

PERSONAL COMPUTER

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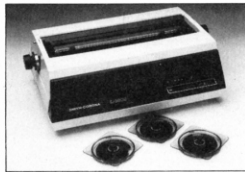
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PERSONAL
COMPUTER
NEWS

Chiller turns on heat

By Bryan Skinner

Mastertronic, pioneer of cheap games, looks likely to set standards in quality as well as price for the rest of the software market to follow.

Its release of Chiller for the Commodore 64 sets a new standard of cheap games which other software houses would do well to look at, and with some trepidation. Chiller costs £1.99, the disk version £5.99, and the game is a winner.

Based loosely on the film Thriller the program uses an interrupt-driven version of the Michael Jackson song. Your task is to rescue your girlfriend from a haunted house. There are five screens, each

with good graphics, and at £1.99 it's a steal.

If Mastertronic can continue to produce games of the standard of Chiller for this price other software houses will be hard pushed. Software houses such as CRL and Anirog and others, which recently formed Omega Software to sell games that are not considered to be worth the average £6 — £10 price-tag, could be in for a nasty shock. Virgin has already been forced to respond with its older titles.

Mastertronic's future plans include a range of educational games featuring Mr Tronic, a character

created by one of the company's directors. Chiller programmers, including the son of a Mastertronic director, signed a licensing deal with Mirrorsoft last year, and a 64 games designer will be issued from Mirrorsoft in the near future. The designer was used for much of Chiller, and the programmers were responsible for the unexpanded Vic 20 Games Designer, distributed by Galactic Software.

Mastertronic reckons to have sold over half a million tapes since its inception just six months ago. The company is now involved in a major export drive and has set up distribution deals in the US and

several European countries. A sister company, Mastertronic Inc has been set up to handle US sales, where Mastertronic games will retail for under \$10. Average US rates in the \$20 to \$30 dollar range.

It seems that even cheap games are subject to piracy. Mastertronic has evidence of low-level counterfeiting in Hull, but the pirated copies are selling for £1.99, the same price as the originals. Perhaps low-cost software will drive the pirates out of business.

Mastertronic opened up in April and set a trend; but WH Smith's clearance sale of 50p programs is probably rock-bottom.

Home Currys

The Currys group is pulling out of business machines and closing down its Micro-C computer stores, but expanding for all its worth in home computers.

All the 530 stores in the Currys chain will stock the Spectrum and Commodore 64 and, depending on the amount of room available, the Commodore 16, Acorn Electron, Toshiba HX-10 and the BBC B.

Delivery of the Toshiba HX-10, an MSX machine, is expected around September 20, at least ten days before other stores.

The C16 is seen as being a major Christmas seller. Currys stores should have a stock of C16s by the last week in September.



Back to school for staff as Currys changes tack from business into home currys.

Currah gives 64 a voice

Currah, the people who brought you the Spectrum Microspeech speech synthesiser, has now released one for the Commodore 64.

Speech 64 was developed in conjunction with General Instruments. On installation and switching on the unit announces every keypress (including cursor up and

clear screen) and, using the SAY command, says whatever phrase follows.

In addition, two voice depths (high and low), and two intonations are available (using upper and lower case). The sounds are produced using the allophone system allowing letters to be interpreted

directly, and indeed most words.

For £29.95 the Speech 64 is a small brown cartridge and a lead that plugs into the video socket. 64 users who use a monitor will need a separate adaptor to allow them to connect a monitor as well.

Currah says that Speech 64 will be available in most high street shops for Christmas and obviously hopes to make a killing.

At the double

IBM should by now have set a new world record by bringing its new PC AT (issue 75) to the UK less than a month after its US launch.

The usually ponderous IBM last week called a press conference due to have taken place yesterday (Tuesday). A tight-lipped spokeswoman gracefully refused to say what the press conference would be about, but the chances are that IBM's new wunderkind was the subject.

The AT's US launch was several months later than planned — an international launch had been scheduled for May. IBM normally takes three months or more to announce products overseas, but in this case it seems certain to have achieved a personal best.

The AT with an Intel 80286, 256K, and 1.2Mb on diskette costs \$3,995. It has set the cat among the pigeons on the US market and has won the awed admiration of various sycophants and industry analysts. Besides PC DOS 3.0, it runs Xenix, an increasingly popular version of the multi-user multi-task Unix.

The prompt arrival of the AT contrasts sharply with the continued non-appearance here of the PCjr.

Fuller lives on

The Fuller keyboard lives. A new company, Nordic Keyboards, has bought the rights to manufacture and distribute the controversial keyboard in the wake of Fuller's crash (issue 76).

But Nordic will not be taking on Fuller's debts, which is bad news for the estimated 230 customers whose cheques were cashed by Fuller but who never received a keyboard.

With the change of owner comes an improved design for the FDS. This aims to overcome problems with the keyboard crashing programs and it alters the layout of some keys.

Nordic is a sister company to the firm that manufactured the keyboards for Fuller and it is keen

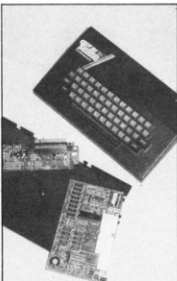
to avoid the mistakes that Fuller made.

Firstly it aims to produce sufficient keyboards to meet demand. 'We are satisfied that we can meet the heavy demand that we expect in the run up to Christmas,' said John Gray, Nordic's managing director.

Secondly, it will not be handling mail-order sales, but will distribute direct to dealers. 'We have 80 at the moment and the list is expanding,' said Mr Gray.

Although Nordic has bought the trading name, tooling, stock and copyright from Fuller's liquidator it was reluctant to take the debts.

'We lost money ourselves,' said Mr Gray, 'and we can't afford £13,000 owed to customers.'



Fuller FDS keyboard — Nordic picks up the pieces.

Long arm of BT

By Ralph Bancroft

Almost unnoticed, it has become a criminal offence to attach unapproved equipment to the public telecommunications network.

British Telecom last week denied rumours that it was planning a crack down on people using unapproved modems and other telecommunications equipment.

But fears of tougher enforcement remain, following key sections of the Telecommunications Act coming into force last month.

Under the Act it is, for the first time, a criminal offence to attach unapproved equipment. Previously British Telecom relied on the threat of disconnection to deal with offen-

ders or, in extreme cases, it took people to court for stealing its electricity.

Now a criminal prosecution can be brought by a local Trading Standards Officer, BT or the Department of Trade and Industry. Anyone found guilty will be liable to a fine of up to £2,000.

It is relatively easy for BT to find out if you're using unauthorised equipment like an unapproved modem. The line testing equipment it uses is sensitive enough to detect whether a subscriber has more than just a single phone attached to the line.

A quick check of its records would reveal whether the subscri-

ber has had the additional equipment installed by BT.

Its suspicions aroused, BT could send an engineer round to your house to check your phone.

The extent to which BT will use this procedure to launch a deliberate clamp-down remains to be seen though some people think it unlikely. 'Our engineers have got better things to do,' said one BT source.

But with the rapid increase in the use of modems by micro users and the lengthy approval procedures of the British Approval Board for Telecommunications (issue 52), BT could decide that the numbers of unapproved modems in use warrants action.

Hewson heads for Avalon

Hewson Consultants is broadening its outlook.

Last week saw the release of Avalon, an 'arcade-adventure' that's a far cry from programs like the Seidabb Attack series and Hewson's flight programs. But it's not so far from the graphics and text adventure Fantasia Diamond, now available for the BBC and Electron, though without the graphics.

Fantasia Diamond is being sold in Europe and has been translated into French and Dutch.

Avalon is easiest to imagine as a cross between Alchemist and Atic Atac. You play the part of the astral projection of Maroc the magician, moving around Avalon's 255 locations depicted in 3D.

Hewson is spurning Sinclair's Microdrive in favour of Rotronic's Wafadrive. Microdrive cartridge duplication costs were blamed for this move, together with doubts about cartridge reliability. New games will be released on cassette and Wafadrive 'wafers', and some of the existing range of Hewson software will be put onto the format.



Cortex II — build-it-yourself in 16-bits from Powertran.

Cortex II boxes 16-bit brain

Powertran Cybernetics has launched what is probably the cheapest 16-bit micro money can buy. With a starting price of only £299 plus VAT the Cortex II offers a resident Basic, a built-in Assembler/Disassembler, and interfaces for cassette, TV and RS232C. The only snag is that you must build the machine yourself from a kit. This could turn out to be a strong selling point among members of the

Soldering Appreciation Society.

A number of optional extras are available for the Cortex II including interfaces for RGB and floppy disk drives. Powertran says some experience of electronic construction is needed to put the machine together, but a help and repair service is available just in case you get stuck.

Details from Powertran on (0264) 64455

QL software explosion on the way

Third party software for the QL looks set to surface soon. Bristol-based Metacom (0272 428781) has joined in with an assembler due for launch in October for the Sinclair system.

The software houses at least seem to be taking the QL seriously as a business machine — Metacom's assembler will cost £59.95, and the little QL software about currently seems to be coming in at around £30-£50. In some cases this will be the 'new machine on the market, take the money and run' syndrome in operation, but from the sound of the Metacom package it's more a case of quality costs.

The company claims it is a full specification assembler/development kit, incorporating a full-screen editor. It's finished, and is now going through beta testing. Watch this space for a review.

W H Smith hits the road with Advance

The Advance 86 goes on the road in a series of Computer Exhibition evenings organised by WH Smith.

During the evening you'll be able to use an Advance and get advice on software and add-ons for the machine. Confirmed venues are at W H Smith shops at Bradford, Broadway (12 September); and Fairfield Halls, Croydon (31 October).

Other venues and dates have not yet been confirmed, but the exhibition will tour the country until February 1985. For further information contact 01-353 0277.

If the Croydon venue is any guide you should look out for names from the old rock tour circuit — Colston, De Montfort, and Free Trade.

Crisis looms in games trade

By David Guest

The lines of supply that put software into the shops are taking another battering as manufacturers, distributors and shop-keepers square up to each other.

Only three weeks ago Prism pulled out of software distribution. Another leading software distributor, Websters, is now coming under fire as all the links in the chain try to live with the slump in demand that has hit the software industry this summer.

Websters, the middle man between the software producer and stores like Boots and Kett's that sell

you the goods, has been criticised for the terms under which it trades. But Clive Digby-Jones, head of the company, defended its policy: 'We are an honest broker, supporting both the retailer and the supplier. If we're to continue, which we fully intend to do, we must be free to deal.'

He also issued a warning that has far-reaching implications for users in the choice and availability of software they can expect: 'Unless the retailers, the wholesalers and the manufacturers get together and everybody gives you a little it will be left to the survival of the fittest.'

The summer has been a bad one for software companies and store owners alike, and it looks as though distributors are getting it in the neck from both sides. 'A lot of people have ended up over-stocked,' said Mr Digby-Jones, who is also secretary of the Guild of Software Distributors. He contrasted this with earlier boom times when retailers enjoyed high discounts and manufacturers could reckon on high returns. Now some of the retailers are being forced out of the business, and under-capitalised software houses are feeling the pinch.

'We all face the problems of piracy, of smaller retailers going under, and larger retailers making quite heavy demands,' he said. 'Now we are facing realism.'

A crisis has been looming for the software industry throughout the summer, with some well-known names and several smaller ones going out of business. All the parties are looking to a bumper Christmas to see them out of the woods, but Mr Digby-Jones said that he was trying to set up a series of meetings to ensure that a short-term improvement doesn't obscure the seriousness of the problem.

VIEW FROM AMERICA



Screen test ahead for US micro stars

By Chris Rowley

A sign of the times, or a portent for Mac sales? The University of California's nine huge campuses plus the 19 California State campuses have signed a deal with Apple to sell Macs for as little as half its \$2,500 list price.

The lucky MacPeople will be faculty, full-time students and those staff members who need computers in their work, and their computer freak friends of course — to whom MacPeople with no love of computers have been turning all over the country to find their cheap but unwanted Mac a good home.

Elsewhere, Commodore dropped the other shoe and announced its purchase of Amiga Corporation for an undisclosed amount. Recently CBM chairman Marshall Smith was quoted as saying that Commodore would introduce a machine similar to the Mac but priced below \$1,000.

Amiga is known to have developed a 68,000-based micro with many striking features, including clear 80-column text on a normal TV set. This will undoubtedly become Commodore's new entry next year.

Certainly Commodore will need something new and zappy. At least ten major Japanese firms are about to launch MSX micros here, to be priced between \$200 and \$400. Actual retail prices could be much, much lower as the giants grapple for market share. More expensive home computers could be wiped out. So analysts view the Commodore 64 as vulnerable if the MSX hordes turn up with an adequate software catalogue.

The news of another Japanese thrust into the personal computer market came from Sharp, which is about to introduce the first 25 by 80 flat panel LCD screen.

This is a forerunner of a profusion of large area flat panel (LAFF) LCD screens we're likely to see in the next year and thereafter. Indeed a new struggle is shaping up between small US firms and Japanese majors over LAFFs. The Americans are ahead in technology at the moment, led by tiny companies such as Crystalvision of Sunnyvale, California, which will gross less than \$1 million this year but may hit \$100 million in two years' time.

These firms are working on advanced LCD systems that offer much better visibility for LCD characters. They are also racing towards full colour LCD panels and will have such devices available sooner rather than later. The crucial thing is cost. Today's bulk price on CRT screens is less than \$100 per unit. Sharp plans to market its LAFF for \$120 early next year. The question being asked in US industry is simple — what happens when LAFF colour screens become that cheap?

Crystaloid of Ohio, for instance, sells custom-tailored LCDs into the automobile industry, which is busy adding a plethora of screens to the cockpits of modern cars. Indeed LCDs are proliferating at an astonishing rate in electronic boxes of every kind. A well-equipped home may present seven or eight blinking time displays glowing on the TV, stereo, VCR all together — an unnerving sight first thing in the morning.

At the same time audio chips, like the Texas Instruments TMS 5220, have become an increasingly common component of everyday equipment. Generations of Americans have learned to pronounce English through TI's Speak and Spell. But even those accustomed to computer voices may not be ready for such items as the talking dashboard in the new Dodge 600ES. Where's all this heading?

Well, take a look at Digital Equipment's DECTalk, a \$4,000 unit that offers sophisticated speech synthesis and a lot more. DECTalk has 256K of ROM, 32K RAM, two phone jacks, two RS232C ports, an internal speaker with volume control, audio and headphone jacks, and software that pronounces English ultra-precisely. It sounds a little remote, like a Scandinavian reporting from deep space.

However DECTalk has seven different voices, including Huge Harry, Uppity Ursula, Kit the kid, and Rough Rita — who must be the first speech-synthetic bag lady. If you have a phone with letters as well as numbers, you can listen to them yourself on 0101-617 493 TALK.

Triptych taped

'Software for somebody who doesn't want to know too much about how a computer works.' That's how Triptych Publishing describes its Brainpower range, launched last week.

The company's first six products each include a training and an applications tape. The training is in how the application works, not how the computer does. Most of the titles are straight business functions and the range overall becomes a guide to good business practice.

'Application through learning'. Triptych calls it. The approach is unusual, the relevant host micros — Spectrum, BBC, Commodore 64 and soon the Amstrad — are not the most expensive business machines, and Triptych's background is encouraging. The company and its products have been born out of the London Business School.

Entrepreneur shows you what to look out for when setting up a business: Decision Maker, Project Planner and Forecaster are self-explanatory but they aren't restricted to business applications.

Numbers at Work is an exercise in numeracy with business aspects in compound interest, VAT, PAYE and the like. Star Watcher teaches identification of various objects in the heavens.

Demonstrations of the programs looked impressive and the documentation was equally so. Stuart Armstrong, managing editor of Triptych, said: 'I don't believe the screen is the place for large amounts of text.' Each pair of tapes comes with a ring-bound booklet which can be propped up and used like a flip-chart as you go through the program. It's a small point but a thoughtful touch.

Not all the programs run on all the machines. Project Planner and Forecaster are available for the BBC at £19.95 on tape and £24.95 on disk; these two, plus Entrepreneur, Numbers at Work, and Decision Maker for the 64 cost the same; and the last three, plus Star Watcher, cost £14.95 on the Spectrum.

Triptych Publishing is on Camberley (0276) 62144.



MOVING PICTURES — Computers and art came together in an exhibition at the Hamilton Gallery, in London last week — the result was moving pictures. With exhibits displayed on monitors, the three-day event had pictures produced by under 12s to the over 18s. It was the result of the Commodore International Computer Art Challenge, where 200 entrants wrote their own software using a Vic 20 or Commodore 64, to produce a still or moving picture. The winners shared £25,000 of prize money to buy Commodore equipment. And the overall winner of the competition was Hugh Riley, with his Meditation Failure and Obsessiveness pictures. As well as £1,500 worth of Commodore equipment, Hugh, from Manchester, has won a £5,000 endowment to study computer art anywhere in the world.

ACT systems run country as business takes back seat

Users of Sirius or Apricot micros fed up with word processing menus and filling out spreadsheets can now relieve the boredom by playing games for the executive.

The aptly named Electoral Services (0427 788595) has converted Simon Hessel's 'Great Britain Limited' and his new strategy game 'Inheritance' to run on these primarily business micros.

For the uninitiated, Great Britain Ltd casts you in the role of the Chancellor of the Exchequer with the task of adjusting taxation and welfare rates as well as public spending with an election on the way.

In Inheritance you are the lucky recipient of a £10,000 legacy which



you have to turn into £1 million by shrewdly putting the money into investments or gambling.

The two games are available on disk for £23 by mail order.

PCN at the PCW Show

The stage is set, the lights go down, the curtain rises, it's time for the PCW Show.

The seventh PCW Show gets under way at Olympia next week, and there's one vital piece of information you'll need—the route to the PCN stand. We're there on level 2, stand number 1002, ready to refresh the parts that other stands

won't reach with our blend of new and old, fun and hard fact, and a universal welcome.

New as in the new-look PCN, (don't miss next week's issue) but it isn't completely away with the old—the faces will be familiar even if the T-shirts have changed this year. The fun will be in the form of a games contest that could win you a

robot, a modem, or an Amstrad micro. And for the four days of the show, from September 20 to 23, Computerdoc will be on hand to answer your questions on the BBC, Oric, Spectrum and Commodore machines. His willing assistants will do what they can on others.

Back to back with us, Pan/PCN will be showing off its latest books,

and diagonally opposite on the BBC's own *Chip Shop* stand you'll be able to check the PCN Games Charts.

And if you're just looking for a place to stop and take it easy after a long days trudging round the show, step in and have a chat. There are no plans at the moment to charge you rent.

Consult the Computerdoc

At last! A doctor you don't have to make an appointment to see. With his stethoscope and soldering iron Computerdoc will be making his rounds of the UK's most popular micros on stand 1002.

On Thursday and Friday our honorary doctors will be dealing with questions on BBC and Oric micros, in sickness or in health. Over the weekend Spectrum and Commodore 64 owners can take advantage of their confident board-side manner.

If your micro isn't among these featured machines, come along anyway and Computerdoc will see what he can do for you. No reasonable requests refused, but we can't offer spare part surgery (or organ transplants for MIDI owners).



The Amstrad—the micro of the moment up for grabs.



Prism modem—one to be won every day.

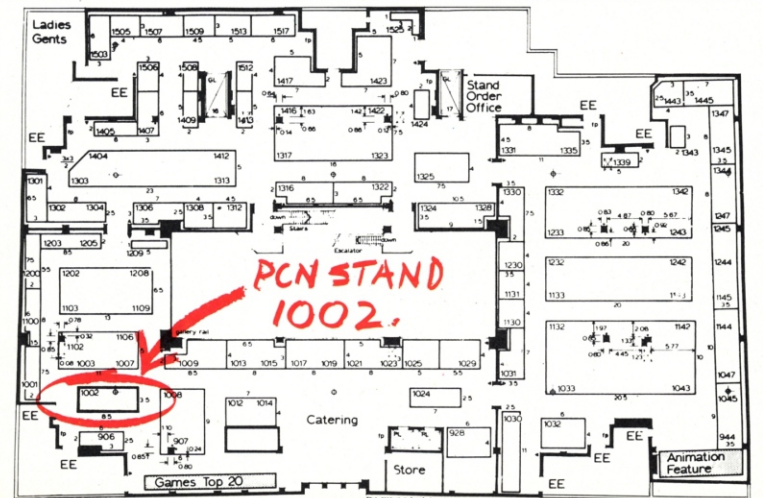
Winning ways

From the first to the last minute of the show we'll be running a custom-designed shoot-'em-up game based on the training that armed policemen go through in the lawless United States.

Get the highest score of the day and we'll award you a Prism modem for the micro of your choice before we send you out to face mobsters. For the runner-up every day there's a Prism Movit. If by the end of the show your score is still out in front, you win the star prize, a brand new Amstrad CPC464.

The game will be running on three BBC micros so you won't have to stand in a queue; all we ask you to do is fill in a form before you play—so that we know where to send the prize.

There will also be the chance to buy the game yourself at a future date when we publish it in PCN. Watch this space...



This plan is subject to alteration.

Big Mac is big softy

Apple is building up a head of steam behind the Macintosh with the launch of the 512K version and plans for a rapid expansion of its software programme.

The Big Mac is due to make its UK debut today (Wednesday), and Apple also expects to be able to offer 150 packages for the Mac line off the end of the year.

By Apple's standards this is a paltry sum — the Apple II line boasts the largest software catalogue of any micro in the world — but it is an important step in bolstering the Mac.

Due to be available this week are Filevision, PFS: File and Report, Microsoft Chart, a database called Habadex, and others that bring the

current total of packages to 50.

The production of software for the Mac is central to the machine's prospects, and from there to Apple's. Apple UK's new boss David Hancock sees the Macintosh as more than just a critical system for the company — more a symbol of the company's style. 'Mac is different,' he said. 'We can do the same things as any other company — we can count beans as well as anyone — but you've got to go further than that.'

He calls the Mac a 'power tool', a means of extending the talents of the user and, most adventurously, a product to match the personality of the person who buys it. You might have thought you were buying a

micro, but obviously there's more to it than meets the eye.

'The challenge isn't just producing software,' says Mr Hancock, 'it's producing the right type of software. People are going to create with it. Communicate with it, enjoy it.'

'What we're doing now is to try to look into the future and program for that,' he adds, meaning the direction of the company as well as the development of the Macintosh. But again the Mac serves as an example — 'it will have to change to meet changes from the users, who are going to put challenges on us when they start using the machine in their own way.'

So, after the larger Mac you can

expect communications facilities and much more software. The present offerings aren't cheap — even the games cost upwards of £25 — but Apple left the cheap and cheerful image behind a long time ago.

The Apple II family isn't being abandoned, but Mr Hancock sees it continuing to develop largely through the momentum that has built up behind it over the years. An illustration of what he means was provided last week by Herdibay which is offering a free Apple IIe and software to any user, reviewer or Inland Revenue staff member who finds an error of calculation in its payroll or Statutory Sick Pay packages for the II, IIe and IIc.

Club looks for Infomaniacs

Schools making do with only one computer to a classroom of students can turn to the newly established Infomania Club as an alternative.

Infomania is a Watford-based organisation set up to give schools and the general public access to and advice on computers. At the moment, it's in its pilot stage but if all goes well another 30 centres will be opened around the country.

The club, which is backed by Vidal Sassoon and Acorn Computer among others, has spent £35,000 buying micros — BBCs, Spectrums, and Commodore 64s — and by Christmas it hopes to add the MSX machine.

Norma McClellan said: 'We're providing a facility that schools

could not provide for themselves. As well as each child having a machine to use, we will also have a full range of software for anyone to try out. It will be up to individuals how they spend their time at the centre — but there'll always be someone here to give help and advice.'

It will cost £15 an hour for schools to use the computers and other users will be charged £15 for a year's subscription. For further information contact Infomania on Watford 55122.

If the club succeeds it will be a sorry reflection on the government's schemes to place micros in schools. But Infomania will not aim to educate.

Film explains Privacy Act

As the implications of the Data Protection Act begin to dawn on micro users a training film on the subject must be a welcome guide to a confused subject.

Produced by Video Arts, 'Data Protection, the Law and You' is primarily directed at companies. But it should be of interest to clubs and user groups as well as the self-employed and small businesses using microcomputers or word processors.

The 13½ minute film covers the key features of the new legislation and how it affects both data users (those holding computerised information) and data subjects (those on whom information is kept).

It is available for hire on video cassette for £65 for two days or £80 for seven days. A better bet for organisations that want to show the

film several times is to buy it on video or 16mm film outright for £175.

Accompanying the film there's an explanatory booklet. One copy is available free with every hiring. Additional copies can be ordered at £2.50 each or £2.00 each if 50 or more copies are ordered.

The film reflects the uncertain nature of the legislation in advance of it coming into effect (issue 76) but at least it draws attention to the subject. It should certainly be seen by anyone who keeps computerised personal data.

Video Arts offers a free pre-view service at 22 places around the country for those who may be interested in buying or hiring the film.

Video Arts can be contacted on 01-637 7288.



OUT AND ABOUT — Turning heads in London's West End last week were three Prism Topo robots making sedate progress from Bond Street tube station to the new premises of Computers of Wigmore Street. The march of the robots marked the opening of the store's new shop at 104 Wigmore Street; they'll be followed over the coming weeks by demonstrations of the systems on sale or in the pipeline. The shop has a reputation for being first — for example with Memotech systems and with retail Microdrives — and when owner Michael Litvin says he hopes to show off the Enterprise, the Commodore 16 and Plus/4, and perhaps the Acorn Business Machine, there's a good chance they'll be there.

Printing anywhere on the Spectrum screen

With reference to John Lettice's program (issue 76) I'd like to point out that printing on the bottom two lines of the Spectrum can be both fast and easy.

The key is held in the system variable DF SZ, which contains the number of lines in the lower screen. This is normally set at 2, but poking 23659 changes this. Setting DF SZ to 0 enables printing on the bottom two lines but must be reset to 2 before exiting the program or an input or the Spectrum will crash.

The following listing demonstrates:

```
10 BORDER 4
20 POKE 23659,0
30 FOR I = 1 TO 24
40 PRINT
   "oooooooooooooooooooooooooooo"
50 NEXT I
60 PAUSE 0
70 POKE 23659, 2
Andy Goodsell,
Kenley, Surrey.
```

Yes, there are a number of quick ways to produce printing on the bottom two lines of the screen — the one you propose is in the manual. In general you must be careful, or you'll crash the Spectrum. The point of poking directly to the screen is first that it is a system that allows you to print anywhere on the Spectrum's screen, and second that it promotes understanding of the way the Spectrum's screen operates. — Ed.

A blot on PCN's Atari copybook

PCN is one of the few micro magazines to devote much time to the much under-rated Atari home games. However, in issue 76, you quoted the manager of Tomorrow's World Today as saying 'Let's face it, there's no enough software for the Atari machines'.

That statement is totally untrue. The Ataris have as much software as the Spectrum, which has more software than the Commodore 64. Atari software may be expensive, but it is good.

The 600XL is the cheapest 16K home micro with a full typewriter keyboard, the 800XL is the cheapest 64K home micro, the Trak Ball the cheapest in Britain and so are the Touch Tablets and four colour printer/plotters.

So it's tough luck on Commodore (they will lose their market share of some 11).

Stephen Prince,
Ashbourne, Derbys.

Charting the ins and outs of Chartpak 64

I would like to correct your correction (Syntax Errors, issue 76). The spreadsheet which links to Chartpak 64 is called Basicpak (not Visacalc), and although Chartpak is



Would you like to see your name in print?
Here is your chance on PCN's letters page.

an American program I am glad to say that Basicalc is a home-grown product of Supersoft.

I can also help your readers with regard to interfacing Chartpak with an Epson or similar printer. We are producing a special version of Printlink 64 (the printer driver software Supersoft sells in conjunction with a low-cost cable) which will not be overwritten by Chartpak. By the time this letter appears in print it should be available.

By the way, our new Basicalc 3 (three-dimensional, bar charts, etc) can also link with Chartpak 64. Don't, however, direct your readers to us for copies of Chartpak — we're happy for Adamsoft to handle the sales.

Peter Calver,
Supersoft,
Harrow, Middx.

An outsider steals the limelight

I recently decided to buy my daughter her own home computer because of the start of computer studies at school, and so she wouldn't have to use mine. I own a 48K Spectrum.

My initial idea was to buy my daughter her own Spectrum. This I would have done, had I not come across a really amazing micro. Its sound and graphical capabilities are astounding. With sockets for Centronic printer, joysticks, video and hi-fi outputs already built-in.

The more I studied the specifications, the more I discovered how superior it was to my own humble Spectrum. So much so that I have decided to give the Spectrum to my daughter and I am keeping the new one.

You are most probably wondering, which micro I am writing about? It is a Sord MS5, which I can highly recommend.

David Hamby,
Ilford, Essex.

Fly the flag for structured programs

Structured programming is frequently misunderstood to be a practice of writing software devoid of GOTO statements. The object of applying structured programming techniques is to produce code which is well-documented, less prone to side-effects, easy to maintain and generally flexible. These are virtues that a large piece of software must possess before I would be happy with it, but a small piece of software should still be well-written.

Structured techniques can be applied to software targeted for Assembler as well as 'structured' high-level languages eg Pascal. So the banner of 'GOTO-less' programming is a nonsense.

Finally, all that structured techniques do is to provide programmers with a better idea of what they're trying to program. This understanding produces programs that work and continue to work.

J Kramer
New Southgate, London.

Magazine listings are an asset

After reading A Sturges' letter (issue 74), I could not help writing on the subject of magazine listings. He states that magazines contain 'too many' listings, and asks if it is due to 'too few people getting to grips with programming'.

Well, I enjoy typing in magazine listings a great deal, not due to my incapability of writing my own programs, but because by using listings, I can learn new ideas and change the program by incorporating my own ideas.

Is this justified?
Adrian Field,
Clacton-on-Sea, Essex.

Most certainly. Next week's issue should be right up your street. — Ed.

Junking the piracy advocates

Two letters in issue 76 particularly caught my attention.

First, Mr K Hewson's. If you wanted a motor car and could not afford it, would you feel justified in stealing one? And, if you are working, would you feel happy about a third person helping themselves out of your pay packet? When you advocate tape copying on any scale you advocate stealing from the publisher and robbing the authors of part of their income.

Is this really your idea of ethics? Next, Neil Olnor. I could not agree more, and think I know the reason. Every sport and pastime

PCN £10 Star Letter



has its lunatic fringe who buy everything they can get their hands on. The Spectrum's lunatic fringe must run into tens of thousands, a ready market for junk books.

But here is a possible remedy. Never buy a book by mail order. All decent bookshops are made for good books so be wary of a book which does not find its way onto their shelves.

Spend at least fifteen minutes browsing through a book's pages. Should the bookseller object, go to another shop.

If only all computer owners would adopt this approach, the junk books would cease to sell.

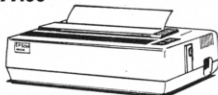
Now a final word to the less well-off. There are plenty of good games listings in the magazines. Why not enter these instead of stealing from publishers and authors? If you decide to do this take a little time to ensure that you understand every line. Then you will realise just how much hard slog goes into writing a program. And, just as important, you will learn first how to change and improve the published programs and then how to produce your own. You could soon be turning out marketable material. Then if you find your programs are being pirated, you will be hopping mad.

C Matthews,
London W2.

Air your opinions, share your experiences or just point out our occasional blunders. If you have an impressive way with words you may gain £10 for the star letter.
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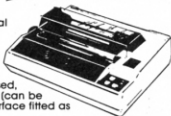
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score; bold and shadow printing;
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optional RS232C serial interface; low noise; low cost;
high reliability.

There's more software on the way from developers like
Microsoft, Lotus and Software Publishing to mention a few. And
with Macintosh BASIC, Macintosh PASCAL and our own
Macintosh Toolbox for writing your own mouse driven
programs, you could turn a few bob in your spare time.

All the right connections

On the back of the machine, you'll find built-in RS232 and
RS422 Applelike serial communication ports for connecting
printers, modems, and other peripherals without adding
expensive cards. If you wish to double Macintosh's storage
with an external disc drive, you don't have to pay for a disc
controller card — that's built in too.

Talking of extras

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Pixel packing Amstrad

Q When defining characters on my Amstrad, I found that the explanation in the user instructions was not explicit as to the order and magnitude of numbers for the symbol command. My Amstrad seems to count the rows from top to bottom and columns from right to left. This means that using the accepted convention of the bottom left cell of a matrix as (1,1), characters come out upside down and the wrong way round. Why is this?

D Carnaghan,
Watford, Herts.

A The answer is simple. Many home computers use an 8 by 8 matrix for characters. The rows of the matrix are numbered from 1 to 8 going downwards. When you want to set a pixel in the matrix, you have to work out its decimal value. This is found by the formula 2^n , where n is the bit position. Bit positions are numbered 0 to 7, from right to left. So, if you wanted alternate bits set on a row, (binary pattern 10101010) you'd convert this to decimal as $2^7 + 2^5 + 2^3 + 2^1$ (ie $128 + 32 + 8 + 2$), giving 170. This would be the value to pass to SYMBOL to define the pixel pattern for a row.

Simplifying the QL's assembler

Q I am interested in software that will allow me to get to grips with 68008 assembly language on my QL. As yet I've been unable to track down any suppliers, can you help?

S. Clifford,
Eartsfield, London.

A We know of three QL assemblers. These are available from Computer One (0233 862616) at £29.95 and Metacompo (0272 428 781) at £69.95. The official Sinclair assembler will be the one written by GST and should be available soon. GST also produces an assembler which runs under its 68K/OS, a plug-in card which replaces Sinclair's

QDOS. The card costs £99.95 and the assembler retails at £39.95. KAT (4A, Lower Grosvenor Place, London SW1) sells a QL monitor for £19.95 and GST will be producing a relocatable linker in the next few months.

Rumour has it that a SID program 'Symbolic Instruction Debugger' to run under QDOS is currently under development, but by whom, for how much and when are still closely guarded secrets.

Spectrum interrupts pause for thought

Q I've been trying to write arcade programs for the ZX Spectrum, but I believe that you first need to understand Z80 interrupts.

Why are interrupts so important?

Kim Gerhardt,
Birkenhead.

A Interrupts are exactly what they claim to be. The Spectrum's Z80 processor receives an interrupt every 20ms, and this forces it to suspend whatever it's doing and jump to 38 hex or 56 decimal. It then increments the system variable FRAMES, scans the keyboard to see if you're keying anything in, then goes back to what it was doing.

Now, although interrupts are first and foremost meant to aid the Spectrum's housekeeping, they can be very powerful for programming purposes. The reason is quite simple — because they stop the program for a short period, go and do something else, then return to the program without you noticing they provide a sort of multi-tasking facility. In the case of most micros, by the way, multi-tasking is doing two things at the same time, but not at the same instant.

The Z80 chip itself has three interrupt modes. Mode 0 allows the interrupting device to place one instruction on the data bus after the interrupt. Mode 1 jumps to 38 hex or 56 decimal, and is the one used by the Spectrum. In Mode 2 the Z80 expects the interrupting device to place one byte of data on the data bus, and this acts as the low order of the address. The Z80 takes the contents of the I, or 'interrupt vector register,' as the high byte, and the Z80

obtains from this address a further address it will jump to.

This last is the crucial point. If you can change the I register to point to your own routine, Robert is your mother's brother. Cracking this is by no means easy, but there are plenty of books around that supply the information. Try *Advanced Spectrum Machine Language* by David Webb, published by Melbourne House. It's not the easiest book to get on with, but once you've got the hang of the basics, it's invaluable.

Glad tidings for a new TRS-80 owner

Q I recently purchased a 16K TRS-80 Color Computer in Tandy's sale. I also bought a printer.

However, I'm now rather worried that I may have purchased a useless machine, as there seems to be no software. Tandy has a few ROM cartridges but these cost £17-£29 each.

I'm really only interested in utility programs, databases etc. Can anyone help with advice? Is there a user group? Or should I have known better?

R Pyatt,
Orpington, Kent.

A Unless you're prepared to do quite a lot of work on the machine yourself, yes you should have known better, but on the other hand it could have been worse. Tandy provides a fair amount of support for its machines, and you should be able to pick up a leaflet or magazine from your local store. But even the most determined of Tandy salespeople would be hard put to say the machine's ever going to achieve much in the way of third party support in this country.

As an aside, we'd just like to stress to Tandy salespeople that we're not organising a competition, so please don't phone.

Fortunately, the TRS-80 range is well-catered for as far as clubs are concerned. The National TRS-80 user group is based in Birmingham, and can be contacted on 021-747 2260. Nearer to you is the Kent TRS-80 user group on Rainham 367012, and the South West London user group on 01-394 2123. There are plenty more in the rest of the country,

should you feel like moving house.

Besides this, all is not lost. You'll have noticed Tandy is selling third party software that is converted from the Dragon, and you'll find it easy enough to use Dragon listings with just a little conversion.

There are also converter tapes around, one being Elkan Electronics' Dragon Cruncher, which converts from Dragon to TRS-80 and vice versa.

This should allow you access to the Dragon software available. You can get in touch with Elkan on 061-798 7613.

Using the Memotech USR command

Q Could you tell me how to use the undocumented USR command on the Memotech MTX 500?

The manual states that the computer jumps to the address stored at FA89H, but it does not explain precisely how to define the syntax at bytes FA85H to FA88H.

Also, can you tell me how to utilise FXPAND at FA&E and USREND at FA&I.

Mark Cytera,
Bristol, Avon.

A The MTX supports two ways of executing machine code. You can do this either by using the built-in 'Front Panel' or by using the USR function.

To use the USR function you must supply the address of the machine code routine in a Basic statement, for example LET MC=USR(nnnn). Here you're just pointing at a memory address from Basic, and the machine code is executed from there.

For example:

```
10 GOTO 20
20 LET MC=USR (16450) (DECIMAL OF 4042)
30 GOTO 30
40 REM MACHINE CODE SECTION
50 CODE
  4042 LD HL, 150
  4045 LD A, 18
  4047 ADD A, A
  4048 LD L, A
  4049 LD B, H
  . . . LD C, L
  . . . RET
```

After calling the machine code routine, the USR will return with the value of the BC registers.

And in this case the register pair is assigned to MC, and MC will equal 168.

GAMES

NEW WEEKLY CHART! NEW WEEKLY CHART



	GAME TITLE	PUBLISHER	MACHINE	PRICE	
▲	1	Decathlon	Activision	C64	£9.99
▶	2	Sabre Wulf	Ultimate	SP	£9.95
▶	3	Full Throttle	Micromega	SP	£6.95
▶	4	Match Point	Psion	SP	£7.95
▶	5	Beach-Head	US Gold	C64	£9.95
▲	6	9 Daley's Decathlon	Ocean	SP, C64	£6.90
▶	7	12 Monty Mole	Gremlin	SP, C64	£5.95
▶	8	8 Micro Olympics	Database	SP, C64, AC	£6.95
▶	9	6 Jet Set Willy	Soft Projects	SP	£5.95
▶	10	10 Lords of Midnight	Beyond	SP	£9.95
▶	11	7 TLL	Vortex	SP	£5.95
▶	12	11 Arabian Nights	Interceptor	C64	£7.00
▶	13	13 Mugsy	Melbourne	SP	£6.95
▶	14	23 Trashman	N Generation/QS	SP, C64	£5.95
▲	15	16 Jack & B'Staik	Thor	SP	£5.95
▲	16	14 Potty Pigeon	Gremlin	C64	£7.95
▲	17	19 Psytron	Beyond	SP	£7.95
▲	18	26 Olimpicon	Hitech	SP, C64	£6.95
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▼	21	18 Stop the Express	Psion	SP	£5.90
▲	22	— Cosmic Kanga	Micromania	SP	£5.95
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▲	24	29 War of the Worlds	CRL	SP	£5.95
▲	25	— Blagger	Alligata	C64, AC	£7.95
▼	26	25 Int Football	CBM	C64	£9.95
▼	27	20 Rapsallion	BugByte	SP	£6.95
▼	28	24 Automania	Microgen	SP	£5.90
▼	29	21 Strip Poker	US Gold	C64	£9.95
▲	30	— Son of Blagger	Alligata	C64	£7.95

MICROS

Top Ten over £1,000

TW	LW	MACHINE	PRICE	DISTRIBUTOR
▶	1	IBM PC	£2,390	IBM
▶	2	Apricot	£1,760	ACT
▲	3	5 Televideo TS1603	£2,640	TH
▼	4	3 Compaq	£1,960	Compaq
▼	5	4 Apple III	£2,755	Apple
▲	6	7 Sirius	£2,525	ACT
▼	7	6 Wang Professional	£3,076	Wang
▲	—	HP 85	£1,917	HP
▲	9	10 NCR Decision Mate V	£1,984	NCR
▼	10	8 Kaypro	£1,604	Kaypro

Top Ten up to £1,000

TW	LW	MACHINE	PRICE	DISTRIBUTOR
▶	1	Spectrum	£99	Sinclair
▶	2	Commodore 64	£199	CBM
▲	3	5 Electron	£199	Acorn
▲	4	7 Amstrad	£349	Amstrad
▼	5	3 BBC B	£399	Acorn
▼	6	4 Vic 20	£140	CBM
▲	7	— Amstrad	£229	Amstrad
▲	8	9 Atari 800XL	£199	Atari
▼	9	6 Memotech	£199	Memotech
▼	10	8 Orc	£99	Omic

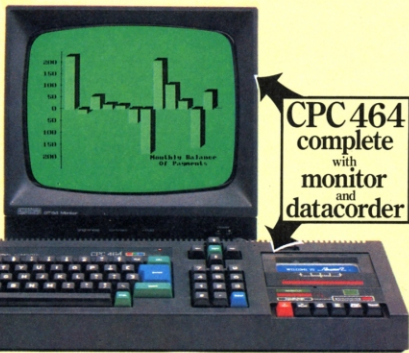
These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets during the week up to **September 6**. The games chart is updated every week.

Neither mail order nor deposit-only orders are included in these listings. The prices quoted are for the no-frills models 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.

Amstrad's new CPC464 comes with plenty of free plugs.



CPC464 green screen VDU (GT64)

You may have noticed that the press has got very excited about our new computer system.

And rightly so.

Because the new CPC464 comes complete with its own green screen VDU or colour monitor, built-in cassette data recorder, 64K of RAM, 32K of ROM, typewriter style keyboard and a very fast extended BASIC.

When you consider that the complete computer system including green screen VDU and cassette data recorder will only set you back £239, that's plenty to get excited about.

You can use the green screen version of the CPC464 with a colour TV by con-

necting the optional power supply and modulator (MP-1).

"I think the Amstrad will give a lot of sleepless nights to Sinclair, Acorn and Commodore..."

POPULAR COMPUTING WEEKLY

Other micros can't get anywhere near the CPC464's memory for the price. Over 42K is available to users, thanks to the implementation of ROM overlay techniques.

Sophisticated and complex programs are easily accommodated.

And the CPC464 offers you high resolution graphics, 80 column text display, up to 8 text windows, a graphics window and a palette of 27 colours.

"The CPC464... in two boxes and one lead includes a list of features that would shame a hybrid of the major machines."

PERSONAL COMPUTER WORLD

One of the most obvious is the quality of the on-screen graphics. Quite simply, the CPC464 beats the micro/domestic TV combination out of sight.

That's because our monitor drives each colour on the screen directly from the computer. Nothing gets in the way of the best possible picture. And you won't have tuning problems, either.

There's plenty of interest for music lovers when the 3-voice, 7-octave stereo output is fed through a hi-fi amplifier and speakers.

"The Amstrad is a powerful, fast machine, with plenty of memory, easy to program..."

PERSONAL COMPUTER WORLD

A fast growing range of Amsoft programs is already available.

The high quality software takes full



£239

Computer complete with green screen VDU (GT64)

£349

Computer complete with colour monitor (CTM640)

CPC 464
complete
with
monitor
and
datacoder

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

Arcade games, educational programs and business applications are all designed to utilise the CPC464's impressive graphics, sound and processing abilities.



Amstrad. User Club.

Join the Club.

Whether you're a games fanatic or interested in commercial applications, you'll want to sign on.

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CPC 464

User
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like the privilege card, Club binder, regular magazine, competitions for valuable prizes and contact with other Amstrad users.

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More hints and tips from our readers to make programming a little easier.

R Randhawa,
Warley,
W Midlands.

Machine code tip on the Spectrum

Readers who program in machine code on the Spectrum may be interested in the following tip. When the USR command is used, both the zero and carry flags are reset to zero and the BC register pair holds the start address of the code to be executed.

The BC register value has an obvious use, that of relocating machine code. It is easy to prove that BC holds the address called by using POKE 25000,201 (ie RET) and then PRINT USR 25000. This will print 25000, that is, whatever is in BC is printed.

The reset carry flag can also be useful since it allows the machine code to distinguish between a call to the first byte or a call to the second byte of the program. For example:

```
LABEL0D SCF
LABELNEW NOP
STARTNEW JR C,STARTOLD
STARTOLD RET
RET
```

What will happen is that a call made to the first byte of the above program causes the machine code from STARTOLD to execute, since the carry flag has been set with SCF. When LABELNEW is called, the carry flag is zero on entry and does not become set by the NOP,

hence JR,C is ignored and the code from STARTNEW is executed.

This provides a way of cutting down on the number of addresses that need to be remem-

bered. The second routine simply runs from the first address plus one.

T P Crispin,
Southampton,
Hampshire.

Charting a course in Amstrad's memory

In order to write a program for the Amstrad CPC 464 to get a screen dump you need to know how the screen is memory mapped.

This is very complicated for the modes 0 and 1 because, when the screen is poked, not only are pixels illuminated by the same address poked determines the ink used. They are not separately mapped.

If you are only interested in the 80-column mode this is a little less complicated. The first important address is 49152. Poke this with 255 and a short bar 8 pixels long will appear on the screen top left. Now POKE 49152 with 0 and the bar is extinguished. The eight pixels are configured exactly the same as a line of user defined graphics and what you get depends on the number from 0 to 255 poked to the address.

Poking the next number, 49153, with 255, does not — as one might expect — produce a second bar immediately below the first. Instead, the line produced is a continuation of the last line towards the right. The numbers 49152 to 51151 denote the top lines of each character position. This is a total of 2000 positions, ie 25 lines by 80 columns.

You would expect poking 51152 with 255 would produce a line in the second line of the first character, but this is not so. There is, in fact, a gap of 49 before we come to the next line: 51200 is the number you want.

Henceforth, everything is as you might expect. Addresses 51200 to 53199 define the second lines (from the top) in the next 2000 character positions. A jump of 49 — 53248 (or 2048 on the second line of the first character position) — brings us to the third line of the first screen character.

Below is a short program to fill the screen line by line, which includes all the useful starts and ends.

David Muir,
Bourne End, Bucks

```
50 REM
60 REM program to demonstrate
screen memory mapping on Amstrad
70 REM in 80-column mode
80 REM
90 MODE 2:CLS
100 FOR i=49152 TO 51151:POKE
i,255:NEXT:REM top lines
200 FOR i=51200 TO 53199:POKE
i,255:NEXT:REM second line
300 FOR i=53248 TO 55247:POKE
i,255:NEXT:REM third line
400 FOR i=55296 TO 57295:POKE
i,255:NEXT:REM fourth line
500 FOR i=57345 TO 59344:POKE
i,255:NEXT:REM fifth line
600 FOR i=59393 TO 61392:POKE
i,255:NEXT:REM sixth line
700 FOR i=61441 TO 63440:POKE
i,255:NEXT:REM seventh line
800 FOR i=63489 TO 65488:POKE
i,255:NEXT:REM eighth line
900 GOTO 900:REM press escape
twice to break into loop
```

You all know the feeling: after hours, days or even weeks spent on a particular problem you suddenly see the answer. Or on one of those late-night expeditions through the memory map you find some undiscovered feature. Well don't keep it to yourself — send it here. We pay £5 for every tip and routine printed and £25 for a genuine Megawave.

Send your contributions to:
Microwaves, PCN, 62 Oxford
Street, London W1A 2HG.

Simple Amstrad sound effects

The Amstrad CPC 464 computer has some advance sound and envelope commands which some users may find hard to use. To remedy this I have written some basic sound effects which can be incorporated into users' programs.

```
Alarm ENT
-1,20,4,1,20,-4,1
SOUND
1,160,800,12,0,1

Drum ENV 1,1,14,1,7,-2,4
Beat SOUND 1,0,
-1,0,1,0,6

Fading ENV 2,1,14,1,14,
tone -1,20
SOUND 1,140,-1,0,2

UFO ENT -2,6,-1,1,1,6,1
SOUND
1,200,400,14,0,2
```

Keeping tabs on your Oric variables

As the Oric Atmos recognizes only the first two characters of a variable name, it is useful to know what has been used so far, especially on long programs.

This short routine uses no variables itself so will not add to the list it produces.

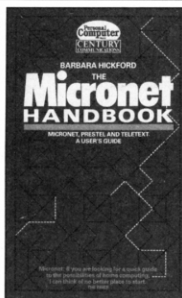
It may be joined onto the end of any Basic program, and lists out all the run-time variables used so far. The length of the routine is less than 250 bytes so should not give any 'out of memory error' when used with a large program.

The routine is run by a GOTO 63992, as RUN would clear all variables in memory.

D Wieckowski,
Burnham, Berks.

```
63992 DOKE (0),DEEK (#9C)
63993 PRINTCHR$(PEEK (DEEK (0))) ; CHR$(PEEK (1+DEEK (0))) ;
63994 IFPEEK (DEEK (0)) > 128 THEN PRINT " ";
63995 IFPEEK (DEEK (0)) < 128 AND PEEK (1+DEEK (0)) > 128 THEN
PRINT " ";
63996 IFDEEK (0) > DEEK (#9E) AND PEEK (DEEK (0)) > 32 THEN
PRINT " dim "; GOTO 63998
63997 PRINT:DOKE (0), (7+DEEK (0)); GOTO 63999
63998 PRINT:DOKE (0), (DEEK (0)+DEEK (2+DEEK (0)))
63999 IFDEEK (0) < DEEK (#A0) THEN GOTO 63993 ELSE STOP
```

More books on getting the best out of your micro. Our reviewers tell you if the claim is justified.



'The Micronet Handbook' by Barbara Hickford, published by PCW/Century at £6.95 (paperback, 105 pages).

It really gets up my nose when people talk about Micronet when they mean Prestel. This book compounds the error by lumping in teletext (Ceefax, Oracle, etc) under the Micronet name as though everything else involved with videotex was merely peripheral to it.

Micronet is only a small part of the wide and wonderful world of Prestel and it is not the only information service on Prestel that caters for micro users.

Indeed, one of the deficiencies of this book is the omission of any reference whatsoever to Viewfax, another database on Prestel Microcomputing that in some respects is considered as good as or better than Micronet.

The author does offer a quick overview of the rest of Prestel but it is a cursory examination that does not do justice to the variety of services that are available and may not be of interest to someone with a micro and appropriate modem.

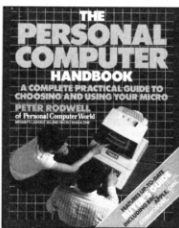
Perhaps one should not complain too much of the bias in the book as the author wrote it with the cooperation of the Micronet staff who have an obvious axe to grind.

David Babsky, Micronet's Editor, warns in a foreword to the book that some of the information on Prestel page numbers and services offered may be out of date. Unfortunately, he is right. Information is out of date and hopelessly so in some cases.

At £6.95 for 105 pages this

book is grossly overpriced for what is little more than a publicity booklet for Micronet.

It is difficult to see who the book is aimed at unless, of course, the book will be given away free to everyone who parts with good money to become a subscriber to Micronet. **RB**



'The Personal Computer Handbook' by Peter Rodwell, published by Dorling Kindersley at £8.95 (paperback, 208 pages).

As Christmas approaches you're probably thinking about buying a micro as a present — but which one? That's where a book like *The Personal Computer Handbook* is supposed to step in.

In 208 pages, Peter Rodwell takes you inside a computer and finishes up with a round-up of the different machines. Each chapter is divided into modules with sub-headings which makes it easy for you to find your way around the book.

Written in a clear informative style, a newcomer to the micro arena will find this paperback a pleasure to read. With clear labelled diagrams and photographs, you learn what a computer is, how to set up the necessary equipment, how the computer works plus bits and pieces on add-ons and software.

One of the major problems with a book of this type is that it becomes out-of-date so quickly. The industry moves at such a pace that it's virtually impossible to list all the machines available at one time. Not only that, but recently there's been a spate of bankruptcy among manufacturers, so that some machines no longer exist when a book is finally published.

At £8.95 this handbook seems a bit expensive as an initial outlay in deciding what computer to buy. But as a start it

offers the layperson a wealth of information in a condensed form. **SG**



'Commodore 64 Sound & Graphics' by Peter Falconer, published by Melbourne House at £6.95 (paperback, 157 pages).

We live in times of increasing sophistication in the computer world — hardware, software and peripherals are all growing closer to our ideals. The same also applies to computer books. While the program listings format, the barely helpful sub-routines format and the rewritten manual format appear with monotonous regularity, a brave new world of books is dawning.

Among these new-style titles is this one from Melbourne House. Yes, there are listings, yes there are explanations but, by God, it's practical. You might actually want to use this book.

Everyone knows you can't sell a game written in Basic, but everyone also knows that writing long machine code programs is akin to do-it-yourself dentistry. In that context Peter Falconer's book is to be welcomed with open arms.

Here in one source is a collection of ready-to-run routines that take much of the pain out of writing machine code games. If you've ever wanted superfast fine scrolling, or those stunning soundtrack effects, or interrupt-driven graphics it's all here.

The format of the book has much to recommend it — Mr Falconer starts with a game written in Basic and then introduces the necessary machine code routines to give it some speed and class.

In addition, you'll also find a collection of utilities that can be

applied to any game or program including a faster interrupt scheduler that makes background music and windowing easy (well, relatively).

Have no illusions, machine code programming is never as easy as Basic no matter how many utilities, aids or attempts you have, but it isn't as hard as many people assume. **PW**



'The Adventurer's Companion' by Mike & Peter Gerrard, published by Duckworth at £3.95 (paperback, 118 pages).

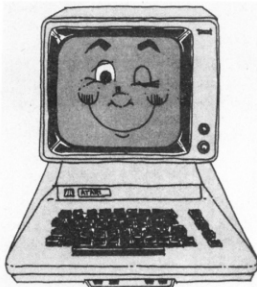
Like the pioneers of the original wild west (before cowboys and settlers), the intrepid brothers Gerrard have forged ahead into unknown territory and opened the way for us to follow.

Or so they would have us believe. I can't see any but the laziest adventure letting someone else do their exploring.

This book won't be much of a companion unless you happen to be playing *The Hobbit*, *Colossal Cave Adventure*, *Adventureland* or *Pirate Adventure*, because these are the only adventures covered. However, they are covered in great detail.

Each chapter starts with an alphabetical list of the 'problems' encountered in each game. The solutions are also given alphabetically rather than chronologically to prevent the reader from simply working straight through the game with the book. Maps are provided in the Appendix for those who are lost or unsure of what lies beyond.

For the four games discussed the subject is well presented and useful. But I certainly won't be spending money on this one. **LB**



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Pitman

Frogger fans can hop again in some web-foot frog-marched fun from G Creasey.

Don't bank on it

It had been a long day for Security Operative Winston Asimov. Stuck outside the Intergalactic Megabank, pacing back and forth, with nothing to talk to but the security robots.

'Allo...allo...allo. I...should... cocoa... John,' one grated metallically as it whirred past. 'User-friendly indeed,' muttered Winston, 'Artificial flipping intelligence!' But wait — he could hear sirens in the distance — there was some sort of commotion at the other side of the M6000 Southampton to the New York North Arterial by-pass.

Peering through the streams of traffic Winston could see a small figure bobbing and weaving across the highway — a bank robber! The figure was getting closer, coming towards him. A security robot grunted 'you're... nicked... John' and lunged at the robber, but missed. Winston saw the figure's face clearly now — 'Good grief,' he thought, 'it's got a head on it like a frog...'

And then everything went black...

Bank Raid casts you as Ronnie Robber. You and your assistants have accidentally parked your getaway vehicle on the wrong side of the M6000 Southampton to New York North Arterial by-pass, and as the Intergalactic Megabank shuts in ten minutes you don't really have enough time to drive 500 miles to the nearest service area and double back.

Fortunately, you used to play a game called Frogger back in the Twentieth Century, and you reckon you remember enough of the tactics to be able to dodge your way across the highway and get to the bank. Praying that there won't be a queue, you dive into the stream of traffic... **PCW**

Program notes

- 30** Sets up the variables z,x,v and w which are used with the machine code pixel scroll routine, then pokes in the data for the scroll routine (lines 80-100).
- 120-160** Set up the user defined graphics for the traffic, guards and Ronnie Robber.
- 170** Sets up the variables for the main program loop. The coordinates of Ronnie's start position are a,b.
- 180** Prints score line.
- 190-250** Print the traffic and motorway lanes.
- 280-350** Main loop. Line 290 checks to see if you've hit anything, while 330 and 340 move Ronnie up and sideways respectively.
- 360-390** The *you're dead* routine. 370 checks the lives you have left.
- 420** High score checking routine.
- 450-480** Print instructions.



SPECTRUM GAME

```

10 REM *BANK RAID*
20 REM By G.Craessey
30 LET z=50010: LET x=50070: LET v=50001
: LET w=50068: LET hs=0: PAPER 0: INK 7: B
RIGHT 1: BORDER 0: CLS : GO TO 00
40 POKE w,3: LET j=USR x: POKE w,3: LET
j=USR x: POKE v,5: LET j=USR z
50 POKE w,7: LET j=USR x: POKE w,7: LET
j=USR x: POKE w,7: LET j=USR x: POKE v,9:
LET j=USR z: POKE v,9: LET j=USR z
60 POKE w,11: LET j=USR x: POKE v,15: LET
T j=USR z: POKE v,15: LET j=USR z: POKE w,
17: LET j=USR x: POKE w,17: LET j=USR x
70 RETURN
80 RESTORE 90: FOR n=50010 TO 50066: REA
D a: POKE n,a: NEXT n: FOR n=50070 TO 5012
6: READ a: POKE n,a: NEXT n
90 DATA 58,81,195,7,7,7,71,62,175,152,50
,81,195,38,8,205,119,195,50,81,195,61,50,8
1,195,29,32,243,201,22,32,205,137,195,203,
30,35,21,32,250,208,205,137,195,203,254,20
1,50,81,195,71,14,0,205,170,34,201
100 DATA 58,148,195,7,7,7,71,62,175,152,5
0,148,195,30,8,205,129,195,50,148,195,61,5
0,148,195,29,32,243,201,22,32,205,197,195,
203,22,43,21,32,250,208,205,197,195,203,19
8,201,50,148,195,71,14,255,205,170,34,201
110 GO TO 440
120 RESTORE 130: FOR n=USR "a" TO USR "q"
+7: READ a: POKE n,a: NEXT n
130 DATA 24,60,60,24,126,24,36,36,0,3,4,4
,63,33,45,12,0,224,48,24,252,132,180,48,0
,7,12,24,63,33,45,12,0,192,32,32,252,132,18
0,48
140 DATA 12,4,60,204,255,56,214,198,40,32
,60,51,255,20,107,99,15,17,33,255,255,255,
223,20,255,255,255,255,255,254,255,28
150 DATA 255,255,255,255,255,127,255,56,2
48,136,132,255,255,255,251,56,56,56,16,124
,16,40,40,40,28,62,127,73,73,127,93,85
160 DATA 195,255,90,102,102,90,255,195,25
5,255,195,195,195,255,255,255,255,219,219,
219,219,255,147,0,0,204,51,204,0,0,0
170 LET r=0: LET i=3: LET s=0: LET a=19:
LET b=15
180 PRINT AT 0,0: INK 7: PAPER 1: SCORE
= HI= ROBBERS= "
190 PRINT AT 1,0: INK 1: "PPPPP PPPPP PPP
PPP PPPPP PPPPP"
200 PRINT AT 3,0: INK 4: " N N N N
N N N N "AT 5,0: INK 3: "00000 0
0000 00000 00000 "
210 PRINT AT 7,0: INK 5: " M M M M
M M M M "AT 9,0: INK 7: " L L L L
L L L L L L "
220 PRINT AT 11,0: INK 3: " 00000 0000
0 00000 00000 "AT 13,0: INK 0: PAPER 4:
"
230 LET a$="00000000000000000000000000000000
000": INK 2: PRINT AT 2,0: a$AT 4,0: a$AT
6,0: a$AT 8,0: a$AT 10,0: a$AT 12,0: a$

```

```

240 INK 7: PRINT AT 14,0: "-----
-----"AT 16,0: "-----
-----"AT 18,0: "-----
-----"
250 PRINT AT 15,0: INK 6: " DE G G
DE JK DE G DE "AT 17,0: INK 5: " F BC
HI BC F BC HI"
260 FOR n=19 TO 20: PRINT AT n,0: INK 0:
PAPER 4:
: NEXT n: PRINT AT 21,0: PAPER 2: INK 7: "
B A N K R A I D "
270 LET al=a: LET bl=b: PRINT INK 7: PAPE
R 1: AT 0,16: hs: AT 0,29: 1
280 PRINT AT 0,0: PAPER 1: INK 7: BEEP
.001, (RND*20)+30: PRINT INK 0: PAPER 0: AT
a,bl: " : GO SUB 40
290 IF SCREEN# (al,bl) <> " THEN GO TO 36
0
300 IF al=1 THEN IF bl=5 OR bl=12 OR bl=1
9 OR bl=26 THEN GO TO 390
310 IF al=1 THEN GO TO 360
320 PRINT AT al,bl: PAPER 0: INK 0: "A": L
ET a=al: LET b=bl
330 IF INKEY#="0" THEN LET a3=a-2: LET s
=s+10: BEEP .003,50
340 LET bl=bl+(INKEY#="2" AND bl<31)-(INK
EY#="1" AND bl>0)
350 GO TO 280
360 FOR n=1 TO 50: PRINT AT al,bl: OVER 1
: INK 0: "A": BEEP .005,n/2: BEEP .001,RND#
60: NEXT n: OVER 0
370 BEEP 1,-30: LET i=1-1: PRINT AT 0,29:
PAPER 1: INK 7: 1: IF i=0 THEN GO TO 420
380 LET a=19: LET b=15: GO TO 270
390 PRINT AT a,bl: INK 0: " : FOR n=1 TO 4
: FOR m=0 TO 6: PRINT AT al,bl: INK m: "A":
BEEP .005,m: BEEP .003,m*2: NEXT m: NEXT
n: LET s=s+100: LET r=r+1: IF r=4 THEN GO
TO 410
400 GO TO 380
410 FOR n=0 TO 30: BEEP .005,n: BEEP .001
,n*2: BEEP .002,n*2: NEXT n: LET r=0: LET
s=s+150: LET a=19: LET b=15: GO TO 180
420 FOR n=1 TO 100: NEXT n: FOR n=-10 TO
-20: BEEP .5,n: NEXT n: IF s>hs THEN LET h
s=s: BEEP .005,10: BEEP .05,20: BEEP .05,30
: PRINT M0:1 FLASH 1: "A NEW HIGH SCORE !!!
!"
430 FOR n=1 TO 500: NEXT n
440 BEEP .1,10: CLS : PRINT PAPER 2: INK
7: AT 0,0: " B A N K R A I D "
"
450 PRINT AT 3,0: INK 4: "You, Ronnie Robb
er, and your assistants, must steal all
the money from the City Bank."
460 PRINT " ' INK 5: "Unfortunately, to do
this you must cross the road, avoid the
moving doorways, keep away from the secu
rity guards, the electronic Ghostie
bots and the burglar alarms."
470 PRINT " ' INK 7: "USE: <-1 2->
0-FORWARD"
480 PRINT AT 21,0: PAPER 1: INK 7: "PRE
SS ANY KEY TO PLAY GAME " : PAUSE 0: BEEP
.05,10: BEEP .05,15: CLS : GO TO 120

```

Rebalance this sh

The BBC Micro can now give an astonishing new account of itself.

Because with Acornsoft's new I6K ViewSheet ROM, it develops a head for figures which can save you a vast amount of arduous brainwork.

Imagine, for instance, that you had to make several adjustments to a balance sheet.

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As simple as pencil and paper.

ViewSheet is a computer-based spreadsheet, the figure processing version of a word processor.

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Because ViewSheet comes with an easy-to-follow reference card.

It enables even the most inexperienced users to feed all the data they need to use, and store on disc or cassette, into the BBC Micro.

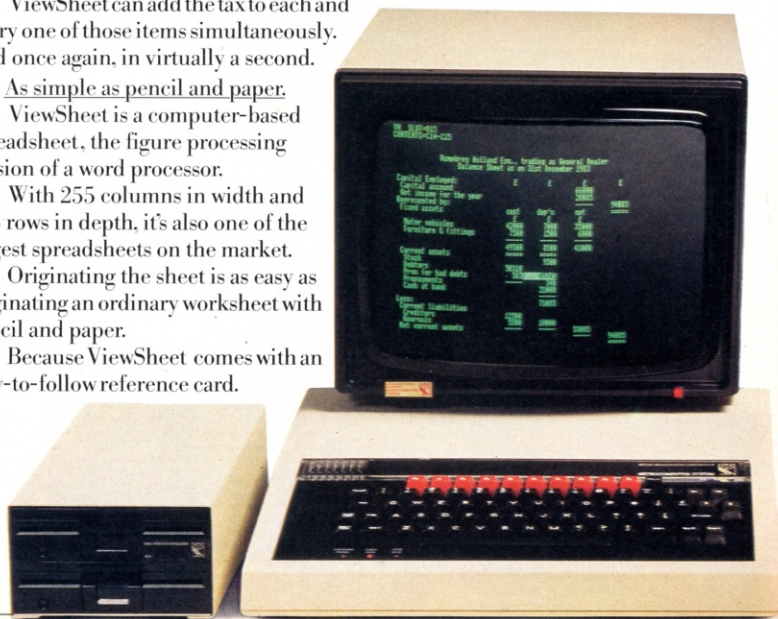
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The sheer size of ViewSheet makes it impossible for the whole sheet to be visible on the monitor at once.

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the screen at the press of a key.

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ViewSheet is also compatible with Acornsoft's View word-processing package. This enables you to produce reports and documents which combine text and figures.

In addition, you can use ViewSheet in any screen mode,

making the most of the BBC Micro's potential. And if you use it with the 6502 second processor, you'll have no less than 30K of workspace in any mode.

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key card and reference card, it'll soon have you juggling figures at lightning speed.

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ViewSheet's operations and functions in brief.

The operations supported by ViewSheet are: addition, subtraction, multiplication, division, exponentiation and bracketed operations.

And the functions supported are: ABS, ACS, ASN, SIN, SGN, RAD, ATN, COS, DEG, EXP, INT, LN, LOG, PL, SQR, TAN, MIN, AVERAGE, MAX, CHOOSE, LOOKUP, COL, IF, READ, ROW and WRITE.

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There's more to Atari sound than meets the ear. Frank O'Dwyer shows you how it's done.

Atari tunes up

There is more to the Atari sound system than Basic's SOUND command. For instance, two channels may be combined to give a nine octave range instead of the normal five octaves. It is also possible to raise or lower the range available to each channel selectively so that channel one, for instance, plays in a very high register while channels two to four play in a low register. In addition, special effects may be achieved by filtering channels or altering the way in which distortion is arrived at.

As you might expect, all this power must be accessed using POKES, since there are no Basic commands to use the extra facilities. Unfortunately, as soon as you reconfigure the sound system using a POKe, the SOUND command becomes obsolete and you must use POKe for this too. This is because the SOUND command will reconfigure the system back to normal. An equivalent POKe to the SOUND command is clearly the first thing required. Actually it should be two POKes; say we want to convert the command:

```
SOUND CHAN,PITCH,DISTORT,VOLUME
```

Then we could write:

```
POKE 53760+CHAN*2,PITCH: POKe 53761
+CHAN*2,DISTORT*16+VOL
```

Unlike the SOUND command, however, there is no need to specify pitch, volume, and distortion together. Suppose you only want to vary the pitch of a note, having already set the volume and distortion. You could write:

```
POKE 53761,168: FOR PITCH=0 TO 255: POKe
53760,PITCH: NEXT PITCH
```

This will run more quickly than the equivalent Basic:

```
FOR PITCH=0 TO 255:SOUND 0,PITCH,
10,8:NEXT PITCH
```

All the extra functions are accessed by POKing location 53768, sometimes referred to as AUDCTL or 'Audio Control'. The values to POKe here are summarised in Table 1. For example, if you want a high pass filter on channel two you POKe a 2 here (POKe 53768,2).

If you want to select more than one option, simply add up the code numbers for each option and POKe the result. For example, to select a high pass filter on channel one (code number 4) and a 1.79MHz clock on channel one also (code number 64), you would write POKe 53768,64+4, or just POKe 53768,68.

Now you know how to select sound functions, what do they mean?

Clocks

There are three clocks available, 15KHz, 64KHz (normal) and 1.79MHz (the full speed of the 6502 processor). The Basic command SOUND uses the 64KHz clock to produce notes. If you select the 15KHz



clock, all notes sound lower than usual, while the 1.79MHz clock makes them sound much higher. You can only clock channels one and three with the 1.79MHz clock (channels 0 and 2 in Basic), but all channels may be clocked with the 15KHz clock.

Program 1 demonstrates the notes available at each clock rate.

Special effects

If you select code number 128 a nine-bit poly will be used in place of a 17-bit poly. 'Polys', or polynomials, are used for noise generation. There are three polys normally, 4, 5 and 17 bits long.

If you use a distortion value other than 10 or 14 in a SOUND statement then you are, whether you know it or not, using the poly counters. The 17-bit poly has no apparent repetition in the sound produced, whereas

Table 1: Special sound functions
Code number purpose

128	Selects 9-bit poly in place of 17-bit poly
64	Clock channel one with 1.79MHz
32	Clock channel three with 1.79MHz
16	Join channels one and two (nine octaves)
8	Join channels three and four (nine octaves)
4	Insert high pass filter in channel one, regulated by channel three
2	Insert high pass filter in channel two, regulated by channel four
1	Use 15KHz clock
0	Revert to normal functions

TABLE 2: Important memory locations

Name	Address	Purpose
AUDF1	53760	Sets pitch for channel one
AUDC1	53761	Sets volume and distortion for channel one
AUDF2	53762	Sets pitch for channel two
AUDC2	53763	Sets volume and distortion for channel two
AUDF3	53764	Sets pitch for channel three
AUDC3	53765	Sets volume and distortion for channel three
AUDF4	53766	Sets pitch for channel four
AUDC4	53767	Sets volume and distortion for channel four
AUDCTL	53768	Selects special sound functions (see Table 1)

the shorter polys produce audible repetition. So selecting the 9-bit poly makes the pattern in the sound more evident. The distortion values that use the 9/17-bit poly are 0 and 8. Only these modes will be affected by selection of the 9-bit poly. Program 2 shows the effect in action.

Other effects are possible by using a high-pass filter on either channel one or two. High pass filters only allow frequencies (or notes) higher than a particular value to pass through. On the Atari, these values are governed by the notes being played by channels three and four respectively. It is normal to set the distortion of

both channels to the same value and then to experiment with the pitch values to achieve special effects, since the results are very unpredictable. Try Program 3 to get an idea of what the high pass filter does.

A nine-octave range can be achieved by joining two channels to form one. For example, you could join channels one and two. The disadvantage is that you then have less channels to work with, but this is rarely a problem since most programs do not use more than two channels for sound. To set the pitch on the nine-octave channel you need to use two POKES instead of one. If you POKe the pitch register of the first

channel you make a fine adjustment in the pitch, while the second channel's pitch register makes a coarse adjustment.

Program 4 allows you to use a joystick to adjust the pitch of a nine-octave channel. Move the joystick up to raise the pitch and down to lower it. Press the trigger to make fine adjustments.

Note that the program also sets the clock to 1.79MHz to get a more useful nine-octave range. If you were to use the normal clock or the 15KHz clock you would be able to take the pitch so low that the note would lose its musical quality and just consist of infrequent clicks. **PCN**



Program 1 - Effect of clock changes

```
10 REM PROGRAM TO DEMONSTRATE AVAILABLE NOTES WITH
15KHZ, 64KHZ AND 1.79MHZ CLOCKS
20 GRAPHICS 0: POKE 752,1: SOUND 0,0,0,0: REM TURN
OFF CURSOR AND SOUND
30 POSITION 14,5: PRINT "NORMAL TONES (64KHZ
CLOCK)": GOSUB 1000: REM TRY ALL PITCHES
40 POKE 53768,1: REM USE 15KHZ CLOCK
50 PRINT "LOW TONES (15KHZ CLOCK)": GOSUB 1000:
REM TRY ALL PITCHES
60 POKE 53768,64: REM USE 1.79MHZ CLOCK ON CHANNEL
ONE
70 PRINT "HIGH TONES (1.79MHZ CLOCK)": GOSUB 1000:
REM TRY ALL PITCHES
90 END: REM TURN OFF SOUNDS
1000 POKE 53761,168: REM PURE TONE, VOLUME 8
1010 FOR P=0 TO 255: POKE 53760,P: POSITION 2,5:
PRINT "PITCH:";P: " ": NEXT P: SOUND 0,0,0,0: REM
TURN OFF SOUND
1020 RETURN
```

Program 2 - Effect of 9-bit poly

```
10 REM PROGRAM TO DEMONSTRATE EFFECT OF 9-BIT POLY
ON DISTORTION MODES 0 & 8
20 POKE 53768,200: REM LOW PITCH
30 GRAPHICS 0: PRINT "DISTORTION 0, 17-BIT POLY":
POKE 53760,0: POKE 53761,0: FOR N=1 TO 2000: NEXT
N
40 PRINT "DISTORTION 0, 9-BIT POLY": POKE 53760,128
: POKE 53761,0: FOR N=1 TO 2000: NEXT N
50 PRINT "DISTORTION 8, 17-BIT POLY": POKE 53760,0:
POKE 53761,136: FOR N=1 TO 2000: NEXT N
60 PRINT "DISTORTION 8, 9-BIT POLY": POKE 53760,128
: POKE 53761,136: FOR N=1 TO 2000: NEXT N
```

Program 3 - High pass filter

```
10 REM PROGRAM TO DEMONSTRATE HIGH PASS FILTER ON
CHANNEL ONE
20 GRAPHICS 0: POKE 53761,168: POKE 53765,168: REM
PURE TONES
30 POKE 53760,100: POKE 53764,50: REM SET PITCHES
40 PRINT "NO FILTER ON SOUND": POKE 53760,0: FOR
N=1 TO 2000: NEXT N
50 PRINT "FILTER ON SOUND": POKE 53760,4
60 FOR N=1 TO 2000: NEXT N
```

Program 4 - Nine octave range

```
10 REM PROGRAM USING TWO CHANNELS TO ACHIEVE NINE
OCTAVE RANGE
20 POKE 53768,80: REM JOIN CHANNELS ONE AND TWO,
AND USE 1.79MHZ CLOCK
30 POKE 53761,168: REM PURE TONE, BUT ZERO VOLUME
40 POKE 53763,168: REM PURE TONE, VOLUME 8
50 GRAPHICS 2+16: FINE=100: COARSE=0
60 PRINT#6: "USE JOYSTICK TO: PRINT#6:
"RAISE/LOWER PITCH": PRINT#6: "HOLD TRIGGER DOWN":
PRINT#6: "FOR FINE ADJUSTMENTS"
70 POSITION 0,0: PRINT#6: "FINE: ";FINE: " ":
PRINT#6: "COARSE: ";COARSE: " ":
80 POKE 53760,FINE: POKE 53762,COARSE
90 S=STICK(0): T=STRIG(0): IF S=15 THEN 90
100 ADD=-1: IF S=13 THEN ADD=1
110 IF T=0 THEN FINE=FINE+ADD
120 IF T=1 THEN COARSE=COARSE+ADD
130 IF FINE<255 THEN FINE=255
140 IF FINE<0 THEN FINE=0
150 IF COARSE<255 THEN COARSE=255
160 IF COARSE<0 THEN COARSE=0
170 GOTO 70
```

A FISTFULL OF HAND-HELDS



Computers are getting smaller every day. Stuart Cooke looks at three micros that literally fit in your hand.

With technology galloping ahead at a rapid pace, hand-helds are getting smaller, thinner and cheaper.

Psion and Epson have produced the latest machines and, with the current trend, calculators could become a thing of the past as programmable computers take their place. The main reason for this shift is that these wallet-sized computers have portable processors which can be used as a database or to work out complicated calculations. And many allow users to write programs of their own.

Psion, known by every computer buff for its involvement with Sinclair Research and its production of software for the Spectrum and the QL, has launched its own computer.

Psion claims the Organiser is 'Your personal database for vital day to day information with the programming power of a desktop microcomputer.' This is probably over generous: the Organiser does allow you to store and retrieve data as with a database but the power of a desktop is stretching it.

First impressions

The Organiser is supplied in a black plastic case that slides over the keyboard when the computer is not in use. It measures 14cm by 8cm, slightly smaller than the average paperback book, and even though it does look large it can fit quite easily into an inside jacket pocket.

The bottom of the machine sports what Psion calls 'solid state drives'. These are spaces for two slot-in program packs. Inside the program pack is a standard EPROM. This means it's possible to get a lot of storage on one drive — one 8K data pack is supplied with the machine and you can purchase more of these as you need them.

The display is a 15 character LCD. When the machine is first powered up this displays a 24-hour real-time clock and calendar.

Documentation

The small pocket-size manual's 42 pages contain all the information you need to use the machine, and it's all easy to find.

Chapters deal with each separate keyboard in detail. The manual for this micro is no more complicated than one for a simple pocket calculator.

In use

A quick examination of the machine reveals that the keyboard is not laid out in a standard QWERTY format but is alphabetic. Great if you've never used a typewriter but it leads to reciting the alphabet to yourself if you have.

Once powered up, the clock is displayed. Unfortunately, even though there is a 'on' key, there's no 'off'. Turning the machine off requires a minimum of three key presses so the idea of quickly and conveniently looking at the time is spoilt.

Pressing the Mode key shows you all the main functions you can use, and Enter allows you to type data into the machine. If you then press the Save key followed by Execute the information typed is stored in the machine for retrieval at will. Another push on the Mode key reveals the word *off*; now press Execute to switch off the machine.

Calc is the next main function. This allows the user to enter arithmetical calculations, making the Organiser a glorified pocket calculator.

The Find key allows you to enter a sequence of characters, and the machine

then searches through all the strings stored in the EPROMs and finds the first one that contains a match. This is where one of the main limitations of the Organiser comes to light.

Supplied with the review machine was a datapack with a database containing a number of restaurants in the London area. Say you wanted to find a Chinese restaurant: you would type in 'Chinese' to the Find prompt after which the machine would list all the Chinese restaurants in its memory. If, however, your Chinese restaurant had to be in a certain area you'd be out of luck. You can't search for a string using two parameters, so you must look through all the entries till you find one in W1, for example. Of course you could always search for W1 and then cycle through entries looking for a Chinese one.

The main problem with the data packs is that they are actually EPROMs. It is very simple to store data in them, remove them from the machine and put it in your pocket until you need the information stored on it. The problems occur when you want to delete information. You can mark the data as deleted but it still takes up some of the valuable memory in the pack. The only way to reclaim this lost data is to erase the EPROM.

This can be done either by buying Psion's eraser which clears two EPROMs at once, or send your data pack to Psion for erasure, which costs you money. Of course, erasing an EPROM wipes out all the data held in it.

Program packs

The Organiser has no built-in programming language. If you wish to write your own routines for use with the machines you need to purchase one of the program packs available. All the program packs contain a number of new routines for the computer such as *PROG* which allows you to write a program, *CAT* which tells you what programs are stored and *RUN* which executes a named program.

The language used on the Organiser is one of Psion's own design called *POPL*. This appears to resemble that tried and tested language Basic. However, *POPL* has no line numbers and all *GOTOS* are made to labels. Commands exist to print out on the display, input characters from the keyboard, perform loops and compare data. It is even possible to write programs that call other programs, passing parameters between them.

POPL is easy to use, though the small display on the computer makes it difficult to remember what you've typed and to edit the programs.



Each of the program packs has a number of routines already added to the Basic. A science pack contains many scientific functions and programs of use to a scientist. The Finance pack, supplied for review, contained programs to work out mortgage repayments, cashflow repayments etc.

As well as the programs, a number of science and maths functions have been added which you can use with your programs such as *SIN*, *COS* and *FAC*.

The supplied pack being the finance one doesn't mean you can't now write scientific programs; it just means you don't get the extra programs supplied with the science pack.

Verdict

Even when all the gripes about no 'off' switch and the problems with the datapacks are taken into consideration the Organiser is still a simple to use and convenient computer. I doubt I'll be carrying a diary or address book with me in future.

29 **N**o bigger than a wallet, the Casio FX-750P is most definitely a pocket computer.

First impressions

Most of the low-priced pocket computers have a small amount of internal RAM with the option of purchasing an additional RAM pack to fit inside the machine. Not so the latest machines coming out of the Casio stable. The FX-750P has a couple of "drives" built into the front edge. These drives are used for insertion of RAM cards, as the machine has no internal memory of its own.

Storage

Two types of RAM card are available for the 750, the RC-4 gives 4K of memory while the RC-2 gives 2K. Both types of RAM card look exactly alike, being slightly larger than a book of matches. The RAM cards have their own internal battery and so can be removed from the machine without fear of losing the programs stored in them.

Programs and variables are stored in a very useful fashion. If you have two RAM cards installed in the machine, programs are stored in the card in slot 0 and all data is stored in the card in slot 1. The manual shows you how this can be used to advantage. If, for example, you needed to manipulate a large amount of sales data you could install the card to hold the data in slot 1 and have a number of different cards for use in slot 0. These cards could hold programs for inputting the data, sorting

the data and searching the data. The other way of using this feature would be to have one program which would use a number of different sets of data stored on separate cards.

In use

Writing programs for the FX-750P couldn't be easier — you just program in Basic.

The Basic supplied is a fairly standard implementation, but there are quite a few additional useful extras. Anyone who requires a machine that performs statistical calculations will not be disappointed. Commands exist to SUM data and calculate standard deviation as well as other statistical functions. Engineers are also catered for and all the standard trigonometric functions exist together with a number of constants such as the acceleration of free fall and the Avogadro constant to make life easier.

A book of programs is available covering a wide range of subjects for those without programming experience. You just type them in and you're away. On the other hand, if you want to learn Basic the manual is very good. Almost every step mentioned is accompanied by a picture of the contents of the display at that moment which makes the text easy to follow and reassures you that you are going about the latest task correctly.

FA-20 interface

Keeping all your data on RAM cards is a little dangerous, especially when the

battery needs changing. To facilitate the storage of your programs and data onto cassette Casio has developed the FA-20 interface.

The FA-20 is supplied in a plastic case which takes the power supply, cassette leads and spare RAM cards. The FX-750P simply slots into the interface and can be kept in position for handy storage. The FA-20 doesn't contain its own cassette; it simply allows you to connect a standard cassette recorder to your pocket computer — so the overall package isn't quite as compact as it would seem.

The Basic supplied on the 750 allows you to save all the files on a card, the current file, all the data or just selected items of data. This gives a very versatile storage system which proved to be reliable, if a little slow. However, you won't be saving programs onto cassette every day as all data can be stored on the RAM cards.

As well as giving you cassette storage the FA-20 also has a built-in thermal printer which allows you to get listings of your programs and output data. Again the printer is a little on the slow side and the text is extremely small, but it does work well and is far cheaper than any other.

Although the FA-20 has a mains unit, rechargeable batteries are built into the unit and it can be used without a mains supply.

Verdict

The FX-750P is a very handy little machine. Write a simple memo program and you just need to carry a number of RAM cards instead of a diary. For engineers, or anyone doing a number of calculations on the move, this machine could prove an invaluable tool.



Casio FX-720P

PCN PRO-TEST HARDWARE

Conclusion

31 The smallest of the two machines from Casio is the FX-720P. This handheld closely resembles the FX-750 except for the keys. However, part of the reduction in price is due to the inclusion of only one RAM card drive.

One function on the FX-720, not found on the FX-750, is the Memo function. Use of the memo bank turns your scientific pocket computer into a portable database.

To enter data into the memo bank just go into Memo in mode by pressing two keys. Then simply type in your memo, be it an address, message or anything else. Separating the fields by commas allows simple manipulation of stored data at a later date.

To search for information, a press of the Memo key displays record number one. Pressing the Exe key cycles through the rest of the files. When you find the file you want, use the Memo key to reveal the remainder of the file.

This method of reading a file is a bit long-winded, so Casio has included a search facility using a string of characters which you input: it is very easy to use. If, for example, you wish to search your files for the address of Casio — you would type in CASIO and press Memo. The FX-720 searches for the first record that contains the string CASIO and displays it.

Like the other Casio portable computers you can write your own programs in Basic.

The Basic included on the FX-720 has extra facilities to allow you to access your memo files from within a program. All the normal standard Basic functions are there, including a full set of trigonometrical and scientific functions.

Three manuals are supplied. One is an introduction to the computer and Basic, the second is a reference manual for the Memo Pad and the third is a library of programs to type in. All the manuals are well produced and extremely easy to understand; all responses made by the computer are shown by diagrams of the display. The program library covers subjects as diverse as games and medicine. All the programs are clearly documented and even show which keys to press to run the programs.

Even if you've never used Basic, you should be able to use the wealth of programs supplied in this book and you may even learn a little about writing programs while you're at it.

Verdict

Although it doesn't offer the storage that the FX-750 does, this machine is still extremely useful. Having the memo bank installed as a feature rather than having to write a program is convenient, whether you want to store names and addresses or write messages.

These three hand-held micros are the shape and size of things to come.

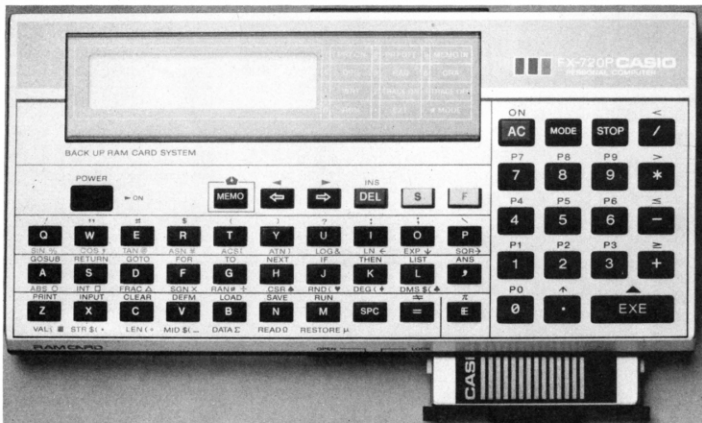
When memory packs become larger and cheaper, as they will, why should anyone carry around sheaves of paper and books when all the information could be fitted into a pocket?

Each of the three appears to be designed for a particular kind of user. The Psion Organiser, for instance, would probably not be bought by an engineer, but it does offer a great amount of data storage. The price, however, may put a few people off when compared with other machines.

The FX-750 would be excellent for an engineer, for instance. A fairly large amount of storage is available in the two drives and the way information can be moved around is useful. On the other hand, the FX-720 offers some of the features of both machines and at a much lower price. Granted, you can't store as much information as on the Psion, but you could always carry a number of the RAM cards with you.

Perhaps the greatest advantages of the Casio are the main dislikes of the Organiser. You can program in Basic and you can carry around a number of RAM cards from which the information can be easily altered without returning them to the manufacturer or buying yet another piece of equipment to wipe them.

PCN



SPECIFICATIONS

Psion Organiser

Price £99.95 including an 8K datapack
16K datapack £19.25
8K datapack £12.95
Program pack £29.95

Casio FX-750P

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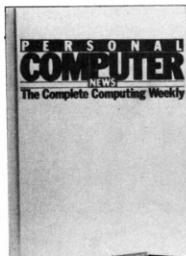
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Drawing and tracing pictures using Super Sketch with your Commodore 64 can be great fun. It's easy to use and for a reasonable price provides hours of pleasure.

Features

Super Sketch comes in a neatly packed box with all the necessary bits to create your masterpiece. With your starter kit comes an owner's manual, a quick reference card, some drawings, a Graphic Master cartridge and a warranty card.

Measuring 360cm x 251cm x 38cm, Super Sketch is securely housed in a sturdy cardboard box. The tablet itself, made of plastic, has several parts.

At the top end of the device are a number of keys:

L/R — there are two of these keys (for left-handed or right-handed people) which, when pushed, allow you to move the control arm without drawing on the screen, or to escape from the menu and return to the drawing.

Release — the long bar in the centre lifts the paper clamps on each side of the tablet to hold a sheet of paper either for drawing or tracing.

Menu — when the Menu key is pressed any current activity stops and the main menu appears on the left side of the screen. The Menu is a list of colours and commands that can be used while you draw.

Select — this button tells the computer to select a command or colour while in menu mode. Select is also used to tell the computer to use the currently selected feature while in drawing mode.

Control arm and pointer — the control arm moves the pen holder around the tablet. The computer always knows exactly where this pointer is — it's used as your drawing utensil for all functions.

Setting up

This is as easy as using a games cartridge — but with a few more bits to get you started. With the 64 switched off, plug the software cartridge into the cartridge slot at the back of the computer. Then take the cord from the graphics pad and plug it into the joystick port.

If you have a disk drive, printer or monitor they can be connected in the normal way. With all the connections made, all you have to do is switch on.

Documentation

The 37-page owner's manual contains all you need to start you on your way to becoming a Picasso.

In a clear easy-to-follow style the standard controls and other features of Super Sketch are explained with hints to guide you. And to save time there's a quick reference card to tell you what's on the main and expert menus.

In use

If your drawing capabilities are anything like mine and only stretch to matchstick men, odd-looking trees and box-type houses, you need the starter kit to get going. It includes sketches of a bluebird, an Island Rover and a cottage, all of varying difficulty.

COMMODORE COLOURING

Colourful sketches were possible on Sandra Grandison's 64.



I attempted to draw and colour the bluebird. First I held down the release bar to slide the sketch of the bluebird under the control arm and paper clamps. Then I turned the 64 on and the Super Sketch title screen came up. Next I depressed the Menu key and instantly the title screen was replaced with a drawing screen and the main Menu.

Since the Graphics Master software automatically starts with the colour blue and is in Draw mode, I was ready to go. Tracing and colouring the bird proved difficult.

I held down the Lift key to remove the Menu from the screen — then, holding down the Lift button, I positioned the pointer of the control arm over the outline.

The next step was to release the Lift button and trace the outline of the bird with the pointer. As I traced the outline of the bird it started to appear on the screen, but I soon ran into problems as the screen wasn't big enough to complete the outline.

To colour the bird I depressed the Menu key and the main Menu appeared on the left side of the screen. By using the control arm, I located the flashing arrow at fill. On pressing the select key, the area around the word fill turned from grey to black. Then I pressed the Lift key to exit from the Menu mode and positioned the cursor in the area

enclosed by blue lines.

To complete the drawing I then pressed the select key on the graphics pad to tell the computer to start filling at the location of the cursor and the bird appeared in brilliant blue.

A zoom facility gives you an enlarged view of the image being created around the area of the cursor. As I drew an image I could see the line formed in the zoom window.

When I tried to draw in that corner of the screen, the zoom window jumped out of my way and went to the upper corner of the screen.

Verdict

I found Super Sketch easy to use and it wasn't long before I could draw and colour my own pictures. My main quibble is that I found the control arm a bit stiff to operate at times. Apart from that it's a reasonable buy for some fun drawing; in terms of a business tool, however, I think there are more sophisticated instruments to do the job.

PCN

Product Super Sketch **Price** £69.95 **Manufacturer** Personal Peripherals, 930 N Beltline Road, Suite 120 Irving, Texas 75061 **Outlets** Tomorrow's World Today, 27 Oxford Street, London W1. Tel 01-439 7799.

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SOFTWARE

• WHAT'S NEW • WHAT'S NEW • WHAT'S NEW •

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, and please don't forget to include prices and a telephone number.

SPECTRUM

Adrift in Space is a text-only adventure game. While we've nothing against that, the way the screen is completely refreshed after every entry makes it rather slow and gets very tedious. The game itself is a reasonable adventure, you find yourself in an alien space vessel somewhere in deep space...

Automata's latest releases naturally include the magic letters 'PI', though at the expense of readability and the English language — how about *Pi-in-'ere?* (*Pioneer?*) It takes ages to load, but despite some clever graphics effects it's not really up to much. You control one of those funnel-nosed beasts so beloved of programmers, and are searching for various items scattered round a computer's RAM. While doing this you have to avoid various classes of bugs, which look much the same apart from their colours, but which have slightly different patterns of behaviour. The first screen shows some brick walls, you, the bugs, items to collect and rotating EDIT

keys. There are swathes of blue through which you can plough, but doing so extends the bugs' range. Removing the blue from beneath an EDIT key makes it fall, and if you can engineer a drop onto a bug you'll gain extra points. Hardly a winner, but it's difficult and reasonably novel.

Piromania is a 'levels and ladders' job. Walter has to fight spontaneous fires by throwing water over them. More water can be collected from the tap at bottom left and there's a spare ladder for making new routes to help the inmates of Automata Towers to escape. The graphics are fair and smooth, but the keyboard controls are complex and awkward.

Silversoft's last release *Worse Things Happen at Sea* was very good indeed, so it's a pity that its latest *Hyperaction* is poor. The first screen fills with large green acorns and small blue mushrooms, then some of these are erased and you're a white spider in the middle. Pursued by Pac-Man characters you can collect objects, push acorns and so on. Further screens offer different scenarios, but I wasn't tempted to continue.

Southern Educational Software is preparing language revision programs for students taking GCSE exams. The programs are suitable for those taking 'O' levels, because

there's unlikely to be much difference to the way subjects are taught or examined in the so-called 'new' system. *French Revision Level 1* covers regular verbs, nouns and adjectives.

COMMODORE 64

Storm Warrior boasts a fast loader, 12 screens and 5 levels of play as well as a demo mode. It's one of the most atmospheric arcade-adventure games we've seen for some time and we'll be carrying a full review very soon.

Chiller from Mastertronics was to be launched on September 5 and we'll carry a review as soon as we can.

Traffic is unusual because your task is to smooth the flow of traffic through various screens by altering the traffic lights at the different intersections. The graphics are rather basic — traffic is shown as rectangular blobs, large for artics, small for bikes. You focus your attention on the intersections by moving a white square, and pressing the fire button changes the lights. Your current score is shown and you're given some indication of trouble spots by an index of queuing vehicles. Not very exciting and no way a chart-topper.

Tir Na Nog won't be released until October, but the press release describes it as a computer movie with state of the art

animation. The action is presented as though a camera is aimed at the central figure and the player can move the camera to get four different views. The game is an interactive graphics adventure in which the hero Cuchulainn attempts to reunite the fragments of the Seal of Calum in the landscapes of Tir Na Nog, the 'Land of Youth' of Celtic mythology.

Pitfall from Activision is *Cuthbert in the Jungle* in thin disguise. Jump over the holes, climb up the ladders if you don't, jump the logs, crocodiles and on and on. If you like that sort of thing you'll love this — the graphics are quite good and the action is smooth.

Some of the other new releases from Activision are less than exciting. In *Beamrider* you can move right and left over a forward scrolling grid landscape firing at oncoming aliens which release projectiles at you... and that's about it. Fast and furious as you mount up points, but old-fashioned by anyone's standards.

Hero is a mines game. As Roderick Hero you must rescue miners trapped by an earthquake. With your rotary prop pack, dynamite and microlaser beam you have to kill spiders and other underground beasts, blast walls and move ever deeper into the mineshaft. Brilliant it's not. PCN

BBC

Spaceman Sid £7.95 English Software 061 835 1358

COMMODORE 64

H.E.R.O	£9.99	Activision 0628 72448/32839
Pitfall	£9.99	Activision 0628 72448/32839
Beamrider	£9.99	Activision 0628 72448/32839
Zenji	£9.99	Activision 0628 72448/32839
Toy Bizarro	£9.99	Activision 0628 72448/32839
Chiller	£1.99	Mastertronic 01-486 3478
Traffic	£7.95	Quicksilver 0703 20169
Fred	£7.95	Quicksilver 0703 20169
Storm Warrior	£7.95	Front Runner

MEMOTECH MTX 500/512

Colossal Adventure	£9.90	Level 9 0494 26871
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NEUBRAIN

Games Tape 1 £5.00 Eggbrain 061 427 7615

SPECTRUM

Tiler	£5.50	Interceptor Micro's 07356 71145/3711
Tir Na Nog	£9.95	Gargoyle Games 021 236 2593
French Revision	£4.99	Southern Educational Software 0622 56376
Hyperaction	£5.95	Silversoft 01 748 4125
Pi-in-'ere	£6.00	Automata 0705 735242
Piro Maniac	£6.00	Automata 0705 735242
Adrift in Space	£5.95	Mogul 01 947 4454
Flight from the Dark	£6.95	Arrow 01 387 2811
Lone Wolf	£6.95	Arrow 01 387 2811
Fire on the Water	£6.95	Arrow 01 387 2811
Terrahawks	£6.95	CRL 01 533 2918

VIC 20

Wunda Walter £6.00 Interceptor Micro's 07356 71145/3711

Close encounters of the dBase III kind for Geoff Wheelwright.

PCN PRO-TEST
SOFTWARE

Three's Company

Dbase III, the 16-bit big brother to the celebrated database package dBase II, is now available in the UK. It is compatible with its sibling and much easier to use.

dBase II's reputation for being the best, and perhaps most powerful, database program ever produced for 8-bit micros was tarnished because it is so difficult to use. In today's world of detailed and friendly front-end menus and programs that hold your hand, Ashton-Tate has had to rethink dBase's user interface.

It was no surprise that dBase II was unfriendly—it was originally designed for minicomputers at the Jet Propulsion Laboratory in Pasadena, as part of the Mariner space program, and was adapted for micros in the late 1970s. This latest version of dBase is as up-to-date as you could wish for. It's extremely easy to use, but is even more powerful than its predecessor.

Features

dBase III requires an IBM or compatible with a minimum of 256K RAM. It runs under MSDOS version 2.0 or greater and needs two 360K floppy disk drives. Given the features, performance and reception of dBase II, dBase III really ought to be the high-water mark for PC databases and is therefore open to heavier scrutiny than most new products—but the program's list of features suggests it should stand up to that examination.

dBase III is a fully relational database which can either operate in a simple dBase II-like command mode or by using an easy—but slower—menuing system, Assist.

It also has a new and extremely quick sort command—for most small databases you don't even have time to make a cup of coffee before the file is sorted. There's also a new indexing technique which maintains a constant sort on the file (as long as you select the index option).

As for statistics, dBase II can use up to 128 fields and hold up to 4,000 characters per record, offers a Memo data mode (which gives you space of up to 4,000 characters for notes on a given record), gives you the option of running up to 10 data files at once and puts no limits on the number of files in a database.

Besides all the flash stuff, the nicest features of dBase III are the Help, Assist and Menu commands. Help gives you access to an extensive help file on disk—which has detailed information on performing many different common operations. It differs from Assist in that it doesn't let you immediately use any of the information it tells you about until you come out of the Help menus. Assist, on the other hand, uses extensive cursor-driven

menu options to execute commands. Its role is to assist you to design a form, edit a record or give a command, rather than Help you with background information.

Another simple but noteworthy feature is the 'recording' facility of dBase III. By using the ALTERNATE command, you can record the whole of a given dBase III session on disk as a text file—and then pull down any information in that text file to a word-processed document or have it sent out to a printer. This allows for a certain degree of integration—though by no means as much as the company's Framework integrated suite (Pro-tested issue 72).

And finally, there's the dBase II link. Although dBase II files are not directly compatible with dBase III, a conversion system called dBase Bridge is included with dBase III. It allows conversion of both dBase II programs and data to dBase III format.

In Use

To start, just stick a system disk in drive A and type 'dbase. The program throws up the usual list of 'You will be locked into a dark and cold room for 30 years...' copyright warnings and presents you with a command line at the lower left-hand corner of the screen.

Unlike most programs which use a flashing cursor or some form of '>' sign as a prompt, dBase III uses only a full-stop (just like dBase II). But don't think you're about to be abandoned this time—the Assist system is only a keystroke away (Function key 2) and it's well worth using.

The Assist command begins by telling

you which arrows do what and how to get context-sensitive Help—use the F1 key. You're then stepped through the process of either getting out a database or creating a new one—all by cursor-driven menu options along the top of the screen and highlighted file names in the centre of the screen when applicable.

Once you've got the database out and start browsing through it or adding to it, you get a nice screen format for records and an optional menu at the top of the screen telling which keys do what to the cursor—much like the 'home' menu in Wordstar.

You can look at records in any one of a number of ways—the two most popular being the 'forms' and the 'summary' modes. The forms mode is the standard sort of 'cardbox' representation which lets you move through the data in each field by moving the cursor—and the IBM's Page Up and Page Down keys let you move from record to record.

The summary mode shows you all the fields and about 14 records at a time on the screen. You can then scroll the cursor up, down or across the data in any field or record.

Not surprisingly, the program includes a 'calculator' function in the command mode. Like dBase II, dBase III is a language, albeit a much friendlier one with many more learning tools, and this calculator function takes the form of print statements and arithmetic operators. So, to quickly get a simple add and divide equation done, you must type something like:

```
?(23+34+87)/89
```

A more powerful facility perhaps is the

A sample of the extensive Help menu

— maximum help —

DISPLAY

Syntax

```
: DISPLAY
DISPLAY FOR <expression>
DISPLAY <expression list> FOR <expression>
DISPLAY NEXT <number of records> FOR <expression>
DISPLAY STRUCTURE
DISPLAY STATUS
DISPLAY FILE
```

Description : DISPLAY will show all or part of the database. With the proper phrase, DISPLAY will show the database structure, the processing status, and the contents of other files.

Examples : DISPLAY
DISPLAY name, address, city FOR zip> '90000'

see also : LIST, ?

PgUp = screen, Esc = HELP, Home = last menu, or ENTER command.
ENTER>



INDEX command — which I found a real help in getting records out of the database quickly. You establish an index by using a database that's already in use and the command:

INDEX ON FIELDNAME TO INDEX FILENAME

You can then use the index — which has been created as an NDX-extension file on disk with the Index Filename you have given it — to quickly get round the database you indexed. You do this by then saying:

SET INDEX TO INDEX FILENAME
and typing LIST — which will then proceed to list all the records in order according to whatever fieldname you originally specified with the INDEX ON command.

Verdict

By virtue of its power, user-friendliness and compatibility with dBase II, dBase III is well set to keep Ashton-Tate at the top of the serious PC software charts. **PCN**

The dBase II relationship

Blood runs thicker than marketing — and despite all that's been said, dBase II and III are brothers under the skin. Each is essentially a programming language, dBase III being more or less a superset of dBase II.

But if the two packages are brothers, dBase III definitely has to be considered the more personable and gregarious of the two.

Asking dBase II and III for the same thing will produce quite different results. Gone is the annoying parade of zeros that served only to intimidate the dBase II user when he asked for a simple thing like listing on a given index. And added to that same operation are helpful things like field names above the records.

Aside from the Assist and Help facilities, the other big difference between the programs is in the addition of a toggled menu when entering, modifying or adding records to a database. Although most of the information is about simple cursor controls, it helps reduce the vast emptiness of screen that terrified many a dBase II user.

Framework phenomenon

You may think that because Framework is one of the best integrated software packages for the PC and dBase III is arguably the best database, that a combination of the two would be ideal.

Well, you would be either wrong or very rich. Both Framework and dBase III can run together, but because each package has a minimum memory requirement of 256K, the total needed to use them together is 512K — and that's before you've entered any data. You would need at least 640K and probably a hard disk before you could really start to use the two packages together.

This doesn't appear to be a problem for Ashton-Tate. The company's answer is to encourage Framework users, if they want something more than is offered by the database built into Framework, to use dBase II. The older package is almost as powerful as the new dBase III but only needs 128K to get going. And Ashton-Tate states that it will run 'beside' Framework so that you need only a few keystrokes to swap between the integrated package and dBase II.

The only problem with this tidy solution is that the people who've bought Framework for its user-friendliness will be demanding a simple-to-use database like dBase III. They'll be mightily confused if they have to jump from something gentle and friendly like Framework to the more esoteric world of dBase II.

However, it could be argued (and I'm sure it will be) that because Framework already has a simpler database facility built into it, the dBase II option is for people who have graduated beyond the Framework database and are willing to spend more time on learning it.

A comparison of dBase II (left) and dBase III (right)

```

USE Names

.. LIST STRUCTURE
STRUCTURE FOR FILE: A.NAMES.DBF
NUMBER OF RECORDS: 00006
DATE OF LAST UPDATE: 01/01/80
PRIMARY USE DATABASE
FLD  NAME  TYPE WIDTH  DEC
001  NAME   C    10
002  ACCOUNT N    004
** TOTAL **          00015

.. SORT ON Account TO Temp.DISC
SORT COMPLETE

.. USE Temp

.. SORT ON Name TO Multiple
SORT COMPLETE

.. USE Multiple

.. LIST
00001  AL      100
00002  BOB    102
00003  JIM     104
00004  JOHN    105
00005  JOHN    103
00006  SALLY   101
    
```

```

.. USE Names

.. LIST STRUCTURE
Structure for database: A.NAMES.dbf
Number of data records: 6
Date of last update: 01/01/80
Field  Field name  Type  Length  Dec
1  NAME             C     10
2  ACCOUNT           N      4
** Total **          15

.. SORT ON Name, Account/D TO Multiple
100% Sorted          6 Records sorted

.. USE Multiple

.. LIST
Record#  NAME      ACCOUNT
1  AL      100
2  BOB    102
3  JIM    104
4  JOHN   105
5  JOHN   103
6  SALLY  101
    
```

The integrated system factor

Perhaps the only cloud on dBase III's horizon is the question of how long stand-alone packages are going to survive against multi-function integrated suites, despite the weaknesses of their isolated sections.

At the moment, memory and storage requirements for an integrated system whose database power could approach dBase III's are very high but, as the price of memory and storage fall, the likelihood

of an integral dBase III-type package grows.

Ashton-Tate would probably point out, however, that you can already integrate most of dBase III into Framework — although it would take something in the order of 640K and a hard disk to be effective.

The future of stand-alone software is, however, an issue that will affect all software houses.

AMSTRAD

Maternal instinct

Name Oh Mummy System Amstrad
CPC464 Price £7.95 **Publisher**
 Amsoft, 169 King's Road,
 Brentwood, Essex **Format** Cassette
Language Machine code **Outlets**
 Mail order/retail

Amstrad's policy of marketing conversions of games from other machines involves high standards: *Oh Mummy* would be worth playing on any machine.

Objectives

The main objective is to walk an archaeologist around a series of blocks within a pyramid to reveal their hidden contents. If this sounds reminiscent of the game *Painter*, it is; what makes it different is a number of bright yellow mummies, determined to exert maternal pressures, preferably around the neck of your hapless scientist.

In play

The cassette loaded first time (I've yet to use a cassette on the Amstrad which caused any loading problems). A good animated title sequence has mummies making fools of each other around the border of the score card.

Options include speed, mummy meanness, background music (monotonous after a time) and sound effects.

The game screen consists of a simple maze composed of five rows of four blocks, around and

between which you steer your man. As you move, a track of footprints shows where you've been.

Once a block has been completely surrounded, it reveals its contents; thin air, a treasure chest, a scroll, a key, a royal mummy or another of your pursuers. The treasure chests and royal mummy score points, the scroll protects you from one mummy-attack and the key is your passport to the next level.

Each pyramid has five levels of identical mazes and each is a bit more difficult than the last. In between pyramids you are awarded either an extra man or bonus points.

By choosing your route carefully, you can achieve some very satisfying results by making a final run to turn every block over in quick succession.

The mummies start off acting fairly stupidly and may sometimes be seen amusing themselves in corners, but as the game progresses they begin to get the idea and start paying attention to your tomb-raiding activities.

Verdict

Although the game is fairly simple in concept, it is nevertheless addictive. The archaeologists and mummies are well defined and smoothly animated and the sound effects are a definite bonus.

Simon Williams

RATING (5)

Lasting appeal

Playability

Use of machine

Overall value



Punchy lines

Name Punchy System Amstrad
CPC464 Price £7.95 **Publisher**
 Amsoft, 169 King's Road,
 Brentwood, Essex **Format** Cassette
Language Machine code **Outlets**
 Mail order/retail

This is the most original of all the versions of *Hunchback*. And it makes use of just about all the traditional characters and objects from the puppet booth. Mr Micro, who converted the game for Amsoft, has tried to produce a program that is both challenging and charming at the same time.

Objectives

Mr Punch has kidnapped Judy and locked her in the Punch and Judy booth.

As the strong arm of the law, in the rather paunchy shape of PC Bobby, you make a valiant attempt to reach her by jumping, ducking and walking through all the hazards the evil Punch can put in your way.

In play

The playing screen is drawn up as a traditional stage, complete with tragicomic masks and proscenium arch. The toy clocks roll above as your overweight constable marches across to the sound of his own squeaky boots.

The figure is a good size and moves realistically. The left and right cursor keys walk him in the appropriate directions, the Copy key makes him jump and the down arrow ducks him down into a suitably Dixonese 'ello, 'ello, 'ello squat.

The audience obviously don't think much of his act, however, since he is forever dodging their tomatoes and custard pies.

Getting through each of the 16 screens is essentially a question of timing, but fortunately the flying obstacles appear pretty much at the same point each time you play.

Points are scored for completing a screen and a bonus is awarded for completing five screens without losing a life. At the right end of each screen is a small cot, and Bobby 'rocks the baby' to the tune of *Rockabye Baby*.

Later stages involve jumping onto carpets to cheat crocodiles of a meal, avoiding the thrust of Mr Punch's sword and numerous other well-executed obstacles. Every so often Judy will send Bobby a good-luck message in the form of a sausage (it takes all sorts) and if he jumps successfully for three of these, you can skip the difficult screen of your choice.

It would have been useful to have had a practice option to start at any screen, and the demo mode mentioned on the cassette insert didn't appear to work.

Verdict

Although a derivative of the arcade game, *Punchy* is sufficiently original to stand on its own. Indeed, for my money, it is a better story and more enjoyable.

Simon Williams

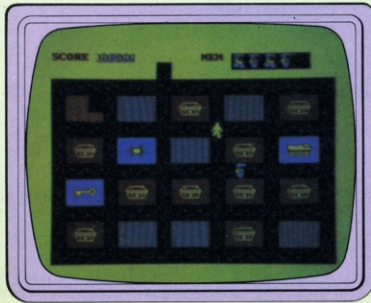
RATING (5)

Lasting appeal

Playability

Use of machine

Overall value



COMMODORE 64

Motorway madness

Name Potty Pigeon System
Commodore 64 Price £7.95
Publisher Gremlin Graphics,
Sheffield 0742 753473 **Format**
Cassette Language Machine code
Other versions None **Outlets** Most
retailers

Discover that life as a feathered friend is not all eating worms and standing around dozing on one leg.

Objectives

Percy must build a nest by collecting ten twigs from the nearby motorway. On the tarmac he avoids squishing car wheels, predatory cats and ferrets. In the sky, Percy is liable to be pranged by planes and balloons.

In play

The credits roll to the accompaniment of a snazzy rendition of a classical piece. Pressing the space key takes you into the lowest skill level.

Percy is a neatly drawn bird who flies horizontally and vertically, wings beating the air in smooth and realistic fashion. He flaps along as fast or as slow as you care to control him by the joystick. As Percy wings his way, the background and foreground scroll along evenly at slightly different speeds, giving an attractive feeling of depth.

The passing scenery is picturesque, if bizarre. It consists of fluffy clouds, blue skies, castles, shops, hills, trees, walls

and, at the bottom of the screen, the ever-present motorway, complete with crash barrier.

Down this mean M1 Percy must go for that's where the twigs are. He gathers one in his talons, taking care not to be squashed by speeding daytrippers. Percy destroys cars by dropping an explosive egg — result, scrambled Chevrolet.

Each twig must be brought back to Percy's nest, avoiding sparrows who are just waiting for a chance to pinch the hard-earned DIY material.

Percy partakes of a passing butterfly for extra points and if he's really browned off with the sparrows, lets them have it with one of his eggs. And then there's the prowling cats, voracious ferrets, planes and balloons. Higher skill levels have Percy living in the fast lane.

The music continues throughout the game — it's pretty catchy and shouldn't have you reaching for the volume control. Losing the last of your three lives brings up the inevitable Death March but the multiple-voice rendition of it is so good, it almost sounds original.

Verdict

Great fun, excellent graphics superb sound, and a worthy challenge. Cool!

Bob Chappell

RATING (5)

Lasting appeal



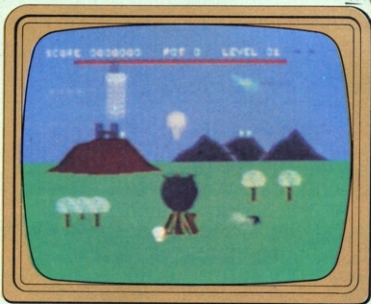
Playability



Use of machine



Overall value



Whirlin' Merlin

Name Merlin System Commodore 64
Price £6.90 **Publisher** Wye Valley Software, Herefordshire
Format Cassette Language
Machine code Other versions None
Outlets Retailers

Picture Ultimate's *Jet Pac* set in Camelot, take away the splendid graphics and variety, and this is what you've got.

Objectives

You are Merlin the Wizard who must destroy the evil creatures sent to destroy you. As despatching monsters is a drain on your supply of magic, you can top it up by dropping nasty ingredients into a cooking pot.

In play

The first thing to strike you as the demo cycles through the four game screens is the unpromising graphics. Each screen, merely a background against which the battle is to take place, is nothing much more exciting than some hills, a castle and some trees. The latter, all of the same appearance and size, making a nonsense of any perspective the game might have had. They are all simply depicted and serve only as a backdrop, playing no part in the game.

At the start, the wizard materialises from thin air. Since the monsters simultaneously appear in random positions around the screen, it's all too possible to lose a life before you've barely begun.

The game plays very fast from the off, so much so that it almost seems the speed is there

to enliven what is otherwise a fairly ordinary game. Really, it is almost too fast to be playable — even for the quickest 'finger-happy' keyboard player.

The creatures are no great shakes, graphically speaking: a green ghost resembling a dishcloth, an overgrown asterisk passing itself off as a blue Hellwasp and some skeletal faces.

The cook-pot ingredients are no better. Merlin himself, however, is not too bad, and performs rather like an Arthurian with a rocket pack.

Although the figure itself is not animated, Merlin zooms around the heavens, a puff of smoke at his feet indicating his self-propelling capabilities. The idea is to shoot all the enemy before they shoot you. A press of the fire button causes a fireball to shoot from Merlin's outstretched hand.

Meanwhile, the baddies are chucking their own brand of missile around. Occasionally, a parachute floats down, heading for the cauldron. Unless Merlin shoots it down, it will destroy any magical stew he is in the process of concocting.

Sound effects, of the fizz-bang variety, are minimal. They don't exploit the 64's sound to anything like its full potential.

Verdict

Not a bad idea, but the implementation is weak by today's standards. Merlin held no magic for me.

Bob Chappell

RATING (5)

Lasting appeal



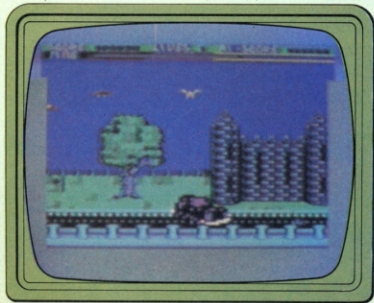
Playability



Use of machine



Overall value



First, a question.

Who do you think are the world's most avid consumers of microcomputers?

The ingenious Japanese?
The fashionable French?
The acquisitive Americans?

Believe it or not, it's we British who own more micros per person than any other nation on earth.

Yet, despite its amazing impact, the microcomputer has only just begun to scratch at the surface of our lives. Without doubt, the best is yet to come.

Use and Abuse.

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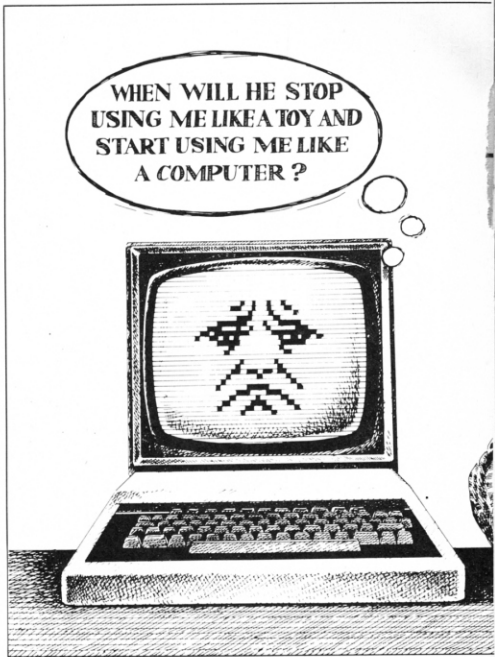
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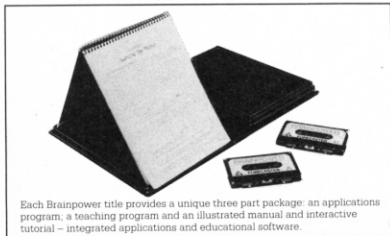
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STAR WATCHER

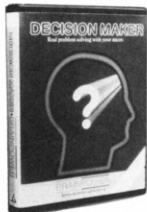
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BRAINPOWER



Program notes

Title: Domino
Machine: Spectrum
Language: Sinclair Basic
Application: Game
Author: Mike Rains

- 5-20 Dimension arrays, gosub introduction and turn off key click.
- 30-60 Read in data.
- 70 Horizontally positioned dominoes.
- 80 Vertically positioned dominoes.
- 145-220 Randomly picks a double as the first domino played by the computer.
- 230 Goes onto next player.
- 240-260 Goes into 'computer's turn' routine if demonstration or computer's go.

Pit your wits against your Spectrum in a game of dominoes from Mike Rains in Durham.

The program is a computer implementation of the popular game, written entirely in Basic. One person can play against the computer or two players can play against two computer hands.

Either way, it is possible to watch a demonstration game in which the computer plays all the hands. At the start, each player is dealt seven dominoes and from there the game proceeds according to the normal rules of play. In turn, each player must indicate which domino they wish to play, and where on the board and in which direction. Pressing 'p' in answer to any of these questions indicates a pass.

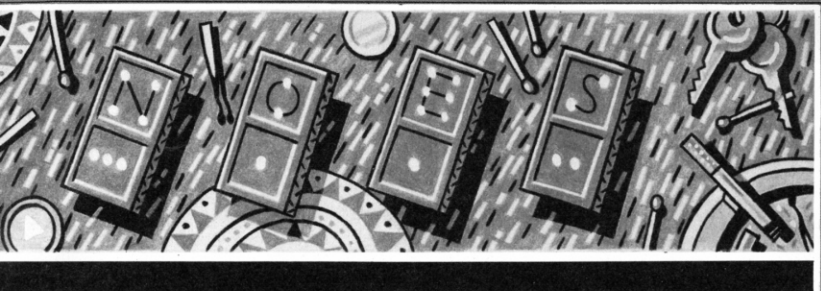
At the end of the game (detected by the computer), the computer displays all the players' remaining dominoes and the winner's name. The computer's moves are governed entirely by chance but it is surprising how often it wins.

When typing in the program, note that capital letters within quotation marks in lines 70, 80, 800, 900, 1000, 1100, 2530, 3510 and 3520 should all be entered in graphics mode.

- a\$(4,7,2) player's dominoes
- d\$(2,7) user defined graphics for dominoes
- e(2,2) current end dominoes
- f(18,31) screen image - records position of dominoes
- go current player number
- ns(4,10) player's name
- o\$ demonstration game flag
- p1 number of players
- t(4) number of dominoes
- v\$ each player has left string of 32 blanks - used in printing messages
- z\$(28,2) contains the values of the full domino set

```

5 REM Set up game *****
7 DIM s(4): DIM t(4): DIM n$(4,10)
9 LET v$=""
10
18 RANDOMIZE : GO SUB 4000
15 POKE 23609,100
20 DIM z$(28,2): DIM a$(4,7,2): DIM f(18,31): DIM e(2,2): DIM d$(2,7)
30 RESTORE 5000
40 FOR p=1 TO 28: READ z$(p): NEXT p
50 FOR p=1 TO 18: FOR q=1 TO 3: LET f(p,q)=9: NEXT q: NEXT p
60 GO SUB 3500: GO SUB 4500
70 LET d$(1)=" ABCDEF"
80 LET d$(2)=" AGHDEI": LET v$=""
90 LET t(1)=7: LET t(2)=7: LET t(3)=7: LET t(4)=7
100 GO SUB 4700
105 REM Double to Start*****
150 RESTORE 5100
155 LET st=INT (RND*4)+1
160 LET t#=READ k$
170 FOR p=1 TO 7
180 IF a$(st,p)=k$ THEN LET tp: LET a$(st,p)="xx"
190 NEXT p
200 IF t(<)0 THEN GO SUB 1500: LET t(st)=t(st)-1: GO TO 220
210 LET st=st+1: IF st=5 THEN LET st=1: GO TO 160
215 GO TO 170
220 LET nam$: GO SUB 1200: PRINT AT 21,0;h$;" starts with a ";k$(v$: TO 11-h)
230 LET go=st+1: IF go>p1 THEN LET go=1
240 PAUSE 150
245 PRINT AT 21,0; PAPER 21v$
247 IF o$="y" THEN GO TO 600
250 IF go=1 OR go=3 THEN GO TO 600
260 GO TO 300
295 REM Players Turn*****
300 LET nam$: GO SUB 1200: PRINT AT 21,0;h$;"s go - which end?";v$: TO 13-h): GO SUB 2500
381 IF f(e(1,1),e(1,2))-1=9 THEN N LET er1=-1: LET eq1=0: PRINT FLASH 1;AT e(1,1),e(1,2)-1;"A": GO TO 315
382 IF f(e(1,1),e(1,2)+1)=9 THEN N LET er1=1: LET eq1=0: PRINT FLASH 1;AT e(1,1),e(1,2)+1;"A": GO TO 315
384 LET eq1=1: LET er1=0: PRINT FLASH 1;AT e(1,1)+1,e(1,2)"A"
315 IF f(e(2,1),e(2,2))-1)=9 THEN N LET er2=-1: LET eq2=0: PRINT FLASH 1;AT e(2,1),e(2,2)-1;"B": GO TO 320
316 IF f(e(2,1),e(2,2)+1)=9 THEN N LET er2=1: LET eq2=0: PRINT FLASH 1;AT e(2,1),e(2,2)+1;"B": GO TO 320
317 IF f(e(2,1)-1,e(2,2))=9 THEN N LET er2=0: LET eq2=-1: PRINT FLASH 1;AT e(2,1)-1,e(2,2)"B": GO TO 320
318 LET er2=0: LET eq2=1: PRINT FLASH 1;AT e(2,1)+1,e(2,2)"B"
320 LET t$=INKEY$
330 IF t$="" THEN GO TO 320
340 IF t$="a" THEN LET ex=1: GO TO 370
350 IF t$="b" THEN LET ex=2: GO TO 370
355 IF t$="p" THEN PRINT AT 21,355: PAUSE 150: LET s(go)=1: GO TO 370
360 GO TO 320
370 PRINT PAPER 4;AT e(1,1)+eq1,e(1,2)+er1;" 1;AT e(2,1)+eq2,e(2,2)+er2"
372 IF t$="p" THEN PAUSE 100: PRINT PAPER 2;AT 19,0;v$: GO TO 595
400 PRINT AT 21,0;"Press arrow key for direction"; INVERSE 1;IC HR$(ex+64); INVERSE 0;"
402 IF INKEY$(<)" THEN GO TO 402
405 IF INKEY$(>)" THEN GO TO 405
410 LET t$=INKEY$
415 IF t$="p" THEN GO TO 355
420 IF VAL t$(5) OR VAL t$(8) THEN GO TO 405
430 LET c1=e(x,1): LET c2=e(x,2)
440 IF t$="5" THEN LET x=c1: LET y=c2-1: LET x1=c1: LET y1=c2-2
    
```



295-318 Puts a flashing A or B at each end of the current game.

320-350 Input A or B depending on which end you want to place your domino. Unable to go.

355-360 Which direction — up,

370-420

430 down, left, right.

440-470 Current end dominoes. Input direction using unshifted arrow keys.

480-490 Error trap.

500-520 Input domino value.

530-535 Invalid entry.

540-584 Checks that player has

585-597 that domino. Goes to relevant subroutine for positioning of domino.

599-660 Computer checks player's dominoes to see if any match the ends.

```

450 IF t$="A" THEN LET x=c1+1:
LET y=c2: LET x1=c1+2: LET y1=c2
460 IF t$="B" THEN LET x=c1-1:
LET y=c2: LET x1=c1-2: LET y1=c2
470 IF t$="0" THEN LET x=c1: LE
T y=c2+1: LET x1=c1: LET y1=c2+2
480 IF x<2 OR x>16 OR y<2 OR y
>29 OR x1<2 OR x1>16 OR y1<2 OR y1
>29 THEN GO SUB 2000: GO TO 400
490 IF f(x,y)>9 OR f(x1,y1)>9
THEN GO SUB 2000: GO TO 400
500 LET o$="LEFT DOWN UP RIGHT"
PRINT AT 21,0;"Enter domino
values ("": INVERSE 11CHR$(e$+
64): INVERSE 01 "": I$=(1+5*(VAL
t$-5) TO 5*(VAL t$-4)):I$)
510 INPUT LINE k$
515 IF k$="p" THEN LET t$="p":
GO TO 355
520 LET dot1=CODE k$(1)-40: LET
dot2=CODE k$(2)-40
530 IF dot1<0 OR dot1>6 OR dot2
<0 OR dot2>6 THEN GO SUB 2000:
GO TO 500
535 IF dot1<>f(e(x,1),e(x,2))
THEN GO SUB 2000: GO TO 500
540 FOR p=1 TO 7: IF a$(go,p)=k
$ THEN LET a$(go,p)="xx": GO TO
560
550 NEXT p: LET i=k$(2)+k$(1)
552 FOR p=1 TO 7: IF a$(go,p)=i
$ THEN LET a$(go,p)="xx": GO TO
560
560 NEXT p: GO SUB 2000: GO TO
500
570 PRINT PAPER 21AT 19,0;v$1AT
21,0;v$
582 LET f(x,y)=dot1: LET f(x1,y
1)=dot2
584 LET e(x,1)=x1: LET e(x,2)
=y1
585 IF t$="5" THEN GO SUB 800
586 IF t$="8" THEN GO SUB 900
587 IF t$="6" THEN GO SUB 1000
588 IF t$="7" THEN GO SUB 1100
590 LET s(go)=0: LET t(go)=t(go)
-1
595 GO SUB 3000
597 LET go$="": IF go>p1 THEN
LET go=1
599 REM Computer's Turns*****
LET n$=go: GO SUB 1200: PRI
NT AT 21,0;h$;"s turn - I'm thi
nking!v$( TO 10-h)
602 IF o$="y" THEN GO SUB 2500

```

```

605 PAUSE 250
610 FOR p=1 TO 7
615 IF a$(go,p)="xx" THEN GO TO
660
620 IF VAL a$(go,p,1)+f(e(1,1),
e(1,2)) THEN LET ex=1: LET az=1:
GO TO 690
630 IF VAL a$(go,p,2)+f(e(1,1),
e(1,2)) THEN LET ex=1: LET az=2:
GO TO 690
640 IF VAL a$(go,p,1)+f(e(2,1),
e(2,2)) THEN LET ex=2: LET az=1:
GO TO 690
650 IF VAL a$(go,p,2)+f(e(2,1),
e(2,2)) THEN LET ex=2: LET az=2:
GO TO 690
660 NEXT p
665 IF o$="y" THEN PRINT PAPER
21AT 19,0;v$
670 PRINT AT 21,0;"I pass
"
680 PAUSE 150: LET s(go)=1: GO
TO 780
690 IF az=1 THEN LET dot1=VAL a
$(go,p,1): LET dot2=VAL a$(go,p,
2)
700 IF az=2 THEN LET dot1=VAL a
$(go,p,2): LET dot2=VAL a$(go,p,
1)
705 IF ex=1 THEN LET q=e(1,1):
LET r=e(1,2)
710 IF ex=2 THEN LET q=e(2,1):
LET r=e(2,2)
715 IF r<3 AND f(q,r-1)=9 AND f
(q,r-2)=9 THEN LET x=q: LET y=r-
1: LET x1=q: LET y1=r-2: LET dr=
0: GO TO 740
720 IF r<28 AND f(q,r+1)=9 AND
f(q,r+2)=9 THEN LET x=q: LET y=r
+1: LET x1=q: LET y1=r+2: LET dr
=9: GO TO 740
725 IF q<3 AND f(q-1,r)=9 AND f
(q-2,r)=9 THEN LET x=q-1: LET y=
r: LET x1=q-2: LET y1=r: LET dr=
11: GO TO 740
730 IF q<15 AND f(q+1,r)=9 AND
f(q+2,r)=9 THEN LET x=q+1: LET y=
r: LET x1=q+2: LET y1=r: LET dr
=10: GO TO 740
735 GO TO 660
740 PRINT AT 21,0;"I will place
the "I$a$(go,p)"
745 LET f(x,y)=dot1: LET f(x1,y
1)=dot2
750 LET a$(go,p)="xx"

```

```

760 LET e(x,1)=x1: LET e(x,2)
=y1
770 GO SUB dr*100: LET s(go)=0:
LET t(go)=t(go)-1
772 PAUSE 200
775 PRINT PAPER 21AT 21,0;v$
777 IF o$="y" THEN PRINT PAPER
21AT 19,0;v$
780 GO SUB 3000
782 LET go$="": IF go>p1 THEN
LET go=1
783 IF o$="y" THEN GO TO 600
784 GO TO 300
790 REM SUB-ROUTINES*****
795 REM Place Domino Left*****
800 PRINT AT x1,y1;"K"
802 LET dot1=dot1+1: LET dot2=d
ot2+1
820 PRINT OVER 11AT x1,y1;d$(1,
dot2);d$(1,dot1): RETURN
895 REM Place Domino right*****
900 PRINT AT x,y1;"JK": LET f(x,
y1)=dot1: LET f(x1,y1)=dot2
902 LET dot1=dot1+1: LET dot2=d
ot2+1
910 PRINT OVER 11AT x,y1;d$(1,d
ot1);d$(1,dot2): RETURN
995 REM Place Domino Down*****
1000 PRINT AT x,y1;"M"1AT x1,y1"
L"
1002 LET dot1=dot1+1: LET dot2=d
ot2+1
1010 PRINT OVER 11AT x,y1;d$(2,d
ot1);AT x1,y1;d$(2,dot2): RETURN
1095 REM Place Domino Up*****
1100 PRINT AT x,y1;"L"1AT x1,y1"
M"
1102 LET dot1=dot1+1: LET dot2=d
ot2+1
1110 PRINT OVER 11AT x,y1;d$(2,d
ot1);AT x1,y1;d$(2,dot2): RETURN
1200 REM Length of name*****
1205 LET h$=n$(n$): LET hl=LEN h
$
1210 IF h$(hl)= " " THEN LET hl=h
l-1: GO TO 1210
1215 LET h$=h$( TO hl)
1220 RETURN
1495 REM First Move Routine*****
1500 LET w$=9: LET y1=5: LET x1=w
: LET y1=16
1510 LET dot1=VAL k$(1): LET dot
2=VAL k$(2)
1520 LET e(1,1)=x: LET e(1,2)=y:
LET e(2,1)=x1: LET e(2,2)=y1
1530 GO SUB 900: RETURN

```


Dragon 32 joystick, converter, magazines, M-code book, dust cover + software. Less than a year old, £140. Tandy CGP-115 Printer £99. Together for £230. Tel: 01-360-3443.

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Wanted. Any back issues of PCN. Must be good condition. Will pay 25p per issue. Bunders also wanted. Tel: Northampton 896261.

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Kempston Centronics printer interface for 49K or 16K Spectrum boxed. Hardly used, £30 only. Tel: Simon (0734) 584561 after 6pm.

NewBrain A with all leads, manual, beginners guide, technical manual, assembler programming language and Basic. Cost £350 will sell for £99 only.

CBM 64 software to swap or sell. Many popular titles including International Soccer, Forbidden Forest. Also educational software and business. Tel: Ruislip (71) 75885.

Ataris For Sale. Atari 400 with educational game + cassette drive (opt. disk drive) + lots of games. Around £250-£300. And/or Atari 800 + 17 Games + all controllers made, around £100 (or less) Tel: (0932) 55203.

Acorn Electron 6 months old, still in box. Excellent condition complete with sw for £40 software, bargain £175. Tel: David on 021 520 4416.

TRS-80 Model 1, level 2, 16K, video software. Also manuals and extra books: £100. Tel: (04024) 44413.

Wanted. TRS-80 Model 1 £30 of original software (Buzzaat Bait, Pedro, etc) and manual, leads, joysticks, etc. All for £110 only. Tel: Laurence (0202) 737244

Apple IIe 64K RAM, 2 disk drives, Microdrive colour monitor, 80 column, RS232, and Z80 cards, Pascal manuals, books, magazines, offers around £1000 tel: (0279) 33711 evenings.

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Texas T199/4A, as new, plus joysticks connect four cartridge and Basic education software. Tel: (066) 6166547.

CBM 64 Programs, game sale, excellent value 70K all four: Hellibitz, Moonship, Breakout, Packman. Send blank tape and p/c for £4 to: Steven Nation, 22 Haresfield, Walsley, Walsley, Walsley.

Microdot Acoustic Model with BBC software and power supply, boxed £40 only. Tel: Kevin 04626 72385 after 7pm.

TRS 80 Programs wanted and for sale, completed Spectrum System for sale, Penpal wanted, TRS-80 Model I/EI wanted; write: 39, Tetbury Drive, Warrington, Warrington.

Bebug, magazines: vols 1 and 2 complete (10 issues), in official binders £1 buyer collects. Tel: (01 444 6244, evenings only).

Oric 48K little used with cassette recorder, manual, leads, books. Forth and many games, etc. excellent condition. Reference only. Tel: (0732) 450281, evenings.

Interface 1 and Microdrive-Basic—new never used. Worth £100. Accept £65 Tel: 035389-678.

Beginner's guide with all leads, manual, beginner's guide, technical manual, Assemblies programming language and Basic. Cost £350—will sell for £99 only.

TI99/4A Expansion Box (unused), ex-Basic, M Memory, PRK, Parsec, Munchman, all going cheap. Tel: Bristol 685934 after 6pm.

Wanted Commodore 64 + Tape Deck will swap for MemotechMIX-500 + tape deck. Tel: Blackpool (0253) 403994.

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VIC 20 Software, 30 games, £2-50 or less each. £200 for lot. 20 CBM 64 games £40 or £2.50 each. P. Simpson, 11, Egremont Street, Millom, Cumbria.

CBM 64 Keyboard, (Smith's 'c'), joystick, reference guide, software, books, cover and c/czn overlay, all boxed as new. £220 Tel: Crewe 820349.

Practical (Disk) for CBM 64 only £25. Includes: CBM Assembler Development System (disk) only £20. Tel: Albert (Oxford) 54084.

Commodore 64 software to swap or sell. Titles include: Zaxxon, Blue Max, Jumpman Jr and many more. write (send your list) to: Helge Stava, 42 74 St, Norway.

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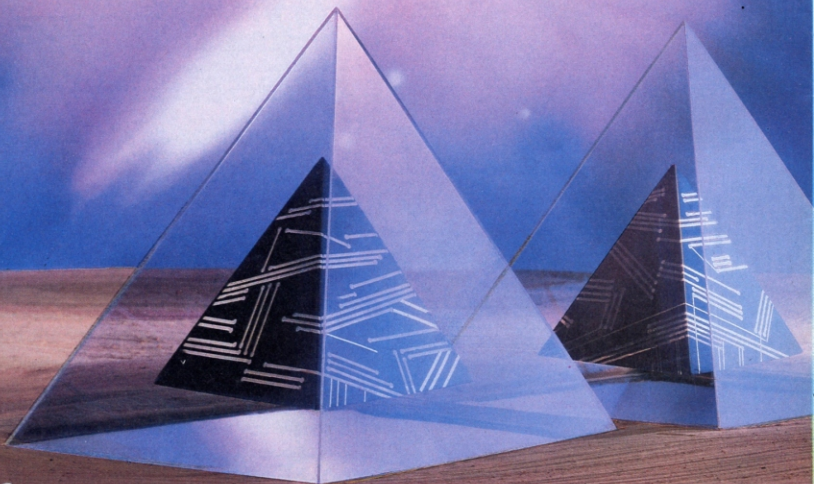
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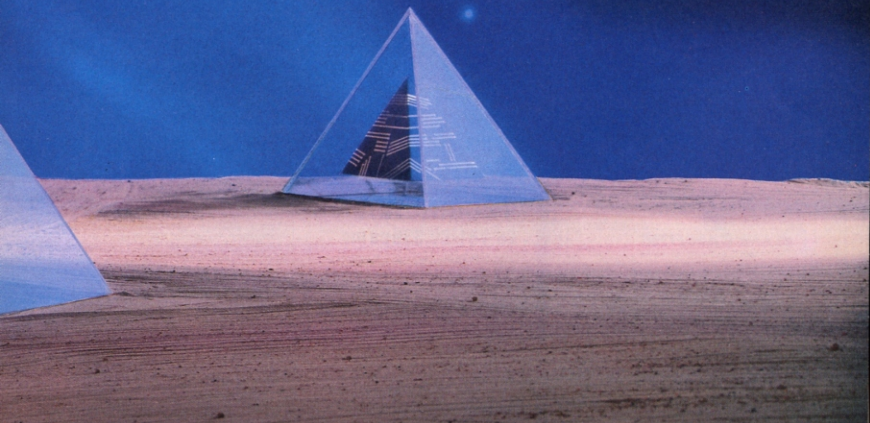


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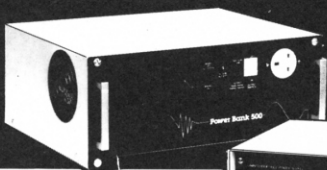
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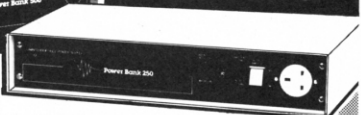
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Extolling the virtues of Bracknell

The Margaret Thatcher School of Oratory has claimed a new victim. To spare her blushes we won't name the poor soul, but after her performance at Micro-Gen's launch of *Pjyamarama* she's clearly in need of sympathy, help and a mouth off.

The lady in question was holding forth on Micro-Gen's various offices. She called Ashford the brain centre and went on to describe Bracknell as 'the heart of the matter'. If Micro-Gen had an office in Basingstoke that would pre-

sumably be the armpit, but wait, she hadn't finished with Bracknell. Hand on heart and slightly breathless (nerves, not exertion) she announced: 'It's a window on the world...'

This will surprise many of Bracknell's inhabitants.

SLANTAX ERRORS

The Memotech 500, number six in last week's hardware charts, is rising despite looking distinctly expensive in our version of the price. We had it at £250 — Memotech sells it for £199.

NEXT WEEK PERSONAL COMPUTER NEWS



Sinclair silos

PCN recently took a call from someone who desperately needed a circuit diagram for the Sinclair Spectrum. So what, you ask?

Well this particular caller claimed to be from the British Army of the Rhine.

Since then our paranoia

glands have been working overtime — are they keen on using them to control missiles? Is Clive's 'one per desk' concept about to become 'one per tank'? And is single-key entry liable to bring Armageddon nearer by the difference between P and POKE?

We wish we'd asked what he wanted to for now...

Computerland remembers

From little acorns do mighty oaks grow. Bill Hossack, general manager in Europe of the Computerland chain, was reminiscing last week about the early days of the organisation when it logged its orders on the back of an 80-column card. This year's projected turnover is \$1.8 billion.

On the subject of acorns, it seems that there's a German expression whose relevance we're not quite sure of. Roughly translated it says that even a blind pig finds an acorn every now and then.



PCN DATELINES

PCN Datelines keeps you in touch with up-coming events. Make sure you enter them in your diary.

Organisers who would like details of coming events included in

PCN Datelines should send the information at least one month before the event. Write to PCN Datelines, Personal Computer News, 62 Oxford Street, London W1A 2HG.

UK EVENTS

Event	Dates	Venue	Organisers
Info North	September 18-20	Belle Vue, Manchester	BED Exhibitions 01-647 1001
PCW Show	Sept 19-23	Olympia, London	Montbuild, 01-486 1951
Computer Communication & Control	Sept 26-28	Brighton Centre	Institution of Electrical Engineers, 01-240 1871
Strathclyde Computer and Business Exhbn	October 2-3	Skean Dhu, Glasgow	GHC Ltd, 041-248 2428
Computer Technol Exhbn — Comtec	October 3-5	Newton Aycliffe, co. Durham	Industry Section, Sedgefield District Council, 0388-816166
Computer Graphics FX Exhibitions	October 9-11	Wembley, London	Online Conferences Ltd, 01-868 4466
Apricot & Sirius Computer Show	October 16-18	Manchester	Paradox Group Ltd, 01-241 2354
London Business Equipment Exhbn — LBES	October 23-26	Earl's Court, London	BED Exhibitions, 01-647 1001
Electron & BBC Micro User Show	October 25-28	Alexandra Palace, London	Database Publications, 061-456 8383
Home Tech '84	October 26-29	Exhbn Complex, Bristol	Nationwide Exhibitions, 0272-650465/15
Computers in Action	Oct 30-Nov 1	Anderson Centre, Glasgow	Trade Exhibitions 0764-4204

OVERSEAS EVENTS

Event	Dates	Venue	Organisers
Software Ireland Exhbn	October 2-3	Dublin, Eire	SDL Exhibitions Ltd, Dublin 904171
Comp Conf & Exhbn — Mini/Micro	October 2-4	Seattle, USA	Electronic Conventions Inc, 8110 Airport Boulevard, Los Angeles CA 90045
Localnet Exhbn	October 10-12	San Diego, USA	Online Conferences, 01-868 4466
Computer Exhbn — Computers	October 24-27	Johannesburg, S. Africa	Specialised Exhbn, 01-486 1951

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(required for disc expansions)

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

ROM EXPANSIONS

- MTX NewWord, a 32K word processing package
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Kokotoni Wilf

Kokotoni Wilf is an arcade adventure program whose undisguised intention is to steal the title of "best arcade adventure program bar none" from Jet Set Willy. Kokotoni Wilf must recover all of the pieces of the legendary Dragon Amulet (which has been scattered through time) for his master the great magician Ulrich. Throughout the quest, Wilf comes up against many dangers from huge Prehistoric Dinosaurs to hostile Alien Robots; but the reward for recovering all of the pieces warrants the risk. The 48K program features a number of major adventures over Jet Set Willy. The games designer, ELITE, stresses that each of the games 60 plus screens settings is genuinely high resolution as opposed to pseudo high-res and doesn't require a title to explain what you're looking at. The Sprite characters are of cartoon quality and exhibit their own unique personalities. Impressive claims. Jet Set Willy fans will no doubt feel both sceptical and intrigued. Now they can find out for themselves!

Available September 15th for -

Spectrum 48K	£ 5.95 (Cass)
Commodore 64	£ 6.95 (Cass)
	£ 8.95 (Disc)

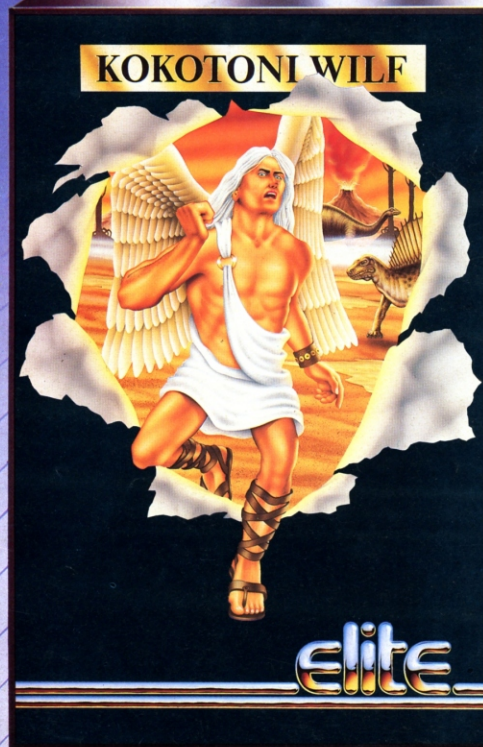
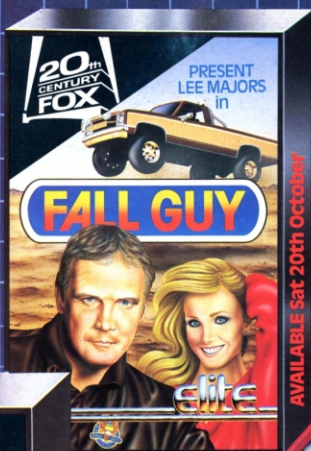
The Fall Guy

Colt Seavers is a top Hollywood stuntman who uses the extraordinary skills he displays before the camera when moonlighting as a modern Bounty Hunter, who apprehends and brings in Bad Boys jumpers. Colt is ably assisted by his would-be manager Howie, his beautiful stunt girl protegee, Jody, and Terri the lady from the Bail Bond Company, who hires Colt when he's not before the camera.

The cast of characters is:

Colt Seavers	LEE MAJORS
Jody Banks	HEATHER THOMAS
Howie Munson	DOUG BARR
Terri Michaels	MARKIE POST

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