 and checks whether it is the end of the look-up table. If this is true the command is turned over to OSLCI to deal with at lines 390 to 450.

If it has not found the end of the table the program continues on to lines 280 to 310. Here the program jumps over the rest of the command in the table and finds if there is a full stop present in the command entered at the keyboard. If so, it jumps to the routine pointed to by the look-up table. It does this by getting the two address bytes held after the com-

mand. This happens at lines 460 to 520.

The command table follows the following format:

```
<command string> <&OD> <absolute address>
```

so it should be easy to add your own commands, but remember to change line 920 and line 3990.

These lines move PAGE up to the new value specified. The star command itself starts at the two byte address pointed to by &F2 and &F3. The parameters after the command may be accessed by indexing the value held at location &80 with the command start location.

Also, remember there has to be a &FF byte at the end of the table so the program knows when to finish searching for a particular command. You can also put your command in the *HELP interception table, which is located at lines 3860 to 3920. The format of the table is:

```
<command string> <&OD>
```

The table is terminated with a &FF byte. To invoke the *HELP command just type *HELP EXTENSIONS.

The standard operating system calls are used, though you might be puzzled by the &DFSD call that appears a few times in the program. This is only OSLCI in disguise, as it is a direct call (shock, horror). This is used because OSLCI stores the X and Y registers at location &F2 and &F3. These locations should not be corrupted as they are used already within the program to store the location of the star command.

To use the program first set the Basic

variable PAGE to equal &1DOO. This is most important because the program overwrites the standard disk Basic program area. Then type in the program as shown in the listing. I advise you to save it immediately.

Once you have saved it type RUN, and providing you have set PAGE properly the program will save two files to disk or tape. The first program in the listing contains the utility routines themselves. The second is the initialisation program. This loads up the main program and runs it. To run the tape version type *RUNBOOT, or on disk Shift-Break.

There will be no noticeable change when the program has loaded, so when the computer returns from loading do a Break or Ctrl Break. You will see the usual display except for the word EXTENSIONS which will appear after the BBC Computer 32K message. The only change you might have to make in the program itself is at line 60. If you have a disk system the line does not have to be changed. If yours is a tape system line 60 has to be changed to:

```
60 PAGE=&AEOO
```

This ensures that the minimum of memory is taken up by the program. In fact disk users could set the PAGE variable to &1100, and save the program to tape. It would ensure maximum memory conservation, although I do not think APPEND would work. But then you would have more memory to do Mode 1 dumps in if the graphics were generated by Basic. ▶

Listing 1

```

1000 STAR COMMAND EXTENSIONS
200EM (C) STEPHEN GRIGG 1984
300EM THIS PROGRAM GIVES THREE NEW
400EM COMMANDS: APPEND, GDUMP, TAB
500EM AND *HELP INTERCEPTION
600page=&1DOO
700FOR NG=&003 STEP3
800page=&
900OPT NS
100osrcli1 STX &F2
110STY &F3 CSAVE START OF *COMMAND
120LDX &250
130RESET LDY #0
140LDA (&F2),Y
150CMP #ASC**
160BEQ L9
170BEQ L9
180LDY INY
190INX CSTART OFF Y AT ONE TO MISS *
200LDA TABLE,X
210CMP #13
220BEQ MATCH
230CMP (&F2),Y
240BEQ L9
250C COMMAND HAS NOT MATCHED
260CMP &255
270BEQ listend
280LDX INX
290LDA TABLE,X
300CMP #13
310BNE L2 CFOUND END OF COMMAND
320LDA (&F2),Y
330INY
340CMP #ASC**
350BEQ MATCH
360INY
380JMP RESET C$KIP ADDRESS BYTES AND L
OAH AT NEXT COMMAND
390listend LDA #13
400LDA #2
410JMP A$FFA CRILL KEYBOARD EVENT SO C
OMMANDS USING TAB WORK
420JMP &DFBD
430LDA #14
440LDA #2
450JMP A$FFA
460MATCH STY &80 CSTORE INDEX SO OTHER
ROUTINES CAN FIND REST OF COMMAND
470GET ADDRESS BYTE AND JUMP TO IT
480LDA TABLE+1,X
490STA &70
500LDA TABLE+2,X
510STA &71
520JMP (&70)
530THIS IS THE TABLE WITH COMMAND
540C TERMINATED WITH ADD
550C FOLLOWED BY ADDRESS
560TAB WITH OFF BYTE AT END OF TABLE
570TABLE EQUIS *APPEND*
580TAB EQUIS *
590JMP APPEND
600EQUIS *GDUMP*
610EQUIS *
620EQUIS GDUMP
630EQUIS *TAB*
640EQUIS *
650EQUIS TAB
660EQUIS *HELP*
670EQUIS *
680EQUIS HELP
690EQUIS *
700BREAK BCC first
710LDY #255
720HELP INY
730LDA MESS,Y
740JMP A$FFE
750CMP #13
760BEQ HELP
770LDA #10
780JMP A$FFE
790JMP A$FFE
800LDA #oscl1 MOD 256
810STA &280
820LDA #oscl1 DIV 256
830STA &281
840LDA #EVENTY MOD 256
850STA &220
860LDA #EVENTY DIV 256
870STA &221
880LDA #NRCH MOD 256
890STA &286
900LDA #NRCH DIV 256
910STA &28F
920LDA #page=&1024 DIV 256
930LDY #0
940LDA #180
950JMP A$FFA
960LDA #14
970LDA #2
980JMP A$FFA
990first RTS
1000MESS EQUIS *EXTENSIONS*
1010BEQ L3
1020APPEND LDA &F2
1030STA &72
1040LDA &F3
1050STA &73
1060CLC
1070LDA &72
1080AND &80
1090STA &72 CADD INDEX TO GET TO FILENA
ME
1100BCC CARRS
1110INC &73
1120CHECK FOR SPACES BEFORE FILENAME
1130CARRS LDY #0
1140L1 LDA (&72),Y
1150CMP #13
1160BEQ NULL
1170CMP #32
1180BNE FINDPAGE
1190INY
1200JMP L1
1210NULL BRH
1220EQUIS 220
1230EQUIS *$yntax: APPEND (&fp)*
1240EQUIS 0
1250FINDPAGE LDA #13
1260STA &71
1270LDA #12
1280STA &70
1290EQUIS 0
1300SEC #2
1310STA &70
1320EQUIS #OCARRY2
1330EQUIS #71
1340OCARRY2
1350C SET UP CONTROL BLOCK FOR LOAD
1360LDA &70
1370STA &74 CSTORE

```

Is the Information Revolution Passing You By?

If you use an Apple, IBM, BBC or ACT micro then you could be missing out on the information revolution of the decade. Today there are literally hundreds of databases worldwide, which can be accessed by a microcomputer fitted with a Nightingale modem and using appropriate software. These data bases include Prestel, Micronet, Homelink, Telecom Gold, various 'Bulletin Boards' and massive American Databases such as 'DIALOG' and 'The Source'. Micros can also be used to send telex messages.



NIGHTINGALE - The Modem

By far the most versatile modem available, at the price, for either home or business use, Nightingale will enable your micro computer to send and receive data utilising an ordinary P.O. Telephone Line. It offers Prestel/Viewdata baud rates (1200/75 & 75/1200) alongside 300/300 baud full duplex for communication between computers.

The state-of-the-art modem chip technology employed in Nightingale requires minimum support circuitry resulting in low power consumption, low cost, high quality and extreme reliability. It also features a simple self test facility for easy installation.

Nightingale complies with the vigorous specifications laid down by British Telecom and is fully BAPT approved.

"INFORMATION SHEETS AVAILABLE ON REQUEST"



A world of information is available to you now when you install the Nightingale modem from Pace. There are hundreds of thousands of 'pages' of data available on Prestel, free computer software on Micronet, homebanking facilities available with Homelink, Company facts, Educational information, magazine and news articles available with Knowledge Index and the ability to communicate with other micro users direct, or via 'bulletin boards'.

The Nightingale modem is only £136.85 inc. VAT. If you do not already have suitable communications software Pace can supply this complete with a manual and full installation instructions.

PACE

PACE SOFTWARE LTD.
92 NEW CROSS STREET,
BRADFORD. BD5 8BS
Tel. (0274) 729306
Telex 51564

"Bringing tomorrow a little closer"



SPECIAL INTRODUCTORY OFFER

For a limited period, when you order the Nightingale modem you will receive discount vouchers entitling you to the following:-

KNOWLEDGE INDEX

20% discount off standard enrolment fee (normally £25)

This remarkable collection of databases includes over 22,000,000 items covering Agriculture, Books, Business, Electronics and Computing, Corporate and Company News, Education, Engineering, Government Publications, Legal Information, Magazine Articles, Mathematics, Medicine and News; Current Affairs (The enrolment fee also includes 2 hours of free access time).

ONE TO ONE

50% discount off standard enrolment fee (normally £50)

One to one is an electronic message service designed to give you the communications capabilities of a telex at much lower cost.

By using your micro fitted with a Nightingale modem you can produce telexes, letters, reports and contracts, and Courier delivery, priority mail and radio paging are also included in this highly efficient communications service.

To Pace Ltd., 92 New Cross Street,
Bradford BD5 8BS

Please supply:

- modems at £136.85 inc. VAT & carriage
- modems & software pack for BBC micro at £159. inc. VAT & carriage
- modems & software pack for Apple II file at £279 inc. VAT & carriage
- modems & software pack for IBM PC* at £269 inc. VAT & carriage
- modems & software pack for ACT at £269 inc. VAT & carriage

Name

Address

Cheque enclosed £..... or please debit my Access

Barclaycard (Please tick)

If you require further information on the above communications products for other computer systems, please write enclosing a stamped addressed envelope.

*Assumes IBM micro fitted with RS 232 interface.

Please allow up to 28 days delivery.

Listing 2

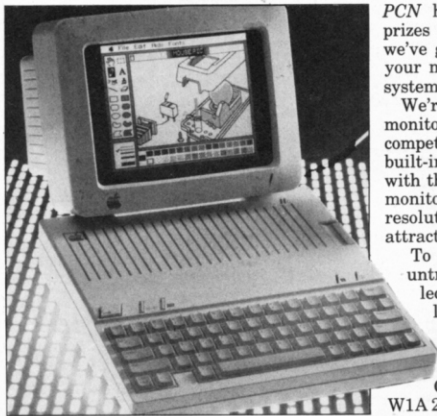
```

138BLDA 671
139BSTA 675 cTOP IN DATA BLOCK
140BLDA 60
1410STA 676
1420STA 677 cRESET OTHER DATA BYTES SO
1430STA 678
1440STA 679 cRELOAD ADDRESS IS TAKEN FR
OM DATA BLOCK
145BLD 682
146BLDY 60 cTELL *LOAD WHERE DATA BLOCK
IS
147BLDA 6255
148BJR BFFD cCALL *LOAD
149D.GDUMP LDA 62
150BJR AFEE
151BJR SETUP
152BLDA 60
1530STA 679
154BLDA 60
1550STA 678
156BLDA 60
1570STA 671
158BLDA 6100MOD256
1590STA 672
160BLDA 6100DIV256
1610STA 673
1620 read LDY 60
1630 LOOP TLA
1640PHA
165BLD 6870
166BLDY 60
167BLDA 60
168BJR BFF1
169BLDA 674
1700CP 625
1710REQ XZERO
1720CP 60
1730CLC
1740REQ NO_PIXEL
1750SEC
1760 NO_PIXEL ROR 675
1770PLA
1780TAY
1790JNR INCY
1800DEY
1810BNE LOOP
1820BIT 255
1830BHI ESCAPE
184BLD 63
1850 SIZE LDA 61
186BJR AFEE
187BLDA 675
188BJR AFEE
1890DEX
1900BNE SIZE
191BJR DEC16
1920JNR INCX
1930JMP read
1940 XZERO PLA
195BJR lineup
196BLDA 60
1970STA 678
1980STA 671
199BJR DEC16
200BLDA 673
2010CP 625
2020BNE read
2030 ESCAPE LDA 61
204BJR AFEE
205BLDA 627
206BJR AFEE
207BLDA 61
208BJR AFEE
209BLDA 605
2100JNR AFEE
211BLDA 61
2120JNR AFEE
213BLDA 612
2140JNR AFEE
215BLDA 63
2160JNR AFEE
2170 DEC16 SEC
218BLDA 672
2190BIC 616
2200STA 672
2210BCC 62
2220RTS
2230 C2 DEC 673
2240RTS
2250 INCY CLC
226BLDA 672
2270ADC 62
2280STA 672
2290BIC L3
2300RTS
2310 L3 INC 673
2320RTS
2330 INCY CLC
234BLDA 678
2350ADC 64
2360STA 678
2370BIC L4
2380RTS
2390 L4 INC 671.

2400RTS
2410 SETUP LDY 60
2420 SELP LDA UPDAT, X
2430TAY
244BLDA 61
2450JNR BFFEE
2460TAY
2470JNR BFFEE
2480INX
2490CP 65
2500BNE SELP
2510 lineup LDY 60
2520 L1PL LDA L1DAT, X
2530TAY
254BLDA 61
2550JNR BFFEE
2560TAY
2570JNR BFFEE
2580INX
2590CP 65
2600BNE L1PL
2620 UPDAT EQU 27
2630EQ 65
2640EQ 8
2650 L1DAT EQU 10
2660EQ 27
2670EQ 76
2680EQ 192
2690EQ 3
2700 TAB LDA #BUF MOD 256
2710STA 670
2720LDA #BUF DIV 256
2730STA 671
2740LDY 6355
2750LDA 6C3EF, Y
2760STA 672
277BLDY 60
2780LDA 632
2790 LOOP STA BUF, Y
2800INX
2810CP 672
2820BNE LOOP
2830LDA 632
2840STA 673
2850LDA 6127
2860STA 674
2870LDX 6870
2880LDY 60
289BLDA 60
2900JNR BFF1
291BLDA 632
2920STA BUF, Y
2930 EVENT CPY 69
2940REQ TABCODE
2950RTS
2960 TABCODE PHA
2970TVA
2980PHA
2990TVA
3000PHA
3010PHX
3020LDA 6138
3030LDX 60
3040LDY 632
3050JNR BFF4
3060LDY 6355
3070LDA 6C3EF, Y
3080STA 672
3090LDX 6318
3100CPX 672
3110REQ ret
3120INX
3130BIX 678
3140 TB2 LDA BUF, X
3150CP 632
3160BNE ret
3170LDA 6138
3180LDX 60
3190LDY 632
3200JNR BFF4
3210SEI
3220INC 678
3230LDA 678
3240CPX 672
3250BNE TB2
3260 ret LDA 61
3270STA 681
3280PLA
3290PLA
3300TAX
3310PLA
3320TAY
3330PLA
3340RTS
3350 WCH CMP 69
3360BNE DOIT
3370LDA 681
3380CP 60
3390REQ DOIT2
340BLDA 60
3410STA 681
3420RTS
3430 DOIT2 LDA 69
3440 DOIT JMP 67500
3450 HELP LDY 680
346BLDA 6821, Y
3470CP 613
3480REQ HELP2
349BLDY 680
3500BLD 678
3510CP #ASC"E"
3520REQ YES
3530INX
3540CP 613
3550BNE HELP2
3560JNR BFFD
3570 YES JNR ID
3580LDY 60
3590 HLP3 LDA 610
3600JNR BFFEE
3610LDA 632
3620JNR BFFEE
3630JNR BFFEE
3640 HLP4 LDA HLPMES, Y
3650CP 6255
3660REQ EXIT
3670JNR BFFEE
3680INX
3690CP 613
3700BNE HLP4
3710JNR HLP3
3720 EXIT JMP BFFD
3730 ID LDA 610
3740JNR BFFEE
3750LDY 60
3760 HLP LDA MESS, Y
3770JNR BFFEE
3780INX
3790CP 613
3800BNE HLP
3810RTS
3820 HELP2 JNR ID
3830LDA 610
3840JNR BFFEE
3850 JMP BFFD
3860 HLPMES EQU "APPEND (rsp)"
3870EQ 13
3880BNE "GDUMP"
3890EQ 13
3900EQ "TAB"
3910EQ "13"
3920EQ 255
3930 BUF
3940
3950NEXT
3960 NR=6703 STEP3
3970 #6900
3980 OPT NS
3990LDA #page%+1024 DIV 256
4000LDY 60
4010LDA 6180
4020JNR BFF4
4030LDA #EVENTV MOD 256
4040STA 6208
4050LDA #EVENTV DIV 256
4060STA 6209
4070LDA 664C
4080STA 6287
4090LDA #BREAK MOD 256
4100LDA #BREAK DIV 256
4120STA 6289
4130 SET UP CONTROL BLOCK FOR LOAD
4140LDA 614
4150LDX 62
4160JNR BFF4
4170LDA #FILE MOD 256
4180STA 672
4190LDA #FILE DIV 256
4200STA 673
4210LDA #page% MOD 256
4220STA 674
4230LDA #page% DIV 256
4240STA 675
4250LDA 60
4260STA 676
4270STA 677 cRESET OTHER DATA BYTES SO
4280STA 678
4290STA 679 cRELOAD ADDRESS IS TAKEN FR
OM DATA BLOCK
4300LDX 672
4310LDY 60 cTELL *LOAD WHERE DATA BLOCK
IS
432BLDA 6255
4330JNR BFFD
4340 FILE EQU "EXTEND"
4350EQ 13
4360
4370NEXT
4380 #61 'BOOT 900 955
4390BCL 1'S. EXTEND "*"STR*page%*" + DOIT
R" (page%+1024)
4400IF page%<61900 THEN END
4410OPT 4 2
4420 #61 'BOOT L
4430 #61 EXTEND L

```

TAKE A BITE OF THIS APPLE!



PCN has offered some great competition prizes in the last few weeks, but this time we've got something that will really make your mouth water — a complete Apple IIc system worth more than £1,000.

We're giving away a IIc, monitor and monitor stand to the winner of this free competition. The IIc features 128K of RAM, a built-in 5.25in disk drive and is compatible with the wide range of Apple software. The monitor is a green screen, 80-column high-resolution unit and the whole set-up forms an attractive and compact system.

To win, all you have to do is prove the untruth of that old adage, a little knowledge is a dangerous thing. All we're looking for is a little knowledge of Apple Computer. Just answer the questions below and send off the entry form to: Personal Computer News, Apple Competition, 62 Oxford Street, London W1A 2HG to reach us by Friday, December 7.

Entry Form

1 Name the two Steves who founded Apple Computer

2 Name the little brother of Apple's innovative Lisa

3 Which main processor is used in Apple's II series

4 The 'e' in IIe stood for enhanced. What does the 'c' in IIc stand for?

Name

Address

Current machine owned

I do/do not wish my name to be included on mailing lists.

The competition is not open to employees of VNU, Quickset, Chase, or Apple Computers. The judges' decision is final. No correspondence will be entered in to.

Datapen

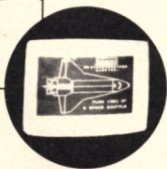
A QUALITY LIGHTPEN for use with the SPECTRUM computer

The DATAPEN lightpen enables you to create high resolution pictures and technical layouts directly on your T.V. screen. The accompanying software allows you to draw any shape or filled area you wish, to pixel accuracy, in full colour and the results may be utilised within your own programs, e.g. for animation, or to illustrate your title pages. At just £29 inclusive, the Datapen lightpen package represents superb value – just look at the actual screen photographs and you will agree that this must be the best value for money on the market.



PLUS: 3 SOFTWARE PROGRAMS

- Routines and ideas for your own programs. (Menus, games, music, etc.)
- User-defined graphics creation program.
- Superb full colour drawing program as illustrated in these actual screen photographs.



- Incorporates features not provided with other pens.
- Push button operation on pen – no need to use keyboard.
- Works under any lighting conditions.
- Plots to pixel accuracy.
- 20 pre-defined commands allow plotting of geometric shapes, including triangle, lines, circles, etc., text, or user-defined characters.

- Uses all paper and ink colours.
- A screen grid may be turned on and off, at will, to assist drawing.
- Flexible erase capability.
- All drawings can be saved to tape for further use.
- Plugs in direct – no batteries, additional components, or adjustments needed.
- Handbook, plus printout of routines for use in your own programs.

Send cheque or P.O. for £29.00 to: Dept. SU2 or ask at your local computer shop. Send S.A.E. for details.

DATAPEN MICROTECHNOLOGY LIMITED, Kingsclere Road, OVERTON, Hants. RG25 3JB 0256 770488
Lightpens and software are also available for BBC B, Dragon, CBM-64 and VIC-20.

IT TRANSFORMS THE HOME COMPUTER OUT OF ALL RECOGNITION

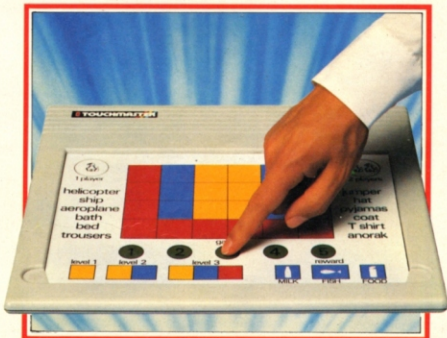
Because Touchmaster is a touch sensitive surface which effectively bypasses the keyboard, it has none of the keyboard's complications, typing skill requirements or potential errors.

To operate Touchmaster, you simply slide an overlay onto its surface, load the matching Touchware into your computer and touch the overlay.

For repeatability and resolution, no other ostensibly comparable pads can touch Touchmaster.

In fact, Touchmaster's unique technology makes it state of the art when it comes to such pads.

Other pads might fairly be described as peripherals. Touchmaster goes a lot further: it re-specifies the home computer.



Now anyone can master the home computer

TOUCHMASTER

For full details, contact Touchmaster Limited,
PO Box 3, Port Talbot, West Glamorgan SA13 1WH,
or phone Teledata (01) 200 0200





CHECKMATE

The Chess column is a new feature of Output for all you dedicated pawn movers. Once a month we shall tune to the latest moves in the chess world. Our expert Tony Harrington begins with an exclusive review of Psion's 3-D chess microdrive cartridge for the QL.

For some time now we've all grown used to see even the best home computer chess programs trailing helplessly behind dedicated machines in competitions. But now Psion has produced a chess program for the QL that looks as though it could close the gap.

The *Psion Chess* program (running on an 8MHz Sage computer) shared joint first place with three dedicated chess computers at this year's World Micro-computer Championship, in Glasgow, in September. But how could a program designed for a home computer compete with the best of the dedicated chess machines?

Dedicated machine manufacturers like Fidelity, Hegener and Glazer not only have the advantage of being able to build their hardware specifically to suit their programs, they also have the financial muscle to spend on research and development.

Richard Lang, the author of *Psion Chess*, has several programs for both the Spectrum and the Dragon to his credit, but it was still a puzzle how he managed to produce a program that was so much stronger than Bryant's colossus.

The answer became obvious when I stepped inside Psion's workshop and saw Lang sitting in front of three screens and an open QL with an interface card to a VAX 11780 coming out one end of it. The old amateurish approach to program development where the programmer spends weeks hunched over his home computer patiently hunting down bugs in his algorithms are over.

3-D approach

The 3-D approach to the board takes a while to get used to but the effect is great. The Psion design team reckon that they spent hours at a chess board checking it out.

Replaying a completed game on Psion Chess is a treat. You can replay a game as often as you please without worrying about misreading a move off the scoresheet.

Performance

Because they don't have a purpose-built piece of hardware at their disposal, Lang and Psion have to fit in with the QL's usual way of doing things, and there is a price to be paid for this. Although it has the same clock speed as the Sage, Lang's program is slower by a factor of three on the QL.

So just how good is Psion Chess as marketed? Someone of a cynical turn of mind might point out that while running

on the Sage at Glasgow, the program had extremely lucky escapes from lost positions: one notable instance being when it was hopelessly down against the Fidelity Elegance.

On the other hand, Psion scored a very good victory over the Conchess machine Princess, which didn't lose to any of its rival dedicated machines in the tournament and ended up with five points, a share of first place and the title of World Champion commercial machine. Beating the 1984 World Champion DCM can't be bad.

Our review copy was a pre-release version and testing is still going on but the results so far are encouraging. I tend to believe that people who buy chess programs don't want to sit around for long periods waiting for the program to move. So competition performances at

C won five games in a row quite convincingly and looked like it would keep going so far ever. So I experimented by taking Psion up through some of the other levels while still keeping the Super C on its blitz level.

If that sounds unfair, remember that very few casual chess players can beat the Novag machine at this level, no matter how long they ponder. You have to be at least a strong club player to have a chance. On level seven, which is theoretically a move a minute, but in practise seems to be a bit faster than that, Psion began to achieve drawn positions against the Super C, a fact which speaks very well for its playing strength.

As to its features, it has almost all the standard facilities that one expects from a chess program. There are fourteen



Psion's chess program in action. It stood up well against its competitors.

two minutes a move are not really the key issue.

Up until the last month or so, during which Conchess, SciSys, Fidelity, Hegener and Glazer all revealed new, more powerful machines, the machine which played the best lightning chess was undoubtedly the Novag Super Constellation. This machine has taken the scalps of several players of International Master standard during blitz competitions, and the other DCMs still have to prove themselves against it. So it seemed logical to pit Psion against the Novag machine. The first point to make is that the Super C has very little difficulty whipping Psion at the blitz level (Psion's level three, which at six seconds a move is actually four seconds a move too fast for blitz chess). The Super

levels' going from novice to infinite time, and eight problems solving levels, with mate in eight being the absolute upper limit.

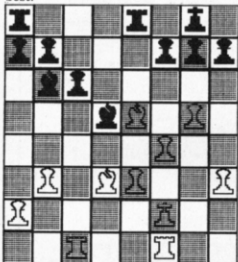
The QL printer can be used to dump board positions or to print out a running (or complete) game score, and there are the usual analysis, hint, takeback and replay facilities. The expected market price will be £19.95, and the program comes with a good well written manual.

The North American Computer Chess Championship has produced an astonishing result. Fidelity achieved second place with a souped up version of its Elegance program, behind the Cray Blitz. This is the best result ever by a microcomputer based program. David Levy's game this month comes from this event.

Annotated by John Nunn

The ability to play the endgame well distinguishes the master from the amateur' is an old chess aphorism. Until recently chess programs have suffered from poor endgame play, even while their middlegame play has been improving rapidly.

Judging from the Glasgow World Microcomputer Championships, this problem is now well on the way to being solved. There were several interesting endgames which were constructively played by both sides. Here is one of the best.



Move 22, black to move.

Psion Chess is White and Princhess X is Black. We take up the story with Black

about to make his 22nd move.

22 Bb6xe3+? Black's well placed bishop at d5 gives him an edge, which could have been maintained by 22...Ra8-d8, but he is lured into a tempting combination which misfires.

23 Kf2xe3 f7-f6
24 g5xf6 g7xf6
25 Rf1-g1+ Kg8-b8!
The best move. 25...Kg8-f7 26 Bd3xh7 f6xe5 27 Bh7-g6+ would have lost at once, while 25...Kg8-f8 26 Rc1-f1! f6xe5 27 f4xe5+ Kf8-e7 28 Bd3xh7 gives White a useful extra pawn.

26 Rg1-g5!
This is a bewildering array of pins on the lines e8-e3 and e5-h8, but White finds the best move.

26 ... Re8xe5+
26...f6xe5 27 f4xe5 is worse since White's rook remains in command of the g-file.

27 Rg5xe5 f6xe5
28 f4xe5
The dust has cleared and we can see that White's problems are behind him; indeed Black must take care lest the passed e-pawn becomes a real menace to him.

28 ... Ra8-g8!
29 Bd3-f5 a7-a5
30 h3-h4 Rg8-g3+
31 Ke3-f4 Rg3-f3+
32 Kf4-g5 a5-a7

A very poor move. After 32...Kh8-g7! bringing the king into the game Black

can draw with ease.

33 b3xa4 Bf5xa2
34 h4-h5
Over the next few moves neither program appreciates the importance of allowing the White king to reach f8, supporting the advance of the e-pawn. Here 34 Kg5-f6 Ba2-d5 35 Rc1-d1 would have won immediately.

34 ... Rf3-g3+
Black misses his last chance to bring the king to g7.

35 Kg5-f6 Rg3-g8
36 h5-h6f
36 e5-e6 Rg8-f8+ 37 Kf6-e5 would have won. Now Black gets a new lease of life.

36 ... Rg8-f8+
37 Kf6-g5 Rf8-g8+
38 Kg5-f4 Rg8-a8f
38...Rg8-f8! pinning the bishop and threatening 39...Ba2-e6 might have drawn. Now all is well again for White and Psion Chess winds up efficiently.

39 Bf5-e2 c6-c5
40 Bc2-e4 Ra8-a5
41 Kf4-f5 b7-b6
42 Rc1-d1 Ba2-g8
43 Rd1-d8 c5-c4
44 Bd5-c6 c4-c3
45 Bc6-b5 Ra5xb5
Forced, as 45...c3-c2 46 Bb5-c4 c2-c1=Q 47 Rc8xg8 is mate. The game concluded 46 a4xb5 c3-c2 47 Rf8-c8 c2-c1=Q 48 Rc8x1 Bg8-f7 49 Rc1-c7 Bf7-e8 50 Rc7-c8 Kh8-g8 51 Kf5-f6 Kg8-f8 52 e5-e6 Kf8-g8 53 Rc8xe8 mate.

Annotated by David Levy

The following game was played at the 1984 North American Computer Championship in San Francisco. White, 'Intelligent Software Experimental' was running on an Apple II, Black, 'Ostrich' on a system of eight Data General Nova computers. The game illustrates two of the significant problems facing chess programmers.

White Black
1 Ng1-f3 a7-e6
2 d2-d4 d7-d5
3 Bc1-f4 Bf8-d6
4 Bf4xe6 Qd8xe6
5 Nb1-c3 Nb8-c6
6 e2-e3 a7-a6
7 Bf1-e2 Ng8-f6
8 a2-a3 0-0
9 Qd1-d3 Ra8-b8
10 0-0 Bc8-d7
11 Rf1-d1 b7-b5
12 Kg1-f1

A strange move, but one which is typical of a syndrome seen in many computer games. White thinks that it cannot improve on the positions of its Knights, Bishops, Rooks or Queen and it does not have any useful play. So it moves the King!

12 ... Rb8-e8?!

(Better was 12... Rf8-e8)

13 h2-h3 e6-e5
This move loses a pawn, but it requires a 14-ply search to discover this fact. After

Black's move White's next two moves are virtually forced, as Black replies, and in the position arising after 15...Re8xe5, it is possible also for White to see the win of the pawn, which is then only 9-ply deep.

I would argue, however, that an intelligent chess program could avoid such 'bad luck' by analysing moves deeply in variations that are forced. This technique would encourage a detailed study of the position arising after 15...Re8xe5.

14 d4xe5 Nc6xe5
15 Nf3xe5 Re8xe5
(If 15...Qe6xe5 then 16 Nc3xd5 Nf6xd5, 17 Qd3xd5 Qe5xd5, 18 Rd1xd5)

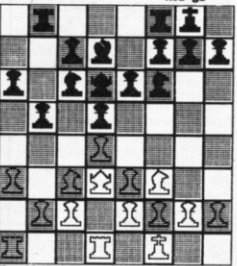
16 f2-f4! Re5-e6
Black can try to hold onto the pawn only at the cost of losing even more material.

16 ... Re5-f5, 17 g2-g4
17 Nc3xd5 Nf6xd5
18 Qd3xd5 Re6x3
19 Qd5xd6 c7xd6
20 Rd1xd6 Rf8-e8
21 Be2-d3 Bd7-c8
22 a2-a4!

A fine move, emphasising the vulnerability of Black's a-pawn.

22 ... b5xa4
23 Ra1xa4 Rc3-e6
24 Rd6xe6 Bc8xe6
25 Ra4xe6 g7-g6
26 c2-c3 Re8-b8
27 b2-b4 Rb8-c8
28 Ra6-a3 Be6-c4

29 Bd3xc4 Rc8xc4
30 g2-g3 Kg8-b7
31 Kf1-e2 Rc4-e4+
32 Ke2-d3 Re4-e1
33 c3-c4 Re1-g1



Move 12, black to move.

34 Kd3-d4 Rg1-g2
35 b4-b5 Rg2-b2
36 Kd4-e5 Rb2-c2
37 Ke5-d5 Rc2-b2
38 g3-g4 Kg7-f6
39 Ra3-a6+ Kf6-g7
40 b5-b6 Rf7-b3
41 h3-h4 h7-h5
42 g4-g5 Rb3-d3+
43 Kd5-c5 resigns

Black cannot stop the white queen side pawns from promoting.

GOING IN CIRCLES

If the thought of drawing circles on your Amstrad puts your head in a spin, try these programs from Kenn Garroch and Bryan Skinner.

A Circle command is sadly absent from the Amstrad CPC 464's Locomotive basic. It's easy to write your own simple circle drawing routines in Basic, but most are very slow if you need much detail. However, you can use mathematical principles to produce some really fast Basic circle sub-routines.

Simple circles

Each point of a circle's perimeter can be calculated by the formulae:

$$x = \text{radius} * \sin(\text{angle})$$

$$y = \text{radius} * \cos(\text{angle})$$

Where 'angle' takes on values between 0 and 360, see figure 1. If your micro doesn't support the DEG command, you must convert the angle in degrees to its radian form using `angle/57.2957795`. For circles whose centre is not at the origin (coordinates (0,0)), an offset must be added to each point:

$$x = x \text{ origin} + \text{radius} * \sin(\text{angle})$$

$$y = y \text{ origin} + \text{radius} * \cos(\text{angle})$$

This rather slow basic method of calculating perimeter points can be speeded up by using integer variables. Listing 1 gives a complete simple circle listing.

Faster circles

Circles have certain unique properties which we can exploit to speed up the drawing process. The compass points N, S, E and W don't have to be calculated—they're obvious:

- North — (x origin, y origin - radius)
- South — (x origin, y origin + radius)
- East — (x origin + radius, y origin)
- West — (x origin - radius, y origin)

Knowing this saves eight calculations involving SIN and COS, and these functions are time-expensive.

Of more importance here is the fact that a circle can be defined in terms of a single quadrant (quarter segment). Once this is done, the other segments are merely reflections of other transitions of the original segment. Figure 2 shows how the calculated coordinates of a point on the perimeter in segment A can be translated to create points in segments B, C and D. Listing 2 is the modified circle drawing routine using this principle, and takes less time than Listing 1.

Even faster

The latest method is the most complex, but allows you to use an extremely fast method of drawing the perimeter. The trade-off is memory—this is a very long program just to draw circles. If your application is time-critical, however, and you're not concerned with memory overheads, you'll want this algorithm.

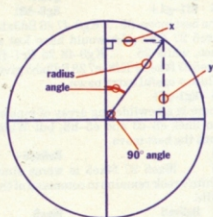


Figure 1

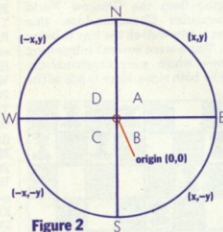


Figure 2

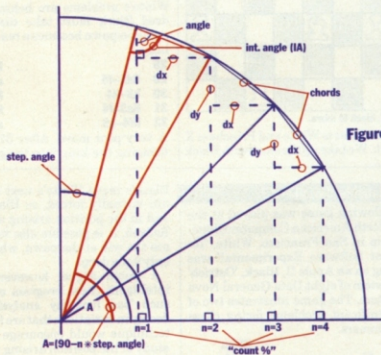


Figure 3

The method doesn't calculate absolute points around a centre like the first two. Given a starting point and a radius, it calculates the set of differential movements required to get from one point on the perimeter to the next, over an arc of 45 degrees. Just as we used the symmetry principle in the second program to generate seven, 45 degree segments, from one.


The algorithm uses the fact that a circle can be considered as a series of straight lines drawn between two points on the perimeter and at right angles to the radius through their mid-point. Provided the number of steps in each segment is large, reasonable circles are drawn. However, as the ratio of the radius to the number of steps increases, so the accuracy of the shape is reduced.

To use the program as a subroutine you must define a radius as 'radius%', as well as the number of steps to be used in

each 90 degree quadrant. This information is held in the integer variable 'no.steps%'. Multiply by four to find out how many steps are used to draw the whole circle. To adapt the routine for use in your own programs you must set the values of 'x origin%' and 'y origin%' too.

Figure 3 shows how the variables used in the routine are calculated. The angle at the base of the segment (marked IA in the figure, represented by 'int.angle' in the program) is given by $(18 \cdot \text{step. angle}) / 2$. Starting from 0 degrees, the large angle A is given by $90 \cdot \text{step. angle}$. Dropping a perpendicular from the current point on the perimeter to the x-axis allows us to calculate the angle at the top of the triangle ('angle' in the diagram) as $90 \cdot n \cdot \text{step. angle}$, where 'n' is the segment count, 'count%' in the listing.

We can then calculate the relative movement required to reach the next



Data Processing Managers should try this simple cost-cutting exercise.

Take the short cut to data processing savings and send for details of Ferranti PT7.

We'll tell you how PT7 can cut investment in mainframe equipment by adding power more cheaply at the terminal. How by connecting the Ferranti pro-personal computer, CP/M86[®] is available at each VDU, enabling you to perform industry standard applications, with word processing too, what's more PT7's local processing distributes system loads, eases mainframe 'peak' problems, and allows simpler planning of mainframe upgrades.

We'll show you how PT7 can cut your telecommunication costs by running more VDUs per communication line. And there's further cost saving by more VDUs sharing the same remote printers and discs.

We'll tell you how PT7 can save your data entry costs by running concurrent data entry and interactive work through one controller.

And how PT7 can save terminal programming and support costs by using industry standard COBOL.

You'll also see that PT7 offers a wider choice of peripherals and software, and a fully integrated choice of systems from basic interactive to fully programmable mainframe independent. You'll also be pleasantly surprised to see that it's all here today.

Pick up the scissors and snip out the coupon now.

**PT7.
THE ADVANCED
ALTERNATIVE
TO IBM 3270,
AND THE
ICL DRS**

Ferranti Computer Systems Limited,
PT7 Product Sales, Simonsway,
Wythenshawe,
Manchester M22 5LA
Telephone: 061-499 3335
Telex: 668084

Please send me data on PT7

Name

Position

Company

Address

PCN

Tel

Ferranti Computer Systems Limited,
Simonsway, Wythenshawe,
Manchester M22 5LA.

FERRANTI
Computer Systems

UTPUT: Amstrad

point (dx and dy in the diagram), using SIN and COS ad the hypotenuse. The hypotenuse is in fact the chord of the segment, calculated in lines 80 and 90 as $(2*PI*radius)/(360/step.angle)$.

We need only repeat this for angles up to 45 degrees, because after this the dx and dy values are the same for each subsequent segment, though they must be transformed (by swapping dx for dy, or negating dx of dy when plotting).

If your computer doesn't use a relative DRAW command you should be able to adapt the routine to PLOT points, as long as you up date the perimeter points, as in:

```
FOR count% = 1 TO no.units
xpoint = xpoint + dx%(count%)
ypoint = ypoint + dy%(count%)
PLOT xpoint,ypoint
NEXT
```

Other uses

By changing some of the definitions and calculations, other interesting shapes can be generated by the routine. For example, in lines 160 and 170, where the

arrays dx and dy are filled, try swapping the SIN and COS statements. Changing line 140 to angle = step.angle produces a four-point star. Leaving out the minus sign in line 170 also changes the effect.

You should find you can generate many interesting shapes simply by playing around with the basic code. It should be possible to adapt it to produce many polygons other than circles and curved shapes.

Listing 1

```
10 REM Simple circle
20 MODE 1
30 xorigin = 320:yorigin = 200
40 radius% = 100
50 GOSUB 1000
60 END
70 '
1000 DEG
1010 FOR angle% = 1 TO 360
1020 xpoint% = xorigin + radius% * SIN(angle%)
1030 ypoint% = yorigin + radius% * COS(angle%)
1040 PLOT xpoint%, ypoint%
1050 NEXT
```

Listing 2

```
10 DEG:MODE 1:xorigin = 320:yorigin = 200
20 radius% = 100
30 PLOT xorigin,yorigin - radius%
40 PLOT xorigin,yorigin + radius%
50 PLOT xorigin - radius%,yorigin
60 PLOT xorigin + radius%,yorigin
70 FOR angle% = 1 TO 89
80 xpoint = radius% * SIN(angle%)
90 ypoint = radius% * COS(angle%)
100 PLOT xorigin-xpoint,yorigin+ypoint
110 PLOT xorigin+ypoint,yorigin-ypoint
120 PLOT xorigin-xpoint,yorigin-ypoint
130 PLOT xorigin+ypoint,yorigin+ypoint
140 NEXT
```

Listing 3

```
10 'Really fast circles
20 'Using eight segments
30 DEG:CLS
40 radius% = 150
50 xorigin% = 320:yorigin% = 200
60 no.steps% = 16
70 step.angle = 90 / no.steps%
80 chord = (radius% * 2 * PI)
90 chord = chord / (360 / step.angle)
100 int.angle = (180 - step.angle) / 2
110 no.units = no.steps% / 2
120 DIM dx(no.units),dy(no.units)
130 FOR count% = 0 TO no.units
140 angle = 90 - count% * step.angle
150 angle = int.angle - angle
160 dx(count%) = chord * COS(angle)
170 dy(count%) = -(chord * SIN(angle))
180 NEXT
190 xpoint = xorigin%
200 ypoint = yorigin% + radius%
210 PLOT xpoint,ypoint
220 ' 0 to 45 degrees
230 FOR count% = 0 TO no.units
240 DRAW dx(count%),dy(count%)
250 NEXT
260 ' 45 to 90 degrees
270 FOR count% = no.units TO 0 STEP -1
280 DRAW -dy(count%),-dx(count%)
290 NEXT
300 ' 90 to 135 degrees
310 FOR count% = 0 TO no.units
320 DRAW dy(count%),-dx(count%)
330 NEXT
340 ' 135 to 180 degrees
350 FOR count% = no.units TO 0 STEP -1
360 DRAW -dx(count%),dy(count%)
370 NEXT
380 ' 180 to 225 degrees
390 FOR count% = 0 TO no.units
400 DRAW -dx(count%),-dy(count%)
410 NEXT
420 ' 225 to 270 degrees
430 FOR count% = no.units TO 0 STEP -1
440 DRAW dy(count%),dx(count%)
450 NEXT
460 ' 270 to 315 degrees
470 FOR count% = 0 TO no.units
480 DRAW -dy(count%),dx(count%)
490 NEXT
500 ' 315 to 360 degrees
510 FOR count% = no.units TO 0 STEP -1
520 DRAW dx(count%),-dy(count%)
530 NEXT
540 END
```

SPECTRUM

GAME	RSP	OUR
DALEY THOMPSON DECATHLON	6 90	5 25
BEACHEAD	7 95	5 99
WHITE LIGHTNING	10 95	10 50
SHERLOCK HOLMES	14 95	10 50
HOBBIT	14 95	9 99
HULK	9 95	7 99
MUGSY	6 95	5 50
SABRE WOLF	9 95	7 99
LORDS OF MIDNIGHT	9 95	6 99
JACK & BEANSTALK	5 95	4 50
MICRO OLYMPICS	5 95	4 75
PSYTRON	7 95	6 99
CODENAME MAT	6 95	4 99
SCUBA DIVE	6 95	5 25
GILLIGANS GOLD	5 90	4 50
OTHER OCEAN ONLY	5 90	4 50
JET SET WILLI	5 95	4 50
FRANK K. STEIN	5 95	4 50
WAR OF THE WORLDS	5 95	5 99
TORNADO LOW LEVEL	5 95	4 50
TRASHMAN	5 95	4 40
ALL IMAGINE	5 50	2 99
FIGHTER PILOT	6 95	5 99
NIGHT GUNNER	7 95	5 25
PENETRATOR	6 95	5 50
MILLIONAIRE	5 50	4 25
WORLD CUP	6 95	5 99
CLASSIC ADVENTURE	6 95	5 50
VALHALLA	14 95	9 99
FOOTBALL MANGER	6 95	5 25
H.U.R.G.	14 95	9 99
MONTY MOLE	6 95	5 50
FULL THROTTLE	6 95	5 75
MATCHPOINT	7 95	6 75
OLYMPICON	7 95	5 50
TWIN KINGDOM VALLEY	7 95	5 70
DANGER MOUSE	6 95	4 99
FOREST AT WORLDS END	5 50	3 99
TILER	5 50	3 99
AVALON	7 95	5 50
HERO	7 95	5 50
ZENJI	7 95	5 50
RIVER RAID	7 95	5 50
ENCINO	7 95	5 50
HAMPSTEAD	8 95	6 95
PITFALL	7 95	5 50
STAR BIKE	6 95	4 99
GIANTS REVENGE	6 95	4 99
SCRABBLE	15 95	11 99
EDDIE KIDD JUMP CHALLENGE	6 95	4 99
COMBAT LYNX	7 95	5 50
KOMOTONI WILF	6 95	4 70

GOOTE

COMMODORE 64

GAME	RSP	OUR
ZIM SALA BIM	9 95	6 99
STRIP POKER	9 95	7 50
BLACK HAWK	7 95	5 50
PSYTRON 64	7 95	5 50
ASTEC	8 95	7 25
ANKH	8 95	7 25
MR ROBOT	8 95	7 25
HOBBIT	14 95	9 99
TALES OF ARABIAN NIGHTS	7 95	5 50
DALEY THOMPSON DECATHLON	7 95	5 50
HENCOX	7 95	5 50
BEACH HEAD	8 95	7 50
ASTRO CHASE	9 99	7 95
DECATHLON	5 95	4 75
MICRO OLYMPICS	8 95	7 50
FLIP AND FLOP	6 95	5 50
SCUBA DIVE	9 99	7 95
PIT FALL	7 95	6 50
MONTY MOLE	7 95	6 50
TRASHMAN 64	14 95	11 00
VALHALLA	14 95	10 99
DEATH STAR INTERCEPTOR	9 95	6 50
PITFALL II	9 95	7 95
RIVER RAID	9 95	7 95
HERO	9 95	7 95
DALLAS QUEST (DISC ONLY)	14 95	12 00
HAVOC	9 95	6 99
NATO COMMANDER	9 95	7 95
SPRITE ACE	9 95	7 95
F15 STRIKE EAGLE	14 95	11 00
EDDIE KIDD JUMP CHALLENGE	7 95	5 50
COMBAT LYNX	8 95	7 25
STUNT BIKE	6 95	4 99
MY CHESS II	8 95	7 25
BATTLE FOR MIDWAY	9 95	7 50
TORNADO LOW LEVEL	6 90	4 99

SPECIAL OFFER

	OUR PRICE
SPECTRUM 48K	129 95
SOFTWARE PACKAGE WORTH	56 00
KEMPTON TYPE INTERFACE	14 95
QUICKSHOT II JOYSTICK	11 95
TOTAL VALUE	212 85
OUR PRICE	£145 00

BBC GAMES

GAME	RSP	OUR
OLD FATHER TIME	9 50	7 50
CITY DEFENCE	7 50	6 95
MUSIC SYNTHESISER	9 50	7 50
TWIN KINGDOM VALLEY	9 50	7 50
HULK	7 95	6 50
AVIATOR	14 95	11 00
BLAGGER	7 95	6 95
JOB DIGGER	9 95	8 50
HOBBIT	14 95	9 99
VOODOO CASTLE	9 95	8 50
CHART BUSTERS	9 95	6 99
ELITE	14 95	10 25

ELECTRON GAMES

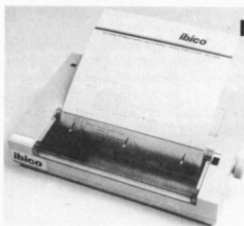
GAME	RSP	OUR PRICE
MICRO OLYMPICS	5 95	4 75
TWIN KINGDOM VALLEY	9 50	7 50
HULK	7 95	6 50
ALL ACCORNSOFT	9 20	7 50
CHUCK EGG	7 90	6 50
BLAGGER	7 95	6 50

ALL PRICES INCLUDE P&P
 QUICKSHOT II ONLY £8.99
 PLEASE NOTE IF YOUR ORDER
 EXCEEDS £50 YOU GET
 10% FURTHER DISCOUNT
 SEND CHEQUES/P.O. TO
 GOODYBYE POB 2
 94 LEATHER LANE, LONDON EC1
 PLEASE STATE WHICH MICRO

TRADE ENQUIRIES
 DO YOU SELL SOFTWARE?
 PHONE 01-405 1270
 FOR DETAILS OF TRADE PRICES

COMPUTERBASE

only
£199.00
 (+ VAT)



IBCO'S New Letter Quality Printer Model LTR-1

Professional standards at your fingertips
 for letters, lists, files, addresses etc.

- ☆ Compact 292 x 57 x 165mm
- ☆ Takes full A4 sheet
- ☆ Continuous or manual feed
- ☆ Elite type 12 pitch
- ☆ Parallel and serial interface
- ☆ 80 Columns
- ☆ 96 characters
- ☆ 12 CP5 Bi-directional

ALSO AVAILABLE -
 Optional adaptors for:
 Sinclair Spectrum
 Commodore 64
 Standard parallel printer cable

Computerbase Dept YC1, 21 Market Avenue, City Centre, Plymouth PL1 1PG

Computerbase Dept YC1, 21 Market Avenue, City Centre, Plymouth PL1 1PG

Please supply:

- ___ IbcO Printers
- ___ Adaptor for Commodore 64
- ___ Adaptor for Sinclair Spectrum
- ___ Parallel Printer Cable to fit

Computer (state computer make)

I enclose a cheque or Postal Order for _____ made payable to Computerbase or

debit my Access/Barclaycard/Diner. Expiry date _____

Account No _____

Name _____

Delivery address _____

Price per unit	
£199.00	
£21.70	
£34.74	
£8.65	
£5 P & P	£5
Vat @ 15%	
Grand Total	

DONKEY APE

A fair damsel urgently requires rescue from the hairy clutch of a barrel-rolling ape. Happily, help is at hand in the form of an intrepid carpenter who climbs girders and ladders to rescue the unwilling stand-in for Fay Wray.

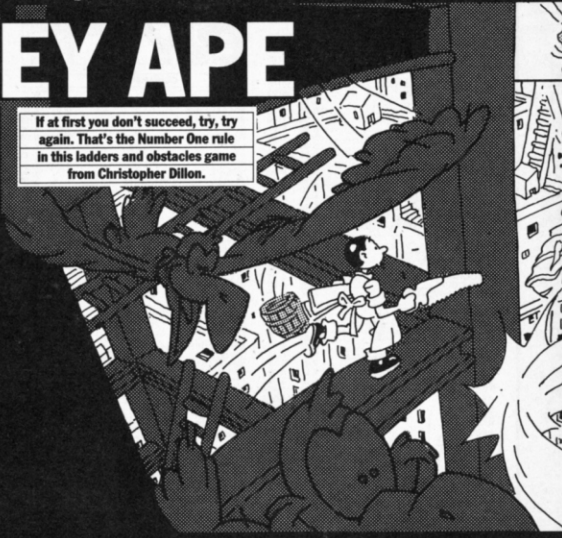
You start off in the bottom left-hand corner of the screen and use the cursor keys to wend your way along each level to the ladders. As you proceed barrels are rolled along the floor — avoid these or be flattened. At the top the hapless female awaits you guarded by a very splendidly coloured ape who obviously has something to do with the rolling barrels.

You bravely struggle your way to the top level only to discover that you are the unfortunate dupe of the ape, and in a flash you are whisked back down to the first level.

Perseverance is the name of the game, so up you go again. Now your upward manoeuvres have become even more tricky as the ape must have collected fresh ammunition, and the barrels come thick and fast.

A downward cursor key has been omitted for a faster running game. ▣

If at first you don't succeed, try, try again. That's the Number One rule in this ladders and obstacles game from Christopher Dillon.



Program notes

80-150	Set up all variables, a\$ is set for the number of barrels	260-262	Moves you up one of the four ladders	273-295	The opening screen showing the cursor controls
200-272	Main game loop	263-264	You hit a barrel	296-402	Data for user defined graphics
254-257	Move the barrels along the different levels	265-268	Make you jump up	405-700	Introduction screen showing the ape
258	Moves you to the right	269	The final jump — you have made it to the fair damsel's position	405-410	Prints ape
259	Moves you to the left			598-700	Data for introduction tune

```

80 LET s=0: LET l=4
81 LET a$=""
  GOTO 100
100 LET i=0: LET p=0: LET q=1
105 LET l=i: LET i=i+1: LET p=p+1
110 LET uu=20
115 LET wait=0: LET count=4: LET t=ss+16
120 LET v=5: LET l=p: LET q=1
125 LET x=5: LET a$="20"
130 LET b$="H": LET c$="I"
135 LET z$="O": LET y$="P"
140 LET uu=0
145 LET t=ss: LET us=c$
150 LET vv=12
160 RESTORE 230
200 REM ## MAIN LOOP ##
245 FOR n=1 TO 30
249 IF n=4 THEN LET uu=4
249 IF n=8 THEN LET uu=8
250 IF n=12 THEN LET uu=12
251 INK 2: IF n=16 THEN LET uu=16
252 IF n=12 THEN LET ss=0
253 IF n=8 THEN LET vv=4
254 PAPER 0: PRINT AT 4,3,ss(n TO n+21):AT 5,2,a$(61-n) TO 61+26-n)
255 PRINT AT 12,3,ss(n TO n+26)
256 PRINT AT 16,2,ss((61-n) TO 61+26-n):AT 20,3,ss(n TO 25+n)
257 BEEP 0,000030,69
258 IF INKEY$="" AND X=28 AND n=1 AND a$uu THEN LET x=x+1: LET t=t+b$: LET us=c$: PRINT AT n-1,x-1,"": LET s=s+1
259 IF INKEY$="S" AND X=3 AND a$=kk AND a$uu THEN LET x=x-1: LET t=t-b$: LET us=g$: PRINT AT n-1

```

```

,x+1,"": LET s=s+1
260 INK 1: PRINT AT n,x:us: INK 5:AT n-1,x,t$
261 IF x=3 AND INKEY$="7" AND a$vv THEN LET s=-1: INK 4: PRINT AT n+1,x,"E": LET k=k-1
262 IF x=28 AND INKEY$="7" AND n=25 THEN LET s=-1: INK 4: PRINT AT n+1,x,"E": LET k=k-1
263 IF SCREENS (n,x+1)=3 THEN GO TO 3010
264 IF SCREENS (n,x-1)="" THEN GO TO 3010
265 IF INKEY$="0" AND wait=0 THEN LET s=-1: LET wait=1: BEEP 0,002,30
266 IF wait=1 THEN LET count=count-1
267 IF count=1 THEN LET s=s+1: LET count=4: LET wait=0: PRINT AT n-2,x-1,""
268 IF wait=1 THEN PRINT AT n,x-1,""
269 IF SCREENS (n-2,x+1)="" THEN GO TO 3000
270 PRINT AT 0,5:5
271 NEXT n
272 GO TO 240
273 REM ## OPEN SCREEN ##
280 PAPER 0: BORDER 0: INK 7: C L$
281 PRINT AT 0,1,"#### ##### ##
## ## ##### ##"
282 PRINT AT 1,1,"## ## ## ##
## ## ## ##"
283 PRINT AT 2,1,"## ## ## ##
## ## ## ##"
284 PRINT AT 3,1,"## ## ## ##
## ## ## ##"
285 PRINT AT 4,1,"#### ##### ##
## ## ##### ##"

```

```

286 PRINT AT 6,9,"#### ##### ##
#
#287 PRINT AT 7,9,"#### ##### ##
#
#288 PRINT AT 8,9,"## ## ## ## ##
#
#289 PRINT AT 9,9,"#### ##### ##
#290 PRINT AT 10,9,"## ## ## ## ##
#291 INK 5: PRINT AT 14,0,"(S)I
FT (B)RIGHT"
292 PRINT AT 16,9,"(7)UP (9)JUH
P"
293 INK 4: PRINT AT 21,0,"
# ANY KEY TO START"
294 PAPER 0
295 BEEP 0,05,-10: BEEP 0,01,5:
BEEP 0,01,-8
296 REM ## USER GRAPHICS ##
300 LET e=PEEK 23675+256APEEK 2
3676
305 FOR f=0 TO 4+150
310 READ c: POKE f,c: NEXT f
320 DATA 0,1,7,15,31,63,127,255
330 DATA 60,255,255,255,255,255
255,255
340 DATA 0,128,224,240,248,252,
254,255
350 DATA 145,140,136,128,204,23
1,232,232
360 DATA 129,129,255,129,129,12
9,255,129
370 DATA 153,0,60,36,0,255,0,0
380 DATA 137,49,17,1,7,231,23,2
3
390 DATA 252,255,252,246,255,25
2,48,120
391 DATA 124,127,124,196,22,246
245,135
392 DATA 204,240,240,240,254,25
5,255,255

```


THE PSION

THE WORLD'S FIRST PRACTICAL

THE PSION ORGANISER WILL CHANGE THE WAY YOU WORK

Imagine how much more convenient and simple your life could be with a full-feature microcomputer - including screen, keyboard, mass storage and software - in your pocket.

That's what THE PSION ORGANISER gives you - a uniquely versatile and innovative computing resource incorporating hybrid microprocessor technology more advanced and powerful than that found in micro computers twenty times the price!

A UNIQUE NEW INVENTION

Thanks to a Psion-pioneered breakthrough in solid-state drive technology, the ORGANISER's data and program packs offer open-ended, failsafe storage and ultra-fast operation.

- Built-in data-base facility allows instant access to programs and information.
- Simple operating procedures for ease of use.
- Off-the-shelf software library provides a mass of powerful programs and information designed to solve problems at work and home.
- The purpose-designed POPL programming language enables you to write and save your own programs.
- Communicate with office computers, printers and other peripherals through a standard RS232 interface.

PACKED WITH EXCLUSIVE FEATURES

- Solid-state drives access information in milliseconds.
- Information stored on datapaks is totally secure. Datapaks may be removed from the Organiser and still retain their information. Datapaks are re-usable through formatting.
- Solid-state drives allow the open-ended use of software and data. There's no limit to the amount of information or variety of programs which can be slotted into the drives.
- Auto-switch off after 5 minutes and low power-consumption CMOS components give six months' life in typical use with standard PP3 battery.
- 16 character alpha-numeric display with full scrolling over a 200 character record with adjustable contrast.
- Includes an editable calculator. Lets you carry out complex calculations involving up to 200 characters and two levels of brackets. Using the editing facility you can amend your calculation during entry. Moreover, you can go back and edit both data and formulae after a calculation has been carried out allowing you to carry out "what if" analyses.
- The special UTILITY PACK extends the power of the calculator even further with an extensive



ONLY
£99.95
(+P&T)

Includes FREE
- 8K Datapak
- Utility Pack

range of additional mathematical and scientific functions.

- Includes time and date clock function.
- Tough, protective sliding case.
- British designed and built with the highest quality engineering including gold-plated contact points and connectors for rugged, reliable use.

THE PSION ORGANISER: THREE WAYS TO PRACTICAL POCKET-COMPUTING

Use THE PSION ORGANISER in any of three ways:

AS YOUR OWN PRIVATE DATABASE TO STORE PERSONAL INFORMATION AND RETRIEVE IT INSTANTLY

You can use the Organiser to store all the vital day-to-day information you need -

Names and addresses	Customer and supplier records
Meeting notes	Survey information
Schedules	Statistics
Important dates	Exchange rates
Expense details	Experimental data
Restaurants	Personal Reminders
Timetables	

ORGANISER

TICAL POCKET COMPUTER

THE PSION ORGANISER: IT'S LIKE HAVING A FILING SYSTEM IN YOUR POCKET

Forget about diaries, notebooks and the backs of old envelopes. THE PSION ORGANISER allows you to type in information as you want and file it away at the touch of a key for instant future reference.

Retrieving information is every bit as simple. Just type in a keyword, a few characters, or even a date or number. THE PSION ORGANISER will search out the appropriate records and display them on the LCD screen. The simple scrolling facility allows you to view an entire entry up to 200 characters long.

Entries can be easily amended and edited and, since all data is permanently stored, there is no danger of it being lost - even if the battery is disconnected. A choice of 8k or 16k datapaks is available for you to build up an infinitely large information base.

WITH READY-TO-RUN SOFTWARE FOR IMMEDIATE PROBLEM SOLVING

A comprehensive range of ready-written software programs is already available for THE PSION ORGANISER and more are on their way.

FINANCE



Mortgage Cash Flow

- monthly repayments
- 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

Polynomials

Matrices

Integration

Curve-fitting

Statistics

- functions
- solutions of equations
- solution of matrix equations
- Eigenvalues
- under a curve
- least squares
- mean
- standard deviation
- Chi-squared

LINK-UP COMMUNICATIONS



- Industry standard RS232 with ribbon cable plug 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
 - PARITY : ODD, EVEN, MARK, SPACE, NONE
 - PROTOCOL : NONE, RTS/CTS, XON/XOFF

AS A PERSONAL COMPUTER TO RUN YOUR OWN PROGRAMS

THE PSION ORGANISER has its own program ming language - POPL - contained in the Finance, Maths and Science packs.

POPL is built around a set of straightforward commands such as IN, OUT and GOTO. It enables you to write your own programs which can be as simple or as sophisticated as you choose. By storing and saving programs in a datapak, you can run them whenever you need.

DEVELOPED BY ONE OF EUROPE'S LEADING MICROCOMPUTER SOFTWARE COMPANIES, THE PSION ORGANISER IS THE WORLD'S FIRST PRACTICAL POCKET COMPUTER. FILL IN AND RETURN THE "FREEPOST" COUPON TODAY AND GET THE POWER OF A DESK-TOP MICRO IN YOUR POCKET - OR CALL US ANYTIME ON 01-200 0200 TO PLACE YOUR ORDER

PSION LTD., 22 Dorset Square, London NW1E 6QG.

TO: PSION LTD., Freepost, 22 Dorset Square, London NW1 1YP

Please send me by registered mail: Quantity Price P+P Total

Psion Organiser with 8K datapak and free Utility Pack		£99.95	+£2.50	
Science Program Pack		£29.95	+£1.50	
Maths Program Pack		£29.95	+£1.50	
Finance Program Pack		£29.95	+£1.50	
Link-Up Communications Pack		£39.95	+£1.50	
16K datapak		£19.95	+£1.50	
8K datapak		£12.95	+£1.50	

I enclose my cheque/Postal order made payable to Psion Ltd. for

or Please debit my credit card: (please tick appropriate Box)

Access Barclaycard/Visa American Express Diners Club

Card No:

Signature:

Name (Mr/Mrs/Miss/Ms)

Address

(Please print)

Postcode:

Tick for further information.

PCN.3

To place an order over the telephone, ring 01-200 0200.

Psion Ltd., Reg. No. 15201 31 England.

Orders can only be accepted for delivery within the UK. Please allow 28 days for delivery.

If for any reason you are not completely satisfied with your Psion Organiser, return it in good condition within seven days and we'll return your money in full and without question.

PSION



SLIDE OFF CASE
GIVES FULL
PROTECTION

EASY TO USE
POSITIVE TOUCH
KEYBOARD

DATA & PROGRAM PACKS
SLOT INTO
SOLID-STATE DRIVES

INTERFACE LINKS
ORGANISER TO OTHER
COMPUTERS & PERIPHERALS

SOLE SURVIVOR

Key in part two of E.H.Wilson's dramatic adventure game and see if you have got what it takes to survive in the jungle. Despite injuries and a damaged plane and although help is on the way, our hero is still keen to find the source of that mysterious light...

Program notes

380-382 Wave routine. Not a lot of good in this game!
 384-404 Cut routine
 406-420 Chop routine. A subtle difference between this and cut. This assumes heavy handedness whereas cut implies a degree of skill
 422-476 Light routine. Meaning "to set fire to". The command is accepted only when certain conditions are met
 478-526 Climb routine
 528-538 Attack routine
 540-548 Kill routine
 550-564 Hit routine
 566-626 Make routine. Once your object is made, its position is noted, the raw materials are decremented or hidden and flags are set to ensure that only so many articles are

made from the one basic ingredient
 628-634 Oil routine. A stuck door may need some lubrication.
 636-644 Stab routine
 646-664 Throw routine. If the object is neither 4 or 10, it is assumed you are dropping it and flow goes to line 146
 666-676 Rub routine
 678-688 Read routine
 690-724 Examine routine
 726-736 Jump routine. Must be in location 29
 738-754 Break routine. Boat must be broken to obtain wood
 756-764 Push routine
 766-808 Save and Load routine. These call subroutine at 78 to obtain the device number and on the basis of this, open the relevant files to tape or

disk. Save prints to the device all object positions, flags, counters, player positions, etc, and Load reads these back in
 810-828 Insert routine. In one location, money must be inserted in slot and in another a hollow in a stone wall must be jammed with something
 830-844 Launch routine
 846-854 Say routine
 856-874 These sort out any repetitions (which Ladder, which compass). Judge each input on the basis of position
 876 Dimensions all arrays on basis of 84 locations, 39 verbs, and 93 nouns
 878-1116 Location descriptions
 1118-1134 Data statements holding all directional information.

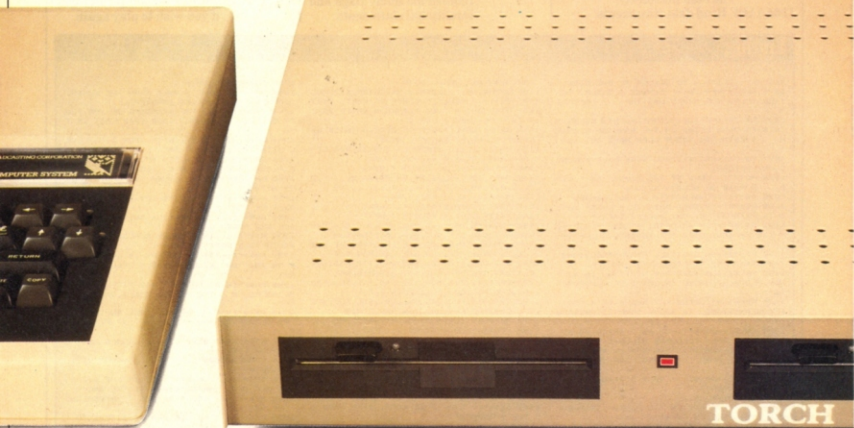
Listing

E LINE, BUT NO FURTHER UPWARD."
 948 PB(20)=PB(19)
 942 PB(21)="STANDING NEXT TO THE BUILDING G, WHICH HAS NO VISIBLE JOINTS."
 944 PB(21)=PB(21)+" IS TIME LIGHT YOU SAW COMES FROM THE SUN REFLECTING"
 946 PB(21)=PB(21)+" OFF THE SHEER, POLISHED SIDES"
 948 PB(22)="STANDING NEXT TO A DEEP PIT. (IS A) RUSTY LADDER DESCENDS INTO THE"
 950 PB(22)=PB(22)+" GLOOM OF THE EARTH'S BOWELS."
 952 PB(23)="STANDING AT THE BOTTOM OF THE DEEP PIT. (IS A) FAINT LIGHT FILTERS DOWN"
 954 PB(23)=PB(23)+" FROM THE OPENING FAR ABOVE."
 956 PB(24)="IN A ROOM SHELLING STRONGLY OF OIL."
 958 PB(25)="AT THE NORTH OF AN SHERILY-LIT CAVERN: THERE IS NO SIGN OF ANY."
 960 PB(25)=PB(25)+"FORM OF NORMAL LIGHT NO, BUT EVERY DETAIL OF"
 962 PB(25)=PB(25)+" THEROUGH-HEWN WALLS IS STARTLINGLY VISIBLE."
 964 PB(26)="ON THE EAST SIDE OF THE CAVE RN. (IS YOU CAN JUST MAKE OUT A SMALL"
 966 PB(26)=PB(26)+" BOX FIXED TO THE WALL."
 968 PB(27)="ON THE WEST SIDE OF THE CAVE RN."
 970 PB(28)="AT THE SOUTH END OF THE CAVE RN. (IS A) SIGN ABOVE A SMALL SLOT IN THE"
 972 PB(28)=PB(28)+" WALL. SAYSDOWN:
 [PURPLE] EIC 01c N1c E1c E1c F1c A1c R1c
 I1c T1c H1c S1c I1c N1c E1c E1c P1c L1c E1c
 A1c I1c A1c S1c E1c E1c 2)
 974 PB(29)="STANDING IN FRONT OF A VAST CHASM. (IS A) THICK, IMPENETRABLE MIST"
 976 PB(29)=PB(29)+" BOLLS OVER THE RIM ONTO THE FLOOR AROUND YOUR FEET."
 978 PB(30)="ON THE EAST SIDE OF THE CHAS N."
 980 PB(31)="IN A COMPLEX OF TWISTING, NARROW TUNNELS."
 982 PB(32)=PB(31)
 984 PB(33)=PB(31)
 986 PB(34)=PB(31)
 988 PB(35)=PB(31)

990 PB(36)="AT THE END OF A VAST CORRIDOR N. (IS T)O THE WEST THE EXIT IS OBSCURED"
 992 PB(36)=PB(36)+"BY A PLUME OF THIN, WHITE MIST RISING OUT OF THE FLOOR."
 994 PB(37)="DOWN THE CORRIDOR: THE MIST FILLS THE WHOLE WESTERN END."
 996 PB(38)="DIRECTLY BEFORE THE PLUME OF MIST, AND ARE VERY COLD."
 998 PB(39)="AT THE END OF THE CORRIDOR. (IS A) FLIGHT OF STONE STEPS LEADS DOWN"
 1000 PB(40)="ABOUT HALFWAY DOWN THE FLIGHT OF STAIRS: THE STEPS ARE NOTICEABLY"
 1002 PB(40)=PB(40)+"WARM. [DOWN]N1c A3 CRUDE NOTE IS SCRAMLED ON THE WALL."
 1004 PB(41)="AT THE BOTTOM OF THE STEPS. (IS THE WALLS ARE VERY HOT."
 1006 PB(42)="IN A CORRIDOR, WITH TUNNELS LEADING OFF IN ALL DIRECTIONS."
 1008 PB(43)="IN A NARROW CULVERT. (IS THE SOUND OF RUNNING WATER IS JUST DISCERN"
 1010 PB(43)=PB(43)+"ABLE IN THE DISTANCE."
 1012 PB(44)="IN A VERY NARROW SQUEEZE. (IS THE WALLS ARE TOO HOT TO TOUCH, AND"
 1014 PB(44)=PB(44)+" THE WATER RUNS OVER THEIR BOOTS AWAY BEFORE"
 1016 PB(44)=PB(44)+" HITTING THE FLOOR."
 1018 PB(48)="FACED BY A WIDE LAKE OF BOILING WATER. (IS IN)N THE FAR DISTANCE THE"
 1020 PB(48)=PB(48)+" WATER OVERFLOWS THROUGH A RAGGED IRON GRATING."
 1022 PB(45)="IN A WIDER CORRIDOR. (IS T)O THE SOUTH THE"
 1024 PB(45)=PB(45)+" WAY IS BLOCKED BY A SOLID WALL."
 1026 PB(46)="IN A HUGE STONE-ROOM."
 1028 PB(47)="IN A SMALL SIDE ROOM, USED AT ONE TIME TO STORE TOOLS."
 1030 PB(49)="IN A ROOM ONCE USED TO STORE IRONWORKERY. (IS ALL THE BOXES"
 1032 PB(49)=PB(49)+" HAVE ROTTED."
 1034 PB(50)="FLOATING NEXT TO THE LAKE'S OUTFALL."
 1036 PB(51)="EAST OF THE GRATING. (IS THE AIR SEEMS QUIET. CHILL HERE."
 1038 PB(52)="FLOATING ALONG A NARROW TUNNEL: SEVERAL PASSAGES LEAD OFF."

1040 PB(56)="STANDING ON A SANDBANK. (IS A) FAINT LIGHT IS JUST VISIBLE IN THE"
 1042 PB(56)=PB(56)+" DISTANCE, AND THE WATER SHOALS TOWARDS THE NORTH."
 1044 PB(57)="STANDING ON A LEDGE OVERLOOKING A SHEER 1000 FT. DROP."
 1046 PB(55)="AROUND ON STAGNANT MUD. (IS AROUND YOU ARE SHEER ROCK WALLS."
 1048 PB(53)="INCREASING SPEED TOWARDS THE SOUND OF RUSHING WATER."
 1050 PB(54)="IN THE MIDDLE OF FAST RAPIDS S. (IS ALL AROUND YOU ARE JAGGED ROCKS"
 1052 PB(54)=PB(54)+"ANY ONEOF WHICH COULD RIP YOUR FRAIL CRAFT TO SPLINTERS."
 1054 PB(58)="AT THE END OF THE LEDGE, WHICH ICH HAD RETERED OUT TO NOTHING."
 1056 PB(59)=PB(58)
 1058 PB(60)="AT THE TOP OF THE CLIFF, ON A SMOOTH, LEVEL GROUND. (IS T)O EITHER"
 1060 PB(60)=PB(60)+"SIDE THELAND SLOPES GENTLY AWAY TO THE FOREST BELOW."
 1062 PB(62)="(LEFT)LEFT (LEFT)LEFT (LEFT)HAW E SLIPPED DOWN THE ASH CONE INTO THE VOLCANO'S MOUTH."
 1064 PB(62)=PB(62)+" (IS THERE IS NO WATER APE, AND YOU MUST DIE OF STARVATION."
 1072 PB(63)="AT THE WEST END OF THE CLIFF F, WHICH EXTENDS AWAY TO YOUR RIGHT."
 1074 PB(64)="AT THE EAST END OF THE CLIFF F, WHICH EXTENDS AWAY TO YOUR LEFT."
 1076 PB(71)=PB(8)
 1078 PB(72)=PB(8)
 1080 PB(65)="COMPLETELY LOST. (IS A) FAINT CHINK-ING SOUND IS JUST DISCERNABLE."
 1082 PB(66)=PB(65)
 1084 PB(67)=PB(65)
 1086 PB(68)=PB(65)
 1088 PB(69)=PB(65)
 1090 PB(73)=PB(65)
 1092 PB(74)=PB(65)
 1094 PB(75)=PB(65)
 1096 PB(78)="IN A SMALL CLEARING. (IS A)

The best thing next



The BBC Model B Microcomputer is widely recognised as an impressive first computer for the home or the school, but its capabilities are restricted by its lack of data storage and the limitations of Basic for serious programming. For the user who needs more from this computer the Torch Z80 Disc Pack is a gateway to the world of advanced computing.

Model B's fitted with disc interface can be upgraded to full business machines by the Torch Z80 Disc Pack thereby offering the use of more powerful and flexible languages such as Fortran, Pascal, BCPL and Cobol while twin 400K disc drives provide a massive storehouse for information and rapid data transfer from disc to processor.

Torch Z80 Disc Pack
The Torch Z80 Disc Pack is the

proven upgrade for the BBC Model B microcomputer. It provides 800K of disc storage plus a Z80 second processor with 64K RAM running TORCH's own CP/M[®] compatible operating system based in ROM.

This advanced design means that almost all of the 64K RAM provided by the Z80 board is available for programming use - an advantage no other BBC micro upgrade can offer.

If your BBC micro has the Econet[®] option, there is a further benefit the Torch Z80 Disc Pack can offer. TORCHNET can link together up to 254 upgraded Model B's on a local area network, so for enthusiasts, clubs, schools and businesses it is a simple and low-cost way to achieve networking facilities.

The discs can be used for storage under the Acorn DFS system or for CP/M[®] programs and data.

A comprehensive software package is provided which includes word and data processing and a spreadsheet program, along with utility programs and manuals.

The Torch Z80 Disc Pack is recommended by the CCTA for government use.

At £699 the Torch Z80 Disc Pack is exceptionally good value.

Torch Z80 Extension Processor (ZEP100)

When fitted to a BBC system which already has compatible high quality twin 400K disc drives, the ZEP100 provides a complete business or scientific computer.

Alternatively, a ZEP100 may be fitted to a BBC system to enable it to be used as a Torchnet station.

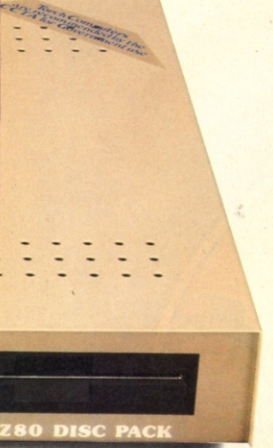
The ZEP100, priced at £299, comes complete with full software support. There are already over 10,000 users of Torch computer systems.

Our customers include hospitals, universities, private businesses, the Government and schools.

If you are ready to take a step into the world of serious computing contact your local dealer listed on the facing page.



to a BBC micro.



5.25" DISC PACK

TECHNICAL SPECIFICATION
Torch Z80 Extension Processor (ZEP100)
Processor - 4 MHz Z80A
Memory - 64K RAM Accessible from the Z80
Hardware - 8K CCP ROM on ZEP100 card
 - 16K MCP ROM for PCB board
Software provided -
 - TORCH CPN CP/M[®] compatible O/S
 - Disc Utilities
 - Music System
 - Misc. Utilities
 - PERFECT[™] SOFTWARE comprising -
 - Perfect Writer - Word Processor
 - Perfect Speller - Spelling Checker
 - Perfect Calc - Spreadsheet
 - Perfect Filer - Database

Other Operating Systems Available
 - UCSD P-System

Torch Z80 Disc Pack. As for ZEP100 but includes 2 x 400K 5 1/4" floppy disc drives with separate power supply unit.

Unicom. These products are part of the best selling range of add-ons to the BBC Micro by Torch Computers Ltd, Abberley House, Great Shelford, Cambridge, CB2 5LQ. Tel. (0223) 841000. Telex 818841 TORCH G.

Where to find your Torch dealer

- AVON**
MICROFILE
 20 Belviders, Lansdown Road
 Bath, BA1 3JH
 Tel: 0225 33400
- BERKSHIRE**
COMPUTERS
 Manor Road, Caddington, Luton
 Tel: 0582 48875
- ABC COMPUTING**
 Systems House, Houghton Parade
 Dunstable,
 Tel: 0582 89940
- BROADWAY ELECTRONICS**
 Aston Road, Bedford
 Tel: 0454 58823
- BUCKINGHAM**
 30 North Street, Coughton Buzzard
 Tel: 02925 21420
- CHESHIRE**
COMPUTERS
 20 Exton Road, Newbury
 Tel: 0635 30247
- DPCE (UK) LTD**
 20 Market Place, Wokingham
 Tel: 0734 79730
- DEVELOPMENT**
 Newbury Computer Centre
 47 Chapel Street, Newbury
 Tel: 07538 9237
- MICROWISE**
 10 Duke Street, Reading
 Tel: 0734 69888
- HUCKINGHAMSHIRE**
MICRO MASTERS (GRUPL) LTD
 12 Windsor Street, Lidsingde
 Tel: 0895 70766
- MICROFILE LTD**
 27 Hart Street, Aylesbury
 Tel: 0295 25487
- CAMBRIDGESHIRE**
CAMBRIDGE COMPUTER STORE LTD
 41 Emmanuel Street, Cambridge
 Tel: 0223 58284
- ICC (CAMBRIDGE) LTD**
 41 King Street, Searston, Cambridge
 Tel: 0223 85230
- WATER DISTRIBUTION LTD**
 Halfpenny Way, Hatfield, Cambridge
 Tel: 0554 89671
- CHESTER**
COMPUTERS LTD
 Brook House, 25 Crown Road
 Wrexham
 Tel: 0957 0246, 09587 6178
- FAIRBROTHER INSTRUMENTS LTD**
 212 Wood Street, Wigan
 Tel: 0552 22884
- NATIONAL MICRO CENTRES LTD**
 36-38 St. Petergate, Stockport
 Tel: 0642 40688, 0642 72284
- CUSTOMISED ELECTRONICS**
 304 4271777
- CORNWALL**
MICROSET LTD
 10 Normandy Way, Bodmin
 Tel: 0208 25717
- DERBYSHIRE**
PERC SYSTEMS LTD
 10 Market Street, London Road, Derby
 Tel: 0332 20280
- NESTOR COMPUTER SYSTEMS LTD**
 57 Saragrove, Chesterfield
 Tel: 05748 01748
- DEVON**
A & S COMPUTERS
 4 City Arcade, Fove Street, Exeter
 Tel: 0352 7707
- DEVON COMPUTERS LTD**
 101 Park Street, 30 Tiverton Road
 Popiton
 Tel: 0962 26203
- HARVEY**
LANSDOWN COMPUTER CENTRE
 5 Hildon Road, Bournemouth
 Tel: 0202 2986
- LANSDOWN COMPUTER CENTRE**
 8 Andover Centre, Poole
 Tel: 0202 87381
- DORSET**
DARLINGTON COMPUTER SHOP
 75 Bondgate, Darlington
 Tel: 0202 46718
- ESSEX**
AKSTER INSTRUMENTS LTD
 29 Ruess Hill, Hatfield
 Tel: 07748 40000
- CAPRICORN COMPUTER CENTRE**
 101 Broadwater, Colchester
 Tel: 0206 68471
- ESSEX COMPUTER LTD**
 76 Shearwater Street
 De-la-Poynne, Chelmsford
 Tel: 0204 53672
- MICROCORE LTD**
 11 Broadfield Road, Chelmsford
 Tel: 0204 53672
- GLoucestershire**
COMPUTER SHACK
 14 Phoenix Street, Cheltenham
 Tel: 0242 58420
- TELEMARKETS WEST**
 27 Deer Street, Cirencester
 Tel: 0285 88349
- HAMPSHIRE**
ADACS
 Foresters House, 4 London Road
 Andover
 Tel: 0584 52867
- ELECTRONIC**
 200-202, 204, 206, Farnham
 Tel: 0202 720870
- COMPUTERSHIRE LTD**
 Brook House, Millbrook Road East
 Farnham
 Tel: 0753 0888, 0483 82826
- FERNANTY AND CRAIG**
 1 New Market Square, Basingstoke
 Tel: 0256 8476, 0258 89886
- HERTFORDSHIRE**
COMPUTERS LTD
 Empire Works, The Green
 Croxley Green, Rickmansworth
 Tel: 0822 77200
- COMPUTER PLUS**
 47 Queens Road, Watford
 Tel: 0822 53827
- HUMBERSHIRE**
THE COMPUTER CENTRE
 PHONESCOPE LTD, LTD
 10 Anaby Road, Hull
 Tel: 0482 2225
- HOLDENBERG COMPUTER SERVICES**
 17 Wintlegate, Pennington, Hull
 Tel: 0964 30223
- ISLE OF MAN**
TYPEWRITE LTD
 1 Aerodrome Court, Douglas
 Tel: 0624 14050
- KENT**
DATA STORE
 (THE MICROCOMPUTERS)
 12 Charleston Road, Bromley
 Tel: 01-460 8991
- WATERS COMPUTER SYSTEMS**
 Army and Navy P.L.C. High Street
 Canterbury
 Tel: 042 460 9981
- KENT MICROCOMPUTERS LTD**
 50 St. James Street, Maidstone
 Tel: 0202 52784
- MICROMAN COMPUTER SYSTEMS**
 Mill Lane Road, Chatham
 Tel: 0664 62880
- MICROGA LTD**
 30 St. Johns Road, Ladbroke Grove
 Tel: 0862 45523
- LANCASHIRE**
CABIN COMPUTERS LTD
 96 St. Helens Road, Bolton
 Tel: 0204 65270
- DOUBLE LINE LTD**
 Unit 1, Forest Road
 Gallowthorpe Industrial Estate,
 Rotherham, Yorkshire
 Tel: 07525 7270
- NORTHERN COMPUTERS**
 Charwell Road, Frodsham
 Warrington
 Tel: 0563 5010
- LANCASHIRE**
D. A. COMPUTERS LTD
 54 Ludlow Road, Lancaster
 Tel: 0538 14440
- PERCY LORD & SON**
 60 New Road, Rippon
 Tel: 0833 78803
- LEICESTERSHIRE**
W. H. MAURCOTT LTD
 Great Central Road, Loughborough
 Tel: 0509 21444
- LINCOLNSHIRE**
RELA COMPUTERS
 63 High Burgate, Boston
 Tel: 0203 54221
- DAILEY COMPUTERS**
 Both Way Street, Grantham
 Tel: 0476 80000
- LONDON**
30 COMPUTERS
 10 Brunelbury Avenue, Ennis, WS
 Tel: 01-922 5863
- BROADWAY COMPUTER SOLUTIONS**
 525 Seven Sisters Road, N7
 Tel: 01-277 8810, 01-263 8060
- CHROMASOIC**
 48 Junction Road, Acton, W9
 Tel: 01-263 8463
- LOWE MICRO CENTRE LTD**
 227 Tottenham Court Road, W1
 Tel: 01-887 3881
- ACORN COMPUTERS LTD**
 10 Haverhill Street, WC2
 Tel: 01-779 5718
- MICROAGE**
 Unit 72, Central Park Estate
 Capitol Way, Epsom Road, WWS
 Tel: 01-836 2622, 01-837 7190
- MICROFAST**
 57 Horden Square, W1
 Tel: 01-729 7178
- WATERS COMPUTER SYSTEMS**
 Bankers, High Street, Kensington, W8
 Tel: 01-871 5432
- PILOT SOFTWARE CITY**
 22 Raffle Place, W1
 Tel: 01-838 2968
- TECHNICAL GROUP LTD**
 17 Burnham Road, NW9
 Tel: 01-838 2968
- TOWERS WORLD TODAY**
 27 St. Dunstons Street, W1
 Tel: 01-838 7738
- TRIGON COMPUTER SYSTEMS LTD**
 100 Tottenham Court Road, W1
 Tel: 01-881 1486
- OFF RECORDS**
 Computer House, 30 Battersea Rise
 SW11 2JZ
 Tel: 01-223 7370
- SYSTEMS**
 Southview, Green Street,
 Salford, W6
 Tel: 0927 89371
- TWICKENHAM COMPUTER CENTRE**
 24 Crown Street, Twickenham
 Tel: 01-891 4981
- MANCHESTER, GREATER**
BYTE SHOP LTD
 THE EMMACHESHIRE LTD
 170 Gateway House,
 12 South Road, Newmarket
 Tel: 091 224 4237
- GM CUSTOMER SERVICES**
 The St. Thomas Centre,
 484-486, South Street,
 Manchester
 Tel: 061 246 2400
- WIDENSWAY**
DATA EXCHANGE LTD
 Exchange House,
 84 New Street Road, Birkbeck
 Tel: 01-847 99838
- MICROVISION (ELECTRONICS)**
 Unit 16, Southold Ind. Estate,
 101 St. Andrew's St., Wigan
 Tel: 07448 5242, 07448 5250
- WILTSHIRE (WEST)**
BYTE SHOP LTD (BRIMINGHAM)
 84-86 New Street, Birmingham
 Tel: 01-422 3800
- WATERS COMPUTER SYSTEMS**
 Rushmore, 50 Temple Road
 Tel: 01-262 3333
- STAMMER COMPUTERS LTD**
 Richwood House, 69 School Street
 Walsingham, Norfolk
 Tel: 0662 70175, 0662 21200
- WALTERS COMPUTER SYSTEMS**
 12 Regent Road, Stroud
 Tel: 01-544 7082
- CAMDEN COMPUTER SYSTEMS**
 42 Coventry Road, Small Heath
 Birmingham
 Tel: 021 7713828
- COMPUTERCONCEPTS**
 21 Spring Hill, Leyland,
 Lancashire
 Tel: 0256 34465
- J.R.C. MICRO SERVICES LTD**
 230 Lamborne Avenue North,
 Leamington Spa
 Tel: 0223 72803
- MICRO BUSINESS CENTRE LTD**
 Worcesterhampton Computer Centre
 17 St. John's Street, Worcesterhampton
 Tel: 0202 29807/29801
- NORFOLK**
JANROLD OFFICE EQUIPMENT
 Barrack Street, Norwich
 Tel: 0693 68081
- SYNERGY LTD**
 6 Brick University Village, Norwich
 Tel: 0693 50315
- ELECTRONIC**
 17 Annesley Avenue, Kings Lynn
 Tel: 0353 3762
- NOTTINGHAMSHIRE**
 68 Junction Road, Acton, W9
 Tel: 01-263 8463
- 1/8 COMPUTER MARKET**
 27 Grosvenor, Nottingham
 Tel: 0602 586404
- D. A. COMPUTERS LTD**
 2027 High Street, Nottingham
 Nottingham
 Tel: 0662 27062, 0662 21225
- H.N.L.L. FISHER (RUSHWORTH)**
 264 Holford Road
 Sutton on Ashfield, Nottingham
 Tel: 0623 50427
- CRIPPSBOROUGH**
ABSOLUTE SOUND AND VIDEO
 10 St. Hugh Street, Huddersfield
 Tel: 0484 83981
- WALTON**
COMPUTERS LAKE LTD
 Salford House, Infield Town Centre
 Salford
 Tel: 0562 508771
- WATERSHIRE**
 25-38 Singleton Street, Swindon
 West Gloucestershire
 Tel: 0993 76208
- STARTFORDSHIRE**
CANONICS (I)CC
 Charnley House, Cannon
 Road, BAC6 7JH
- COMPUTERS**
 107-109, 111, 113, Stafford
 Tel: 01-483 4889
- PEN SPEED LTD**
 Wharf, Frankley, Wharfedale Junction
 Airedale, Salford on Trent
 Tel: 0535 76208
- SUFFOLK**
BUFFALO MICROSOFT LTD
 24 Crown Street, Ipswich
 Tel: 0474 50963
- S.J. MERTON & CO**
 10 Market Place, Bungay
 Tel: 0986 2141
- SURREY**
30 COMPUTERS
 230 Waterloo Street, Sutton
 Tel: 01-821 4257
- 30 COMPUTERS**
 23 Station Road, Belmont, Sutton
 Tel: 01-888 2204
- CROFTON COMPUTER CENTRE**
 24 Longwalk Road, Thornton Heath
 Tel: 01-888 1280
- SHROPSHIRE LTD**
 59 Staines Road West
 Walsley, Walsley
 Tel: 01-822 4557
- S.J. MERTON COMPUTERS LTD**
 61 George Street, Luton
 380 Rickford Road, Bedford
 Tel: 01-541 1465
- VULCAN COMPUTING LTD**
 22 Sandford Road, Ipswich
 Tel: 0525 72482
- SUSSEX**
CASTLE ELECTRONICS
 7 Centre Street, Hastings
 Tel: 0424 24428
- COMPUTAG LTD**
 22 Queens Road, Brighton
 Tel: 01-275 34228
- TWEED & WEAR**
HCC2
 103 Chesham Road, Low Fell
 Lanchester
 Tel: 0191 24228
- OFFICE INTERNATIONAL**
 W. Harold Sports Ltd
 1012 Pigeon Street
 Westborough, Essex
 Tel: 0788 0275
- WARRICKSHIRE**
CARROLLS OF RUGBY
 Bank Bus Stop, Rugby
 Tel: 0788 0275
- WESTMIDLANDS**
TECHNICAL COPY CENTRE
 Recktons, 79 The Parade
 Leamington Spa
 Tel: 0523 27600
- WILTSHIRE**
W. H. MAURCOTT CENTRE
 Unit 6, Central Trading Estate
 Upper Hill, Old Town, Swindon
 Tel: 0782 62298
- WILTSHIRE (WEST)**
YORKSHIRE (SOUTH)
COM-TEC COMPUTER CENTRE
 Lutter Hill, Lutterworth Park
 Cambs Road, Bedford
 Tel: 0274 72232
- YORK COMPUTERS LTD**
 884 York Road, Leeds
 Tel: 0532 847474
- MICROPOWER**
 Northwood House, North Street
 Leeds
 Tel: 0532 43880
- WALES, NORTH**
TECHNICAL COPY CENTRE LTD
 Unit 4b, Airside Ind. Estate
 Porthkerry, Mach, Dyfed
 Tel: 0547 67366
- IRFANT COMPUTERS LTD**
 27 Murray Street, Llanidloes
 Powys
 Tel: 0462 70882
- WALES, SOUTH**
BUCELOS LTD
 25-38 Singleton Street, Swindon
 West Gloucestershire
 Tel: 0993 76208
- GWENT COMPUTERS**
 105 High Road, Newport, Gwent
 Tel: 01493 84760
- HEADINGHAM COMPUTERS LTD**
 27 Murray Street, Llanidloes, Dyfed
 Tel: 0542 72027
- PREDEFINITE LTD**
 102 Hous, Bangor, Gwent
 Tel: 0292 89274
- SCOTLAND**
ANDREW WHITE & SON LIMITED
 Macroway, 12 Leven Street
 Leven, Dundee
 Tel: 032 228 111
- WEST OF SCOTLAND**
PERSONAL COMPUTERS
 30 Wellington Square, Apr
 Tel: 0202 36508
- STAMMOCOTT LTD**
 10 Station Street, Glasgow
 Strathclyde
 Tel: 041 226 4818
- SCOTLAND (SCOTLAND)**
89/90 Westgate Place
 Whitnash Ind. Estate, Sharncliffe, Fife
 Tel: 0592 773716
- LODGE COMPUTER SERVICES LTD**
 12 High Street, Olton, Apple
 Tel: 081 56823
- SALFORD CENTRE**
 7 Falcon Street, Edinburgh
 Tel: 011 881 6148
- IRELAND (NORTHERN)**
ICM MICROCOMPUTER SERVICES
 7 Centre Street, Luton
 Tel: 0223 24428, 0223 24264
- IRELAND (SOUTHERN)**
LONGSHAW SYSTEMS
 4 Dawson Street, Dublin 7
 Tel: 003 70228, 003 70716



Lighting the way ahead.

Pics is quoted as an 'AAT' CP/M in a registered trademark of Digital Research Inc. Econet is a registered trademark of Acorn Computers Ltd. Perfect Software is a registered trademark of Perfect Software Inc. Text, graphics and keyboard icons provided by BBC Model B.

POPEYE[®]



© 1984 King Features Syndicate, Inc.

dk'tronics
the games name

Now available for Spectrum, Commodore 64, Amstrad and MSX Computers

VU FILE UNCHAINED

Getting Vu-File to run with the Sinclair Microdrive is not all that difficult. Carl Lawrenson unlocks the mysteries of this simple conversion that will enable you to run programs at no extra cost.



Sinclair's Vu-File can easily be converted to run on Microdrive.

Listing 1

```
50 BORDER 11 PAPER 11 INK 71 CLEAR 25087: LOAD *m*111"VU-CODE MD-CODE
100 DIM #B(32): LET a=29785: GO TO USR 29721
1000 CLS : GO SUB 6000: GO TO USR a
1005 SAVE *m*111gCODE s,1
1100 VERIFY *m*111gCODE
1200 GO TO USR a
2000 CLS : GO SUB 6000
2020 LOAD *m*111gCODE s: GO TO USR a
3000 LPRINT #B TO 32: GO TO USR a
6000 INPUT #B: LET #B TO 10: #B: LET s=CODE #B(11)+256*CODE #B(12): LET 1-CODE
#B(13)+256*CODE #B(14): RETURN
```

Listing 2

This is for Kempston Interface S

```
1 OUT 58303,129: OUT 58303,15: LET a=PEEK 23631: LET b=PEEK 23632: LET c=a*2
56#b+15: POKE c,0: POKE c+1,91
2 LOAD *m*111"n1 r#s"CODE : LOAD *m*111"VU-FILE"
```

A growing number of small ads in various micro magazines, PCN included, offer programs that allow Psion's Vu-File to operate with the Microdrive. It is actually very easy to convert Vu-File to Microdrive without spending any money. Here's how.

The problem is that the Basic part of Vu-File is too large to fit between the end of the channel area set up by the Microdrive and the start of the machine code.

Fortunately much of the Vu-File Basic contains unnecessary 'frills'. If we remove them, the Basic and one Microdrive channel will sit below the machine code and thus allow Vu-File to use one Microdrive.

Place your bytes

Take a blank Microdrive cartridge and FORMAT it in Drive #1. Now load the Basic part of Vu-File, type MERGE "", which will load it but prevent it from auto-running. LSR the program, and amend it in accordance with listing #1. You must do this exactly as we are grabbing every spare byte here. Note that the normal prompts for loading and saving will not now appear when the program is in use, but you know what you're doing anyway don't you?

Having changed the Basic, you now need to save it to Microdrive. Type:

```
SAVE ""M";1;"RUN"LINE 50
```

and hit ENTER. Now for the machine code, we can forget about the SCREEN\$, so wind the cassette past it.

Type LOAD "" CODE to load the code from cassette. When this has loaded, all that remains is to save it to Microdrive. To do this type:

```
SAVE ""M";1;"VU-CODEMD"CODE25088,5640
```

and hit ENTER.

You now have Vu-File on Microdrive. To use it reset the Spectrum, insert the cartridge in drive 1 and press RUN and ENTER.

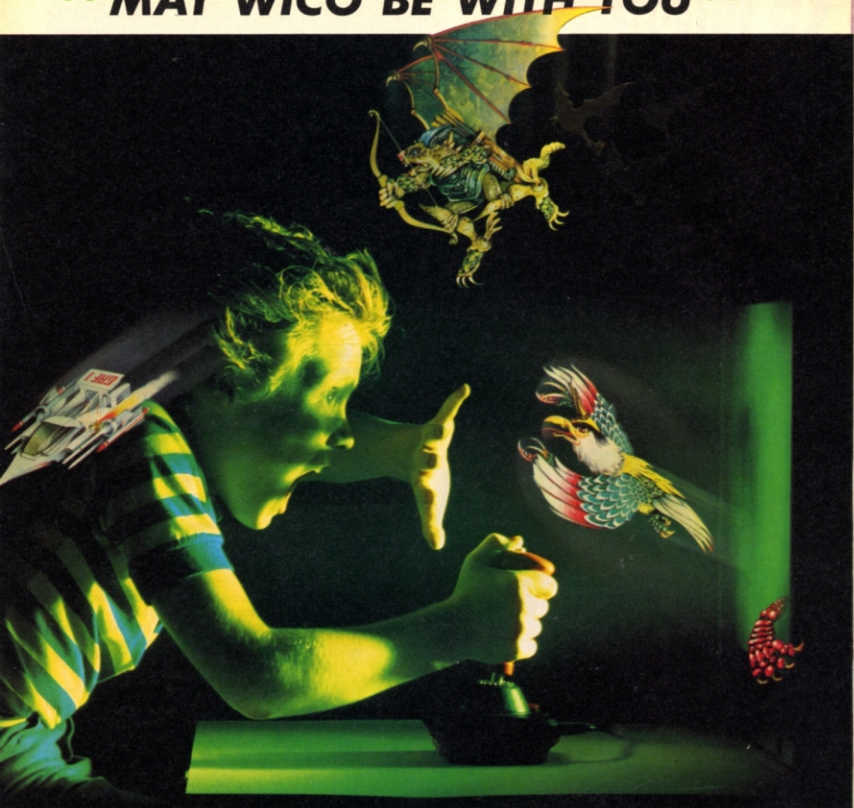
Kempston interface

If, like me, you use a plain paper printer connected by a Kempston Centronics interface (or similar) then it is a good idea to save the interface software on the same cartridge so that it boots up with Vu-File. Don't incorporate the interface software loading instructions in the Vu-File Basic as it will use up too much memory. Instead write a small loader (call it 'run') which loads the interface software and is then overwritten by Vu-File Basic. My loader is given in listing #2.

If you use this, then remember to save Vu-File Basic as 'Vu-File' rather than 'run'.

I hope you find this information useful. But remember, this is intended for you to produce your own Microdrive version of Vu-File. Needless to say, you should not infringe the copyright laws by passing copies to other people. ▀

•• MAY WICO BE WITH YOU ••



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

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

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

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

What do you get? A man-sized handle on a virtually unbreakable shaft. Tough, ultra-sensitive Wico.[®] switchgear. A heavy-weight base. A year's guarantee. And more sheer

dodging, chasing and blasting power than ever before.

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

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

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

WICO[®]

THE FINEST HAND CONTROLS
IN THE KNOWN UNIVERSE



CGL HOUSE, GOLDINGS HILL, LOUGHTON, ESSEX IG10 2RR. 01-508 5600. LOOK FOR THE WICO NAME IN ALL GOOD SHOPS AND CATALOGUES.



Nasty Nazis are why the Dungeon Master is stuck atop of a ski run. But Mike Gerrard is by no means off the piste.

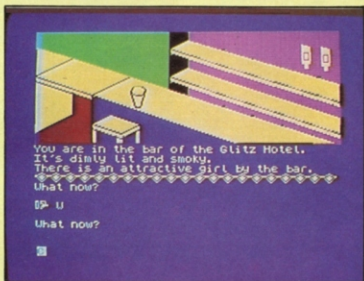
Valkyrie 17 is the name of the adventure, the RamJam Corporation's first release, in which 'The red kipper flies at midnight' — a phrase whose meaning may be revealed at some point. Valkyrie 17 is a group of ex-Nazis with the simple aim of taking over the world.

They plan to achieve this by manufacturing a super-weapon, to help re-establish the Third Reich. Or will it be the Fourth? Time enough for such questions afterwards. For now you must concentrate on stopping them, bearing in mind that they have already murdered one of your colleagues.

You have no idea how you hope to foil the fanatics, but some clues are given in an ingenious idea — side one of the cassette contains the program (Spectrum 48K at the moment, Commodore 64 soon), and when this is loaded you flip the tape which then becomes the cassette you find in your Answerphone when you get home. You listen to several breathless messages from a contact, read the accompanying dossier and set off, maybe even wearing the metal badge to get you into the spirit of the game.

If you hadn't spent £9.95 on the adventure, you might have had some cash for a drink in the first location, the bar of the Glitz Hotel. A remark to the woman seated there produces the response 'I'd lof a trink, dollink. Unfortunately, trinks cost cash and you have no Grotniks, as the barman reminds you. This location has accompanying graphics in the top half of the screen, as do about half the places you visit: those that don't, have reasonably lengthy text descriptions about the locations.

SLIPPERY SLOPES



The bar of the Glitz Hotel: but drinks cost cash.

The graphics are nicely done, although slowly drawn, and the option to switch them off would have been welcome. In some places where you can open things (safes, windows) the picture is redrawn to illustrate this, and altogether there are over 100 places to visit.

Roaming the hotel you find the manager is also after your Grotniks, for he won't let you leave without paying your bill. In the reception area there's a telephone, which sometimes rings with a pleasing double-trill from the Spectrum. Sound is also added to the responses, which scroll up the bottom half of the screen, in the form of a mini-chord

which plays to tell you the 'What now?' prompt has appeared.

The responses are rather slow, unfortunately, and a little tidying-up could have been done here, too.

Get knotted

More tidying-up needed in the broom cupboard, where your clothes get covered in dust. Happily, a solicitous chambermaid appears to ask if you've been standing in a broom cupboard, and dusts you off. Could this be one of your mysterious contacts? Sadly, she disappears before you can talk to her. And what of the voices you can hear through the ventilation grille

in the laundry room? And what's this... sheets in the laundry room? Not allowed out of the front door of the hotel? Looks like the old knotted sheets routine has been programmed into this one.

A full exploration of the hotel is necessary before attempting to flee. However, escaping isn't exactly straightforward. Entering one of the bedrooms reveals a blonde wig and a black silk dress. Can you wear them? Yes, of course, and very fetching you are, too. But I'm not sure that the manager is convinced, for the next time he sees you he offers you his lipstick. And he still won't let you leave.

The adventure has a healthy helping of humour, and I especially liked the swear-word routine, but I'll leave you to discover what that one is. Some of the responses definitely raise a smile, such as the one you get if you try wearing skis and snowshoes at the same time. Skis suggest a ski run, and outside the hotel, if you make it, there is indeed a ski run, but marked 'For experts only.' I'd read the book hidden in the hotel and believed I knew everything about skiing. Skis donned, I issued the fearless command DOWN (having cautiously saved first, of course) only to be told my footwear needed attention. This is where I remain, too, after exploring every location in the hotel I could, spoken to everyone I've met, and unsure what it is about my footwear that's wrong. I've donned my show-shoes and tramped across the ravine to the little hut, but that is firmly padlocked.

Most commands are of two words, but you can enter brief sentences, and as well as saving the game to tape you can transfer it to Microdrive. It loads quite quickly from tape, and the loading screen includes a lightning flash effect. RamJam is evidently concerned about software copying, as when the game is loaded you're asked, strictly for their files, if you're using a pirated copy. I'm not sure how many people will be taken in by this and type 'Yes,' but if you do, you get what you get for swearing at the program. My only advice: don't pirate it, buy it. ■



MOVABLE FEAST

The Zenith Z160 enters the portable-weight class of IBM compatible. From his ring-side seat, Brendin Lewis weighs up the chances of a possible prize-fighter.

The IBM-compatible market is becoming increasingly crowded as more and more companies release new machines. One of the latest is the Zenith Z160, a portable version of the popular Z150 PC. The system boasts 100 per cent IBM compatibility and offers twin 5¼in half-height floppy disk drives, four IBM compatible expansion slots, a built-in amber screen, colour graphics, two serial and one parallel ports and up to 640K or RAM. So how does it measure up?

First impressions

My suspicions were first aroused when I

set eyes on the package. Too large for a portable, I thought. These suspicions were confirmed as soon as I opened the box and removed the packing material. Grasping the bull by the horns (as it were), I grabbed the large metal handle. I braced myself and heaved the system onto the desk.

Someone really should redefine the word 'portable'. This system is not so much portable as 'movable'. In appearance, it resembles a large 'ghetto blaster', mainly because of the carrying handle (which also doubles up as a tilt support for the whole unit once it's on the desk).

As usual with this type of system, nothing is visible from outside except the rear-mounted connectors and, of course, the clips. This machine has six; the two on the front disengage the keyboard while the two on top don't seem to do very much except act as a dust cover for the gap between the disk drive assembly and the rest of the unit. Flicking the final two clips gives the best surprise of all — the disk assembly pops up almost toaster fashion to reveal the two drives. These spring loaded drives are held down, (yes down), by two pegs. When the assembly is up it can be further raised, for removal, by releasing them. Also inside are two small compartments which house the keyboard and mains cables. One of these is just a gap beside the disk drives; the other is on the front, covered by a sliding door which also hides the brightness control for the monitor.

The keyboard has the standard 84 key IBM layout. This includes ten function keys, alphanumeric keys and the dual mode numeric keypad which also doubles up as a set of cursor and text movement keys. The swap from one to another is carried out by the use of a key marked 'Num Lck'.

One possible problem is the large gap between the keys and the case. All sorts of things could get lodged inside. The keyboard is connected to the rest of the unit by a spiral cable with five pin DIN plugs at each end. Incidentally, it's the highest quality keyboard cable I've come across.



The Zenith Z160 is more of a movable desk top machine than a portable. Note the brown screen which is comfortable to use for long periods.



The disk drives 'pop-up' from the top of the machine and are supported by two 'bed springs'.

Documentation

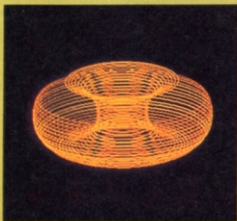
Though not as voluminous as the manuals supplied with the Z100 system (which consisted of seven ring-bound volumes), the two boxed manuals included with this system are of the same high quality. The first, and larger of the two, is the standard MSDOS v.20 documentation. This covers all aspects of the operating system including both the built-in and the disk-based utilities.

The second, and initially the more important, is the operators manual. It has three main headings: hardware, operation, and general service. The hardware section contains specifications, internal switch settings, motherboard and expansion slot information, and a small section on both floppy and hard disks. Operations takes you through the commonly used MSDOS commands, plus basic information on system set-up and configuration of the various I/O ports. The final section, general service, discusses internal diagnostics and diagrams on how to open the system up for PC board replacement. Another nice feature is a table of simple questions and answers for the user to work through when the system fails.

Only two other points dealing with documentation are worthy of a mention — the tiny manual dealing with the differences between Z160 (movable) and the Z150 (standard) PC designs. Last, but by no means least, are the all important licence agreements.

Hardware

Opening up the system is simplicity



The small screen makes the graphics look better.

itself. Simply remove the disk drive assembly, undo four screws and the top of the case lifts off revealing the interior. The unit is split into three main sections: monitor and video driver board; power supply with a built-in cooling fan; and the mother board and main printed circuit boards (PCBs). Access to all sections is good, except to the video driver board, which is mounted horizontally below the monitor tube. It could have been mounted vertically to one side



The keyboard cable and the controls for the screen are hidden behind a sliding panel.

of the tube, as there appears to be enough space.

The power supply, which looks very safe, is totally enclosed in a metal case. The mains socket, switch and voltage selector are mounted directly into the power supply which again increases safety.

The 'business end' of the system is the main PCBs which plug directly into the mother board. The eight sockets on the mother board are all IBM PC XT compatible and may be extended by fitting an expansion chassis. Four boards make up the basic system — the floppy disk controller, the video controller, the cpu board, and one memory board.

The standard system comes with 128K of RAM, but the review model had the full complement of 640K on two boards. One connector is mounted to each of the memory boards. These, like all the rear mounted connectors, are unmarked, unfortunately. They are 25-way D-type connectors, configured as a standard Centronics parallel printer port. If the

machine can drive two separate parallel printers (one from each board), it has definite word processing applications. A fast draft printer could be connected to one port, while a slower letter quality printer would be connected to the other.

The cpu board contains the 8088 microprocessor with an empty socket beside it for the 8087 coprocessor. An interesting feature is the six diagnostic LEDs mounted on it. These would be used when system failure prevents built-in diagnostics from operating. The LEDs, when lit, indicate a failure in one or more of the following sections: cpu, ROM, RAM, interrupts, and disks. The final LED is the ready or working indicator. The connectors mounted on this board are externally, a five pin DIN socket for the keyboard and internally, the 2in 80hm speaker.

The video board uses the ubiquitous 6845 video chip offering a versatile video interface for any user. Seven video modes are available, four are text and three are graphics offering different colour/monochrome/resolution combinations. The graphics modes, as so often is the case, correspond with the

pixel resolution of the text in a given mode. For example, medium would be 40*25-320*200 and in high it is 80*25-640*200.

Text on the screen conforms with the IBM character set, though this can be altered by changing the position of a jumper on the board. Other characteristics of the video can also be changed by swapping around another set of jumpers. These include synchronisation signals for both external video monitors and for the light pen strobe. Three connectors are mounted to this board. Internally, there is the signal lead to the built-in monitor. The two rear mounted sockets are both for external monitors. A phono-type socket carries the monochrome output while a nine pin D-type carries the RGBI (red, green, blue, intensity) output. Both are designed for Zenith monitors, so their characteristics may need to be altered if using a different monitor.

The final board is the floppy disk controller, capable of controlling up to four disk drives, each of 360K capacity. Strangely enough, the two serial ports

ARDWARE PRO-TEST: ZENITH Z160

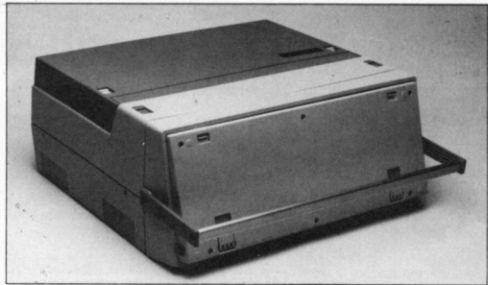
are also connected via this board. Both are standard RS232 ports capable of driving serial devices at up to 96500 baud including printers, plotters, modems and the Microsoft mouse.

The hard disk and its controller, although not on the review system, is available and the documentation contains a section on its use. The controller board would sit in one of the expansion slots, leaving three slots on the standard system for any of the plethora of IBM expansion boards available.

In use

When powered up the system attempts to read a disk in drive A. It spends about 30 seconds doing this, giving adequate time to put a disk in. If at the end of this time no disk is found, a 'drive not ready' message is displayed on the monitor. At this point you can jump to the system monitor program by pressing escape. When in monitor mode, the screen clears and a version number and the memory size are displayed.

The program allows various commands to be typed without the need of an operating system. Facilities include read or write to an I/O port, display, examine, fill and search memory, execute from a memory location, run diagnostic tests and display a colour bar. All command syntax is shown on the help screen, making it quite simple to



The Zenith Z160 folds away neatly but could have done with wheels.

quite a while longer to finish the task.

Software

Four disks arrived with the review system, three marked MSDOS 2.0 demo disks and the other marked user demo disk. Why one of the disks is marked MSDOS 2.0, I don't know because it is simply a v1 system disk.

The user demo disk offers help and information on graphics and software. A features and graphics demo are also included. The graphics demo, because of the small screen size, looks better than it

sectors, partitioning and restoring a hard disk unit. A utility for moving the heads over an unused track for shipping purposes is also included.

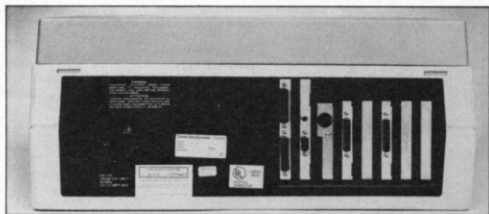
Applications software for any IBM compatible covers a vast range, and this is no exception. Zenith produces a list of available software obtainable from any Zenith dealer. The list is updated bi-monthly and all the software has been tested by Zenith.

The only piece of software I had was a copy of Microsoft Word, the word processing package. My main criticism of it is the persistent reference to press cancel (for example) when no key is marked cancel. I found out later that this is the escape key. Software should be documented to be consistent with the hardware it's being used on, or at least come with a mask.

Verdict

Apart from this so-called portable being built like a tank and weighing almost as much, I liked it. Once it was on the desk it was a joy to work with. The disk drives are serenely quiet, the monitor clearly readable for long periods, and I especially liked the pop-up disk drive assembly.

There is little one can say about the IBM standard that has not been said before. When it comes down to the nitty gritty, it is the quality of the software packages running on the IBM that wins in the end. With the number of packages available for the IBM the Z160 can't fail although it will be a close finish. ▀



Plenty of room for IBM-style expansion at the rear.

use. This is quite a useful tool but its effectiveness is hampered by the lack of one important facility, a hardware test reset button.

If a problem occurs during execution of a program, the reset button can normally be pressed as a last resort. At that point the monitor would be invoked and various tests could be run to isolate the fault. The Z160, on the other hand, uses a software reset (alt, ctrl and del keys together). If the software locks out the keyboard, all you can do is power down/power up, and, of course, all stored data is lost.

The system automatically tries to boot from drive A, though drive B can be selected from the monitor. The operating system loads very quickly (about five secs) when using MSDOS v1, which is a huge improvement on some systems. MSDOS v2.0, on the other hand, takes

really is. One thing Zenith shouldn't have bothered showing was the smooth scroll — it's pretty awful.

The others were an MSDOS v2.0 system disk, an MSDOS v1.19 system disk, and a hard disk utilities disk which takes care of formatting, detecting bad

SPECIFICATIONS

System	Zenith Z160
Price	£2360
Processor	8088
ROM	32K
RAM	128K to 640K
Screen	80 × 25 or 40 × 25, 320 × 200, 640 × 200
Keyboard	84 keys including function, cursor
Interfaces	Any IBM compatible
Operating system	MSDOS v 2.0
Software included	None
Distributor	Zenith Data Systems 0452-29451

MICROTIME INTERNATIONAL LIMITED

106A BEDFORD RD, WOOTTON, BEDS MK43 9JG

Telephone (0234) 767758/766351

NEC PC-8201A, TANDY MODEL 100 & OLIVETTI M10 OWNERS!
LOST FOR SOFTWARE?? NO LONGER!! CALL MICROTIME!!

From Traveling Software Inc.

Traveling Writer - acclaimed word processor	£50
Time Manager - time costing for professionals	£50
Appointment Manager - calendars & appointments	£50
Sales Manager - sales activity/customer notes	£50
Expense Manager - full expense accounting	£50
Project Manager - budgets/actuals/costs/activities	£50
Accounting - double entry general ledger package	£50
T-Base - the ultimate relational database system	£80

From Chattanooga Systems

Autopen - full featured word processor	£30
Autopen N&A - as above with name/address options	£40
Autopad - the 5K spreadsheet with <i>ezgy</i> feature	£35
Trip - expense account details and trip log	£25
ChequeBook - personal cheque book record	£25
Index - list processor and indexing system	£25
Calc1/Calc2 - simple and advanced calculators	£15
Autobase - database package (avail. Oct. 84)	£60

From Dataaccount, Inc.

Data-Dex - automated desktop card index system	£35
Data-Text - text formatting and word processor	£40
Data-Code - bar code generation package	£30
Data-Max - database, any record in 0.5 secs.	£50

From Silicon Crafts/MicroTime

MPLAN - the original portable spreadsheet	£40
MSOLVE - multiple-equation solver	£40
MBRAIN - full RPN calculation with stacks/memories	£25
MLABEL - general purpose labelling program	£30
MMAILER - outstanding letter writer w/mail list	£40

(all prices ex-VAT, incl. UK p&p, 2nd class post)

SEND OR RING FOR DETAILS TODAY FROM MICROTIME

3D COMPUTERS

THE HOME COMPUTER SPECIALISTS

BBC 'B' + DFS £585
with 100k disk drive

BBC 'B' £399
with cassette recorder

SINCLAIR QL £399

COMMODORE 64 £234
with cassette recorder

ACORN ELECTRON £234
with Plus 1 interface

ACORN ELECTRON £205
with joystick and interface

ORIC-1 £75



£1000 instant credit



BRANCHES:

230 TOLWORTH RISE SOUTH, SURBITON

01-337 4317

30 STATION ROAD, BELMONT, SUTTON

01-642 2534

114 GUNNERSBURY AVE, EALING

01-992 5855

26 STANLEY ROAD, NEWBURY

(0635) 30047

1 MANOR ROAD, CADDINGTON, LUTON

(0582) 458575

NO HOME COMPUTER IS COMPLETE WITHOUT IT

Because Touchmaster opens up the home computer.

First, to the full range of users, even the very young.

Secondly, to a whole new style of software ("Touchware"), which is not limited by the keyboard.

Touchware goes all the way from early education packages to sophisticated graphic programs.

What's more, comparable pads are limited because their surface is composed of either a bank of switches of finite size or carbon tracks laid in a grid.

Or they need a delicate electronic stylus. Or they offer a limited working surface. Touchmaster's full A4 printed surface, by comparison, is totally linear.

It has a resolution of 256 x 256 points (that's what makes Touchmaster so flexible).



Now anyone can master the home computer

TOUCHMASTER

For full details, contact Touchmaster Limited,
PO Box 3, Port Talbot, West Glamorgan SA13 1WH,
or phone Teledata (01) 200 0200



PLOTTER: FOUR COLOURS FOUR PENS A4 COMPATIBILITY APPLICATIONS INCLUDE BAR CHARTS PIE CHARTS GRAPHS DRAWINGS
 REPRODUCED PRODUCT - THE MCP80 PRINTER
 SERIAL PROFESSIONAL AND HOME USER COMPUTER PERIPHERALS AND SOFTWARE ARE PLEASED TO ANNOUNCE THIS MONTHS FEATURE

THE MCP-80
4 COLOUR BLACK BLUE GREEN RED
A4
PRINTER
PLOTTER

DEALER ENQUIRIES WELCOME

FEATURES

- * CENTRONICS COMPATIBLE
- * SIMPLE COMMANDS
- * 0.2mm RESOLUTION
- * COMPREHENSIVE MANUAL
- * SOFTWARE EXAMPLES INC
- * 64 SIZES OF CHRS
- * ROLL PAPER 114.5/216mm
- * UP TO A4 SHEET PAPER

FUTURE OPTIONS

- * RS232 INTERFACE
 - * OVERHEAD PROJ FILM PENS
- INTRODUCTORY PRICE

£179 exc post & vat
 £211.60 inc post and vat
 EXTRA SET OF PENS £4 inc
 EXTRA PAPER ROLL £3 inc
 USES

- * BAR CHARTS
- * PIE CHARTS
- * GRAPHS
- * LABELED DRAWINGS
- * FLOW CHARTS

FOR A QUICK DELIVERY

SEND YOUR CHEQUE TO:
 CHOTA GRAPHICS
 6 Walton Lane, Weybridge,
 Surrey, KT13 8NF
 TEL WEY1 0932154268 24 hrs
 MAIL ORDER; CALLERS WELCOME
 BY APPOINTMENT

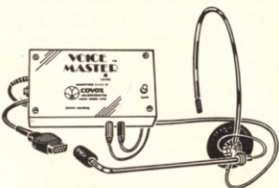
PLEASE RUSH ME THE FOLLOWING;

___ MCP-80 @ £211.60 each ___
 ___ pen sets @ £4 each ___
 ___ rolls paper @ £3 each ___
 TOTAL £ _____

NAME _____
 ADDRESS _____

CHOTA GRAPHICS SUPPLIERS OF INDUSTRIAL

THE AMAZING VOICE MASTER



- Record & playback speech *In your own voice*
- Any accent. Any language
- Playback without Voice Master
- Recognize your spoken commands
- Hum or sing to compose or play music in real time — notes and chords!

All this and more for only: **£89.95** Add \$10.00 for shipping & handling

You won't believe it until you hear it!

UK DISTRIBUTORS NEEDED



COVOX INC.

675-D Conger Street Eugene, Oregon 97402, U.S.A.
 Telephone (503) 342-1212
 Telex 708017 (Av Alarm UD)

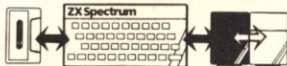
!NEW VERSION!

Would you like to transfer your Spectrum programs from

- ① MICRODRIVE TO MICRODRIVE
- ② TAPE TO TAPE
- ③ TAPE TO MICRODRIVE
- ④ MICRODRIVE TO TAPE

Then do it with

TRANS-EXPRESS



TRANS-EXPRESS is the most comprehensive package of four m/c utilities for transferring Spectrum programs. They are user-friendly, simple to use, reliable & very efficient! They will enable you to transfer any kind of programs up to the full 48.0k length. TAPE TO MICRODRIVE will also automatically, if necessary, modify re-structures & relocate both BASIC and m/c to RUN from microdrives.

TRANS-EXPRESS is an essential microdrive companion and an invaluable software back-up utility.

You can buy each of the four programs separately for **£ 5.50** or TAPE TO MICRODRIVE & MICRODRIVE TO MICRODRIVE for **£ 7.50** or an entire package of all four programs on one tape for **£ 9.95** or on a microdrive cartridge for **£ 14.95** only.

M'DRIVE TO M'DRIVE

Please send me a copy of TRANS-EXPRESS ①②③④ Please tick where applicable
 I enclose cheque/PO for _____ (European orders please add £L overseas £L)

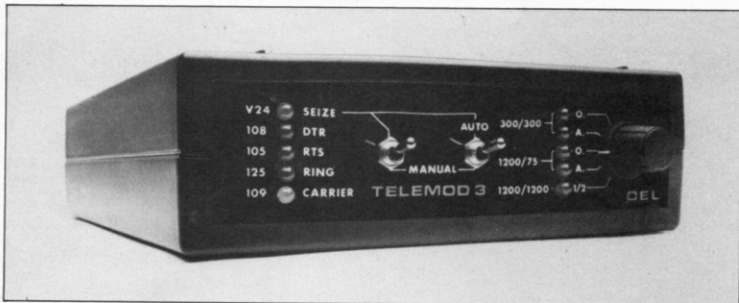
Name/Address _____

ROMANTIC ROBOT 113 Melrose Ave, London NW2



DIAL STRAITS

Brendin Lewis hooks up the Telemod 3 modem and places a few calls.



The Telemod 3 features ten LED indicators, and two switches for auto or manual answer. A bit of a waste as only three positions are used.

Multi-mode modems for micros are not a new idea but only a small number have been given the all important British Telecom seal of approval. The Telemod 3 from OEL, is one of the lucky ones. It offers multiple speeds (1200/1200 half duplex, 300/300 full duplex and 1200/75) with answer (both auto and manual) or originate modes.

First impressions

After wading through the usual cardboard and polystyrene packing I found, to my surprise, a very neat and attractive black plastic-cased modem. Gone, it seems, are the days when such equipment looked as though it was made by the average soldering iron-wielding hobbyist.

All controls and cables are located on the front and rear of the case. The front panel contains all LED indicators, of which there are ten. There is one for each of the speed settings — not entirely necessary — but a nice feature nonetheless. The other five indicators deal with the line conditions, seize, DTR (data terminal ready), RTS (ready to send), ring and carrier. The latter four are also marked with their relevant CCITT V24 circuit numbers, for example 108 = DTR. Next to these indicators are two switches which are used for auto or manual answer. The use of two switches seems wasteful to me, as only three position combinations are used. They could be replaced by a single three position switch.

At the rear can be found the mains cable (no plug), switch and fuse, a 25-way D-type serial connector and a British Telecom-type 600 phone socket. The use of this type of socket is quite a

recent innovation. Previously BT, which used them itself, deemed that they were unsuitable for mounting on the modem. Now the installation is much neater, because the phone can plug directly into the back of the modem and the modem directly into the line (for which a cable is built in).

Whether it is becoming a trend or not, I don't know but the documentation available with modems seems rather meagre. This one is no exception. All is revealed on six sides of A5 paper. This comes down to five and a half sheets if you already know how to put on a mains plug. What there is, however, is brief though understandable.

Providing everything works first time there should be no problems. If, on the other hand, they don't you'll be using your phone to talk to OEL and not to Prestel.

One of the problems concerning BT approval is that a modem must not produce the dialling tones for the Bell telephone network used in America. This is not the fault of OEL because it uses a standard modem chip which can supply both of these tones. Hopefully BT will look into this matter in the near future, as it prevents users dialling the US.

In use


Installing the modem looked a simple task and proved to be just a case of plugging the bits together and powering up. Nothing ever goes wrong until a unit is powered up, which is just what happened with this one. The manual states that on power up one of the speed indicators should light up if all is well. It didn't. Power down/up and there was still no change. I changed the position of

the switch and hey presto! It was fine. Apparently there are five speed indicators but six switch positions — so beware.

Another strange thing happens with the other set of indicators involving DTR and CTS. They were both illuminated, indicating that the terminal and modem are ready for communication, but the terminal wasn't switched on. These two pins should be asserted by the local terminal or micro and therefore should not light until the DTE is ready.

Leaving these problems aside, I reached for the phone, unable to test all modes (my fault, not the machine's). I decided to call the local mainframe at 300 baud. After wrangling with the different buttons on both phone and modem, I finally got the log-on message.

Verdict

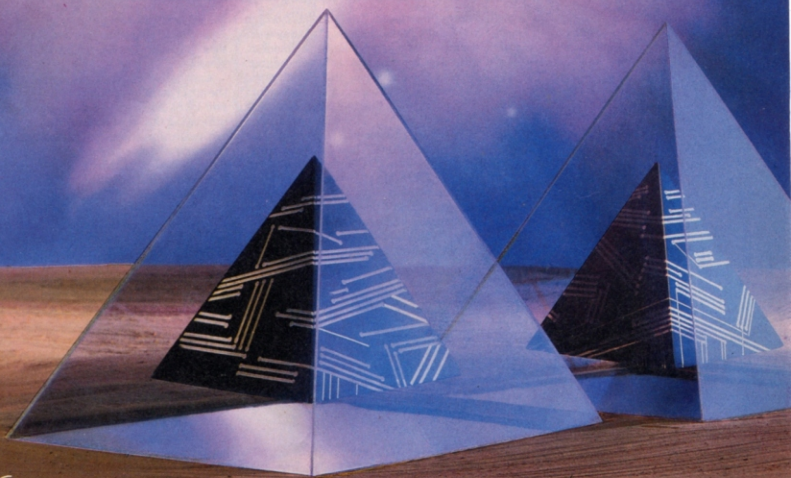
It seems the only thing the Telemod 3 has to offer over other modems is BT approval, which is a shame. Though the specifications sound good, there are a few obvious omissions. The most basic is the lack of a local loopback switch for test purposes. Also missing is an auto-dial facility, which would be far more useful than auto-answer. However, these drawbacks with the Telemod 3 can easily be ironed out, and I look forward to seeing Telemod 4. 

REPORT CARD: 1 TO 5

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

Price £175 Supplier OE Limited, North Point, Gilwilly Industrial Estate, Penrith, Cumbria.

R.P.S. THE MEM



rp
RHÔNE-POULENC



Computers can only be really effective if the information they use is stored securely.

R.P.S. specialises in the manufacture of advanced information storage products that far exceed the reliability standards set by leading computer manufacturers.

Part of the giant RHÔNE-POULENC group,

ORY BUILDERS.

R.P.S. is committed to a major research and development programme to meet the storage needs of tomorrow's computers.

The R.P.S. label is recognised by computer professionals everywhere as a guarantee of quality in magnetic data storage.

The professional computer memory.

RHÔNE-POULENC SYSTEMS - High Street, Houghton Regis, Bedfordshire, LU5 5QL
Tel.: Dunstable (0582) 605551

The logo consists of the letters 'RPS' in a bold, white, sans-serif font. Each letter is contained within a dark blue rectangular block. The blocks are slightly offset from each other, creating a sense of depth and movement.

A DIVISION OF THE RHÔNE-POULENC GROUP



PAGES OF POSSIBILITIES FOR YOUR ZX SPECTRUM



The Pan/PCN Computer Library is an extensive and authoritative series of computer books. Its broad range caters for games players and programmers of all levels of ability and experience. Good value paperbacks for ZX Spectrum owners at your local computer book stockist NOW!

SIXTY PROGRAMS FOR THE ZX SPECTRUM £5.95
Includes space games, word games, war games, utility and educational programs.

INSTANT ARCADE GAMES FOR THE ZX SPECTRUM £3.95

Will enable newcomers to computing to write creative games programs without learning BASIC.

25 PROGRAMS FOR THE SINCLAIR ZX MICRODRIVE: MULTI-USER GAMES FOR THE SPECTRUM £5.95

NEW A lively collection of 25 multi-player games for single and multiple screens.

THE SPECTRUM PERIPHERALS GUIDE £4.95

Assesses the types of accessory available for expanding the SPECTRUM. Provides all the information needed to make an informed purchasing decision. An essential reference book for SPECTRUM owners.

THE COMPANION TO THE ZX MICRODRIVE AND INTERFACES £5.95

NEW The complete reference companion for users wanting to explore the world opened up by the Microdrive and Interfaces.

CRACKING THE CODE ON THE ZX SPECTRUM £6.95

NEW A practical guide to machine code programming. Shows how to utilise the full power of the hardware.

THE BEST SOFTWARE GUIDE: SPECTRUM GAMES £3.95

A consumer guide to the vast quantity of arcade games software on the market for the SPECTRUM.



**PERSONAL
COMPUTER**
COMPUTER NEWS LIBRARY



SPEAKING UP

Your 64 can be made to speak volumes with this American gadget, The Voicemaster. Kenn Garroch linked it up to his machine for a test conversation.

One of the good things about the Commodore 64 is its sound synthesis chip (SID). Many games are beginning to use this for speech synthesis, to make the games a little more interesting. One thing that may be puzzling a few people is how the speech is coded and set up for use.

The Voicemaster from Covox can be used to input speech, via a microphone, store it in files, and modify it to a certain extent. The gadget is American and can be ordered only from the US.

Presentation

The device itself consists of a small, flashy-looking, brushed aluminium box (10cm x 6cm), a disk or cassette, an electric condenser microphone, and a manual. This comes all wrapped up in a box about the size of a 'ten pack' of disks.

Setting up

The main box plugs into the user port on the back of the 64 (make sure the machine is switched off). The microphone goes into a 3.5mm jack socket on the left side, and the 64 can then be switched on.

The review model came with its software on disk and was loaded from Basic with the command LOAD "VOICE-MASTER", 8 and then RUN. As well as loading the machine code and initialising it, it also asks you whether you want to turn off the SID filter. To the innocents among you, the SID chip contains a set of tone generators to produce the sound, some envelope generators to alter the volume with time, and some filters to alter the shapes of the waveform (effectively giving the different vowel sounds of 'ee' and 'oo' but with shades in between). Also included are a few other features and FX to make the SID a bit more flexible.

Turning the filter on or off didn't seem to make a great deal of difference, although the 64 I was using was fairly new and the Covox manual vaguely mentions something about older

machines not having the same SID as the newer versions. Anyhow, with an ordinary everyday television the speech was more or less intelligible.

After selecting the filter off option, another disk access is performed and the computer speaks.

In use

The whole idea of the Covox is that you can input speech, save it, and then be able to reproduce it without add-ons.

There are a number of programs on the disk — Demo, Calculataor, and Clock.

Demo is a simple program that allows you to input speech and then play it back.

on (N +ve or true) or off during voice playback. When the screen is on, the speech is slowed down a little but this can be offset somewhat by using SPEED. CLEAR deletes the current vocabulary, unlike the command NEW (normal Basic) which leaves it intact. It also resets all current settings such as speed and volume.

SPEED N changes the speed of playback where N is in the range 0 to 9, with 5 being the norm. The highest speed makes the voice playback sound like Pinky and Perky (remember them?), while the slowest is like the belt slipping on a record deck.

VOLUME N sets the volume in the range 0 to 15 with 15 being the loudest.

RATE N changes the sampling rate at which the voice or sounds are recorded. So the sound quality improves the faster it is sampled.

The Covox can incorporate up to 64



The flashy Covox showing the manuals and software. Unfortunately, we can't reproduce the sound.

It also allows some of the added effects to be demonstrated, such as altering the speed of the playback, which changes the pitch of the sound rather like speeding up, or slowing down a record player. The calculator turns your Commodore into a speaking adding machine and Clock is more or less the same as dialling the speaking clock.

After you have become fed up with the demo programs, you can try writing your own. This is very easily achieved from Basic, since the software gives you a whole new set of commands to use. These are:

SPEAK N, where N is the word number previously placed into memory, with LEARN N which analyses the voice input from the microphone and stores it in memory.

PUT "filename", 8 stores the current vocabulary onto disk.

FIND "filename", 8 loads a vocabulary from disk.

SCREEN N selects whether the screen is

(family number) sounds in memory. These can be brought back, at will, with the SPEAK command. Incorporating speech into your programs is simply a matter of executing a SPEAK at the appropriate time.


Verdict

The Covox is a pretty good gadget. If you can think of a good use for it, I really could not think of a great deal of use for a computer that talks, unless you can talk to it and hold a conversation. ▀

REPORT CARD: 1 TO 5

Features	●●●●
Documentation	●●●
Performance	●●●
Overall Value	●●●

Product Covox Voicemaster Price \$89.95
Availability Covox, 675-D Conger St., Eugene, Oregon 97402, Tel USA 5032-342 1271. Mail order add \$4.00 pp.



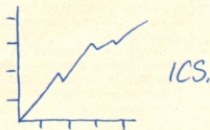
Really inexpensive way of writing down whatever comes up on your computer screen.

Lightweight and totally portable — independent power source!

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

Works perfectly in the dark even during a power cut!

45 characters per second (only in optional "totally-illegible-squiggly-line" mode).



Dear Me,
Even writes letters!



The new, portable Epson P40.

Now the home computer user can have a true business quality printer, from Epson – maker of the world's most popular printers.

Our new P40 is only £99.95 – that's including VAT and recharger. It's suitable for BBC, Sinclair, Commodore, Oric and almost any

other popular home computer, as well as virtually any portable or desk top micro.

Running off its own rechargeable batteries as well as mains, your P40 is totally portable and being Epson, an absolute doddle to use. And though particularly compact it even gives

you 80-column width printing in condensed mode.

So wherever and whenever you want to print, now you can – with the new, portable Epson P40. In fact, anything a ball-point does, it can do – better. See it at selected branches of Boots, or ring 01-200 0200 for details.

EPSON



'Sinclair QL User Guide' by Lionel Fleetwood, published by Sigma Technical Press at £7.50 (paperback, 211 pages).

QL books aplenty are about to hit the streets. Or at least that's one way I could deal with the mountain cluttering my desk. But at the back of my mind there's always been the voice of responsibility, telling me first that these are good, honest authors out there, and second that I'd better review a couple before the pile gets any bigger.

Putting them in order of complexity you come to Lionel Fleetwood's Sinclair QL User Guide first. This is one of the better value QL books, as it is mostly for the first time user who wants an explanation of the applications packages. It does a quick overview of SuperBasic in the first forty-odd pages, and for the rest of the distance concentrates on the applications packages that come with the machine.

These later sections aren't bad, but there are cavernous gaps. Say you've just gone down to the shops, bought a QL and Mr Fleetwood's user guide. Boot up the Quill, type some stuff, then you want to print it out. You tear through the index of the book, which refers you to page 17, which tells you how to choose a printer.

Undaunted, you head for the section on the Quill, which tells you: 'Once you've designed your document with headers and footers, you're ready to print: this you do by (a) making sure you have a printer and (b) hitting F3 P.'

With RS232—pull the other one, Lionel!

A couple of other points might make you doubtful—the cover picture is an enhanced version of an early Sinclair PR shot, complete with non-existent RAMpack, and there's a particularly awful paragraph on the jacket which refers to the technical section on the 68010 processor, the Motorola instruction set and the QDOS operating system.' None of these things are actually in the book (we reckon the 68010 is a 68000 with a 16-bit data bus) and there's a sticker over the

paragraph, or there was. Memo to Sigma—send books to reviewers with bitten fingernails. . . **IL**

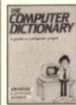


'QL SuperBasic' by Dr A Berk, published by Granada at £6.95 (paperback, 165 pages).

QL SuperBasic, by Dr A Berk, is a sort of combination guide to SuperBasic and introduction to computers. As far as the latter is concerned it's no worse than some, but as a guide to SuperBasic it might as well be a guide to the ZX81.

Get this for an introduction to loops:
10 LET N=0 PRINT 12*N: LET N=N+1: GOTO 10
Fine as it goes, perhaps, but Dr Berk sees fit to spin this one out to 17 lines including REM statements. He makes a virtue of this soon after by introducing multi-statement lines, but I suspect many people will have nodded off by then.

But my major objection is that the book seems upside down to me. Dr Berk approaches the QL just as you'd approach a 'normal' machine, and the most important thing about the QL is that it isn't normal. QL SuperBasic is radically different from most dialects of Basic, and is surely an opportunity to teach newcomers more about structured programming. I'd say it's a grave mistake to start out teaching boring old Basic, and not introduce the structures until later. **IL**



'The Computer Dictionary' by Jon Wedge, published by Adam & Charles Black at £3.95 (paperback, 128 pages).

Somebody—either the author or his publishers—has a damned odd idea about what computers are. You and I know what computers are... they are relatively small things that sit on a desk or the dining table. If you've used one for more than a few weeks you'll have picked up on most of the jargon you'll ever need.

On the other hand, you may be a complete newcomer, in which case you may find this book a godsend. Or you may not. Consider the following: 'MICR stands for Magnetic Ink Character recognition. The most common use of magnetic ink is on the bottom line of bank cheques.' Not exactly the kind of thing to bring enlightenment as you struggle with your Spectrum.

You see, Mr Wedge sees no difference between your kind of computer and the Ministry of Defence's kind of computer, so you'll find lots of references to things like punched cards, batch processing, something called fallback, switched packet networks and other terms relating to the near-extinct dinosaurs of yesteryear.

This is a pity since the book is amusing—downright funny in parts—and worth buying for the single reference: 'Jackson, Michael—see structured programming.' **PW**



'Personal Computers & Special Needs' by F Bowe, published by Sybex Computer Books at £6.95 (paperback, 171 pages).

Although low cost personal computers have been around for a while, little has been done to exploit the technology to assist the disabled. This book is therefore a welcome addition to the bookshelves.

As a US import it has its limitations for a UK audience. It often refers, for instance, to specific pieces of equipment not available over here.

However, Frank Bowe does have a deep insight into this field as he has written widely about the disabled and using technology to meet their special needs.

It's a relatively brief book with chapters on employment, education and independent living. Further chapters deal with vision impairments, hearing losses, mobility limitations and learning disabilities.

The book can be recommended to those seeking an introduction to the subject or wishing to benefit from American experience in this important field.

It is also a valuable source book of ideas for those wanting to use micro to assist the disabled. **RB**



'Expert Systems—Principles and Case Studies' edited by Richard Forsyth, published by Chapman and Hall at £9.95 (paperback, 231 pages).

Tales of sales of millions of home micros occasionally lead you to suppose that computers are no longer strange intelligences understood only by a highly trained priesthood. But the next step is always there to be taken, and the pioneers will invent a new line in gibberish for it.

So it is with the fifth generation, artificial intelligence, and

expert systems. This particular volume is written in English but draws on so many terms from earlier work that a new vocabulary is necessary.

The text isn't unreadable, rather it is accidentally obscure in the best traditions of computer literature. But this is a book for the committed student of computer sciences, a reference work to be read for its value to a course of study. If you want to create your own expert system the book might provide a first step but it won't take you all the way—it may even deter you.

The book is in four parts—background, inference, knowledge engineering, and learning. Various distinguished contributors address themselves to specific topics within these sections, and if you make it to the end you'll emerge with the feeling that there can't be much left to know about the subject. But will you be able to make use of your knowledge? You may need an expert system to help you out. . . **DG**



'A Practical Guide to Designing Expert Systems' by Weiss & Kulikowski, published by Chapman and Hall at £15 (hardback, 174 pages).

With a sigh of relief you'll note that crucial word 'practical' in the title and sharpen your coding pencil to get stuck into some expert designing. Sharpen your wits first. There are scene-setting chapters and enough contextual information to sink a ship before you reach the practical work.

Don't be put off by the assertion early on that 'this is an engineer's book'. An engineer in this field means a software engineer, which is just a fancy word for a programmer who takes the work seriously.

The greater part of the book, though, concentrates on the practical aspect, using the authors' own general system called innocently Expert. There is a touch of old-world academic charm about this, but nothing so patronising as a listing. The expert system you create will be your own—Expert is used merely to point the way. The authors then illustrate the lesson with several applications, and finally look ahead to the implications of the kind of research area in which by now you should count yourself a co-worker.

This is not the best book on expert system design, nor the most accessible, nor the most direct. But it is a serious attempt at a serious subject and you're unlikely to consider your money wasted. **DG**

Mirage

SOFTWARE &
DISTRIBUTION

9 Rossini Street
Seaforth
Liverpool
L21 4NS
Tel: 051-920 9713

PROGRAMMERS

WE ARE LOOKING FOR TOP QUALITY PROGRAMMES TO MARKET IN THE UK AND ABROAD. THE PROGRAMMES MUST BE OF TOP QUALITY AND IN MACHINE CODE WITH GOOD GRAPHICS AND SOUNDS AND ORIGINAL CONCEPT. WE ARE LOOKING FOR PROGRAMMERS TO CARRY OUT WORK ON NEW MACHINES SUCH AS THE C.B.M/16 AMSTRAD AND M.S.X. WE CAN SUPPLY THESE MACHINES TO CARRY OUT WORK FOR MIRAGE. WE ARE ALSO OFFERING £500 PRIZE FOR THE BEST PROGRAMME RECEIVED BY THE END OF FEBRUARY 1985 WHICH WE WILL DECIDE TO MARKET. WE OFFER AN OUT RIGHT PAYMENT OR 10% PLUS PAYMENT OR 20% ROYALTIES. FOR MORE INFORMATION CONTACT THE SOFTWARE MANAGER HE WILL BE GLAD TO LISTEN TO ANY QUESTIONS YOU MAY HAVE.

SOFTWARE HOUSES

WE ARE LOOKING FOR TOP SELLING PROGRAMMES TO DISTRIBUTE TO OUR WIDE RANGE OF OUTLETS THROUGHOUT THE UK AND GIVE YOU A VERY FAST SERVICE TO HELP WITH YOUR SALES AND TO MAKE THE MOST OF YOUR PRODUCTS. SEND A SAMPLE COPY OF YOUR PRODUCTS WITH RATES AND TERMS FOR A FAST ASSESMENT. FOR MORE INFORMATION CONTACT THE SALES MANAGER HE WILL BE GLAD TO HELP AND ASSIST YOU.

DEALERS AND DISTRIBUTERS

DEALERS WE HAVE THE BEST SELLERS FROM THE BEST PRODUCERS; WE ALSO OFFER VERY GOOD RATES AND TERMS TO HELP YOU AND US TO ACHIEVE THE BEST SALES AND SERVICE. FOR MORE INFORMATION CONTACT THE SALES MANAGER.

DISTRIBUTERS HAVE YOU GOT THE MIRAGE RANGE ON YOUR SHELVES, IF NOT THEN CONTACT THE SALES OFFICE FOR SAMPLES AND RATES.

SALES MANAGER
T.C. SAPHIER

SOFTWARE MANAGER
C.A. SAPHIER

LOGIC PROGRAMMING AND FOOTBALL

Put your micro-PROLOG to work and predict the pools.

- AI** Apply Fifth Generation methods to football data.
- PROLOG** Over 10 modules of PROLOG programs.
- DATABASE** Several seasons of first division results.
- POOLS** Specially written update programs. Rules based prediction system. Add your own rules and heuristics.
- NAT** Natural language interface.

Requires micro-PROLOG 3.1

Text (over 100 pages) and IBM-PC diskette at £60.00 (includes air-mail postage to Europe.) Mail Order. VISA. Make cheques/POs payable to Computer Knowledge.

COMPUTER KNOWLEDGE

Faxaskjól 4
107 Reykjavík
Iceland

DAISY DEALS

DAISYSTEP 2000..... £219 + VAT
NEW PRICE — A FOLLY FIRST

JUKI 6100 £329 + VAT
UK BESTSELLER — LIMITED OFFER

NEW MP 165 DOT MATRIX
High Speed 75 cps, NL Quality
165 cps, 80 col £275 + VAT

CANON 1080A £289 + VAT

NEW SHINWA 100 cps £195 + VAT

All orders £9.50 delivery, mail order only

“Well done Sir Clive”

FOLLY MICRO



0730 894078
0730 67057

10 College Street, Petersfield, Hampshire
9am-9pm every day or send SAE for full range

We have no connection with any other retailer

HISOFT

ULTRAKIT £9.45

The most powerful toolkit yet for ZX BASIC. All the features you will ever need; AUTO insert, full RENUMBER, block DELETE, CLOCK, ALARM, error trapping, break trapping. Full TRACE with single-step and much, much more. Makes ZX BASIC easy-to-use and powerful.

DEVPAC £14

An excellent assembler, an advanced line-editor, a comprehensive disassembler and a superb 'front panel' debugger all in one package. Used by many leading software houses to write their games. "Buy it!" Adam Denning 1984.

PASCAL £25

A powerful and almost full implementation of Pascal - not a Tiny Pascal. A valuable educational and development tool, programs typically run 40 times faster than a BASIC equivalent. Spectrum version includes Turtle Graphics package. "I haven't seen any other compiler that could match Hisoft's Pascal"



HISOFT

180 High Street North
Dunstable, Beds. LU8 1AT
Tel: (0582) 696421



HISOFT



for the ZX Spectrum

HiSoft is pleased to announce a new compiler for this popular and effective systems programming language. Not a tiny-C but an extensive, easy-to-use implementation of the language. Allows direct execution of compiled statements. Supplied with function library. Available direct from HiSoft for £25, or write for further details.

All prices, UK delivered, relate to 48K ZX Spectrum versions. Our software is available for many other 280 machines e.g. Amstrad CPC 464, MSX, Memotech, SHARP MZ700, New-Brain, CP/M etc. Please write for details.

SOFTWARE PRE-VIEW



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

SPECTRUM



Ocean's latest new release, *Chinese Juggler* is a real test of skill and strategy as you try to balance the eight plates on rods.

Cylon Attack did quite well on the BBC, and now A&F has converted it for the Spectrum. Improvements include better graphics and faster and smoother movement.

Spectrum games are getting larger and larger. *Xavior* claims some 4096 rooms, 256 different creatures, 32 room designs etc. Your task is to collect as many DNA fragments as possible to ensure the survival of your species. Due for release on November 19, we'll carry a review as soon as we can.

The Staff of Zaranol isn't the Martian version of *Upstairs, Downstairs*. It's an adventure which could have been called the Sorcerer's Apprentice. That's the part you play. Your task is to banish the demon you've accidentally released.

The aim of *Plummet* is to save a mayor, stranded in the lift shaft of a New York skyscraper. To do this you have to carry lengths of rope to the top of the shaft. Needless to say the journey is fraught with perils.

CCS continues to expand its Charlie Charlie Sugar budget range. *Nuke Lear* involves deflecting barrels of radioactive material into the correct locations. Too many in the wrong place and the situation gets critical. Fair at the price, but not quite up to the standard of other budget games — like those from Firebird or Software Projects.

For those tackling machine code, *Gener-80* looks handy. It's an editor assembler with some unusual features. For one it processes input immediately, syntax-error checking just like Sinclair Basic.

There's a 40-column full-screen editor and string search, block move and the like. Microdrives are supported and source, text and object code can be located at will in memory, allowing the use of a co-resident monitor.

New Cylon Attack	£5.75	A&F 0706-341111
Xavior	£5.95	PSS 0203-667556
Air Defence	£5.95	CCS 01-858 0763
The Staff of Zaranol	£5.95	CCS 01-858 0763
Nuke Lear	£2.99	CCS 01-858 0763
Tomb of Akhenaten	£2.99	CCS 01-858 0763
Chinese Juggler	£5.90	Ocean 061-832 6633
Merry Xmas Santa	£7.95	Icon Software 091-2846966
Gener-80	£7.95	Seven Stars 01-485 7775
Plummet	£7.00	Interceptor Micros 07356-71145

BBC

DELETED FROM
Mineshaft



Funny how the games market often borrows from media events like the Olympics, even if accidentally. One such is *Mineshaft*, and it's nice to see the BBC version on one side of the cassette and one for the Electron on the other. Your aim is to collect all the lumps of coal in the 20 rooms in the pit. The rooms have unlikely names such as The Derelict Place, Ghosties Revenge and The Junkhouse Mk II. You only have a limited air supply, so

time is of the essence and you can move to the next screen at will. The screens are a bit bare, but the graphics and the animation are among the best.

Only seven weeks to Xmas, and the theme games are rolling in. Latest is *Merry Xmas Santa*. Your festive task is to help him make safe deliveries, avoiding marauding snowmen, jumping over snowballs and dodging falling icicles. Bonus points are available for collecting plum pudding and sherry.

Wongo's unusual scenario is the Great Wall of China, with a bouncing Chinaman defusing bombs along its length, evading arrows, gremlins and boulders.

Holy Horrors	£6.99	Romik 0753-71535
Mineshaft	£6.95	Durrell 0823-54489
Merry Xmas Santa	£7.95	Icon Software 091-2846966
Ultron	£7.95	Icon Software
Wongo	£7.95	Icon Software

AMSTRAD

It's a pity that the standard of Amstrad games released to date simply hasn't done justice to the machine's capabilities. Particularly so when you consider their high price.

Unfortunately, the latest Amsoft releases do nothing to improve the situation. True there are some good graphic

touches in *Astro Attack*, but the space ships which travel round the maze are rather chunky, and the game is too simple in concept. *Bridge It* has better graphics, but that's about all. *Software Projects* is shortly to release *Jet Set Willy* on the machine, and let's hope that will show just what can be done.

Bridge It	£8.95	Amsoft 0277-230222
Astro Attack	£8.95	Amsoft 0277-230222

COMMODORE



Yet another space attack game — this one, *Invaders*, from Live Wire is in the usual style. Earth is threatened by alien invaders and you must destroy them with your laser.

On paper at least, the *Expert Sprite Editor* looks very good indeed. Features include sprite attribute data compression, moving and stationary anima-

tion, sprite layering, 224 sprites available from Basic or machine code, as well as all the editing commands you could want.

That the 64 is being seriously considered as suitable for a small business is shown by Kuma's latest spreadsheet. The model can support up to 26 columns by 50 rows — rather limited, but the package costs only £14.99 and uses colour coding for totals, sub-totals, formulae etc, which makes it easier to use than some.

Expert Sprite Editor	£8.95	Android Dreams 021-458 4475
Spreadsheet	£14.99	Kuma 07357-4335
Stunt Bike	£6.95	Ocean 061-832 6633
Nuclear War Games	£8.50	Severn Software 0594-43352
Quango	£7.00	Interceptor Micros 07356-71145
Guzzler	£7.00	Interceptor Micros 07356-71145
Time Zone	£6.95	Channel 8 0772-53057
Phase 4	£6.95	Channel 8 0772-53057
Borzak	£6.95	Channel 8 0772-53057
Invaders 64	£6.50	Live Wire 061-834 4233
Salvage 64	£6.50	Live Wire 061-834 4233
Time Truckers	£7.95	ASK 01-874 6046
Allard's Tome	£6.99	Romik 0753-71535
Animal Magic	£6.99	Romik 0753-71535
Titans	£6.99	Romik 0753-71535
Biaze	£6.99	Romik 0753-71535

DRAGON

The *Z1 Grafix System* allows you to control the micro's display via joystick and single key presses. It also allows mixing text and graphics as well as saving and loading images.

The Soft Sell is a display generator which allows you to page through up to 17 colour graphics screens, with the lower part showing scrolling messages in large characters.

Snow Queen	£5.95	Cambrian 07456-7121
The Soft Sell	£17.25	Micro Sign, Woking 67847
Z1 Grafix System	£5.00	Zircon Software 01-641 7102

SPECTRUM OWNERS

LET'S GET DOWN TO BUSINESS



OCP ANNOUNCE ALL PROGRAMS COMPLETELY REWRITTEN FOR ZX MICRODRIVE COMPATIBILITY & PLUS 80's FOR USE WITH 15 DIFFERENT CENTRONICS/RS232 INTERFACES INCLUDING ZX INTERFACE 1



★ **FINANCE MANAGER** ★
★ **ADDRESS MANAGER** ★

£8.95

(BOTH LESS £3 REBATE FOR EXISTING USERS ON RETURN OF OLD CASSETTE)

★ ★ **80 COLUMN - 'PLUS 80' VERSIONS** ★ ★ £19.95

(LESS £5.00 REBATE FOR EXISTING USERS ON RETURN OF OLD CASSETTE)

Write to us for a quotation for the software, the interface and the latest high performance Japanese Dot Matrix Printer — you will find our prices very competitive.

Both programs are available in standard form which work only with ZXTM and AlphaCom 32 column printers, and Plus 80 which work in conjunction with most Centronics/RS232 Interfaces and 80 column printers.

ADDRESS MANAGER and **FINANCE MANAGER** utilise the same "on the page" presentation and offer 48K Spectrum owners a "professional standard" address filing, indexing retrieval, and financial analysis system. Below are examples of the screen presentations.

Both have been carefully constructed to provide the user with a tool that is extremely friendly and easy to use, the speed and presentation of these programs are second to none.



ADDRESS MANAGER features MULTIPLE INDEXING via our 3 way 3 character index, an ability to store over 400 full names and addresses or 1500 individual names/titles.

USES include storing and updating names, addresses and phone numbers, printing out Xmas card lists, etc, mail order work, customer classification by type size (doctors have used this program to catalogue patients by treatment).

FINANCE MANAGER is a powerful, flexible and fast MENU DRIVEN general purpose program carefully designed to handle up to 255 separate accounts for domestic and business accounting applications. The magic of MACHINE CODE has enabled us to produce the very latest "on the page" presentation which lets you enter and edit data naturally, as if with a pencil and paper. That's not all, not by a long way. This program automatically raises a corresponding debit or credit for every entry, and will even open up a new account if an entry features an unrecorded account name.

Voted "The best value financial program available" by Sinclair user.



Accounts can be MERGED, DELETED, ANALYSED, MARKED as priority, RENAMED, EDITED and SCROLLED. Transactions can be RECONCILED, AMENDED, DELETED, PRINTED, DESCRIBED for analysis and RENAMED. Standing orders can be APPLIED, REMOVED, DESCRIBED, AMENDED, DELETED and even DUMMIED for planning purposes. Other features include DATE CHANGE, RUNNING TOTALS, 2 KEYBOARD MODES, PRINT PAGE/ LINE/BLOCK/FROM END/FROM START/FROM DATE etc., LIST BALANCES, FIELD ERASE/INSERT/DELETE, EXIT TO BASIC. You may not want all these features but they are there just in case.

★ ★ ★ ★ UTILITIES ★ ★ ★ ★

£9.95

- ★ MACHINE CODE TEST TOOL ★
- ★ EDITOR ASSEMBLER ★
- ★ MASTER TOOL KIT ★

sinclair ZX MICRODRIVE COMPATIBLE

(Existing users wanting latest versions will receive a £3.00 rebate on return of old cassette)

From WHSMITH and other outlets or send cheque or telephone details to 0753 889055.

Replacement tapes only available from OCP direct.

OXFORD COMPUTER PUBLISHING LTD., 4 High Street Chalfont St. Peter, Bucks. SL9 9QB.



SOFTWARE ★ ★ ★ ★ SIMPLY THE BEST

SPECTRUM

DELTA WING

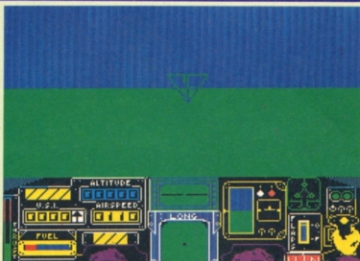
Naturally they called me when they heard. A hush-hush new high-performance jet fighter from Thorn EMI was parked on the tarmac, and as the only PCN operative with F15 experience I was ideal for the job.

Not that this was going to help much. For a start the cockpit was oddly-shaped — no matter where I looked my knees always seemed to be poking up into the windscreen, and as I moved the joystick I could see my right hand trembling on it. Odd really, especially when you consider I'm left-handed.

The basic mission's easy enough to grasp. You have to take your jet-powered fighter-bomber into the air and perform a small miracle that combines using bombs to destroy all the enemy bases and shooting down the enemy intruders trying to bomb your bases.

In common with most of the other new jet-powered flight simulators the weapons technology is fairly old hat, and you have to mess around with boring old conventional bombs and cannons. We're still waiting for a software house to come up with Sidewinder missiles and napalm, but when it does it's certainly got my vote.

In *Delta Wing* you start off playing for take off, with an enemy aircraft fairly close to your airfield, so it's important



to deal with this one before you go waltzing off on bombing raids. My first try wasn't a great success. While taking off I spotted an alien shape of some sort at the end of the runway, so instead of pulling the stick back and getting airborne I started pumping bullets into it. It was only when I crashed into it that I realised this was in fact some kind of end of runway marker.

Nothing daunted I had another bash at reaching for the skies, this time with a little more success. Normally you get a representation of the control panel, complete with the aforementioned knees and hands. The top of the screen is taken up by a view out of the cockpit, although you can switch to a radar map of the whole playing area.

The combat radar screen in the centre of the console is fairly

standard, showing where you are and the nearest base or intruder in relation to you in terms of angle and height. You can switch this between short and long range.

Once you're in the air it's a matter of getting to the same height as the intruder then engaging it. The ensuing dogfight, provided you can stay alive for long enough, is an entertaining affair. Part of its charm is that, unlike the enemy in *Fighter Pilot*, this one will try to stay with you, so your spells of twisting and turning are liable to be a lot more prolonged.

I'm not sure how accurate the simulation is, but it does a fair impersonation of a full dogfight. Unfortunately you need to hit the beggars seven times before they go down, and either I didn't hit them at all or there's

no way to tell how many times you've hit them.

My precision bombing experiment was also a flop. I went in at 200 feet, dropped the bomb right over the airfield and . . . blew myself up. Apparently you do this if you bomb from lower than 250 feet, even if you're going at twice the speed of sound. Anyone sending me an algorithm proving this is nonsense will be lightly rewarded.

All in all I found *Delta Wing* curiously unsatisfying. The controls are more leaden than those of *Fighter Pilot*, and I found the lack of a rudder particularly annoying in dogfights.

It's also possible to fly off the screen, and if you can't remember where you left from you're in big trouble.

Finally, bombing. I find it difficult to believe that in this day and age the cream of Strike Command is being sent into action without a proper bomb sight. Peering over the side may have been OK in 1914, but at 1,400 knots it isn't really an option.

Delta Wing would have been excellent six months ago, but on balance I'd say you'd be better off now with *Fighter Pilot*.

John Lettice



Rating 7/10

Price £6.95 Publisher Creative Sparks/Thorn EMI Computer Software, 142 Wardour Street, London W1

SPECTRUM

ALL OR NOTHING

All or Nothing looks promising from the cassette cover, but playing it — well, that's another story.

You're an enemy spy whose mission is to obtain the plans of a secret matter transporter, held somewhere on your competitor's industrial site. As you approach the landing patch on the site by parachute, your watch loosens and falls to the ground.



Your first task is to find the watch before you can continue your mission. To control your SAS-type character you can use the keyboard, define your own keys or use a joystick.

The instructions are pretty lengthy and you'll need about

1Mb of brainpower to remember what key does what and how to play the game. You've got to digest a number of screens of text before you can get stuck in — a demo game gives a few tips.

Playing the game proved to be a killer. On starting, out of the sky drops the hero hanging from a parachute. It's the next bit that gets difficult. Controlling him to go in the direction I wanted to took a lot of practice.

To the patter of running feet off he goes to find the key that gives access to the secret documents. It took several attempts to find the key before my man

was either shot, bitten by snarling dogs or caught. Quite often he was running aimlessly avoiding his pursuers.

The idea of this game is pretty good and the 3D graphics are an added bonus. You can also use a Currah Speech add-on, although the sound is poor.

I found this strategy/adventure game a bit hard to play and it wasn't long before I got bored.

Sandra Grandison



Rating 7/10

Price £6.95 Publisher Abbey Electronics 01-289 2377

COMMODORE 64

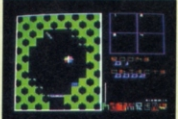
ANKH

This game is something else but exactly what I'm not sure. Put at its simplest (and this game is anything but simple), *Ankh* is a series of logic puzzles, some unbelievably tough.

The game environment is described as the 'Metareal world of Ankh where logic works but doesn't rule'. The idea is to find your way through 64 connecting rooms, each of which is different and holds a

puzzle. Sometimes you can pass through a room's doorway with no trouble but mostly you need to find a way to open up the exit before you can pass.

Each room must be prodded, poked and probed to yield up its secrets. Solving a room's puzzle may bring forth a treasure, a tool or (groan) yet a further object. You control a spherical object, your Mindprobe. It can be moved around and fire missiles. You gain power by performing certain actions (gaining access to a new room, for example) and lose it at a rate of



knots when you collide with your environment. The game is over when you lose all power — or when you solve it.

At start-up you have the opportunity to experiment on an abstract set-up — a confi-

dence-sapping experience in my case. You may also select the level of perplexity of the puzzles (from mindboggling to mindstatter).

A real headache inducer, *Ankh* is like nothing you've played before. There's no middle way — you either love it madly or stick it straight under a steamhammer.

Bob Chappell



Rating 8/10

Price £8.95 Publisher Beyond 01-837 3699

SPECTRUM

BATTLECARS



Death Race 2000 on a micro — that's the excellent *Battlecars*. You know you've got a

winner the instant you open the package — two keyboard overlays and a hefty instruction booklet to make your mouth water and your fingers twitch.

Set in the year 2081, with the *Highway Code* flung in the gutter, it's down to you to equip your battlecar and duel to the death with fellow gladiators. Numerous options mean you must take some time over the manual before getting started. The main menu gives you five choices. First up is *Solo Practice* (mastering these monster vehicles takes more than a few spins with BSM) in which you take a few leisurely turns round the track, alone or racing against the computer.

Or you can check out your lap speeds in trial mode. Then there's *Autodrome* for some solo combat against the computer, a simple two-player game and, best of all *Slug City*.



Each battlecar has six steering functions, turning through 45 or 90 degrees to left or right and drifting — handy for corners. There are four fire controls, one for projectile devices like shells, guns, flames and lasers, the others for the 'passive' weapons systems housed in the left, right and rear pods, containing goodies like oil, spikes, mines and smoke.

Firing isn't as simple as it looks, due partly to a limited quantity of ammo, and partly because shots are accurate only to 15 degrees (unless you've a gunnery computer aboard which brings this down to 10 degrees). And of course there

are throttle and brakes — it takes a long time to get used to all this lot.

The display during an *Autodrome* duel comprises five main sections; at bottom left and right the two cars are shown from above, and damaged areas flash orange. To the side of these are fuel gauges, and just above is a speed indicator. Aerial views of each car take up most of the screen which changes colour to give a rough idea of speed. Turning too quickly damages the tyres which further reduces your safe cornering speed. At bottom centre the two cars are shown as moving white dots, so you can

plan engagements ahead of an encounter. When you're hit, the damage display becomes a weapon display of what weaponry is still active, and the damage points to each car. You can stop a bout at any point, such as when your car stops moving and there's an orange blob in the centre of the car — you're dead.

There are eight cars set up, but you have money to invest in a really hot rod, so you can select chassis size, engine type, armament and armour, and even save car specifications to tape for use in later games. And there's some crazy kit — for instance, the auto-steer which increases your safe cornering speed by 10mph.

The *Slug City*, where you battle with an opponent in the streets, take time out for refuelling and repairs (if you can find the pit stops, that is). The graphics and action are tremendous.

It's about time someone came out with an original idea for a computer game. Go out and buy it today, there's so much in it.

Bryan Skinner

Price £7.95
Publisher Games Workshop, 27-28 Sunbeam Rd, London NW10.

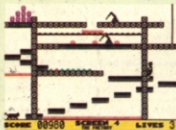
SPECTRUM

CAT WALK

Spectrum games are getting better by leaps and bounds. This one makes the Spectrum look like a Commodore 64, its graphics are so good.

If I say that you start the game with nine lives you'd probably guess that there's a cat about and you'd be dead right.

Your task is to take Snooky out for his nightly prowling, gobbling mice and birds, looking out for tins of cat-food, and steering clear of dogs and humans. Control is configurable, left and right, up and



down, and not jump but pounce, of course.

The first scene is the garden. Here two brutish black mastiffs patrol from left to right and mice scuttle about. Contact with the mice is what Snooky's after, but the dogs are best left alone. You also have to dodge a veritable hail of domestic debris that flies out of the win-

dows of the red-brick houses at the back of the picture. Take out all the mice and it's on to the building site and a different diet.

Here we're into a lift and platform scenario. The construction work is shown as a system of girders, and some cleverly animated brown birds flap and strut about. Watch out for the workmen. They climb rapidly from one level to the next and take strolls about each level.

At the centre is the hoist, and Snooky has to leap onto this to get at the tasty morsels in the upper reaches of the building. Don't fall too far or it's curtains for you.

The graphics are fairly simple, but incredibly well done — very clear, good choice of colours and very well animated indeed.

The only criticism I have is that when Snooky pops his clogs and floats to that great feline rest-home in the sky, much of him seems to get left behind — still I guess it's his spirit ascending, complete with catty halo.

Still, it's not a bad game for the money.

Bryan Skinner



Rating 8/10
Price £5.95 **Publisher** Power Software
0384-370811

COMMODORE 64

HERO

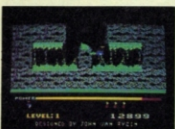
Could Roderick Hero be the man to let the miners live to fight another day? It seems there is trouble at the old mine. A group of miners have been trapped in the labyrinthine mineshafts of Mount Leone by the lava and debris of a hyperactive volcano and super-hero Roderick plans to live up to his name by coming to their rescue.

The trouble is Roderick Hero is a bit like a fish out of water... all his special gear is close by but he needs your guiding hand to point him in the right direction. So plug in the joystick and

away he'll go on his search.

To assist his movement in the vertical shafts and cavernous voids, Roderick has a propeller pack strapped to his back turning him instantly into a human helicopter and enabling him to step into any abyss without hesitation. But this is not all. There's his microlaser beam which he uses to blast his way, although somewhat slowly, through any obstructive walls in the mine, as well as dispose of the 'vile vermin' liberally scattered in the passages and intent on bringing his rescue mission to a premature end.

And there is dynamite, too. Six sticks of it which can be placed at the base of any wall to



effect a much quicker demolition job. But be careful. Roderick, too, can be blown away by the blast and there are only three of him in the game.

A further advantage comes in the shape of heat resistant rafts. These are there to help Roderick effect a safe passage on the white hot lava rivers.

But let's not forget the object

of the game — the miners. Roderick has to locate one on every level before being allowed to move deeper into the mine. The quicker he does it, the more points there are to be had and at every 20,000ft there's an extra Roderick.

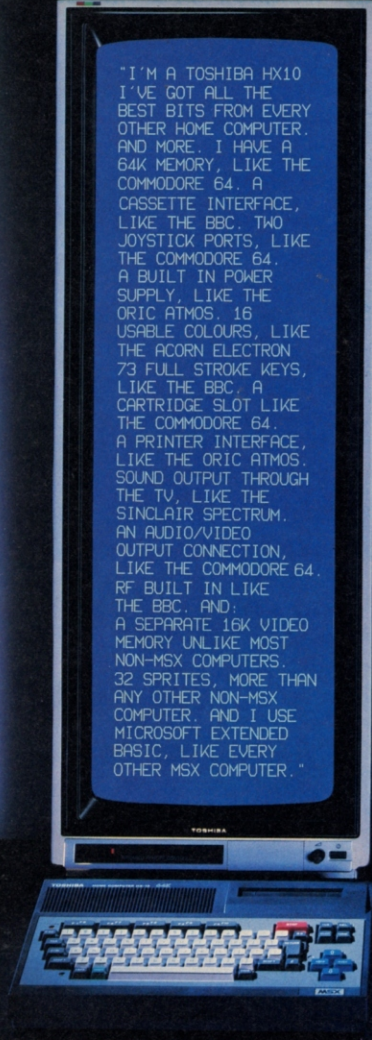
A nice touch is that the instruction leaflet contains six tips for playing the game.

Hero isn't particularly brilliant and lacks that addictive quality necessary for a chart-topper, but it's quite nicely done.

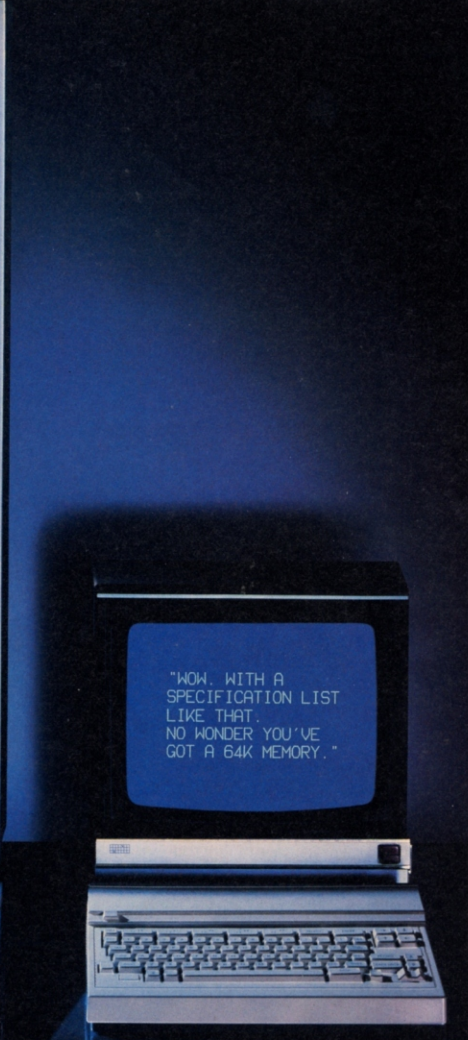
Keith Mason



Rating 7/10
Price £9.99 **Publisher** Activation 0628-72448



"I'M A TOSHIBA HX10
I'VE GOT ALL THE
BEST BITS FROM EVERY
OTHER HOME COMPUTER.
AND MORE. I HAVE A
64K MEMORY, LIKE THE
COMMODORE 64. A
CASSETTE INTERFACE,
LIKE THE BBC. TWO
JOYSTICK PORTS, LIKE
THE COMMODORE 64.
A BUILT IN POWER
SUPPLY, LIKE THE
ORIC ATMOS. 16
USABLE COLOURS, LIKE
THE ACORN ELECTRON
73 FULL STROKE KEYS,
LIKE THE BBC. A
CARTRIDGE SLOT LIKE
THE COMMODORE 64.
A PRINTER INTERFACE,
LIKE THE ORIC ATMOS.
SOUND OUTPUT THROUGH
THE TV, LIKE THE
SINCLAIR SPECTRUM.
AN AUDIO/VIDEO
OUTPUT CONNECTION,
LIKE THE COMMODORE 64.
RF BUILT IN LIKE
THE BBC. AND:
A SEPARATE 16K VIDEO
MEMORY UNLIKE MOST
NON-MSX COMPUTERS.
32 SPRITES, MORE THAN
ANY OTHER NON-MSX
COMPUTER. AND I USE
MICROSOFT EXTENDED
BASIC, LIKE EVERY
OTHER MSX COMPUTER."



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

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

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

It was developed along with other Japanese home computers to operate

on one language: MSX. You can swap programs, games, cassettes, even peripherals like disk drives, printers, and joysticks: they're all compatible with every other MSX computer.

All of which makes MSX the system of the future.

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

TOSHIBA
MSX



Education's a scream down at Spooky Manor.

Acornsoft have a range of education programs that encourage children to think logically and creatively.

And at the same time, they make learning bags of fun.

SPOOKY MANOR: An adventure game for up to four players. Where exploring the creepy old house and solving mysteries involves co-operation and planning. It is suitable for children aged seven and upwards but many adults will enjoy the challenge it provides.

WORKSHOP: An easy to use and completely captivating program. Full of unusual machinery.

By experiment children discover what each of the machines can do with simple geometric shapes. For ages three or over, Workshop encourages highly creative thinking and experimentation.

ABC: A writing tool designed for young writers aged seven and upwards. It is easily operated and quickly understood and before they realise it children will be creating and reshaping their words and ideas.

TALKBACK: Both entertaining and demanding. It allows children to create their own computer 'characters' capable of holding simple conversations on the screen and provides valuable lessons in both English

and computer literacy. For ages ten and over.

All four programs are available for the BBC Micro computer on either cassette (£9.95) or disc (£11.50).

Talkback and Workshop are also available for the Electron on cassette (£9.20).

For your local Acornsoft stockist or to order by credit card simply ring 0933 79300 during office hours. Alternatively you can order the programs by writing to Acornsoft, c/o Vector Marketing, London Road, Wellingborough, Northants. NN8 2RL, enclosing a cheque or postal order. Please allow 21 days for delivery.



ACORNSOFT

GAMEPLAY

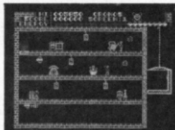
SPECTRUM

BILLY BLUEBOTTLE

Power Software is a new company, and if *Billy Bluebottle* is representative of the standard of the company's games, you'd do well to ask Santa for a sackful.

The game boots up with keyboard/joystick options, but not just a simple menu — the keyboard and stick are drawn, so there's no confusion. Above these icons are three flags, you can select English, French or German, each of which changes the prompts.

Into the game then, with you operating the flying hero, Billy.



The scenario at the first screen is a cross-section through a house and in the basement is a fly, trapped by a rising tide of water. Your first task is to rescue the winged beastie from death by drowning.

You start on the third floor, brick walls terminate the corridor, fly paper hangs between

the green telephone and the yellow vase of flowers, and to cap it all there's a bloke strolling up and down spraying fly spray.

Being supernatural you can push the fixtures and fittings around and temporarily disable the pest control officer, which is just as well as his spray tends to hang around for ages.

On the top floor there's a blue desk, a green kettle and a pot of mouldy old food — just the job to keep a fly's strength up. The trouble is, landing on it skips it down to the third level, so it leads you a merry dance in search of sustenance.

The graphics are extremely

well done — no attribute problems here — and the action's smooth, with the exception of the lift which is a bit jerky. Pity the sound's limited to beeps and chirrups. There are several neat touches — like Billy's colour cycling through the rainbow when he bites the dust, which in my case was every few minutes. It's a very tricky little number, frustrating and so well done that I think I'll just have one more go. . .

Bryan Skinner



Rating 9/10
Price £5.95
Publisher Power
Software 0384-370811

SPECTRUM

JASPER

If you've mastered the jungle and platform-type game, you'll feel at home with this one.

Jasper is a jungle rat who goes on a wild adventure through the swamps avoiding all the beasts of the land, in a bid to find his way back home.

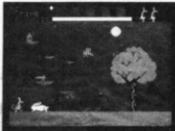
In this cartoon adventure you have 22 screens to plough through — each with its own dangers and problems. The scenery of the first screen is quite good. Bees flutter, spiders bob up and down and a killer rabbit bounces towards Jasper

ready to pounce on him. At the top of the screen is the number of lives you have (you start with three) and there's also a timer.

Controlling Jasper needs clever planning, quick thinking and good keyboard control. There's no single way of getting through the dangers as some screens need to be visited more than once.

To save Jasper from the manic rabbit I pressed S to go right, and then Y to jump over the rabbit. But then I ran into trouble: my friendly rat collided with a deadly spider and a wasp, and lost his three precious lives.

I tried another strategy — this time Jasper went left on to



the next screen — jumped over a leopard and skillfully grabbed an apple and traversed towards the riverbank. With the leopard pacing up and down I didn't have a lot of time to get Jasper across.

So I adopted some long-jump tactics. Going quickly up to the riverbank, I pressed Y for jump

then grabbed a rope dangling above the river and pressed B for hold. Then H to climb down the rope, A and S to swing it and when the time was right, I pressed Y to let go and land.

Along Jasper's journey he picks up objects which he can use later. But he can carry only five objects at once. I never got further than the third screen — but there's certainly plenty to keep you going.

Sandra Grandison



Rating 8/10
Price £6.95
Publisher Micromega
01-223 7672

SPECTRUM

AMERICAN FOOTBALL

American Football is quite in vogue, and this version of the game from Softstone isn't half bad. It's very like *Football Manager*, and almost as good.

You can select from five levels of play. The lowest is novice, through group level of the team, coach, and finally the team itself. And don't they have great names — The Huston Oilers are my favourites, with the LA Rams a close second.

There are many options in



the game, checking the team's statistics, changing players' names and so on. Sooner or later you'll want to play a match, and it's here that games like this come into their own. The view is from the side and slightly above the pitch. On a green backdrop, the yard lines marked out in

white, the players get to work. The figures are small and a bit stick-like, but move quite well across the pitch. All the action's here as you pray for your team to make touchdown.

The aim of the game is to coach your chosen team to the Superbowl — the peak of the game, like the FA cup. That could take you some time and careful strategy is needed to keep your team ahead of the competition.

You don't need to have any knowledge of the game because all the action's automatic though it would have been an improvement to have informa-

tion about the game rules, as well as some background — the only instructions on the inlay cover loading the game.

I'm not partial to this type of game, where all the choices are menu selection, or name and price entry, but if that's your bag then you should check this game out. You might even win a sovereign should you come across a hidden message.

Bryan Skinner



Rating 8/10
Price £6.95
Publisher Softstone
01-486 5266

COMMODORE 64

ANCIPITAL

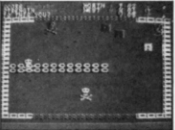
Oh, weird! Like, this game from Jeff Minter, the *Lord of the Llamas*, is really heavy, man. Let me lay it on you — this one's megafreaky with a capital M. When you play, shake off the sand from your Polaroid shades and put 'em on; the strobe effects make *Top of The Pops* look like dinner by candlelight.

Ancipital is the name of the goat/human creature that first appeared in *Sheep in Space*. Beautifully animated, it roams a number of chambers, blasting away at the bizarre inhabi-

tants. As befits the way-out nature of the game, Ancipital can fly skywards to walk upside down on the ceiling as well as up walls and (dullsville) along the floor.

Music and messages are broadcast while the game loads and a demo mode hints at the lunacy to come. While you battle with the forces of freak, a steady drum beat thumps and the screen is filled with light, colour and action.

Each screen-sized chamber has walls that pulse, glow and do alarming things. A host of unique weirdos occupies each room. Forget about your boring old bomb-dropping aliens,



these creatures are far out. The first room has malicious flying Granny Smiths and I'm not talking about OAPs: apples are the enemy, turning into cores when shot . . . with bananas.

It gets heavier. There are furious floppy disks that must be bombarded with cassettes. Guinea pigs savage your ankles

when fired upon. There are army boots, tube station signs, guitars, camels (of course), skulls and crossbones, rats, nuts (but not bolts), pyramids, pound signs, goats and all manner of other Minteresque oddities.

Weird and wacky, this latest piece of psychedelia from Llamasoft will have you giggling.

It's a hit, man.

Bob Chappell



Rating 9/10
Price £7.50
Publisher Llamasoft 07356-4478

You've just thought of a great idea for a new game, you can already hear the tinkle of the money falling into your bank account. It's then you realise your programming isn't up to the standard needed to produce the game yourself. Well, help is at hand in the form of Mirrorsoft's latest release, *Games Creator*.

All the drudgery associated with programming has been removed and through this menu driven program you can define your own background, sprites, music and even the type of game.

With some other games creators you are extremely limited in the type of game you can produce. This is not so with Mirrorsoft's designer, as the demonstration programs show.

First impressions

The best way to evaluate a product such as this is to see some of the games that have been developed using it.

When the *Games Creator* has been loaded into the machine a game called *Bouncer* is present in memory. *Bouncer* is a fairly standard platform game in which our hero Hoppy has to collect keys while jumping over aliens and obstacles. In this game the aliens consist of an elephant, a dalek and a boot, all of which are well animated and colourful. Movement is quick and as smooth as you have come to expect from a Commodore game.

Two other games are included in the package. *Hawk Patrol* is one of those space games that has a scrolling landscape. Harry the hero can move backwards, forwards, up and down in order to rid the skies of the gun ships which appear from the left and right-hand edges of the screen.

The second game is *Snake Pit*, a standard maze game where you must avoid the monsters while trying to reach the exit. The background scenery is particularly impressive — the walls have a 3D aspect to them. All of the

BIG GAME HUNTER

You've had a brainwave for a great game. But, there's one slight problem — you haven't got the programming skills to put it into action. Stuart Cooke says *Games Creator* will put you on the right track.

games are accompanied by jingles and impressive sound effects.

You wouldn't want to pay a fiver for any of these games but they do demonstrate exactly what it is possible to produce with a little thought and effort.

Documentation

Unfortunately, the documentation supplied with the package is sparse. The 28-page manual is clear and every option provided has a section to itself. It doesn't, however, go into enough detail and there are no examples. This is fine if you know a little about how your Commodore 64 works but if you are new to computing then you may struggle. A games designer should enable everyone to produce games easily.

In use

Once you understand what's needed to set up in order to play your game then

design is easy. Choosing scenery from the main menu allows characters to be designed that will make up the background pieces.

There are three sets of characters: characters that you move over; those that block your way, and those nasty ones that kill you. The Sprite option allows you to design the sprites for the missiles, the monsters and your player. For this you simply select a colour for the relevant squares on your sprite.

The music menu allows you to type in your tunes and select from a number of predefined instruments, such as piano and guitar. The tune will play during the game or just when you finish it.

The movement and rules menu are what actually set up the game. From these menus you place your sprites on screen, define how they move and their movement boundaries.

Again, this is easy once you understand what is needed, otherwise you'll probably find yourself going round in circles.

The manual suggests you alter the provided games before developing your own — a good idea as it will demonstrate exactly how all the options work.

Verdict

Games Creator is a very good product. You're not limited to one type of game and you can very quickly produce a good quality one.

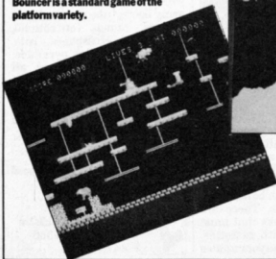
If you think there's a budding games designer in you then go out and buy this and find out for sure. ▶

REPORT CARD: 1 TO 5

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

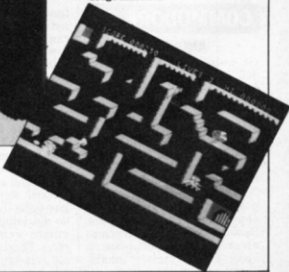
Product *Games Creator* Price £12.95 Publisher Mirrorsoft 01-822 3800

Bouncer is a standard game of the platform variety.



A scrolling landscape is the backdrop for *Hawk Patrol*.

Snake Pit — a maze game where you dodge monsters.



FORGET SOFTWARE THINK TOUCHWARE



Simon's Shapes



Simon Says



MultiSound Synthesiser



Dick's Diamonds



Strategic Command



Othello



Graphics Editor



Simply Simon

An expanding range of totally new Touchware is now available for Touchmaster (software houses throughout the UK and Europe are continuously adding to it). Due to the enhanced concept behind both Touchmaster and its Touchware, they combine to expand your use of the computer - dramatically and easily.

Experience the expanding range of Touchware - Arcade Games, Graphics packages, early education programs, Synthesiser, Board Games.

They all take on a new dimension with Touchmaster - some examples are shown above.

But they only hint at what you can do when you come to write your own programs with Touchmaster.

Complete and post the coupon for more details. Or telephone Teledata on 01-200 0200.

Now anyone can master the home computer
TOUCHMASTER



Touchmaster Limited, PO Box 3,
Port Talbot, West Glamorgan SA13 1WH.

More details on Touchmaster and Touchware please.

Name _____

Address _____

Post Code _____



HARDY



OR NET

Using an isolated personal computer in the modern office is rather like using a megaphone to telephone.

The multitude of tasks and diversity of communications calls for a radical new approach.

Logica Networked Office Automation Systems.

Logica Networked Systems are revolutionising working procedures by enabling users to pool resources.

Groups can now work together from consistent data, sharing information and expensive hardware.

Logica offers two comprehensive systems which can be tailored to the needs of all companies.

The Kennet Business Computer and the Polynet Office System.

The Kennet Computer is a powerful multi-function workstation with advanced hardware architecture and a diversity of software.

For the first time, the Kennet range allows personal computer users to reap all the benefits of local area networking.

The Polynet Office System, based on Logica's own high speed local area network, is a total system including all the hardware and software for text processing, data processing and communications.

Its sophisticated network management service also facilitates the sharing of extensive resources such as file storage and printing.

WORK.



TWORK.

The benefit of both systems is that neither is confined to specialised groups such as Accounts or the typing pool.

Both can be used effectively by casual users as well as professionals.

You can start with a single Kennet Computer or cluster using one processor to drive several screens.

Or a Polynet Office System designed as a stand-alone advanced word processor.

And since both systems use local area networks, you have a smooth upgrade path for flexibility and growth in line with your needs.

What's more, there is no need to buy different equipment for different jobs (personal computers, word processors, terminals etc.).

To talk shop, dial our 'user-friendly' hotline on 01-637 7761.

Or alternatively, write to our office automation team at 84 Newman Street, London W1A 4SE.

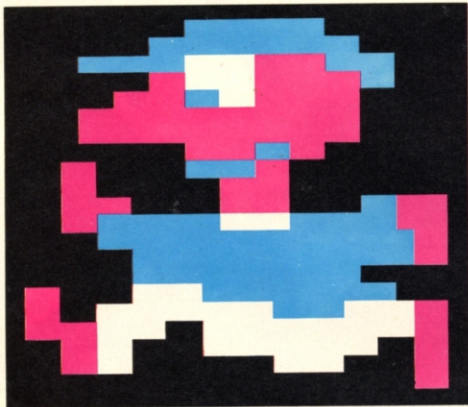
Logica is Britain's leading independent software, consultancy and products company.

With subsidiaries in eight countries, we know all about networks.

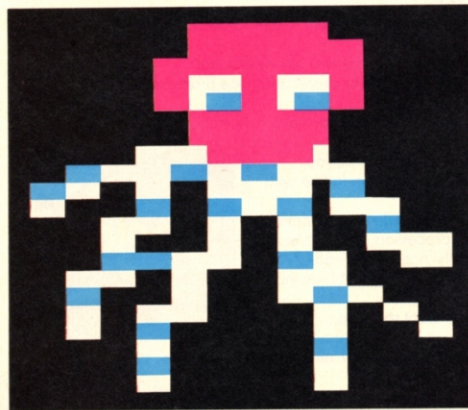


See us at COMPEC, Stand 613/712.

Make new friends,



and enemies.



With Mirrorsoft games, you can make loads of new friends like Mr. Bounce and Caesar the Cat. Or, now, like Dr. Frankenstein, you can create your very own monsters and aliens. As well as friends and heroes to defeat them.

GAMES CREATOR

Invent your own games. As simple or as complex as you care to make them. The only real limit is your imagination.

For the CBM64, the Games Creator comes with a step-by-step manual and three ready-to-play games. Each demonstrates some of the programs exceptional features: shapes, movement, speed, scrolling backgrounds, scoring, music, sound effects and many more. And you don't need to know any program language to work it.

On fast loading cassette for the CBM64. £12.95.

STAR EGGS

A space fantasy. Earth is threatened by attack from Alien life-forms hatching out in space. You must first overcome the Guardians. Then into the Hatchery up and down escalators and ladders to crack the eggs before the aliens escape.

On fast loading cassette for the CBM64. £6.95.

CATASTROPHES

Use a helicopter to build a hotel on an island paradise. But you have to move fast and design your building carefully because earthquakes, floods, storms and lightning can strike at any moment.

For one or two players. On fast loading cassette for the CBM64. £6.95.



HI-BOUNCER

An arcade type game featuring Mr. Bounce and the Mr. Men. But don't get the idea that it's just a kids' game. Far from it. There are four main screens each with eight levels of difficulty and complexity. Don't worry there's also a practice program with slower speeds.

On cassette for the BBC B. £6.95.

CEASAR THE CAT

Cesar's cute and quick. Help him hunt the crowded shelves for mice who eat all the food. He must catch the mice before the food disappears. Outstanding graphics, animation and sound.

On cassette for the CBM64, Spectrum 48K, BBC B. £6.95.



MIRRORSOFT

SOFTWARE FOR ALL THE FAMILY

Available from Boots, W.H. Smith, Spectrum and all good software stockists. Write for a free catalogue to: Mirrorsoft, Holborn Circus, London, EC1P 1DQ.

HIGH C

David Janda hits the high notes with Hisoft's version of C language for the Spectrum.

The language of the '80s is C. At least, that's what the pundits would have us believe, and judging by the amount of publicity it's getting, this could well be the case.

C is usually associated with minicomputers and micros running CP/M, CP/M86 or MSDOS. But now Hisoft, which produces an excellent Pascal for the Spectrum, has released a version of Spectrum C.

The C language is a general purpose, high-level programming language that can be used for a wide variety of programming tasks. Many software houses use C instead of assembly language, because C object code is fast and saves costs.

The other attraction is its portability — a program written in C on one machine can be run on another, providing both machines use compatible Cs (there are dialects of C but the differences are often unimportant). Hisoft's C conforms closely with the definition given in the C programmer's bible — Kernighan & Ritchie's *The C Programming Language* (often abbreviated to K&R). After learning C with Hisoft's version it would be possible to progress to a Unix-based system without too much trouble, and you could run programs written on your Spectrum on a DEC VAX, or vice versa.

Features

The package consists of a tape and manual. On one side of the tape is the C compiler/editor and a front-end program which allows a backup to be made. On the flip side is a standard C function library containing functions for dealing with I/O string, store management and so on.

While Hisoft's implementation is very close to the K&R standard, there are exceptions. The two most notable are that there is no floating point feature, and you can't use identifiers.

Included in the package is the line

editor used in Hisoft's Pascal and Dvypac. Source code can be entered and amended, saved to tape or Microdrive, printed and so on.

Although the compiler and editor are separate, they're loaded into the Spectrum's RAM together. This means that program development is quicker because the two are always resident. Error messages are abundant, and for each an error number is displayed with a brief description. A neat feature is that the error messages can be cleared from memory, just leaving the number; this frees about 2K, and it's easy enough to look up the error meaning in the manual.

Version 1.0 does not allow object code to be run independently of the compiler, but this will be possible in the next version. This will also feature identifiers, and floating point routines are being considered.

In use

The best method of getting to grips with this package is to keep a copy of K&R close to hand. It's a bit pricey at £16.95, but it's essential because Hisoft's manual is written with dozens of references to it. Cross referencing between the two isn't difficult.

The first thing I did was to make a working copy of C on Microdrive. Once the compiler/editor is loaded from tape you're asked whether you wish to make a backup and a single key press will do the job. Unfortunately, this process doesn't also backup the library and I hope Hisoft includes this in future versions.

Entering source code using the line editor is straightforward. It's comprehensive and includes a full set of useful functions, such as search and replace. Source code can be entered directly, but is not recommended for large programs because mistakes cannot be rectified.

One non-standard feature I took a liking to was the ability to use commands in an immediate mode, similar to that of Basic, which allows you to 'test the water' without diving in.

What is C?

The C programming language was developed by Dennis Ritchie on a Unix system running on a DEC PDP-11. It is very much a 'bare bones' language with no inbuilt I/O, string handling or array functions. These are achieved by using routines from function libraries. This system might seem odd, but it has the advantage of making the language compact and due to the minimal set of commands and functions it can be learned quickly.

Fundamental data objects are provided by integers, characters and floating point. Control constructs include IF, WHILE, FOR and DO and there's a case-like statement called SWITCH.

C promotes the use of memory pointers, and address arithmetic is allowed. The result is that although C is not very strongly typed, it is possible to create data types quite easily.

Verdict

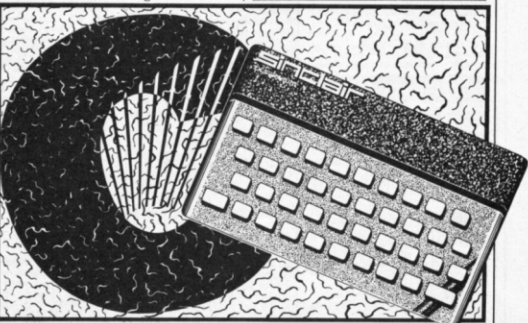
Hisoft C is an excellent tool for learning the language, and an important product for the Spectrum. The lack of floating point and identifiers is no hassle if you're learning the language, but I hope floating point will be included in later versions as integer maths is restrictive.

C is a mega-product for the Spectrum, but £25 is quite costly. Ten pounds less and more would buy it. However, to learn C on another machine you'd have to lash out somewhere in the region of a thousand pounds for the kit and a decent compiler.

REPORT CARD: 1 TO 5

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

Name Hisoft C V1.0 System 48K ZX-Spectrum (Microdrive compatible) Publisher Hisoft, 180 High Street North, Dunstable, Beds LU6 1AT 0582-696421 Price £25 Availability Mail order only



Acorn

BBC B wanted, good condition, plenty of software, all offers considered. Under £300. Tel: Middleburgh (0642) 597597.

Wanted BBC B OS 1.2, Basic II + DFS and disk drive if possible. Other extras considered. Tel: John on Redcar (0642) 484785 after 5pm.

Acorn Electron plus 1 as new in box, plus books and 26 software titles. Worth £530 sale £399. Also please collect. Tel: 0272 839926.

Assembly Language Programming for the BBC micro computer (book), £5 one, Tel: 01-291 2327 after 6pm.

For Sale: BBC software, Hobbit, Furthest Liberator, Battleground 2000, Roman Empire, Micro Olympics, Desk Diary, The Synth, Football Manager, Confrontation, 3D Tank Zone, etc. Tel: (0962) 883971.

Electron box guarantee, Quick Shot 1 games, 6 books, joystick, interface, all leads, mag. All for £250 one. Tel: Leon, 01-870 1894.

BBC 1.2, 1.2 Cumana disk drive, Solidisk 32K, sideways RAM fitted. Five months' old, £575. Tel: Basingstoke 5523.

BBC Prism acoustic modem + ROM software for sale, £35 one. Tel: Giuseppe, 01-672 4212.

BBC B software 10, swap or sell, including Micro Olympics and Overdrive. Tel: Trevor, Stevenage (0438) 313797.

BBC Soft sell, Hobbit - £7.50. Space Shuttle, Pinball Arcade, Five Spheres - £5. Incredible Hulk - £5. Zalaga, Starship Commander, Secret Mission - £4.50. Tel: Chris, 01-550 0806.

BBC Microcomputer 32K RAM, Watford electronics disk interface, 100K disk drive, 14 inch colour monitor and software. £750. Tel: Brighton (0273) 25155.

BBC disk software - Gemini word processor, 114. Rocket Raid, £7. On tape - Philosophers Quest, £6. Snapper, £5. Twin Kingdom, Valley, £5. Hunchback, £4. Swamp, £4. Also Acorn Atom software. All original. Tel: Mark, 0656 870264.

Acorn Electron, As new, all leads, user guide, cover etc in original box, £160. Tel: Reading (0734) 864070 (evenings).

BBC software packages (original titles), Acornsoft, £2.50 each. Micro Power, Software Invasion + others at £2 each. All 19 only £35. Tel: Richard, 01-236 6640.

BBC originals to swap in Cylon Attack, Chuckie Egg, Daredavid Denis, Twin Kingdom, Scott Adams Adventures, Snapper, Partridge, Furthest disks. Tel: Julian, Harrogate (0423) 68383.

Wanted: BBC B OS 1.2. Must be good condition, plenty of software, around £300. Tel: Middleburgh (0642) 597597.

Wanted urgently: Acorn Electron for cash or swap for Spectrum £48K with loads of software for sale at £105. Tel: Bolton (0204) 31668.

Wanted, Sinclair ZX Microdrive's, no interface included. Tel: 029-575-627 or 029-575-8231 any time after 4.15pm.

Wanted Sharp XE-6000 with discs, please state price and condition. Irvine 1011, Petunia Crescent, Chelmsford, Essex

Amstrad

Swap Adventure Quest for any other level 9 adventure for Amstrad. Also Roland in the Caves or sell for £5. Mr A Hagger, 60A Harrold Rd, Hull U5 4LJ.

Amstrad CPC464 computer 64K (see all reviews) plus Toshiba music centre, 25 wats per channel. Both fairly new, exchange for BBC computer. Tel: 0900 6214 or 71 Senhouse St, Worthington, Cumbria.

Amstrad CPC464, one month old with colour monitor and software. Will sell for £290. Tel: 01-558 3646 after 7pm.

Amstrad CPC464, colour monitor, Hunter Killer, Codename Matt. All boxed, only one month old. £280 one. Tel: 01-958 6769.

Wanted: Amstrad GT64, green screen monitor. Will arrange for collection. Tel: 0400 61075.

Apple

Apple Macintosh, 3 months' old with swap. Macwrite/Magical Offers? Tel: Alan, Coventry (0203) 78649 (evenings and weekends).

Apple II, Complete 64K RAM system. Diskdrive, PAL encoder, CPM software, 250K software manual, 1-year-old offer. £550. Excellent condition. Write, Luke, 56 Park House, Seven Sisters Rd, London N4 2LS.

Apple software, Wordstar/Mailmerge, Multiplan, VisiCalc, Information Master, Database, Artist Designer, Also MX80 and Anadex printer ribbons, Apple books. Tel: David Bromley, 0754 866372.

Atari

Wanted Atari 800. Tel: 0904 791067 after 6pm.

Atari 400, 48K, cassette drive. £500 worth of best games including Buck Rogers. Also magazines, joystick. Worth £700. Bargain £200. Tel: Alan, 0904 791067.

Atari 1050 disk drive for sale. Only £150. Tel: 061-792 6766 after 5pm.

Atari 48K 400 computer plus 1050 disk drive. £250. Or swap for good condition. BBC Model B computer. Tel: 061-792 6766 after 5pm.

Atari 400 48K, 410 recorder, joystick, games, Basic, manuals. £140. Tel: Chelmsford (0245) 269300.

Atari 600 XL colour computer plus Atari 1010 tape deck. As new with packaging and full instructions. Ideal Christmas. Tel: Bedford 44060 after 7pm.

Atari ROMs disks and tapes to swap, very good collection. Especially wanted: new-style Atari joysticks and Track Ball. Tel: Bedford 44060 after 7pm.

Atari software for sale or swap. Encounter £5. Bruce Lee £7.50. Tel: C. P. Jones, Herne Bay £7903 anytime.

Atari software for sale. Daeling Dragon, Airstrike, £4. Crossfire, £6. Zaxxon, Wizard of War disks, £12. Also swap disk software. Tel: Scunthorpe 845252. Ask for Stephen.

Atari software for sale. Disk, Necromancer, Zaxxon, Poygan cartridges, Miner 2049er, Dig Dug, Don Kong, Pole Po, Choplifter, Centipede, Pac-man, £10 each, Basic language, £15. Tel: 0727 23109.

Atari software for sale. Star Warrior, Star Trek, Galactic Chase, Preppie, Caves of Death, £5 each or the lot for £20. Tel: Canvey Island 696601.

Atari software to sell and swap. Hundreds of the very best programs available. Tel: Tamworth 51394 and ask for Fox.

Atari VCS. Boxed in excellent condition (three months new). Four cartridges, including Pitfall II, Space Shuttle, Frostbite. Only £50. Tel: 01-724 2240 after 7pm.

Atari Analog and Antic magazines wanted. Pay £1 each. Sell for £3 each. 16K, cassette recorder, Basic cartridge, books, software, joystick. £120 one. Tel: Brighton 513671.

Atari software for sale. Combat Leader, £10. Paris in Danger, £10. War in Russia, £25. Carrier Force, £20. All in one. Tel: 01-941 6163 after 6pm.

Atari VCS for sale. 17 top games including Defender, Indy 500, joysticks, paddles, keyboards and driving controllers. £36 one. Tel: Weybridge (0932) 55203 (evenings and weekends).

Atari 400, 32K, 1010 Data Recorder typewriter-style keyboard. Five cartridges including Basic, Pole Position, Defender. Tel: 01-558 3646 after 7pm. £150 one. Tel: 0272 45958 after 6pm.

Atari VCS for sale. Including 17 games including Defender, Indy 500 etc. Also includes joysticks, paddles, driving, keyboard controllers, game sets. £90 one. Tel: Weybridge (0932) 55203 (evenings).

Big Deal

Commodore

IBM £250 dual disk drive, £490 or will swap for a good CD player + cash. Tel: 021-440 2124.

Commodore 9032 business software: VisiCalc, Wordstar 80, Oz (database) all as new with manuals etc. £400 or split. Tel: 0272 567916.

Vic 20 computer software, 32K RAM cartridge, £20. Tapes, £2. Magazines. Tel: Uxbridge 65881 (Middx).

Vic 20 starters kit, 16K rampack, 2 cartridges, chess, Adventureland, 62 games inc Jetpac, Maths 1 plus joystick. Sell £130. Tel: 01-671 0768.

Vic 20 16K Quickdisk, joystick, Basic intro (1), C2N cassette, books, manuals, games tapes, games cartridges. Total £250. Tel: 061-220 2183.

Vic 20 software for sale, new Vicgraf cartridge. Excellent for studying complicated equations and functions by their graphs. Only £17. Tel: 061-881 8091 after 6pm.

Vic 20 C2N cassette, guaranteed, 16K switchable RAM, educational software, games, books, £220. Tel: B. Barnes 021 651 6783.

Bargain! Vic-20, 16K, super expander, C2N tape deck, joystick, programmers reference guide, Jet-Pac, Gridrunner, Charriot Race, Mythical Five cartridges, 6 months' old. £120. Tel: 01-267 0465.

IBM 64 Commodore printer, C2N cassette, printer, paper, joystick, PRG, m/c book, m/c tape assembler, Hobbit, International Soccer and more + mags. £380. Tel: Luton 424715 after 5pm.

Vic 20 software for sale. Various adventure and strategic games for unexpanded and expanded computer including top names like Anirog. Tel: 780295. Ask for Peter.

IBM 64 software. To sell or swap. Includes many American titles. Tel: 0633 852575 after 4pm and ask for Peter or Julian.

Vic 20 games, £4 each. Crazy Kong by Anirog, Galactic Abductors, Andes Attack, Scramble by Anirog. Tel: Northall 477.

Vic 20, games. Trader 55. Colonel's House (Rabbit) £2. Gorf £5. Krazy Kong (Software City) £2. Parashot's Tomb £3. Panic £2. Tel: Northall 477.

Vic 20 games. Race Fun (Rabbit) £3. Tornado £2. The Lair £2. Spiders of Mars (Audiographic) cartridge £5. The Dungeons £3. Tel: Northall 477.

Vic 20 games. Outback, £2. 3-shot Motherboard, £15. Stack light rifle and three games, £15. Reference guide, £5. Tel: Gary, Northall 477.

Vic 20, 1-shot Motherboard, £15. Stack light rifle plus 3 games, £15. Reference guide, £5. Mission Impossible, £5. Mastermind, £5. Tel: Northall 477.

Vic 20 software to swap tapes with Sweden? Many turbo-loaded games. Send list to: Bo Isborn, Hedhamregatan 10d, S-82100 Bollnas, Sweden.

Vic 20 games. Available under guarantee. C2N recorder, manuals, Spectravideo, joystick, games including Hobbit, Camels, Falcon Patrol, Grandmaster. Sell for £275. Tel: Stephen, 01-929 0077.

Wanted Vic programmers ref guide, £3. **IBM 64**, software, 1/2 rd list paid. Intro to Basic 2, 1/2 rd list. Tel: 01-262 7856 (evenings).

Vic 20 games. All originals. Trax 44, Jetpack 44, Wacky Waiters 42, Catcha Snatcha 42, Mission Mercury 44, Alien (Canada) £5. Blitz 1.75. Tel: Doncaster (0302) 845025.

IBM 64 software to swap. Pitfall, Decathlon, Beach-head. Any two for the Quill. Snowball for any other level nine adventure. Tel: F. Brown, Glasgow 04574 66125.

IBM 64, d/drive, CPM (Z80), Imprex Centronics interface, two cassette decks, back-up copier, hex, RS232C interface, Modem software, books, tapes, disks, cartridges, £500. Tel: P. Lee, 061-789 5445.

Commodore 1525 dot-matrix printer for use with Commodore 64. Cost £230. Excellent condition. Best offer accepted. Tel: 01-444 5499.

Commodore 1525 dot-matrix printer for use with Commodore 64. Cost £230. Excellent condition. Best offer accepted. Tel: 01-444 5499.

Commodore 64 with tape recorder and over £100 worth of software and Quickshot II joystick and an extended two-year guarantee. £310 one. Tel: 031-581 1111.

Commodore 64 C2N cassette recorder, joystick, 4 games, O' level physics, Laser Zone, Space Pilot, Chinese Juggler, magazines, all £180. Tel: 01-267 0465.

Vic 20 16K, Super Expander, C2N Deck-five cartridges, brilliant games: Jet-Pac, Charriot Race, Gridrunner + loads. Offer under £110. Tel: 01-267 0465.

32K 4000 Series Pet 12' screen computer, with cassette CBM 4022 printer, excellent. £545. Tel: Waterloo 267189.

Vic 20 16K, cassette recorder, joystick, £120. Software, Programmers Aid, Introduction to Basic. Read all in original boxes. £121-454 0234, 4.30pm to 7.00pm. Hurry!

Vic 20 plus cassette recorder, 8K RAM pack, cartridges, cassettes, books, tapes. £250. Tel: Basingstoke (0256) 59336 evenngs.

Vic 20 Data Recorder, Intro to Basic, various manuals and games tapes, m/c book, £250. Offers around £80. Tel: 0632 665780.

2001 PET with lots of software and sound-box for sale. Tel: (0271) 870125, after 6pm.

IBM 64 programs to swap of sell. Many titles including American. Write to Stephen, Fearon, 22 Westminster Lawns, Kinxton, Dublin 18, Ireland. Dublin 885634.

IBM 64 software to sell or swap: over 100 American titles including Hes-games, Karate, Diskos or tapes. Send list to: Peter, 1000, 1000, 1000, Latchford, Warrington, Cheshire.

IBM 64 C2N + 21S of software and books. Bargain at £220. No haggling. Offer under £53. £41 ext 281 Tony, daytime.

Vic-20 C2N cassette unit, battery backed 8K, 3 slot motherboard, can hold 80K on tape. Gorf + Farth cartridges etc. Offers over £100. Tel: Halesworth 2689.

32K Vic-20 cassette recorder, Honifield assembler, Intro to Basic, joystick, d/ustover, £85. Software, £22. Books, dozens of magazines. Offer £185. Tel: Peter. Magador 832479.

Lynx

LYNX48K c/w cassette deck, games, books, user mags and newsletters, £100. Tel: (0454) 41361. Lynxjock.

Lynx software for sale. Many original tapes at half price. Also Lynx joystick and joystick interface for £15. Tel: 0323 24921 ask for Gavin.

Lynx 48K complete perfect condition. Includes software, Intro Mine and Power Blaster games. £170 one. Tel: Maidstone 0622 666535.

Dragon

Dragon 32 excellent condition, over £100 software, d/ustover, joysticks, magazines, books, cartridges. One careful owner. £200 one. Tel: Oaka-moor 0638-702857.

Dragon 32 software for sale. Sprite Magic £7, Cyrus Chess cartridge £8, Ugh 8 ball, Scramble Pettigrew Diary £3 each. Par Microed Joysticks £5, Mr A Hagger, 60A Harrold Rd, Hull U5 4LJ.

DRAGON 32 2 joysticks, premier micro-royist, sprite graphics board (16 colours). Books, software. £170 one. Tel: Hove 0303 666666.

DRAGON 32 with voice synthesiser, still boxed with manual. 64 games, two joysticks, 3 books, d/ustover, Dragon decks, back-up copier, hex, RS232C interface. Bazzard. All £200. Tel: 01-946 1434.

FOR SALE Buzzard Bait for the Dragon 32/64. Unwanted price, brand new. £7. Tel: Chris, Ludlow (0584) 429.

Dragon 32, disk drive, 2 joysticks, spare disks, software including telewriter **WTP**. All leads and cassette recorder £230 ono. Tel: Nigel on 01-485 1383 will split package.

Dragon 32 with joystick, Compuserve hi-res cartridge, software and books. £20 ono. Tel: Stoke-on-Trent 0782 721491.

Dragon 32 Dragon disk joysticks books tapes. Also T199-4A with speech many cassette tapes and cartridges including parsec speech editor 0203 443062 after 6pm.

Lynx 48K in good condition with manual, user and computer magazines, software, leads, power supply and introductory cassette. £130. Tel: after 5pm (0761) 412668.

Lynx 48K complete with manuals, introductory cassette, plus eight games as new all for £75. Tel: Billercy (02774) 57485 anytime.

Lynx 48K manual handbook all leads, tapes and magazines £130. Tel: 0904 37690 after 5pm.

Lynx with books, manual, leads, joystick interface and over 360 software including Snowball, Invaders, Spannerman. Sell for £150. Tel: Keith, Chichester 528595 (evenings).

Lynx 96K, parallel printer interface and manual printer lead, compatible cassette recorder, manuals and user magazines, plus software, £200 ono. Tel: Sheffield (0742) 306319.

Lynx 96K in excellent condition. Boxed with leads, manual etc, and £25 worth of software. £200 only. Tel: 01-303 2483 (eves).

Oric

Oric 16K, Oric printer, cassette recorder, all leads, also Mushroom Mania and The Ultra. Sell for £110 ono. Tel: 01-368 8468.

Oric-1 48K, compatible cassette recorder, also manual 6502, machine code book, The Ultra and Zorgon's Revenge. Cost £195, sell for £90. Tel: 0204 852451 (Bolton).

Oric software, for sale. Great, ditka, Kong-Loki, Oricak, Back Gammon, Oric-Lunch, £4 each. Xenon 1, Zorgona Revenge, £5 each. Lot £25. Tel: Leigh Sinton 35224.

48K Oric Atmos - boxed, excellent condition - Sanyo cassette player + lots of software worth £60+. Cost £280, will sell for £125. Tel: (01-876) 4332 (eves).

Oric 1/Atmos games for sale or swap: Hopper, Ultra, Electro-Strom, Two Gun Turtle and Frigate, £3.50 to £4 each. Tel: (0242) 527210, ask for Matthew.

Oric 1 48K plus manual, leads, 20 games including Zorgona Revenge Xenon 1, bargain at £1.00 worth over £250. Tel: Bolton 591736.

For Sale, 48K Oric/Atmos micro, Hi Quality tape recorder, magazines & £50 worth of software. All for £165. Tel: Taunton 73588.

ORIC Atmos 48K, over £100 software, several books, £120 ono. Tel: 01-399 5523 after 6.00 pm.

Oric 1 48K excellent condition plus £140 software including Zorgona, Xenon, Hunchback, Wuffy etc. Manual and books included in price of £140. Tel: Cannock (Stamps) 78633.

Sharp

Sharp M290K, WP, Visualca, etc. matrix printer, cost, £875 as new, accept £475. Tel: 0480 57371 Julia Mejer daytime.

Packet Computer, Sharp PC-1211 plus CE-121 cassette interface plus much software, books and information. Includes games, utilities, application software. £60 inclusive! Tel: 01-654-2582 (Paul).

Sharp PC1245 computer CE1245 printer/micro - cassette (built-in) interface, machine code manual, software, instruction tapes. Boxed excellent condition. £130. Tel: 01-521 1058.

Spectrum

Spectrum 48K, Quickshot 2 joystick plus interface, 22 original games, Valhalla, Hobbit, plus 5 Spectrum books worth £230, sell £230. Tel: (0425) 57409 after 6pm.

Spectrum software 5 games + original keyboard + new power pack swap for Currah Swap - Tel: Penicuik 71322. McHugh, 44 Namur Road, Penicuik, Midlothian.

Spectrum 48K Cheeta keyboard, machine code manual, software, Kempston Sinclair joystick interface, Fullerbox software, £230 or will swap for Commodore or Amstrad. Tel: Chichester 44063.

Swap VTX5000 Modem for Spectrum keyboard also software to sell/swap (originals). 36 The Riggs, Avchermuchy, Fife, FT14 7DK.

£5 first offer over £350 secures must sell soon, also parallel interface £40. Tel: Tony 01-578-7704 after 7pm.

Spectrum games Arcadia, Escape, Ghost Town, Kong, Meteor Storm, Orbiter, Roman Empire, Eye of Star Warrior, £120. R.A. Kidd, 20 Buckfast Close, Ipswich, Suffolk.

Spectrum software for sale all originals at half price. Send see list. Wanted Alphacom Printer. Ann Woods, 73 Alcester Road, Moseley, Birmingham.

Spectrum software to swap/sell Valhalla, £8, Doomsday Castle, £3.50, Avenger £2.50, Brax Bluff, £4.50, Xenon 1, Robert Alberici, 5 Wentworth Close, Chichester, W Sussex.

£5 worth London N30.

£5 worth London N30.

£5 worth London N30.

£5 worth London N30.

Spectrum 48K ZX printer Kempston joystick, software, blank tapes, floppy records, £180 ono. £3 Plumtree Rd, Thorngumbald Nr. Hull. Tel: Keyingham (0964) 6038.

16K ZX81 complete with typewriter style keyboard, manual, books, and software including 3D Monster Maze and Mazogs. Only £50. Tel: Basildon 27254 after 6pm.

Sinclair QL complete with software and manual. Unused, 3 months old, offers? Tel: Ian Ferguson 01-641 3500 Ext32.

SPECTRUM 48K, (mint condition, +28 chart games worth £250, + joystick interface, yours £160. No offers. Tel: 01-370 5042 eves and weekends.

48K SPECTRUM, Saga keyboard, Spectra sound, ZX printer + paper, Interface 2, tape recorder, handbooks, software, books all as new, bargain, £160. Tel: Luton (0582) 38016.

Spectrum Software - Warlock plus book £6, Valhalla £10, Hurg £10, Trans Am £3, Hunchback £4.50, Chess £2, Flight £2. Tel: Watford 43114 (10-10pm) Mon-Sat.

16K Spectrum with over £100 worth of software, plus lots of mags and couple of books for £85. Tel: Matthew, East Grinstead 25245.

Spectrum 48K, 6 months old vgc, some software included, £100 ono. Tel: Wendover 623497.

Spectrum with interface one, RS232 lead, ZX printer, Hi-Soft Pascal and Devpac, B/W TV, £155. Tel: 0274-873935.

Z1 Microdrive and Interface, 1 plus four cartridges and Microdrive book, cost £125 will sell for £75. Tel: 01-556 1841 (London 110).

Swap Spectrum 48K, tape-recorder, joystick - interface, over 50 games dust-cover, board for a Commodore 64 + C2N-cassette or sell for £240ono. Tel: Slough 70288 after 6pm.

Z1 X1, 16K, £30 of games, manual + mags, adaptor, leads, blank tapes, boxed as new. £60 ono. Tel: Glasgow 01-649 8999.

48K Spectrum - Interface 1, Microdrive, six cartridges, Kempston interface, Quickshot II joystick, ZX printer + paper, lots of software, some on Microdrive offers? Tel: Plymouth 0752 262838.

ZX81 16K all leads manual plenty of tapes plus blank ones. Buyer must collect or deliver. Brighton 503549 after 6pm, ask for Penny.

Spectrum: Artic Fort, Scope II, Fifth, Code Name Mat, Fighter Pilot, Lords of Midnight, Doomsday Castle, JSW, Valhalla, Hobbit, all half-price. Tel: Sheffield 460004.

Spectrum Carrak Microspeech, Kempston/Protel joystick interface plus Quickshot II joystick. Will swap for Alphacom or ZX printer. Tel: 01-853 1179 Steve (eves).

Spectrum 48K DK/Tronics keyboard, Interface one, two Microdrives, ZX printer, ZXLI print III interface. Software including Tasword 2 word-processor, boxed, books, manuals vgc. £270. Tel: 01-940 9483.

Spectrum Games inc - . . . Robotron, Kokotini Wolf, Tir-Na-Neog, Beach Head, Strip Poker, Whinn. Tel: Steve 0703 767580. Also CBM64 software from 80p a game.

48K Spectrum Interface 1, Microdrive sound AMP DK, Tronika keyboard cassette recorder, lots of software disk + mags might offer. £160. Write N. Eagles 20, Wheatley St. W. Bromwich, W. Midlands, B70 9TY.

Texas

TS 90 900 1, 48K, twin disks, video monitor, 300 baud modem, NEW-DOS-80, business progs, assemblies, disassemblers, monitors, EPROM programmer, owned by enthusiast, £700. Tel: 02930-0450.

TR500 Level II 16K Tandy tape recorder leads games and business software manuals and books. £75. Ideal first micro. Tel: Buntingford 38287.

T1 99-4A computer plus expansion unit with two disk drives, 32KRAM, RS232 and full assembler cartridge. will sell separately. Offers? Tel: 01-625 8455 (eves).

Peripherals

Solkonus GP100A printer, BBC cable, 5 spare ribbons, paper perfect condition. £135. Tel: Richard, anytime 01-236-6640.

Skysave multi tasking Forth Epprom for simple editing functions, portable. £44. Tel: 01-595-8275.

Sackville Road, Hove East Sussex.

TR800 second processor for BBC complete with 'Perfect' software cost £240. Tel: £210. Tel: 0761-71675 after 6pm.

Brother EP22 printer/typewriter, 16 character correction, 2K memory, BPC micros, £40 ono. FM Smith, 47 Sackville Road, Hove East Sussex.

Swan second processor for BBC complete with 'Perfect' software cost £240. Tel: £210. Tel: 0761-71675 after 6pm.

Swan President Homebase CB K40 power Mike, silver rod aerial, coax cable, and SWR meter, for Interface 1 and Microdrive. Tel: Gerrards Cross 888557.

Centronics compatible printer for any Atari computer. Works with Epson, Star, Juki etc. All cables included, £30. Tel: Farnmouth 731639.

£34 + £58 + assembler/monitor for Tandy color computer with manual and Zak's 6809 book. Cost £50, + sell for £20. Tel: Tyneside 091 2761031 after 6pm.

TD modems both direct connect, one Prismo 1000 for Prestel with BBC ROM software, £60, other 300 baud power monitor FDUP, £35. Tel: 01-567-2233.

Phoenix Green monitor, 24MHz, composite sync, RGB adaptor lead, boxed as new, two months old, £90. London NW4. Tel: 01-202-4184 eves.

Line Printer VII with parallel and RS232 interface, dot matrix, with cable for BBC B £120. Tel: Gosport 581040.

£34 + £58 + assembler/monitor for Tandy color computer with manual and Zak's 6809 book. Cost £50, + sell for £20. Tel: Tyneside 091 2761031 after 6pm.

Wanted Microdrive monitor for QL. Also Quic printer. Tel: Mendlesham 7130 eves.

£2000 Printer user interface for Spectrum, cost, £39.95 only £29.99. Also BBC and Electron books for sale, machine code, assembly etc. Tel: Andy 01-985 5140.

Apogee £2 printer for Commodore 64. Also 10 rolls of paper £70. Write A. Forestier, Sunnyside, Agincourt Rd, London NW3.

Others

Nebrala Ad, PSU, all cables including printer, technical manual, £60 of software, all as new, £95. Tel: Jim 0202 518828.

Colour Game 16K, new Basic ROMs, technical manual, monitor lead, game tape, £75 ono. Tel: Herne Bay 69108 after 6pm, weekdays, anytime during weekend.

Wizard 320 Gem Electronic organ £200 ono or swap for computer plus extras and software. Spectrum or Commodore preferred. Tel: 01-595-8275.

MZ711 good condition plus £100 software, plus tape deck, will allow to go for £250. Tel: Rickmansworth 770216.

Billboard Buy & Sell Form

Free return - from now on you can advertise your second-hand equipment and (almost) anything else you want for free in PCN. To place your Billboard ad, fill in the form on the left with a maximum of 24 words. Send the completed form to:

Billboard, Personal Computer News, 62 Oxford Street, London W1A 2HG.

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

Your name:

Address:

Telephone:

Commodore 64 games for sale. Panic, Frogun, Labrynth, £2.50 each. All three for £7.90. Ring Basingstoke 25795, ask for Keith after 4.30pm on weekdays.

CBM 64 software 8 titles all originals. Worth more than £50. Sell for £25 or credit for £5 each. Phone Leeds 812094 after 7pm.

Commodore 64 with disk drive and printer. Software-easyjet Super Base 64 advanced Calc-Result Assembler. £350. Tel: Saffron Walden (0799) 24244 evenings.

Atari 16 World War Commander pig your own team only £3.50. N. Wright 3 Rushall Court, West Road, Hamstead Great Barr, Birmingham B43 5PD.

Commodore 64 Games: Aceptual, Xaxxon, on Pole, QVO Vedio, QVO Virus. Our list for mine. Steve, 12 Windsor Close, Tamworth, Staffs, B79 8UH.

Commodore 64 Computer unused in original box. £140 one for credit sale. Ring 01-244 9900, day or evening. Earis Court, Will deliver Central London.

CBM 64, cassette, cover, programmers manuals, software including Hobbit and book, all boxed. Plus lots of mags. Bargain at £200. Tel: 01-582 1158 evns. (S-8).

Commodore 64 with lotsa extras for sale. Reference guide, tapes, games, cartridges, assembler tutor course, etc. £150 takes all. Cophorne 0342-712263.

Commodore 1701 monitor. Unused and still boxed and under warranty. New £200. Till sell for £150. Cophorn 0342-712263.

CBM64 software for sale, original, China Miner £24, Solo £60, Grandmaster £5, Hobbit £6, Revenge £3, Hunter £2, Cyclon £1, all for £26. Tel: Albert 0865-54084 (after 7.30pm).

Commodore Pet wanted series 2000 or 4000 in working order. Must have Tim or other monitor. Will pay up to £80 Mike 051-63394516.

Commodore 64 games for sale. Panic, Frogun, Labrynth, £2.50 each. All three for £7.90. Ring Basingstoke 25795, ask for Keith after 4.30pm on weekdays.

Commodore Vic 20 and cassette unit plus super expander cartridge and books and magazines £75 one. Tel: Naislee 0272-852598.

Wanted Commodore 64. Will swap my 48K Spectrum, Fuller box, Cheetah keyboard, Kempston and programmable interface, tape recorder, Leads of games. Ring Bedford 46060.

Software for sale £20 Twenty original games for sale or part-swap for Pentax Spotmatic camera body or complete. Tel: Stephen 01-589 0071.

Commodore 64 software for sale. Beach Head, Decathlon, Spirit, Ace Turbo 64, Hulk etc. Also some Spectrum. Ring 01-731 3194.

Wanted Music Composer cartridge for Commodore 64. Willing to pay £4. Contact Mike 146, 146, 146, Road, Bestwood Nottingham NG5-5GA.

Commodore 64 software wanted to swap. Many titles available. Write with program list to Mick 146, 146, 146, Road, Bestwood Nottingham NG5-5GA.

Vic 20 software for sale. Star Battle £4.50, Crazy Kong £2.50, Grandmaster £2, etc. All less than half price. Tel: 031-339 5376 evenings.

CBM 64 software (original). Sell or swap Solo £7, Flight Path, Hunter, Revenge, Falcon Patrol, Caesar, Revenge, Cyclon, Manic Miner (disk), Grandmaster, Jumping Jack. All less than half-price. Ring (Albert) 0865-54084 evening.

CBM 64 Time, Valhalla, Hobbit, Lord-of-the-Rings, Galaxy, Astrochase, Arabian Nights, Falcon Patrol, Niecepye, Revenge, Mutant Camels. All half-price. Tel: 0332-752567.

CBM64 C2N cassette. Simons basic cartridge, International Soccer cartridge, light pen, joystick, plus other software £250 the lot. Ring 0532-524755.

Wanted Commodore 64 disk software. Anything considered. Send to: Mark Lednor, Mansfield Hall, Kendrick Road, Reading, RG1 5DX.

Commodore 64 and tape deck, joystick and manuals £170. Disk drive £180. Software and books at various prices. Tel: 01-934 5962 daytime, Flout 4655 evns.

Vic 20 C2N slot motherboard and 8K 16K RAM super expander. Machine code monitor, Eprom programmer, joystick, books software games £150. 01-560 2788 evns.

Vic 20 £300. 32 games. Total worth over £200. £60 the lot or swap Tandy TP-10 printer. Tel: (0294) 56449.

Vic 20 16K RAM, cassette deck, 2 joysticks, 4 cartridges, 30 games, 5 books, magazines, dust cover, history '90 level cost over £450, only £250 one. Andrew, Dembigh 4394.

CBM 64 software into to Basic, Practical, Monopole, Slip of the Line. All on cassette. CBM64/Vic 20 cover, the working Commodore 64 book. Tel: Bournemouth 316599.

64 games, sell or swap. Titles include: Boulder Dash, Gryrus, Starwars, Jungle Hunt. Plus many more. Tel: 05275 8111. Ask Lee, after 5pm.

Vic 1540 disk drive including games and utility disks £190. Tel: 01-959 2245.

Vic 20 Computer 32K RAM in Arlon Motherboard with switched slots and games toolkit, expander, cartridges and C2N. Data coder with books and manuals £200. Tel: 01-859 2245.

CBM 64 software for sale: Revenge 5, Attack £4, Guardian £6, Annihilator £3, Falcon Patrol £4, BMK £1. Available together £20. All originals. Tel: (0245) 442502.

Commodore 4032 and 4040. Dual disc drives, manual, cables and large selection of software. £250. Tel: Only £550 one. Tel: 0235 24795 (office hours).

Amazing value C64 Easyfile information handling system only £35 (RRP £50). Also introduction to Basic Part 1, only £7 (RRP £14.95). Both £40. Tel: 0558 822509.

C64 Easyfile, only £35 (RRP £50). Also introduction to Basic part 1 only £7 (RRP £14.95). Amazing bargains. Tel: Mike Llandello 0558 822509.

CBM64 plus cassette recorder, two joystick boxes, cover, ref. guide, magazines, software, Hobbit Level 9 adventures, Grid Runner etc. The Quill. Cost over £370 sell £230. Tel: 021 796 2700. Ring 01-454 3281.

Vic 20 +3K super expander, tape recorder, joystick, eight tape games, manuals. All fully boxed. £100. Tel: 0359-42037 after 6pm.

Atari

Atari 600XL + cassette recorder + two joysticks, ROM + 4 cassette games, large amount of listings, 4 books on the Atari 6502 machine code book, £190 one. Tel: 0705 734434.

Atari software wanted. Will buy anything not available. Will also sell/swap any software you need. Tel: Tamworth 0827-51394 and ask for Gus after 6pm.

Atari 400 16K + 410 recorder + joystick + 2 cartridges, games including Xaxxon, Diamonds, Preppie 1-2, Shamus, Asterix + adventure tutor. Worth £500, sell for £110 one. Tel: Bursough (0704) 894885 after 6pm.

Atari 400 computer for sale without box. One month old. Unwanted gift. £40 one. Tel: (021) 358 1010.

Atari cassette recorder and some software. Offers? Tel: Chris, 01-550 0806 after 6pm.

Atari software for sale. Caves of Death, Star Warrior, Preppie, Star Trek, Galactic Chase, £5 each or £20 lot original. Tel: Canvey Island 696601.

Atari software for sale: originals with instructions: Scram, Leggit, Airstrike 2 considered. Send to: Mark Lednor, Mansfield Hall, Kendrick Road, Reading, RG1 5DX.

Atari owner with disc drive has some software to swap. Tel: Bedford 44060 after 7. Also 20 ROMs for sale, Popeye, Tennis, Q Bert, Astrochase.

Atari 800, + Basic + assembler five cartridges, Bluemac, Soloflight, Overmind, Tempa, Aphai, Baja Buggies, Computer war tapes + joystick, £140. Tel: (01) 602 0472 after 7pm.

Atari 400 plus cassette recorder, Basic, manuals, joysticks and lots of software, including Pole Position, Star Trek, Xaxxon, Zaxxon, Doodooker. £150 one. Tel: 01-530 2768.

Atari 600XL computer with £160 worth of software. Unused and in perfect condition. Cost £230. Sell for £120 one. Tel: 01-863 5113.

Atari 800XL, cassette deck, £200 plus software, joysticks, £300. Atari VCS, 17 games, £100. Grifter MK1, £30. All excellent condition. Sell all for £400. Tel: 01-253 8395.

Atari 800, wanted. Tel: 0904 791067.

Atari VCS, six cartridges, £60. Or swap for £200. £800 worth of Atari 600XL with all leads. Tel: Wolverhampton 790004.

Atari disks for sale. Dallas Quest and Soft Flight, 49 each as new. Also Eastern Front cassette, £5. Tel: Dick, Tiverton 257083 (evenings).

Atari 600XL, 1010 Atari, tape recorder. Brand new 28K Kong, cartridge, 20 joysticks and manuals. Tel: 061-442 0373 or 432 3514, wend £110.

Atari 400, 410, 410 recorder + joystick software including Donkey Kong. All excellent condition, £160 one. Tel: 0928 33697 (Frodsham) Great Xmas gift.

Wanted Atari VCS cartridges: Starpath supercharger, plus cassettes: Prefer cartridge not for Atari. Letter replies please help: Charles Trager, 7 Grantley Street, Glasgow, Scotland, G41 3YF.

Atari 400 48K full stroke keyboard, dust cover, Hyperblast, Space Shuttle, Myrapiacle, Computer Cube, Tapes, cover, manuals, programming, software, basic £125. Tel: Sheering (02789) 5099.

Atari 400 in box 6 months warranty remaining. Basic cartridge with over 300 games on 65 cassette tapes. Pole Position, Xaxxon. £80. Tel: (09544) 733.

Atari 800, 48K, 810 disk drive, 410 tape deck, 4 carts - AS-Med, Defender, Centipede, Raiders, Macro assembler, Tel: 01-445 3281.

Wanted Atari 800 48K computer or Atari 400 with real keyboard. Tel: Crowborough (08526) 2059.

Atari 800 48K, Basic cartridge, tape recorder, joysticks, dustcover and many games, including Xaxxon, Pole Position. Excellent condition, everything boxed. Tel: 01-646 8726.

48K Atari 400, 410 recorder basic manuals, software, dust cover, £60 one. Tel: (0234) 768569 after 6pm.

Acorn

Acorn Electron, plus BBC data recorder. Both as new. Acorn User magazines, books, etc. £180 one. Tel: 0480 21870 (eves please).

Brand new BBC B £310 ovon. Tel: Phil, 0249 854292 (weekends), 02473 61017 (weekdays).

Acorn 200 second processor for BBC micro. Unsuitable for my needs. £275 ovon. Tel: Reigate 41033.

Acorn Electron software for sale. Bandits at 3 o'clock, Felix in the Factory, £3 each. David Roberts, 25 Oxwich Road, Mochdre, Colwyn Bay, Clwyd.

Acorn Electron software for sale. Bandits at 3 o'clock, Felix in the Factory, £3 each. David Roberts, 25 Oxwich Road, Mochdre, Colwyn Bay, Clwyd.

BBC model B plus Basic and assembly code books, £250, games included. Cassette recorder, £10. Tel: Epsom 22439 after 7pm.

Electron D/convertor built from Electronic and Computing Monthly Dec

'83 with instructions. £15. Tel: 0408 21870 (eves please).

Could I borrow somebody's Acorn Atom circuit diagram for mine's in bad condition. Will photocopy, return, pay for postage. Tel: Russell, evenings/weekends 0707-54333.

BBC manuals for sale. At £9 originals, Elite, Zelaga etc. Tel: Chris, 01-550 0806 after 4pm. Also Atari software and cassette recorder.

Acorn Electron first byte interface with joystick, excellent condition, only £30. M R White, The Rectory, Barming, Kent ME16 9NA. Tel: (0622) 26263 after 6pm.

Acorn ROM original but no manual, £15 one. Tel: Mr Barret, Leeds 647485.

Acorn Electron software to swap. Send lists of games and wants, Micro Power games and some Acornsoft ones. 4, Osprey Gdns, Sheffield S2 5GE.

Electron software for sale: Micro Olympics, Pool, Killer Giller, Blagger, Bugblaster, Football Champions, and Quest for Holy Grail £4 each. Tel: 0233 27457 after 6pm.

Acorn Electron software for sale. Gunamoke, Cosmo Cruiser, Hunchback, Intruders. All original. £3 each. Write to Justin Lewis, 166 King St, Bryncrenna, Gwynedd, N. Wales, NP9 4SN.

BBC Model B32K, Torch 2 x 400K disk drive with disk interface, TV display Kaga 12in Colour, Facit 4510 printer. Almost new £937. Tel: Rumcor 1-21-2203.

BBC B 1.205 optical monochrome monitors, tape player. Eight months old. Hardly used, excellent condition. £450. Tel: 01-444 8349 (eves).

Acorn 0.90 disk interface, £65. Tel: 01-863 5113 (London).

BBC-B, 40 track double sided drive, cassette recorder, double density interface, disks advanced user guide, joystick + £520 software. Excellent condition. £790 one. Tel: Robert, (0255) 507717.

Electron Books for sale brand new. Easy programming for: Electron Gamesmaster, machine code for electron + £200 software, tape postage. Tel: Kingwinning 271187.

Acorn Electron boxed, nearly new guaranteed, leads, £75 of software plus books, worth £280, only £165 one. Tel: 01-689 4234 (William after 6pm).

Electron speaker, laser games (inc Aviator, Chucky Egg) plus extra books and many mags. Worth over £20. Full boxed, offers please. Tel: Billingham 551049 after 6pm.

Electron star recorder, games, (inc Aviator, Chucky Egg) plus extra books, many mags. Worth over £320. Offers please, boxed. Tel: Billingham 551049 after 6pm.

Amstrad

Amstrad CPC 464 with colour monitor for sale. Offer? Tel: 021 358 1010.

Wanted: Amstrad with or without monitor. Also Epson FX80 or Canon printer in good condition. Contact: 202 Castle Cliff, St. Andrews, Fife KY16 9AJ.

Swap Amstrad 901 CB power pack, external power Mike, SWR meter, Centronics printer, S&W meter. Tel: Peterboro (0733) 241354.

Amstrad CPC 464 (bw monitor) plus colour monitor for sale. £160. Any enquiries after 6pm. Mr C. Tubb, 18 Farmers Court, Westlands, Droitwich, Wcs, WR9 9EL.

Amstrad CPC 464 colour monitor including joystick, books, mags, for sale. New, £295. Also introduction to Basic Part 1, £12. Tel: Bradford (0274) 881896.

Dragon

Dragon 32 guarantee, boxed, all leads, manual, 2 joysticks, £190 of software, worth £200, sell for £130. Tel: Medway 405981.

Dragon 32, 3 joysticks, £250 software, various books, manuals, subscription to user mags, cost £550, just £220 now. Tel: Elaine 0227 69694 (after 6pm).

Dragon 32 still in box complete with cassette recorder, joystick, lots of software £80. Tel: Tewkesbury 0684 295348.

Dragon 32, 1 joystick, £90 of original software and dustcover, £140. Tel: St Albans 62082.

Dragon 64, Aldread, Edit + 30 tapes including arcades, adventures, educational, utilities, books magazines. Cost over £550. £180 buyer collects. Tel: 01-883 6099.

Dragon 32 boxed, as new, joysticks and lots of software. Exchange for Spectrum peripherals or £80 cash. Tel: Rugeley 6677.

Tandy

Tandy FIC-64 printer controller, boxed and tested with printer cable. £190. No. 01: 720 0469.

Tandy Monitor, 12in, Green screen £35. Tel: 0294 64144 (Ayrshire) after 6pm.

Tandy Models I/III cassette software (originals) Script including manual and Trainer £15. Jumbo Simulator, Database, VAT Register £5 each. Tel: Welwyn Garden City 2458 eac.

TIS-90 Model 1 16K, Level II, cassette recorder, Modulator, much software inc. Games, assembler, monitors, utilities. Bargain £110. Tel: Oakley (02302) 4420.

TIS-90 Model 1, Level 2, 16K, video display unit, recorder, printer interface (Centronics), manuals, Games and business software. Also extra books £75. Tel: 04024 44413 eves only.

TIS-90 model 1, 48K internal memory, monitor, cassette, £300 + software plus books, lower case, £125 now. Tel: Nigel 0494 716686 after 6pm.

Tandy CDP-115 colour, graphics printer + dragon lead. Cost £167, sell for £90. Boxed as new. Tel: 01-360 3443.

Peripherals

Printer, Tandy LPIII dot matrix, Centronics interface, business quality with 140 CPS Bi-directional printing, immaculate condition £180. Tel: Welwyn Garden City 24591 after 6pm.

Yamaha CS-01F synth £50. Sharp PC1211 + tape interface £20. CGL M5 Basic-G Falc 8 games £200 now or w.h.y. Contact S Rima Kylemore, Connemara, Co Galway.

Wanted Desperately! Spectrum lightpen and/or White Lighting. Also, for sale, original software, electronic games and equipment, and 6 x 60 telescope. Tel: (0425) 57409.

Epson FX-80 printer with BBC cable, screen dump ROM and character definer, software. Excellent condition £335 now. Prism modem 1000 + RA423 cable. £55 now. Tel: 0227 751100.

Wanted 1541 disk drive plus Serious software for 64. Tel: 0484 29990 after 19.00 hrs. E.G. Multiplan The Last One Easyprint etc.

PCN Billboard

Texas Instruments

Prism VTX 5000 modem for use with Sinclair Spectrum. Excellent condition, as new with operating instructions £65. Tel: 0793 611525.

Saga Emperor keyboard for Spectrum. Brand new unopened duplicated, gift £174 £45. Can deliver in Midlands. Tel: 06845 68095 after 6pm.

Wanted! Centronics printer, good condition and under £100. Tel: (0922) 242823 after 6pm. Ask for Matthew 57824 8K x 8 EPROM's only £5 incl. SCD M5 micro with jopyads £75. MCF40 colour printer £65 both nearly new. Tel: 021-459 2384.

For sale pair half height double sided 40 track disk drives as new. Bargain £210. Would split. Tel: Huntingdon (0480) 811020.

P.D. modem model 2B for sale. 300 baud full duplex RS232C interface. Good condition and working order £120 or offer. Tel: Mike, 051 639 4516.

Disk Drive 5 1/4 in. teac, 40 track, 100K. Complete with books for BBC. £100. Tel: Luton (0582) 27573.

Seikosha GP-100A printer with Kempston interface for Spectrum £135. Tel: Hinds (0792) 69688.

Quickshot joystick/Sureshot, programmmable interface for Spectrum. Original Hobbit and Jetcap Software. All as new. Half-price at £30 the lot. Tel: 051 523 9217.

Brother EP22 printer typewriter. Will interface with Atari, Commodore, TI99, Epson, Nec, Sharp, Sord Mint condition. Cost £145, bargain £80. Tel: Macfield 26571.

MC940 printer/plotter, never used, full pens with manual and box, unwanted gift, half price £55. Tel: Martyn, 01-870 1984.

Spectrum peripherals: Prism VTX5000 modem £60. Currah V-apech £19. Fre! programmable joystick interface + Quickshot joystick £19. All boxed, mint. Tel: 0742 460004.

Sharp

Sharp M280K computer with twin disk drives and printer. Software including interpreted/compiled Basic, FIDOS. Forth. Disk assembler. £495. Tel: Brighton 34030.

Sharp MX80A, excellent condition, hardly used, original packaging, various software worth £100. Offers around £250. Tel: Teresa on Bristol 642132 daytime or 712467 evenings.

Swap Sharp PC-1245, brand new, still under guarantee for ZX81 expanded or not as long as its in good condition. Tel: Paul 01-804 3229.

Sharp MZ706, 64K, built in recorder assembler/disassembler, database, Chess, manual, books on machine code. 3 months old £160 now. Tel: 01-749 1165.

Sharp MZ 80K, integral tape recorder monitor, high res graphics board, lots of software, books £200 now. Tel: 0702 348109 evenings.

£140. Tel: Ian Vatcher, 0202 721010, 49 Belmont Road, Parkstone, Poole. **Spectrum** games, Bogabo, Schizods, Harrier, Attack, Atic Atac, Kong, all in first class condition and original. £3.50 each. Tel: 076384 442.

For sale, Spectrum software, Mikron, Chess, Maze, Deathrace, Vu-file, Madmartha 2, Incarcure, Rider, Adversers, Heathrow, Knightsquest, Faustfully Originals. All £2.50 each. Tel: Kingswinford 271187.

For sale, Fuller master unit for Spectrum. Includes voice synthesis, sound chip amplifier, joystick interface, demo, booklets, unused, new, bargain £150. Tel: Kingswinford 271187.

Spectrum packages wanted to exchange tips, ideas, books and software. Please write to: Carmen Vella, "Chalienta" TX10, El-Haddara Zetjun Malta.

Wanted A ZX80, cassette or two if possible £7 now. Tel: Bratton 830261 after 4pm.

Spectrum 48K in good condition, 9 months old. Also over £100 worth of quality software, eg Beach Head, Deception. Price £175. Tel: Corby 68424 411pm.

Spectrum 48K + £500 software + books £15 + over 70 mags + Kempston joystick and interface. The lot £180. Tel: Harpenden (05827) 63983.

Help! I'm after a 16K RAM pack for my ZX80 and any other ZX80 info/software/hardware etc. Please tel: 01-883 2829.

Spectrum 48K, software worth £90, 30 magazines, complete manual at £30 the lot. Kempston joystick interface, cassette recorder, keyramps, total worth £280, asking £175 now. Tel: 01-554 3842.

Spectrum 48K, Fuller box, joystick interface, +£150 software including all the best known names. Bargain £150. Tel: 01-840 1004 after 6pm.

Spectrum 48K, issue 3, complete with power supply unit leads and manuals. £90. Quick sale. Tel: 01-958 7175 evenings.

Spectrum 48K, 13 HT games monitor, White Lighting 6 books, compatible data recorder and 109 magazines. All in excellent condition. £140. Tel: (0632) 284 2439 after 6pm.

Top of Spectrum 's' which must be sold. Nearly 300 programs including Crusoe Fremontina, Danger Mouse, all Fantasy, Ultimate, so phone Steve, 0703 767580.

ZX81 software for sale, 16K, Fantasy games, Scramble, Flight Simulator, Gulp and the EPK Black Crystal Sexology. All originals, all cheap! Tel: Southampton 555741.

Spectrum 48K interface 2, Quickshot joystick, magazines, much software, including Jetman, TLL, Night Gunner, Hunter Killer. Worth over £250 only £180 now. Ask for Gordon. Tel: (0304) 812681 (eves).

ZX81 +16K, mags, books and many software titles including Flight simulation, Hi-ves invaders, 3D Designs (ideal for beginner). £30. Tel: 022 17 3723 after 6pm.

ZX81 16K, manual, book + leads + 4 games including Football Manager, Spectrum Contact. All on (031) 336 4342 after 5pm.

Billboard Buy & Sell Form

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

Billboard, Personal Computer News, 62 Oxford Street, London W1A 2HG.

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

Your name:.....
Address:.....
Telephone:.....

COMPUTER CONNECTIONS

EVERY PROGRAMMER HAS THE POTENTIAL TO EARN IN EXCESS OF £10,000 WITH US THIS YEAR

Due to expansion in Product Activity, we are in a position to offer unique opportunities to competent programmers. To ascertain if you can fulfill our requirements, simply answer the following questions.

1. ARE YOU A COMPUTER PROGRAMMER?

YES	NO
-----	----
2. DO YOU WISH TO HAVE YOUR PROGRAMS PUBLISHED BY A SOFTWARE HOUSE WITH A MAJOR MARKET SHARE IN YOUR PARTICULAR FIELD?

YES	NO
-----	----
3. DO YOU SEEK PROFESSIONAL ADVICE, BOTH COMMERCIAL AND TECHNICAL?

YES	NO
-----	----
4. DO YOU WISH TO AVOID THE COMPLICATED PROCEDURE OF NEGOTIATING FOR CONTRACTS WITH PUBLISHERS?

YES	NO
-----	----
5. WOULD YOU ACCEPT SPECIFIC CONVERSION WORK, THAT WE CAN OFFER YOU?

YES	NO
-----	----
6. ARE YOU UNHAPPY WITH THE MARKETING YOUR PROGRAMS ARE RECEIVING?

YES	NO
-----	----

If you have answered YES to question 1 and at least one other question and you are not already "rolling" in it, then contact us now.

The company has strong connections in the computer industry with such names as K-Tel and Quicksilva in our portfolios. During the two years we have been in operation, we have gained the confidence of numerous professional programmers.

We are also interested in aspiring programmers, young or old, who require professional help and guidance. Our FREE services include practical advice and ideas designed to improve your programming skills and overall results.

For further details of how Computer Connections can successfully market and develop your ideas, please write with brief personal details and if possible samples of previous work to:-

The Technical Director, Computer Connections, Barmor House, 70 Rhodes Avenue, Pleckgate, Blackburn, Lancashire BB1 8NP.

COMPUTER CONNECTIONS

CONNECTING YOU WITH TOMORROWS WORLD TODAY



800XL 64K COMPUTER £169



800 48K COMPUTER £99



1050 DISK DRIVE £34



1050 127K DISK DRIVE £199



1050 & COLOUR PRINTER £99



1020 COLOUR PRINTER £299



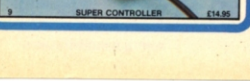
1050 LETTER QUALITY PRINTER £299



1050 SUPER CONTROLLER £49



TRAK BALL £19.95



SUPER CONTROLLER £14.95

THE NEW ATARI

EVERYTHING YOU WANT FROM A HOME COMPUTER

1. ATARI 800XL - £169: The Atari 800XL, with many facilities and includes such advanced specifications that you will be amazed by its performance. At the new retail price of only £169 for a full specification 64K computer with a proper full stroke keyboard, we believe that the 800XL cannot be beaten. Just look at the following specifications:

COLOR CAPABILITIES: 16 colours and 16 intensities giving 256 different colours (all of the 256 colours can be displayed at the same time).
OPERATING SYSTEM: 24K ROM including Atari Basic programming language and a self diagnostic test program.

KEYBOARD: A special design with 62 keys including help key and 4 special function keys, international character set and 26 graphics keys.

SOUND: 4 independent sound synthesizers each capable of producing music across a 3½ octave range or a wide variety of special sound effects. (Additional programming can achieve an octave range of up to nine octaves).

DISPLAY: 11 graphic modes and 5 text modes. Up to 320x192 resolution. Maximum text display 24 lines by 40 columns.

SPECIAL ATARI INTEGRATED CIRCUIT (ITIA): For graphics display. Priority for sound and controller ports. Antic for screen control and I/O (input/output).

CPU: 8502 microprocessor - 650 microsecond cycle and a clock speed of 1.79 MHz.

EXTENDED GRAPHIC FUNCTION: High resolution graphics. Multi-coloured character set. Software screen switching. Multiple refined character sets.

PLAYER: Player (serial) graphics. Fine screen scrolling. Changeable colour registers. Smooth character movement. Simple colour animation facilities.

PROGRAMMING FEATURES: Built on Atari Basic programming language supporting peek, poke and USR plus at least 8 other languages available. The help key will provide additional information and menu screens with certain software. Full on-screen editing is available as well as syntax checking on entry.

INPUT-OUTPUT: External processor bus for expansion with memory and peripherals. Composite video monitor output. Peripheral port for direct connection software. Over 1,500 titles of software are available including self-teaching programs with unique voice over. The range of programs includes Education, Home Management & Programming aids. There is also APX (Atari Program Exchange) and of course Atari's famous entertainment software line at only £9.95. In addition there is a host of support and help available from specialist Atari magazines like Antic and Analog and from over 75 Atari books/manuals.

2. ATARI 800 48K COMPUTER - £99: We have a limited number of the Mk1 model 800 computer with 48K. The price is £99 (as a games machine) or £39 with the Basic Programmer Kit (Basic cartridge & 2 manuals). Both come with a full 12 months guarantee.

3. ATARI 1010 PROGRAM RECORDER - £34: For low cost storage and retrieval capability. Data transmission 800 baud. Storage capacity control/unique soundthrough facility. Also included is built in accidental erase prevention and automatic shutoff after each program as well as a 3 digit tape counter.

4. ATARI 1050 DUAL DENSITY DISK DRIVE - £199: 5¼" disks holding 127K randomly accessible bytes provide both expansion and flexibility for your 400/800 or XL system with new "helpful" DOS 3. All customers who purchase a Disk Drive from Silica Shop will be automatically given a FREE set of 100 programs on 3 Diskettes on both sides.

5. ATARI 1020 COLOUR PRINTER - £99: Printer and Plotter with four colour graphic print capability. 40 column width printing at 10 characters per second. Can print 5, 10 and 20 characters per inch. 64 character sets. Prints text in 4 directions. Choice of line types.

6. ATARI 1027 LETTER QUALITY PRINTER - £249: For word processing letters in professional type. Print speed of 20 chars per second.

7. ATARI TOUCH TABLET - £49: Enables you to draw and paint pictures on your TV screen with the touch of a stylus.

8. ATARI TRAK BALL CONTROLLER - £19.95: Enables cursor movement in any direction and adds arcade realism to your games.

9. ATARI SUPER CONTROLLER - £14.95: The ultimate joystick with double fire button to give you a greater competitive edge in your games.

SILICA SHOP ARE THE No 1 ATARI SPECIALIST

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

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

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

AFTER SALES SERVICE: Your name will automatically be added to our mailing list and you will receive price lists, newsletters and details of new releases and developments as well as special offers which are exclusive to Silica Shop Owners.

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

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

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

NEXT DAY DELIVERY - FREE: All goods dispatched from Silica Shop are normally sent by first class post or parcel FREE OF CHARGE. As a special introductory offer for a limited period only we will be sending all Computers and Disk Drives by a next day delivery service at our expense.

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

SILICA SHOP LTD, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX Tel: 01-309 1111 ORDER NOW - OR SEND FOR A FREE COLOUR BROCHURE

To: SILICA SHOP LTD, Dept PCN 7 11, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX Telephone: 01-309 1111

LITERATURE REQUEST:

- Please send me your FREE colour brochures and 16 page price list on Atari Computers.
 I own a Videogame I own a Computer

Mr/Mrs/Ms: Initials: Surname:

Address:

Postcode:

ORDER REQUEST:

- Please send me:
 800XL 64K Computer £169
 800 48K Computer £99
 1010 Program Recorder £34
 1050 127K Disk Drive £199
 1020 Colour Printer £99
 Letter Quality Printer £249
 Touch Tablet + Cartridge £49
 Trak Ball £19.95
 Super Controller £14.95

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

CREDIT CARD - Please debit my Access/Barclaycard/Visa/American Express/Diners Club

Card Number: PCN 7.11



CROSHOP

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

NEW GAMES. NEW PRICES

LYNX

see our ad in
**PERSONAL COMPUTER
 GAMES**
 OUTFRIDAY

BLANK CASSETTES

Custom-taped top quality computer audio cassettes of great budget prices. **Packed in boxes of 10 with labels, inlay cards and library case.**

Pieces include VAT, post and packing.

- (C5) £3.35
- (C10) £3.40
- (C15) £3.45
- (C30) £4.70
- (C60) £5.30
- (C90) £5.00
- (C15) £3.75

BASF FLOPPY DISCS

Prices of boxes of 10

- 5 1/4 Single side Double density £19.95
- 5 1/4 Double side Double density £21.85
- 5 1/4 Double side Quad density £28.75

MICRO FLEXI DISCS

Price per unit

- 3 1/2 Single side £4.00 each
- 3 1/2 Double side £4.75 each

Indicate quantity of each product required in boxes. Free delivery U.K. only. Cheques P.O. Enclosed for £

NAME

ADDRESS

PROFESSIONAL MAGNETICS LTD



Cassette House, 229 Hurst Road, Leeds LS10 3YJ
 FREPOST Tel: (0323) 70066

© C.B. '81

SENSIBLY PRICED SOFTWARE FOR AMSTRAD CPC 464

Graph. The first and the best graph and function plotter. Line graphs, pie and bar charts, auto scaling, any mathematical function or your own data. Hard copy on MG50. Full colour and size control. Very friendly! Price £8.50 inc postage.

Number 11. Could you run the economy? Everyone thinks they could solve the country's problems. Now you can put your money where your mouth is, or take a boatful friend down a pagg or two! Full graphics and sound, great game features. Price £5.50 inc postage.

Tools. Outstanding value utility. Graphics and sprites creator (usable in your own programs). Plus cassette file backup utility with high-speed options, plus MIC monitor. All for just £4.95.

Cheques/P.O. to:

**CAMEL MICROS, WELLPARK
 WILLEYS AVENUE, EXETER**

AMSTRAD CPC464

ARNOLD BLACKWOOD — ADVENTURER EXTRAORDINAIRE

THE TRIAL OF ARNOLD BLACKWOOD

A very worthwhile addition to the Adventurers' library...

CPC464 DISK, Oct '84

ARNOLD GOES TO SOMEWHERE ELSE!

A healthy sense of the ridiculous... Plenty of fun... CPC

Oct '84

Each Adventure £5.50 inc. By Return Post. CDS/P.O.s to

NEMESIS

10 CARLOW ROAD, KINGSTON,
 KETTERING, NORTHANTS NN14 4DW.

BLANK DISKS

SPECIAL OFFER

Scotch 3M 5 1/4" single sided double density. Supplied in 10's with a FREE plastic library case.

1-4 boxes £18.95

5+ boxes £18.95

Prices include VAT

* Wide range of 5 1/4" and 3 1/2" Disks available.

* Bulk order discounts available. A dealer enquiries welcome.

FOR FREE FAST DELIVERY — Please send Cheques/P.O. to:

S. J. B. Disk Supplies (Dept G3)
 11 Ouedra Drive, Middleburg Hill 15N

Tel: (0602) 782318

WANTED

PERSONAL COMPUTERS

all models bought for cash
 Morgan Camera Company
 160 Tottenham Court Road,
 London W1. Tel: 01-388 2562

TOUCH-TYPE

FOR THE 48K Sinclair Spectrum

DO YOU YEARN TO DO SOMETHING USEFUL ON YOUR SPECTRUM?

Are you fed up with silly games? Make this the moment you take a step forward using your Spectrum into the world of "The Office of the Future!"
 Learn to touch type on any QWERTY keyboard using the Spectrum as the teaching machine.

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

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

£8.95 inc p&p and VAT.

To: JCS Software, 1 Pastos Close, Gosham, Surrey KT11 2BQ.
 O.K. I'm ready to step forward and improve my ability. Please send me copy of TOUCH-TYPE for the 48K Spectrum. I enclose a cheque for £8.95 (Please make cheques payable to JCS Software.)

Name

Address

TOUCH-TYPE TOUCH-TYPE TOUCH-TYPE TOUCH-TYPE For The Spectrum 48K.

JOYSTICKS FOR QL

Straight into control port 1 or 2. No interface required

£7.95 each or 2 for £15.00 (add 50p p&p)

QL Micro Assembler-Disassembler £19.95 (including p&p)

Computer Supplies (PCN)

146 Church Road, Boston Lincolnshire PE20 5JX

TEXAS EXTENDED BASIC!

Our new range of extended basic programs is now available

We also have programs for Metacom and Accusius

please send S.A.E. for further details

SOLWAY SOFTWARE

6, CURCUM STREET, HARTPORT,
 CUMBERIA CA15 6EL

Access card holders
 please call our 24hr
 service on
**TEL: 0900
 812579**

SERVICE AND REPAIRS SPECTRUM, BBC, COMMODORE, DRAGON.

MAIL ORDER OR CALL IN

HUGE

selection of software and full range of accessories. SAE for lists.

Enfield Communications,
 135 High Street, Ponders End, Enfield, Middx.
 TEL: 01-805 7434.

ZOOMSOFT

Latest Software for CBM 64 & ATARI

CBM	Cass	Disk
Zork 1	N/A	£11.95
Zork 2	N/A	£11.95
Zork 3	N/A	£11.95
Starcross	N/A	£11.95
Deadline	N/A	£11.95
Boulder	£8.95	£10.95
Britles	£8.95	£10.95
ATARI 400, 800, XL	Cass	Disk
Oils Well	N/A	£21.55
Flight Simulator	N/A	£37.95
S.A.M. (Talkie)	N/A	£41.95
Sorcerer of Claymorgue Castle	£9.95	£17.95

Hundreds more titles available. Send SAE for free catalogue or Tel: 01-723 0562 (10am-7pm) Please state make of computer.

Send Cheques, P.O. to Zoomsoft, 48 Huntworth Mans, London NW1 6DB.

MAGIC RINGS

A crazy cross crossed fruit machine where the nudge and hold functions let YOU make the decisions. An interesting quality game for the Commodore 64.

Price £4.99 on tape. Send P.O. or cheque to:

Robert Black
 3 Woodside, Gretna CA6 5ES

£148-£598

World Champion Elite program
 now exists on several Fidelity
 Machines



For full details by return leave name and address on:

041 221 3399 Ext 70
 or write to: DURIE & WILSON LTD.

Fidelity Distributors
 24 McGrigor Rd, Glasgow G62 7LD

COMPUTER SOFTWARE:

BUSINESS AND GAMES FOR MOST COMPUTERS.
 Commodore 64, Vic 20, BBC, Atari, Dragon, Spectrum, ZX81.
 Special offer on Commodore 64
 New Releases for CBM 64, Spectrum, BBC, Atari, Dragon, Spectrum, ZX81.
 New releases for CBM 64, Spectrum, BBC. Every 2 weeks — just send S.A.E. and we send you a new list every 2 weeks.
 Atari C10 data cassettes 40p each. 5 C15 data cassettes £2.40 5 1/4" floppy discs Disaided — DL density. £2.30 each or 5 for £10.
 Send to: M.J. Seward,
 SL Otard Road, Stratton
 Nr. Bude, Cornwall EX23 9AF. Tel: (0288) 4179

COULD YOU TEACH BASIC?

If you can write your own programs in BASIC and can talk to people then YOU CAN TEACH with the PROTOS System ©.

The PROTOS System contains all the information you need: Organisers Manual, Tutors manual, full lecture notes, handouts, visual aid guide, how to advertise . . . and a FREE back-up service by phone.

The PROTOS System costs are covered by just 3 students at home . . . but is designed for up to 40.

For more details and application form write NOW to:

**Dept. PCN, The Computer Group,
Oaklea, Goldhanger Road,
Maldon, Essex CM9 7QU,
or ring 0621-58091 NOW.**

PROTOS

BASIC COMPILER

Turns your basic programs into really fast machine code. The compiler is very easy to use, and comes complete with full instructions.

For the BBC model B, or Model A with 32k.

Cassette	£17.95
Disk	£19.95
(40/80 TRACK)	

Cheque/P.O. or SAE for details to

ACK Data

21 Salcombe Drive, Redhill,
Nottingham, NG5 8JF
Tel. (0602) 262498

PAGES OF POSSIBILITIES FOR YOUR MICRO



LANGUAGE LIBRARY: LOGO

£5.95

NEW A thorough introduction to the facilities and applications of this popular but under-exploited language. Examines the programming benefits of its simple syntax, flexible structures and famous 'turtle graphics'.

MICROPUZZLES

£2.95

A Compendium of challenging puzzles from the puzzlemaster of Personal Computer World's Leisure Lines. Hours of pleasure for anyone with an appetite for brain teasers.

TEST YOUR COMPUTER IQ £2.95

A book of simple self-scoring tests for assessing computer aptitudes and measuring personal ability to use, work and play with computers—at home or in the office.

Good value paperbacks from the PAN PCN Computer Library available at your local computer book stockist NOW!



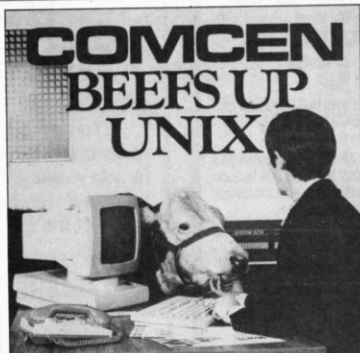
**PERSONAL
COMPUTER**
COMPUTER NEWS LIBRARY

There was an interesting item in PCN's mailbox recently — a copy of the Conservative Computer Forum's newspaper.

The most intriguing bit was tucked away inside the newspaper. Welcoming Geoffrey Pattie as Kenneth Baker's replacement as Minister for Information Technology, the paper says: 'His experience at the Ministry of Defence where he has spearheaded the military application of new technology will serve him well...'

Why? What's the Government planning... missile guidance for A-level? O-level counter espionage?

Amstrad owners will be interested in the latest issue of Your Computer which carries a round-up of software for their machine. Among the products is Amsoft's version of MikroGen's Master Chess which is highly praised for its book openings and other qualities. Unmentioned, but apparent in the photograph, is the fact that the board is the wrong way round so coloured pieces are a case of no check, mate?



BEEFY NUMBER — We receive a lot of press releases here at PCN and most are mundane at best. The one accompanying this photograph grabbed our attention for obvious reasons. Less obvious is the fact that it is not promoting a new package for cattle farmers but a version of Unix from Root Computers running on Comcen's 68000-based system.

So where does the friendly bovine come in? Simply to back up the headline 'Comcen beefs up Unix'. But as Comcen itself admits, it adds a entirely new meaning to the expression 'a load of bull'.

SYNTAX ERROR

Either we're perfect or you're not reading the magazine carefully enough, but there were no syntax errors in last week's issue.

NEXT WEEK

BBC Upgrade

Looking for a second processor for your Beeb? Upgrade Technologies has one that is as good as Acorn's and costs less. We test it out.

Digital Debut

Don't miss our world exclusive on the latest desktop system from Digital.

Professional words on the Spectrum
Turn your Spectrum into a word processor with our listing.

Splitting the 64

Divide your Commodore 64 screen in two by exploiting rasters.

Memotech extras

Make your Memotech more versatile by adding extra routines.

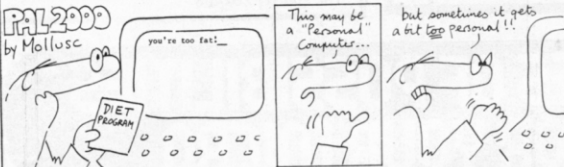
Floating Atari

Atari programmers who miss the ability to use floating numbers, take heart — we provide a series of routines for you to key in.

Peripherals

How does Oasis Electronics' EPROM programmer measure up? Why are we in a fizz over Smith Corona's D200 printed? **Software**

As well as a bumper crop of games, we get down to business with a graphics package for the Spectrum and verbalise on two word processing packages for the Amstrad.



PCN DATELINES

Event	Dates	Venue	Organisers
Scottish Home Computer and Electronics Show	November 9-11	Anderston Centre, Glasgow	Trade Exhibitions Scotland, 0764-4204
COMPEC	November 13-16	Olympia, London	Reed Exhibitions 01-643 8040
Schools Computer Fair	November 14-15	Pembroke Halls, Manchester	EPC, 01-580 6321
COMDEX	November 14-18	Las Vegas, USA	Interface Group Inc, 300 First Ave, Needham, MA, 02194, USA
6809 Show	November 17-18	Royal Horticultural Halls, London SW1	Computer Marketplace Exhibitions, 01-930 1612
Artificial Intelligence Seminar	November 17-18	Middlesex Poly, London	Intellect Seminars, Steve Torrance, 01-801 3434
ZX Microfair	November 17-18	Alexandra Palace, London N22	Mike Johnstone, 01-801 9172
Humberside Computerfair	November 18	Winter Gardens, Cleethorpes	Grimsby Computer Club, 0472-694047
Videotex Europe Exhbn & Conf	November 20-22	Amsterdam, Holland	Online Conferences, 01-868 4466
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

EDITORIAL: Editor Peter Worlock. **Production editor:** Lauraine Turner. **Sub editor:** Harriet Arnold. **Editor's assistant:** Karen Isaac. **News editor:** David Guest. **News writers:** Ralph Bancroft, Sandra Grandison. **Features editor:** John Lettice. **Software editor:** Bryan Skinner. **Peripherals editor:** Ken Garroch. **Hardware editor:** Stuart Cook. **Programs editor:** Nickie Robinson. **Art director:** Jim Danise. **Art editor:** Dave Alexander. **Assistant art editor:** Tim Brown. **Layout artist:** Bruce Preston. **Publisher:** Cyndy Miles. **Publishing assistant:** Tobe Bendish.

ADVERTISING: Group advertising manager Peter Goldstein. **Advertisement manager:** Bettina Williams. **Assistant advertisement managers:** Laura Cade, Claire Rowbottom. **Sales executives:** Claire Barnes, Phil Benson, Mike Blackman, Julian Burns, Steve Carrick, Tony Keefe, Andrew Flint, Christian McCarthy, Isabel Middleton, Sarah Musgrave, Tony O'Reilly, Anita Stokes. **Production:** Richard Geoffrey. **Advertisement assistant:** Jan Moore. **Subscription enquiries:** Gill Stevens. **Subscription address:** 53 Frith Street London W1A 2HG 01-439 4242. **Editorial address:** 62 Oxford Street London W1A 2HG, 01-636 6880. **Advertising address:** 62 Oxford Street London W1A 2HG 01-323 Street London W1A 2HG 01-439 4242. **Printed by:** VNU Business Publications, Evelyn House, 62 Oxford Street London W1A 2HG 01-636 6880. **Printed by:** Chase Web-Offset, St Austell, Cornwall. **Without written consent from the copyright holders. Photoset by:** Quicksat, 184-186 Old Street, London EC1. **Registered at the PO as a newspaper.** Distributed by Seymour Press, 334 Brixton Road, London SW9, 01-733 4444.

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.

You'll find it at above standard computer dealers now.



GoldStar

Distributed by:-

MICRO DEALER UK Ltd

29 Burrowfield, Welwyn Garden City Herts AL7 4SS

Tel: (07073) 28181 Telex: 23674 MDUKG

FIRST AID



for your 64

Computers, like people, are fallible. They need the right combination of code and care to perform effectively in the business or the home. And that requires first hand knowledge from you to create a healthy operating environment for your Commodore 64.

Knowledge about machine language, about the lesser known qualities of the 64, about the disc drives, graphics, and about the tricks and tips to keep your 64 on line. That's why First Publishing has now launched in the UK a series of high quality books and software packages to provide a complete health care kit for your 64. Commodore 64 users throughout Europe have already found it a tonic. We think you will, too.

For a brochure on all the Commodore 64 books and software packages available from First Publishing, please fill in the coupon and send to: Amanda York, First Publishing, Unit 20B, Horseshoe Road, Horseshoe Park, Pangbourne, Berkshire.

Name _____
Address _____

Or ring Amanda York at (07357) 5244 or Calco Software at 01-546 7256

PCN1

1st
FIRST PUBLISHING LTD