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50p NOV 17-23 1983 Vol 1 No37

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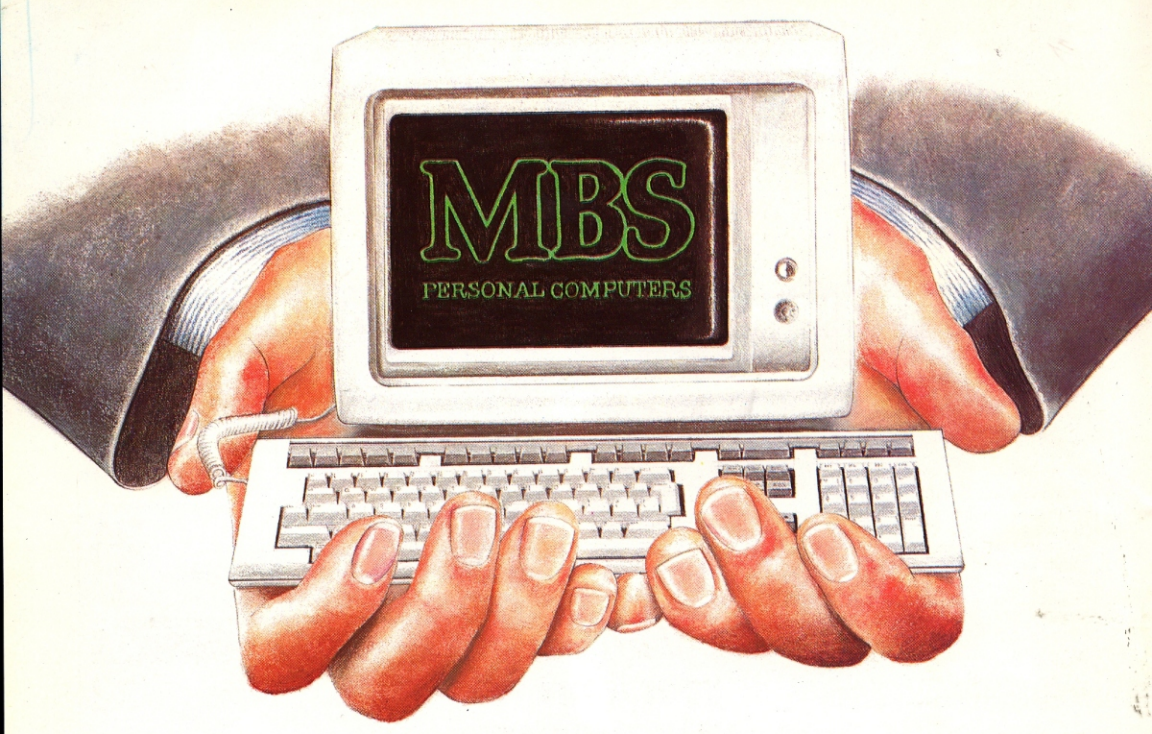

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Steady Advance

By Ralph Bancroft

Advance, the £400 IBM-compatible micro, is set for a mid-January release and should be available before Christmas to mail-order customers.

The company, Advance Technology, is new to the computer business and caused a stir earlier this year when it announced plans for two machines — one using cassettes, the other twin disks (Issue 6).

Predictably, it has slipped behind its promised delivery date of July. But in most other respects it seems to have lived up to its promises.

The model 86a will cost £404.99 (including VAT and delivery) and comes with an 8086 processor, 128K of RAM, a 64K ROM and 16K of RAM dedicated to the screen display. It has an 84-key keyboard similar in style to that on the IBM PC and it conveniently slides into the processor base unit when not in use.

Up to 16 colours can be displayed on screen in a text resolution of 80 by 25 characters or 40 by 25, and a graphics resolution of 320 by 200 or 640 by 200 pixels. Video outputs include TV, RGB and composite video. Other interfaces can handle a cassette recorder, light pen, joystick and Centronics compatible printers.

Moving forward at last — the Advance 86b, promising IBM compatibility.

The 86b model will cost £1,390 and consists of the same base unit as the 86a together with an expansion box housing two 360K floppy disk drives. Users will get in the price the MSDOS operating system and Wordstar, Mailmerge and Calcstar software.

Advance is promising full compatibility with IBM software — although software for the 86a is unlikely to be plentiful until software houses produce games and other applications for the cassette-based system.

The machines are being assembled by Ferranti, which is also making the several ULAs that go into each machine and contribute to the low price of the micros.

Advance has already started shipping supplies to European distributors and is currently negotiating with leading High Street chain stores with a view to distributing the machines in the UK.

Would-be users who can't wait until January could take a gamble by ordering by mail. The company has said it has already had an enthusiastic response and a large number of orders. The 86a will be available by the end of November and the 86b by the middle of December.

Advance is on 01-609 0061.

Ceasefire in price war?

The first signs of a ceasefire in the price wars are coming through from the US. Atari has announced that in the new year its 600 XL and 800 XL machines will go up in price by $40.

This increase will be in the price that Atari charges its dealers. It remains to be seen whether the dealers will pass the rise on to customers, and whether Atari UK will follow suit.

The company says it has sold out of these two models in the US until the end of the year, and a US spokesman said it was taking a stand by pricing the systems 'realistically'.

But Atari's move could signal the end of the price wars that have ravaged the US (and, for that matter, the UK) personal computer business this year. Ironically, it could be the feared appearance of the IBM PC Jr that will make the difference.

The trend throughout the summer has been for prices to tumble, particularly at the home computer end of the scale. IBM's entry, with a $700 64K machine, could halt the slide by dragging prices up to meet it. Home computer makers will be able to compete comfortably against the PC Jr where it sells purely as a home micro.

Another effect could be a booming second-hand computer market in six months' time.

January advent for Compaq

Compaq's long-awaited portable IBM lookalike will be available to UK users in the new year.

Nigel Fox of Digitus, which will distribute the system, said: 'In the US it sells for marginally lower than the IBM PC so I would say the UK price is likely to be in the region of £3,000.'

The manufacturer, Compaq Computer Corporation of Houston, says the Compaq is directly compatible with the IBM PC. It has the same disk format and same keyboard, and you can take any disk from an IBM PC and slot it straight into one of Compaq's integrated disk drives.

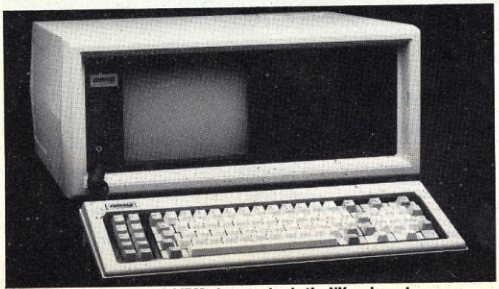
As well as using software produced for the IBM PC, it has standard RAM of 128K as opposed to the IBM's 64K, and this is upgradable to 512K.

'Internally, it has three IBM PC compatible expansion card slots, which will take the same plug-in boards that you use on the IBM PC,' said Mr Fox.

Compaq is setting up an office in the UK in January, when it is expected to announce other dealers.

In the meantime, anyone with queries should phone Digitus in Covent Garden on 01-379 6968.

■ A hard disk version, the Compaq Plus, was launched in the US in October. It includes a 10Mb disk supplied by Rodime, the Scots company that pioneered micro-Winchesters (Issue 1).



Compaq's highly successful IBM-clone — due in the UK early next year.

CBM bundles

Hot on the heels of its price cuts to cartridge software, Commodore is moving into the give-away business.

Buyers of the 1541 disk drive are now being given the Easyscript word processing package. In another deal concluded last week with Precision Software, the Commodore 700 system is being packaged with the word processor Superscript, and the database, Superbase, currently available on the Commodore 64. It looks as though the 700 is really on the way.

There is a snag — you will have to buy a complete system, not merely the computer.

Apple bridge

Apple has changed its independent tack and in a joint venture is taking on IBM on its own ground.

As a result of collaboration between Apple and Rana Systems of Chatsworth, California, an add-on box will be produced that will plug into the Apple and run most of the IBM software available on the market.

Apple was forced to make this move because of the nagging problem of compatibility with IBM software. As IBM gained support from software houses, Apple was in danger of being left behind.

The introduction of the PC Jr two weeks ago also added pressure, particularly on the Apple IIe.

But Apple hastily points out that no way is it bringing out an IBM clone. A spokesman from Apple UK said: 'The introduction of this add-on will bridge the gap between IBM and the Apple IIe, and with the Lisa it's important in terms of communications.'

Bob Bledsoe, president of Rana said: 'Apple has had a difficult time competing with IBM software that will not run on its machines. After a meeting with them about mid-September we decided to produce the Rana system. Apple helped to fund the project and we drew up a technical agreement.'

The Rana system, to be sold for almost $2,000, could almost be described as another computer which will incorporate an IBM-compatible processor to take over the CPU of the Apple and two disk drives similar to those used by IBM.

Rana expects to start shipping the system in large volumes by March 1984 in the US, and depending on how it fares there it could reach the UK by Autumn 1984.

Micro runners hit the wall

By Ralph Bancroft

Who will be next? That's the question on many people's lips as the catalogue of company collapses and announcements of large losses seems to continue unabated.

For users, a second and more important question is 'Will the micro that I buy this Chrismas still be around in a year's time?'

For over two years cynics have been predicting a big shakeout among the micro manufacturers leading to a market dominated by no more than three or four big names. Until recently they have been proved wrong. Now it looks as though they might be right after all. So just how did this turnaround come about?

Almost certainly, the single most important factor has been the relentless price war that has been raging throughout the summer.

In the early days, the demand for micro computers came in the main from keen hobbyists or small companies looking for a cheap way to computerise their businesses.

As demand continued to expand there was always room for newcomers.

But with the growth came a new and much more significant micro consumer: the non-technical user who wanted to learn something about computing or, more importantly, to use the micro as a tool or toy.

The days of mass-marketing came to the micro world and the winners were inevitably those with the large advertising budgets and a well known name to trade on.

So it was inevitable that as the big bucks started to be thrown around, a price war would follow in an attempt to build up all important market share. The winner so far is mighty Commodore, first with the Vic-20 and then with the 64.

Unable to compensate, Texas Instruments ran up massive losses and despite slashing prices, or maybe because of reduced profit margins on the TI 99/4A, it withdrew from the home computer market. Mattel with the Aquarius also faced massive losses — $156 million in the second quarter alone.

Atari's losses are greater — $425 million in the first three-quarters of the year. Backed by the Warner films and television corporation it has survived to launch two new home micros in the shape of the 600XL and the 800XL. It remains to be seen whether this will stave off further trouble.

The Christmas sales period is of vital importance for home computer companies. If they are successful they are more likely to survive to fight another year.

British micro manufacturers are not immune from the home computer wars. Dragon over-estimated demand for the Dragon 32 during the summer and had to be bailed out with a £2.5 million cash injection from city institutions. Oric has sold out to an investment company, and Camputers, which produces the Lynx, has also to raise extra money.

Jupiter Cantab meanwhile has been forced out of business because of its dependency on a single product that all too quickly became out of date.

The shake out in the home micro market has been matched by an equally savage sort-out in the business micro field.

Osborne made rapid strides when it introduced the world's first transportable micro. That success bred a host of imitators, many of which could offer something better in terms of quality and value. Osborne started losing money heavily, laid-off most of its staff and has since filed for bankruptcy.

Part of Osborne's problems was the emergence of the mighty IBM as the market leader, for IBM compatibility has become a major selling point.

Perhaps the biggest loser in this part of the market has been Victor, which makes the Sirius — still holding its own against the IBM PC in Britain but in its Victor 9000 guise almost disappeared in America.

Even Apple has not been immune. For the financial year ending in September it reported a staggering 73 per cent drop in profits. The Apple IIe and III have lost out to IBM in the business market and the Lisa has yet to make its mark. Apple's future now lies with the Mackintosh.

In the UK we have seen Grundy and Information Technology go to the wall but the Newbrain and the Zita may survive under new ownership. Torch has received a £1 million cash injection that may yet help it to weather the storm.

Sinclair should continue to enjoy its number one British home computer status as long as it can produce a micro at a cheaper price than the likes of Commodore or the emerging Japanese competition. Acorn also has carved out a comfortable niche by virtue of its Government sponsorship in schools.

As for the other home computer companies, who can say? If Dragon has a good Christmas and doesn't overstretch itself on its disk system it may thrive. Oric is selling well in France, which may offset its failure to produce disk drives, a new ROM and other add-ons for the UK. But the prospects are there for more chapters in the shake out.

STICKY WICKET — At last — an improved clock for the Spectrum. Just attach one of the two devices shown in our illustrations and you can use it as a sundial. Seriously, the two devices you see here are joysticks. You clip the whole shooting match onto the top of your Spectrum, and when you move the joystick on the top, a system of levers presses one of the four cursor keys underneath. So you can use a joystick for games that use keyboard input, provided it's from the cursor keys. But why two of them? One is manufactured by EEC Ltd, of 1 Whitehouse Close, Chalfont St Peter, Bucks (the chunky looking one) while the other is from Grant Design, Norwich 870852. They each cost £9.95, but the companies are not related. A joystick shoot-out is clearly in the offing.

£700 for Adam

By Geof Wheelwright

The Coleco Adam micro will cost about £700 when it is introduced in this country next spring — half as much again as the US price.

At $700 — including a daisywheel printer, digital tape drive, built-in word processor, function keys, games cartridge capacity and 80K of memory — the Adam is considered something of a revolutionary product in the US. But the strength of Coleco's wind of change could be reduced to a mere breeze when it arrives in this country with a price tag some £300 higher than the BBC Micro.

A spokesman for Coleco said last week that prices for the Adam have not been finalised, but it would be somewhere near a direct dollar to pound conversion — and perhaps even higher than £700. He said the main reasons for the trans-Atlantic price jump were the costs involved in producing an external power supply on the UK version of the machine, the cost of transporting the machines to the UK and of modifying the printed circuited board to accept the European PAL TV standard.

For owners of the Coleco games machine, however, the Adam will come a little cheaper and a little sooner. Coleco will offer an upgrade for the games machine that will turn it into the Adam (including tape drive, printer, word processor and all the other standard Adam features) for about £450.

That upgrade should be available in February — and the Coleco spokesman said he saw no problems in meeting that release date.

Read all about the Coleco system in our exclusive Pre-Test next week. One of the first Coleco Adams to reach the public will be thoroughly tested.

Vikings board Commodore 64

The cartoon game Valhalla should be available to Commodore 64 owners in the New Year.

Legend, publisher of the game for the 48K Spectrum, expects to have a version for the 64 ready in January. The price should be the same as for the Spectrum, £14.95.

For a full review of Valhalla, see issue 35.

VIEW FROM JAPAN

Enough to make your eyes pop out

by Serge Powell

One of the peculiarities of Japanese computer makers is their tendency to launch many of their new products overseas before the natives get a close look. After all, does General Motors show off its latest model in the UK prior to launching it in the US? Does Pierre Cardin shun Paris, London and Milan to launch his fashions in the People's Republic of China?

No indeed. But then, General Motors and the good Monsieur Cardin don't have to reckon with Japanese trade shows to give their latest offerings an airing.

The Tokyo Data Show is dominated by hardware. It shares a site with an audio show and the Jemima Show.

The latter isn't a pancakes extravaganza but the Japanese Measuring Instrument Manufacturers Association's shop window. Jemima's members make the sort of kit that is used to test out-of-order computers but that is by the by.

Fortunately each exhibition this year had its own building (four in the case of the Data Show). Unfortunately, it was raining. This put the brake on movement from one building to another; those people who normally linger en route from one to another were driven indoors, and the Jemima exhibition seemed to be losing out. Perhaps people are discouraged by the sight of the brave new world of technology cheek by jowl with the means of repairing it.

The result in the Data Show was a crowd comparable in density to the numbers of bodies that are crammed on to subway cars every morning. On especially crowded trains it isn't unknown for contact lenses to pop out.

But it isn't a truncated series of notes like 'right foot trodden on', 'left knee-cap ground to dust', or 'umbrella in nostril' that you'll be interested in. It's the topic of the moment — MSX. The Japanese/Microsoft combined effort at standardisation was most prominently represented by Toshiba. With patience and determination it proved possible to get a close look at Toshiba's new Pasopia IQ system, which sells here for £188.

Pasopia, attractive as it sounds, is merely Toshiba's brand name for micros. The IQ has 64K of RAM, 32K ROM, 16 colours, and the MSX Basic that will make it compatible with a host of other machines. Many of these other machines have yet to appear — so far they are little more than an impressive list of signatories backing the MSX standard. But the Toshiba system demonstrates that MSX is for real. Whether it will make any differences to the rest of the world remains, for the moment, an open question.

Megabyte storage

It may be too early to generalise but it is to be hoped that the software for these machines rises above the standard of at least one package at the show. Called O! Jesus, it offends against taste more than against software quality — the graphics are really great, and the screen could be printed out on one of the multiplicity of colour printer/plotters that were among the more interesting items on show. I want one but I would have absolutely no use for it — this is one of the tantalising things about owning a home computer.

Storage is another of them. One of the hopeful signs of the Data Show was the appearance of hard disk drives at reasonable prices — a Teac unit in particular looks as though it will be going after a piece of the action, and if history is any guide the local chip-heads will probably leap-frog technology again by moving straight from cassette recorders to megabyte disk drives.

Other than that, things were pretty much as they've been touted for the last year or so. The manufacturers are consolidating their product lines and worrying about who will get shaken out first in the domestic market before going for a bigger chunk overseas.

Things being what they are, you'll probably hear about that before I do.

Acorn acts on divorce rates

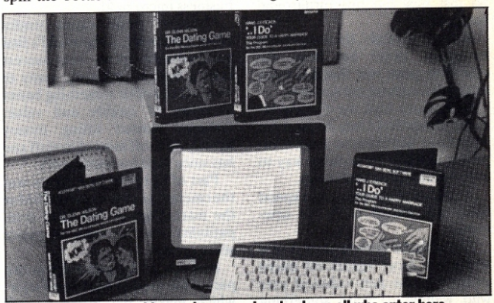
Having patronised female micro users with its gardening program Acornsoft has turned its attention to another pressing social problem — divorce.

With I Do and The Dating Game Acornsoft launches its own contribution to true love and world happiness. These programs, it says, 'could improve people's love lives and help bring down the divorce rate'.

At the launch last week the comments were more realistic. Dr Glenn Wilson, whose research inspired The Dating Game (a matching and compatibility program), described it as 'an electronic spin-the-bottle'. He added: 'It could be used by a marriage guidance counsellor as a starting point for discussions.' It's most obvious use is as a party game — with the opportunity to match 40 people at once you could play havoc with your guests.

I Do is a more heavyweight offering devised by Hans Eysenck. In a series of questionnaires it builds up your personality profile in the aspects that might lead to friction with your partner: psychology, social attitudes, sexuality and others.

The packages cost £12.65, a small price to pay for the survival of the family unit, but for a game it's slightly high.



Acorn's marriage guidance bureau: abandon hope all who enter here.

Yorkshire TV looks for micro nuts

Calling all celebrities and maniacs! Yorkshire Television has asked us to pass on the news that it is planning a series of programmes in which you might star.

Producer Adam Hart-Davis is looking for celebrities addicted to micros and for 'micro maniacs' who do extraordinary things with their machines — he is stressing extraordinary and says: 'not just unusual games'.

If you think you might qualify on either count, let us know at *PCN*, Evelyn House, 62 Oxford St, London W1, and we'll send your letters on to Yorkshire TV.

■ On the subject of celebrities and television, Sir Clive Sinclair will be talking about computers and employment on BBC-1's One in Seven on Sunday, November 20.

Merlin waves wand on tour

Modulas, an integrated hardware/software system specially designed for travel agents was launched last week by Merlin, British Telecom's business systems arm.

The system was designed in collaboration with the Association of British Travel Agents (ABTA). It runs Digital Research's multi-user MPM-86 operating system and is based on the Intel 8086 chip.

What you want will depend on the size of your tour operations. The Model 1000 costs £6,320 and will provide you with 128K and a 1Mb dual floppy disk unit.

There are four versions of the Model 2500 from £10,200, with 128K upgradeable to 896K. This has the 1Mb floppy and a Winchester disk, and has a built-in modem.

Access to Viewdata and Prestel is provided by the basic model, plus a reservation system, diary, word processing and the ability to add on other facilities yet to be specified.

Using Prestel, it accesses other organisations' reservation systems such as Skytrack, Tops and Holidaymaker.

The Model 2500 also takes care of ticketing, accounting, client management and cashflow.

Deliveries are due to start in three weeks. Enquiries, if you live in the south, should go to 01-840 4567, and 0532 451000 (Leeds) if you are based in the north.

A feast of Apples

By Richard King in San Francisco

There's a superstition that it always rains during any Applefest, no matter where it is, and the Applefest held at the Moscone Centre in San Francisco between October 28 and 30 was no exception.

The rain couldn't dampen spirits among Californian Apple-users though, and the show itself was well attended by the local enthusiasts, visitors from many parts of the world, and real stars (Wozniak and several others). There were plenty of booths, too, though there were also some notable absences — Videx wasn't represented despite being based almost next-door in Oregon. However, its Ultraterm was selling like hot-cakes on several stands. Microsoft was also absent, though that was less surprising since it has moved away from the Apple to some extent.

The Apple is often said to be a business machine in England, and a home computer in the US. This difference wasn't all that apparent, with both 'serious' items and 'entertaining' ones present in equal proportions.

Some of the more serious (and hence expensive) items were very much state-of-the-art, and yet again force speculation as to whether there's any ceiling to the development of the Apple. Co-processor cards, which enhance the machine by adding an alternative CPU, were popular. Advanced Logic Systems, maker of the popular Z-card, offered a high-performance Z80B chip clocked at 6MHz coupled to 64K of fast RAM on their new CP/M card. This comes with CP/M Plus 3.0 and CBasic, and is claimed to run applications up to three times faster than other Z80 cards.

Personal Computer Products were showing an 8088 card with 64K of memory and MSDOS, which gives a 128K machine with the Apple's memory. CP/M-86 is available as an option.

Much more impressive were the three 68000 cards. Putting one of these in your computer turns it into a very big machine indeed, with a true 16-bit CPU and, in two cases, greatly expanded memory. The Saybrook by Analytical Engines had 128K as standard, upgradeable to 512K, and was belting along at 14MHz. Coupled to a Legend S'card 256K RAMdisk (which can be expanded to 1Mb), it was compiling 700 lines of version IV.1 Pascal in 19 seconds!

Nearby, the PDQ II was on show. This is another 68000 card with 256K of RAM on a separate card, turning over at 10MHz.

Both of these systems are large and heavy on power, so alternative PSU's come as part of the package. Saybrook's fits inside the case and delivers 5A, PDQ IIs is less tidy, being an external unit.

Less massive, but equally advanced, was the MegaTask Plus from Data Link. This is an 8748 single-chip microcomputer which, when added to the system, provides multi-tasking (16 simultaneous jobs) and virtual memory (largest program 8Mb, largest file 451Mb), as well as mainframe Basic. Believe it or not, this plugs into the game port, and is claimed to provide these features with little or no modification to software.

Research has revealed that the Apple IIe is capable of double-density graphics under software control, and Doublestuff from Doublestuff Software produced some truly amazing effects.

The Number Nine Graphics system was unique in being serious, expensive, and pretty as well. It's a graphics card with an NEC 7220 chip, which has been used on the NEC APC, the HH Tiger, NCR Decision Mate V and others, and gives the Apple 512 × 512 pixels in 16 colours at minimum. It works with the Saybrook, too.

On the software front the main activity was in the educational field, with a wide range of new ideas presented as well-designed games. Spelling and Maths drills for the most part, aimed at various age-groups, with the pre-school operator not forgotten.

One of the most intriguing was Algebra Arcade from Wadsworth Electronic Publishing. In this you have to apply an algebraic formula such that the resulting graph will knock down as many randomly-scattered 'Algebroids' as possible. Not easy to do, and much harder to explain, but great fun, and quite instructive.

Business programs were less obvious, but The Incredible Jack, an editor-filer-calculator program à la Lotus 1-2-3, was causing a stir under its own name and also as 4-in-1 (Softsmith has it under licence).

There was plenty more to see, and over the next weeks *PCN* will be looking at several of these in greater depth.

Business expo

By Wendie Pearson

There wasn't much room for micros at Software Expo Europe, held at Wembley last week.

The three day conference and exhibition concentrated mostly on minis and mainframes, but there were some new products around for business micro users.

United Information Services unveiled the modular Seed database system which, at £1,150, works on the IBM and Texas Instruments micros. Seed is a standard Codasyl rather than relational database and consists of eight modules. Decision support options for the non-technical user include Harvest, a query language, Bloom, a report writer and Rainbow, for colour graphics.

Applications development systems for more experienced users include Garden, an interactive data manipulation language, Vista, a screen formatter and editor, Sprout, an intelligent file converter, and Catalogue — a data dictionary.

Datasolve Software in Sunbury, Middlesex, was showing Inquire for the IBM PC; this was previously only available on mainframes. Datasolve was unable to quote a price for this database system, which lets you create private databases and access external files, but it can be accessed on 76 85566.

Meanwhile, anyone wanting to connect their micro to a mainframe, mini or another micro, could be interested in MOM Systems of Aberdeen's Able communications package. This lets you connect two incompatible micros for file transfer purposes. It will set you back £150 if you want to connect micro to micro or £295 if you want to connect to a mainframe.

A conference session covered Unix; speakers stressed that this portable, multi-user operating system was originally developed as a programming tool, which could be why accusations of its not being 'friendly' flow thick and fast. Eileen Skrabutenas, senior analyst at Yates Ventures in the US said she felt Unix would have its largest growth in professional and government areas.

Richard Waller, associate consultant with Imbucon Management Consultants, spoke of IBM's effect on the industry and the possibility that in due course the hardware side might imitate the car industry. He said that although there are many manufacturers now, in the future there may only be about six.

The conferences were pretty dry in content and micro users would have had to look hard for stands dealing with micros at the exhibition.

Co-operation is very educational

By Bryan Skinner

The educational software bandwagon picked up yet more momentum this week with Macmillan's, the publishing house, joining hands with Sinclair in the release of several new titles.

Aimed at four- to 11-year-olds, Sinclair's programs were written by Blackboard and focus on such literary skills as spelling and punctuation. The software for Macmillans was written by Fisher Marriot which writes for Griffin and George, (Issue 35) and Fiveways which has also produced software for Heinemann.

The stars of the launch were easily the four Fiveways programs which provide open-ended learning, borrowing heavily from arcade adventure games. The rest was average, and in one or two cases would be grown out of faster than a pair of tight shoes.

Sinclair and Macmillan: joint effort in education.

Pertec system

Just when you think that buying half a dozen IBM PCs and linking them together in a network provides all the answers someone else comes up with a cheaper alternative.

Pertec, though its UK distributor Kode (0249-81371), launched its multi-user true 16-bit 3200 and 4200 systems last week. They could provide a more cost-effective solution to the office thinking of introducing several micros but sharing the same files.

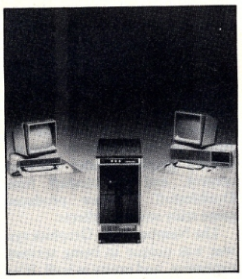
Both systems are based around a fast Motorola 68000 microprocessor with a minimum 256K of RAM up to a maximum of 1Mb of RAM in the desktop version and 4 Mb in the floor-bound version. The desktop version can support four intelligent terminals and the floor standing version up to 32 terminals.

Costs of the two systems depend on the chosen configuration, but at around £4,000 for a single 256K desktop machine with twin floppies they are certainly competitive.

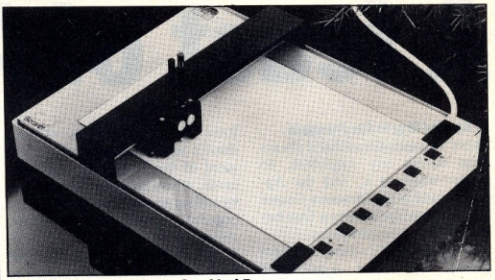
Because of the power of the 68000 there is little noticable drop in speed of operation of the terminals over a stand-alone micro, and because you can share the same hard disk you are saved the cost of attaching floppy disk drives to each terminal.

Pertec is offering a variety of operating systems, including its own, as well as BOS and the much praised Pick system. In the pipeline is Unix.

The model 100 workstations that can be attached to the main processor have a Z80 and 64K on board and can run CP/M software. The 4200 is based on the 3200 but with firmware changes to enable it to conform to the requirements of the Pick operating system. Pertec is including with Pick a package called System Builder that allows you to create your own database systems and design your own screen formats.



Many hands . . . the Pertec systems.



Hatching a plot — Linear Graphics' Bearer.

The Beavers are plotting

Linear Graphics has trimmed the cost of plotting.

The company claims accuracy to 0.2mm for its plotter, called the Beaver. At £516.35 the Beaver has a standard Centronics interface and can be used with most computers. A flatbed machine, the plotter has a range of 190 by 172mm (A4).

Another useful feature of the Beaver is that it can take any type of pen or pencil in its two pen holders. You can also have an RS232 interface for £531.30.

BBC and Apple users can also take advantage of a software package called the Interceptor which has been developed with the plotter. Interceptor is a routine that intercepts graphic commands for plotting and drawing from Basic and routes them either to the screen or the plotter as required by the user. The Interceptor costs £67.85 for the BBC and £102.35 for the Apple.

Duet for less

The Japanese 8086-based Duet 16 has come down in price making it one of the cheapest 16-bit machines on the market.

Computer Exchange International (0628 75355) will be selling the 128K machine at £2,064 for the monochrome version or £2,294 for the colour model. On the colour model this is a cut of almost £1,000. For a complete review of the Duet 16 see issue 17.

PERIPHERALS

PCN rounds up the latest add-ons.

APPLE II: If you've still got some empty expansion slots in you're Apple machine, C/WP has a new release of its printer interface cards for you to drop in. At £72 the range includes a parallel card designed for graphics dumps to the Epson and Star printers. And at the same price the serial card features switchable baud rates and asynchronous communication facilities for connection to remote devices as well as to serial printers. Contact C/WP Computers, 01-828 9000.

ZENITH: Monitor specialist Zenith Data Systems, (0452 294451) has added the ZVM 133 Colour Monitor to its line. Selling at £494.50 the monitor has 20 MHz bandwidth, a rise time of 20 nanoseconds and a resolution of 680 dots by 240 lines—and can be used with any micro with RGB outputs.

RS232: A handy little device has been produced by Aims (0908-562953), called the DRS Data Route Selector. At the turn of a switch up to four word processors can share a printer or a single micro can be linked to a cluster of printers each carrying a separate type of form. DRS is available with RS232 female sockets and screw locks or with IBM-compatible female co-axial sockets. — There's a maximum of five sockets for £110.40.

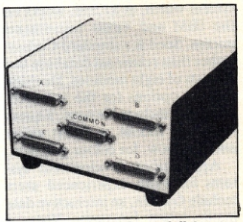
PRINTERS: After you've bought your micro, the next thing you'll probably want to buy is a printer and Hal Computers (0252 517175) has got two for you to look at. The FT 5001 is a matrix printer with a print rate of 100 characters per second and a bi-directional 80 column unit. At £332.35 it comes with a Centronics 8-bit parallel interface and can deal with a maximum paper width of 10in. The WP 550 daisywheel printer has a print-speed of 14cps and uses cut sheet or fan fold paper up to 13in wide. You can also get an RS232 interface.

Big Buffer Mark II

NEWBURY DATA'S 8931 dual capability text processing printer has finally surfaced after its launch a year ago. Pitched at word processing daisywheel users, the 8931 has a 12 needle print head and offers three print modes. Another feature of the printer is its drop-in standard cartridge which has a multi-pass carbon film ribbon with a character life of 1.5 million characters. At £2,156.25 the 8931 has Diablo 630 code compability which means it can support Wordstar and a number of other word processing packages.

COMMODORE: Big Buffer II allows you to switch between two code translation tables and unchanged code which means that the device can be used with HP and CBM computers. With an IEEE-input and Centronics output the buffer has up to 120K capacity, and can be operated in monitor mode in which all characters that are transferred via the IEEE-bus are printed in hexadecimal. Contact Mikrocomputertechnik (West Germany 0202/510444).

ICL, IBM: If you are looking for a back-up system, Alloy Computer Products has one you can look at. Pitched at IBM PC XT and ICL Personal Computer users the cartridge tape can be used for both file mode, backup/restore and data transfer between different systems. The ICL PC back-up has a ¼in tape that stores 21.6Mb unformatted on a single 555ft cartridge at £2012.50. Contact Alloy (0285) 68709.



Aims': five card trick specialist.

Disk bleeper

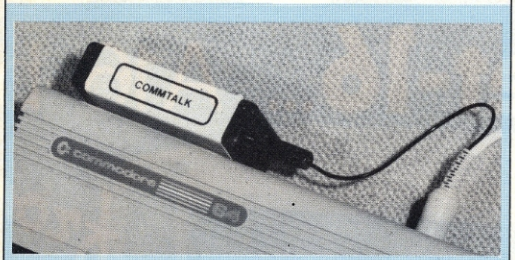
Jaytee Products has come up with what sounds like a useful aid for Commodore 8050 and 4040 disk drive users.

Many users would like an audible warning of disk errors, in addition to the red light.

Such products have been available for the 4040 for some time, usually imported, and costing about £15.

Jaytee has come up with a very cheap bleeper, which sticks inside the case of the disk drive, and which is attached to the pins of a couple of chips by spring-loaded hooks.

Opening up the drive will, of course, invalidate your warranty. The bleeper costs about £10. Phone Jaytee on 02273 5254 in the evenings.



HAPPY TALK— Dublin-based AndOr Systems has produced Commtalk, a speech synthesiser for the Commodore 64 and Vic 20. It uses allophones, giving it a virtually unlimited vocabulary, and connects to the system without obscuring the cartridge slot. AndOr (0001-900107) offers a six month guarantee on Commtalk which costs £39. One discouraging aspect of the product is AndOr's publicity material, which calls speech 'an aquisite' unique to man, and refers to Commtalk as a 'very versitial speech unit'. So much for phonetic spelling.

Fujitsu flair

By Sandra Grandison

A new alternative to the IBM PC from a seasoned IBM competitor will make its UK debut next week.

Fujitsu, the giant Japanese company that takes business away from IBM in the Far East and Australasia with its Facom mainframes, is turning its attention to the micro business. It already has a share in the Duet 16, distributed in this country by Lambart, but it is due to launch two business micros under its own name.

Fujitsu's FM-7 is an 8-bit, Z80-based machine with 64K of RAM. For £1,610 you get two disk drives holding 320K each, an RGB monitor and a bundle of software — CP/M, Wordstar, SuperCalc II, Basic and a general integrated ledger system.

Its IBM-compatible machine runs 8086 and Z80 processors. The FM-16S has 128K RAM expandable to 1Mb, has the same amount of disk storage as the FM-7, and comes with a colour monitor.

At £2,294.25 it looks to be competitively priced, and part of the package is a free batch of software including CP/M80, CP/M86, Basic, Wordstar, SuperCalc II and an integrated ledger system.

Both machines will be available in this country by March 1984. Contact Fujitsu Microelectronics (0753) 59117.

● Keeping in line with the MSX trend, Fujitsu has launched a home computer in Japan for Y49,800 (£150). Called the FM-X the machine has a 16 colour graphic display and animation capability.

As yet it is unclear whether the FM-X will reach the UK. A spokesman from Fujitsu said: 'We want to establish ourselves in the business area before going into the home.'

The first crop of MSX computers were unveiled at the Japan Electronics Show at Osaka recently. Machines came from NEC, Sony, Hitachi, Toshiba, Mitsubishi, JVC, Sanyo and Matsushita. Designs varied, including systems with built-in cassette units and others with detachable keyboards.

Software News

PCN rounds up the software releases.

Business

Sirius: Medicom will already be well known to doctors using a Commodore 8000 to help them run their practices. Now the company has introduced four of its packages to run on the Sirius. They are Age/Sex register, practice monitor, repeat prescription and practice accounts. Each package costs £750. Medicom is on Newcastle upon Tyne 815157.

Commodore: As the name suggests, Accounting Software specialises in producing professional accountancy software. Attempting to be a cut above the average its Purchase Ledger includes the concept of risk categories and aims to help you 'screw the maximum amount of credit from your supplier'. Similarly the Sales Ledger can be linked to a word processor so that you can produce specialised mailshots. The company is on 0272-730950.

CP/M86: Graffcom is making a bid for the electronic office market with a new product called O-MAN, which incorporates in one package all the features required for: word processing; financial planning; data manager; diary; calculator; telephone book; business graphic and printing. Plus features of O-MAN are that it will also run under Concurrent CP/M and house a mouse interface. Phone 01-385 9422 for prices.

IBM PC: IBM has brought outs its own-label general accounting package for the PC which would appear to do all the things you want it to right down to accumulating VAT Return information, printing cheques and generating balance sheets and profit and loss accounts. It can accomodate up to 1,000 accounts and is yours for just £351 plus VAT. For further details contact your nearest IBM PC dealer.

Education

BBC/Spectrum: Sulis Software (0225-61929) believes that learning should be fun and has introduced game playing into its two new programs. Time Traveller tests your knowledge of British history from the Bronze Age to to the present day by creating graphic maze games for each period. Beseiged, available only on the BBC, aims to teach you something about spelling by requiring you to get a knight across a ravine to relieve a beleaguered citadel.

Games

Commodore 64: 'Pit your wits against Kamikaze aliens. Save the whale. Fight the war of the worlds.' So reads the blurb from PSS which has secured the UK rights to five adventure games from the USA and Canada which are entitled: Metro Blitz; Moby Dick; Cosmic Split; Krystals of Zong; and Neoclyps. Priced at £7.95 each they should be available from the end of the month from high street stores.

BBC: Superior Software (0532-842385) has brought out another six games for the Beeb. Crazy Painter, 2002 and Fairground are arcade action games and Star Trek Adventure, Lost City and Gideon's Gamble are adventures. Priced at £7.95 each you can get them from Superior dealers, selected branches of WH Smith or on mail order.

Spectrum: Two 'real time graphic adventures' are the first Spectrum offerings from Terminal Software, better known for its Commodore programs. Called Vampire Village and Space Island they are yours for just £6.95 each. Call Terminal on 061-773 9313 for details of availability.

Vic 20: Outback and Countdown are two new arcade games from Paramount and cost £5.50. Phone 0642-604470 for further info.

How to win: If you enjoy cheating as much as playing games then the 'How to beat home video games' series of video-cassettes are a must. The three volumes from PolyGram cover all the well known favourites and should be available from usual video outlets. If not try PolyGram on 01-743 3474.

Home Applications

Spectrum: Home budgeting and banking are available on the first Microdrive package from Richard Sheperd (06286-63531). Called Cash Controller it is priced at £9.95 — a benchmark against which other Microdrive applications will be judged.

Apple, IBM PC: Find out where you came from with Family Roots from Pete & Pam Computers. This genealogy package is available from P&P for £149 plus VAT.

Systems Software

Wang: Micro Focus has ported all of its business programming software tools on to the Wang Professional Computer. Packages available include Level II Cobol, Animator, Forms-2 and Native Code Generator. For prices and availability phone Micro Focus on 0635-32646.

Commodore 64: A full feature assembler/disassembler has been published by Sunshine. Named Mastercode it's yours for £13.00 plus VAT direct from Sunshine (01-437 4343).

IBM PC: Expert Systems (0865-242206) has produced an enhanced version of its fifth-generation language Prolog for the IBM PC that adds features not available on the earlier Z80 version. It is priced at £390 plus VAT or £300 for educational establishments.

PET: Microcomputer Services (01-802 0019) has developed a package called 'Speakeasy' to allow you to communicate to your PET through the Microwriter hand held word-processor. It costs £140.

Sage: Lisp and Fortran are now available for the Sage super-micro courtesy of Metacomco (0272-550756).

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128K Single Disk Drive, Keyboard, Mono System	**£1395.00**	Rec. Price
128K Two Disk Drives, Keyboard, Mono System	**£1795.00**	£2595.00
128K Two Disk Drives, Keyboard, Colour System	**£1995.00**	£2995.00
10mb Mono System inc. 1 Floppy Disk Drive	**£3450.00**	
10mb Colour System inc. 1 Floppy Disk Drive	**£3650.00**	

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d.Graph	**£200**
Quickcode	**£200**
Autocode	**£225**
Friday!	**£195**
Intostar	**£295**
Datastar	**£175**
Cardbox	**£155**
Rescue	**£295**
Perfect Filer	**£339**
Knowledgeman Retrieve	**£395**
UTILITIES	**Price**
TSS Support (Comms) Programme	**£355**
B STAM	**£130**
INTERLINK	**£130**

Macro 80	**£138**
Toolbox	**£500**
Datasafe	**£100**
LANGUAGES	**Price**
Digital Research	
C	**£234**
C Basic Compiles	**£234**
Pascal MT+	**£400**
SPP	**£167**
PL/1	**£500**
Microfocus	
Level II Cobol	**£965**
Forms -2	**£110**
Animater	**£475**
Microsoft	
Advanced Basic	**£249**
Macro Assembler	**£99**
M Basic Interpreter	**£269**
Basic Compiler	**£303**

Business Basic	**£460**
Cobol	**£575**
Fortran	**£344**
C	**£384**
Pascal	**£269**
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Level II Cobol Compiler	**£750**
Level II Cobol Animator	**£375**
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S'soft Fortran	**£300**
RM-Cobol	**£520**
C 86	**£299**
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PCN Charts

This top 30 games list is compiled from both independent and multiple sources across the nation. It reflects what's happening in high streets in the two weeks up to November 10 and, like the micro charts, does not take account of mail order sales. The micro charts this week show the number of machines sold in the same two-week period so they tell the story in the high street between October 27 and November 10.

GAMES

Top Thirty

			GAME TITLE	PUBLISHER	MACHINE	PRICE
▲	1	(—)	Lunar Jet Man	Ultimate	Spectrum	£5.50
►	2	(2)	Manic Miner	Bug Byte	Spectrum	£5.95
▲	3	(8)	Flight	Psion	Spectrum*	£5.95
▲	4	(5)	Hobbit	Melbourne	Spectrum*	£14.95
▲	5	(—)	Valhalla	Legend	Spectrum	£14.95
▲	6	(14)	Hovver Bovver	Llamasoft	C64	£7.50
▼	7	(4)	Zoom	Imagine	Spectrum	£5.50
▼	8	(1)	Kong	Ocean	Spectrum	£5.95
▼	9	(3)	JetPac	Ultimate	Spectrum	£5.50
▼	10	(9)	Gridrunner	Llamasoft	Vic 20*	£7.50
▼	11	(6)	Penetrator	Melbourne	Spectrum	£6.95
▲	12	(—)	3D Ant Attack	Quicksilva	Spectrum	£5.95
▲	13	(28)	Heathrow ATC	Hewson	Spectrum	£5.50
▲	14	(—)	Chukkie egg	A&F	Spectrum	£5.50
▼	15	(13)	Horace and the Spiders	Psion/Melbourne	Spectrum*	£5.95
▼	16	(15)	ZipZap	Imagine	Spectrum	£5.50
▲	17	(25)	Halls of the Thing	Crystal	Spectrum	£7.50
►	18	(18)	Scrabble	Psion/LG	Spectrum	£15.95
▲	19	(21)	3D Deep Space	Postern	BBC*	£8.00
▲	20	(30)	Hunchback	Superior	BBC	£7.95
▲	21	(—)	Purple Turtles	Quicksilva	C64	£7.95
▲	22	(—)	Splat	ISL	Spectrum	£5.95
▼	23	(7)	Harrier Attack	Martech/Durell	Oric	£6.95
►	24	(24)	Xadom	Quicksilva	Spectrum	£6.95
▲	25	(26)	Blue Max	Showcase	Atari	£27.95
▲	26	(—)	Football Manager	Addictive	Spectrum*	£5.95
▼	27	(16)	Golf	Computer Rentals	Spectrum	£5.95
▲	28	(—)	Corridors of Genon	New Generation	Spectrum	£5.95
▲	29	(—)	Bugaboo	Quicksilva	Spectrum	£6.95
▲	30	(—)	Transylvania Tower	Shepherd	Spectrum	£6.00

*Denotes available on other machines

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PCN Charts

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, like the games, is updated every alternate week.

PCN Charts are compiled exclusively for us by MRIB (Computers), London, (01) 408 0250.

HARDWARE

Top Twenty up to £1,000

	MODEL		PRICE	DISTRIBUTOR
►	1 (1)	Spectrum	£99	(SI)
▲	2 (3)	BBC B	£399	(AC)
▼	3 (2)	CBM 64	£229	(CO)
►	4 (4)	Vic 20	£140	(CO)
▲	5 (8)	ZX81	£45	(SI)
▼	6 (5)	Oric 1	£99	(OR)
►	7 (7)	Dragon 32	£170	(DD)
▼	8 (5)	TI/994a	£99	(TI)
▲	9 (10)	Atari 800	£300	(AT)
▼	10 (9)	Atari 400	£150	(AT)
▲	11 (17)	Apple 11e	£750	(AP)
▼	12 (10)	Sharp MZ80A	£349	(SH)
▲	13 (14)	Lynx 48/96	£225	(CA)
▼	14 (13)	Aquarius	£60	(MA)
▲	15 (16)	Sharp MZ700	£240	(SH)
▲	16 (20)	Tandy Colour	£240	(TA)
▲	17 (—)	Electron	£199	(AC)
▼	18 (15)	CGLM 5	£150	(SO)
▼	19 (11)	Colour Genie	£168	(LO)
▼	20 (18)	Epson HX20	£472	(EP)

Top Ten over £1,000

►	1 (1)	ACT Sirius	£2,525	(ACT)
►	2 (2)	IBM PC	£2,390	(IBM)
▲	3 (7)	HP86A	£1,438	(HP)
▼	4 (3)	Apple 111	£2,780	(AP)
►	5 (5)	Commodore 8000 series	£1,200	(CO)
►	6 (6)	Epson QX10	£1,995	(EP)
▲	7 (9)	Olivetti M20	£2,180	(OL)
▼	8 (4)	DEC Rainbow	£2,359	(DEC)
▲	9 (—)	Apricot	£1,760	(ACT)
▼	10 (8)	British Micro	£1,495	(BM)

AC Acorn Computers. **ACT** — ACT. **AJ** — Anderson Jacobson. **AP** — Apple Computer. **AT** — Atari International. **BM** — British Micro **CA** — Camputers. **CO** — Commodore. **DEC** — Digital. **DR** — Dragon Data. **EP** — Epson. **HP** — Hewlett Packard **IBM** — IBM. **LO** — Lowe Electronics. **LL** — Lucas Logic. **MA** — Mattel. **OL** — Olivetti. **OR** — Oric. **SH** — Sharp. **SI** — Sinclair. **SO** — Sord. **TA** — Tandy. **TI** — Texas Instruments.

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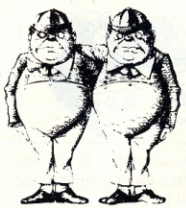

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Sorting out the Spectrum 3

In reply to the Star letter in Issue 32 about loading problems with an Issue 3 Spectrum, could I offer the following information and advice. I own both an issue 2 and an issue 3 Spectrum, and both load commercial software without any problems. The issue 2 machine has been upgraded by Sinclair to 48K, and whether they changed the ULA at the same time I cannot say, but the two ULAs and the various internal Sinclair 'bodges' on the two machines look quite different.

There are three possibilities which come to mind when trying to explain Mr Clements loading problems: an incompatible cassette recorder, a dirty replay head, and poorly adjusted replay head azimuth.

The Spectrum requires a very high input level from a cassette recorder, and not all recorders will drive it hard enough. When I changed from a ZX81 to the Spectrum I had to change from a Tandy recorder to a W H Smith data recorder specifically sold for use with the Spectrum. This has given perfect performance since purchase.

The Spectrum is very intolerant of a poor signal, and cassette tapes do tend to shed oxide onto the tape heads. Every fortnight or so I clean the heads and capstan with cotton buds soaked in iso-propyl alcohol. This can be bought at any dispensing chemists and is non-toxic, though highly inflammable.

PCN £10 Star Letter

Finally azimuth. If the recording head is at a slight angle (it should be exactly vertical) it has exactly the same effect as oxide clogging. Most cassette recorders have the facility to adjust the azimuth, and the procedure is as follows: unplug the recorder from your computer so you can hear the screech from a computer cassette through the internal speaker. Without loading a cassette press *Play*. The playback head will move forward to its playing position. On either side of the playback head — it's the one in the middle and is usually silver in colour (the one at the opposite side to the rubber pinch wheel is the erase head and requires no adjustment) — are screws. One will probably have paint over it to stop you messing around, but the other should be adjustable.

Now load a computer cassette with a commercial recording on it and start playing it. You will need to listen to it through the speaker at a fairly high level. Using a watchmaker's screwdriver adjust the azimuth of the head — perhaps through an access hole in the case of the recorder — until the sound is as harsh as possible. You will find that either side of the correct position the sound is woolly. This should solve your problems. The only difficulty now is that all the programs you recorded yourself will not load because they were recorded with the azimuth incorrect.!

Roy Tipping,
Blunham, Bedford

Bristol scourge offers shops advice

In reply to Marco Dawson (Issue 34) I must make it clear I don't expect shop assistants to know everything about every computer they sell, but I do expect simple knowledge of the computers in question. If you want to buy a car, for example, you'd expect the sales-person to know what they're talking about so why not have the same level of competence in computing.

I totally agree that the more knowledgable assistants are young but shops employ older people who, in general, don't know about computers.

I'll tell you how I'd go about selling a computer. First, and most important I'd have to know something about the equipment. Second, I wouldn't specify any machine, just weigh up the pros and cons for each and suggest they purchase a buyer's magazine and think it over before deciding.

I end with a call to all computer shops to employ more young people like Marco Dawson who have been brought up with computers and know what they are talking about, a rare thing in the shops of Bristol.

Stephen Baker,
Bristol

But surely, even the oldies can learn given chance! Ed.

Chain stores give a better service

I was interested to read Marco Dawson's letter (Issue 34). Specialists computer shops are failing dismally to meet the needs of their customers and are an endangered species. In contrast, the big chain stores are getting better all the time.

For instance, some months ago I asked a Plymouth dealer for a computer book. He didn't have it and I was told it wasn't worth their while getting single copies of books. W H Smith, on the other hand, will try to get any book in print no matter how obscure.

It is true the assistants in the chain stores know a great deal less about computers than those in the specialist shops, but who do you think gives me the better service? If I go into a car showroom I don't expect the salesman to know the compression ratios of a Maestro.

It all comes down to professionalism. Most specialist shops are staffed by enthusiasts who know a lot about some aspects of computing. Most know little about selling. The chain stores, on the other hand, have been selling things for years and they're good at it. Buyers will form an opinion by getting advice from friends, comparing specifications and reading magazines like *PCN*. What they can't get from the chain stores they'll get by mail order, knowing that if something goes wrong they'll probably get their money back without problems.

Unless the specialists learn to 'sell' they will end up selling to businessmen with special needs and to hobbyists who enjoy the jargon and mystery.

Martin Graebe,
Okehampton, Devon

More gen on the Atari XL600

Thank you for an interesting and informed article on the new Atari 600 (Issue 31).

In fact, you didn't quite do the machine justice. It is perfectly feasible to redesign characters. Multiple character sets can be generated and programs switched between them. Couple this with the capability to mix the various graphics modes together on the screen (Display Lists) and you have a very powerful set of graphics programming tools.

The high price of software is indeed a problem, although the quality is generally high. However a few British companies are producing quality software at realistic prices. Maybe if Atari market its new range properly, *ie* as sophisticated computers rather than just games machines, they will become as popular as they deserve to be and will attract comprehensive support from the UK software houses.

H G Denholm,
Stonehaven, Aberdeen

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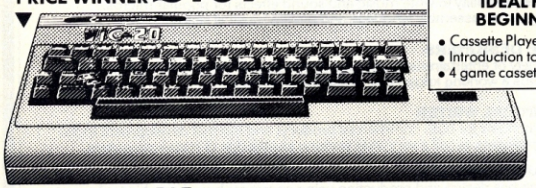

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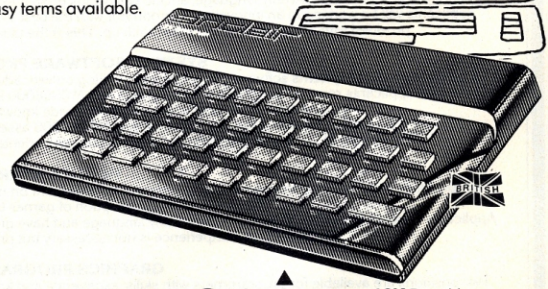

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Solutions to three times 64

Q I am a Commodore 64 owner with a problem or three. How can I load and run a program from inside another program? Can the problem of the user having to press the Commodore key during loading be eliminated? Can a display, eg a title page, be shown during loading?
Andrew McEwan, Edinburgh.

A Three affirmative answers here, although with the usual provisos. First, you can load a program from within another with the greatest of ease. You use a line something like:

10 LOAD "YOUR PROGRAM"

The problem is that the second program will overwrite the first if it is written in Basic. With machine code there is no problem. You simply write your machine code in high memory where it will not clash with Basic and then load it using LOAD "YOUR PROGRAM",1,1.

You can get around the problem of overwriting Basic by moving the area where your 64 stores its programs. By moving the pointers to the start of Basic above your first program, the second will load and run as normal, except that you lose a lot of memory this way — make sure you have enough free RAM available for both. See the Programmer's Reference Guide for details.

Second, you don't have a problem. Provided that you name the program you want to load, it isn't necessary to press the Commodore key. The program will load eventually anyway.

Your third question is more difficult. I assume you are working with tapes, in which case you will be aware that every time you read or write to the cassette the screen goes blank. This is not a bug, as some people have said. Because the VIC II chip, which handles all video processing, interrupts the main 6510 processor so often, it is turned off during tape operations leaving the 6510 free to check the information coming to and from the cassette.

When working with the 1541 disk drive this does not happen so you can create any screen display and show it during disk operations.

However, all is not lost. You can display sprites during tape operations. Using defined sprites in combinations, you can have words and pictures on screen. By laying these out on graph paper first you should be able to do words and graphics, bearing in mind that you can have different sprites in different colours and expand them both horizontally and vertically.

Spectrum owners' useful addresses

Q I have a Spectrum and would like to buy some educational programs.

I have seen lots of advertisements, but I haven't been able to find any in the shops I've tried.
L Fish, Birmingham.

A It's surprising that you're having such difficulty. A number of publishers have recently launched educational programs which are available in some retailers.

The immediate solution would be to write to such companies as Heinemanns, 22 Bedford Square, London WC1B 3HH; Sinclair Research, 25 Willis Road, Cambridge CB1 2AQ; Shards, 189 Eton Road, Ilford, Essex IG1 2UQ and so on.

Reviews of educational software have appeared in *PCN*, so searching through back copies should give you more addresses.

You could also contact MUSE (Microcomputer Users in Secondary Education), Teaching Centre, Westhill College, Weoley Park Road, Birmingham B29 6LL.

Oric Basic chops both ways

Q As you will know, the contents of arrays are lost when Oric programs are CSAVEd and there's no way in Oric Basic of saving arrays to cassette. This means that I'm forced to use rather a lot of long DATA statements. The problem with these is it takes too long to find the information I need to extract from them using READ.

My question is whether it's possible to use a bisectional search (binary chop) algorithm for extracting the DATA I'm looking for? I understand that the DATA would have to be arranged alphabetically.
Alan Humm, Broughty Ferry, Angus.

A Now there's a tricky question. You could use a binary chop to access DATA statements by using the fact that the current DATA line number is held in location 174. You could issue a RESTORE, then start searching the DATA statements as you would a one dimensional array. The differences would be the subscripts would be the line numbers of the DATA statements, rather than an array cell reference and this would have to be DOKEd into the location mentioned.

This would restrict you to one item per DATA statement (which would use a up a lot of memory) and you would have to be very careful to make sure that the DATA was arranged in order. You might be able to improve on this technique by using more than one item per DATA statement and only matching the first few characters of the first item when searching.

The best way to deal with your problem is to use the advice given in the answer to Andrew Chard.

You could then write a short program to set up the array by READing DATA statements, then save the array to tape. This could then be CLOADed into an array once the array has been DIMensioned in your program.

Save Oric arrays onto tape

Q I have an Oric 48K and am writing programs which require variables and arrays to be saved with the program on tape. Please could you tell me how to do this as it's not in the manual.
Andrew Chard, Alfold, Surrey.

A A good question: the reason that the information you need isn't in the manual is because, incredible as it may sound, the Oric's Basic lacks any file handling commands. The routines are, of course, available in ROM because they're used for saving programs.

What you need is a machine code routine which will find the start and end addresses of your array, load these into the relevant locations (& 5F, & 60, & 61 and & 62), then call the routine at & E57B to save the file. A listing of such a program can be found in issue 2 of Oric Owner magazine (June/July 1983). This is available from Tansoft Ltd, Units 1 & 2, Techno Park, Newmarket Road, Cambridge. Tel. (02205) 2261/2/3/4.

Machine code checklist

Q I have had my ZX Spectrum for some time now, but I still do not know how to copy a machine code program from a magazine and into my ZX Spectrum. So please can you tell me how to go about this, check that it is in my ZX Spectrum, and how to run it.
Larry Leung, Sutton Coldfield, Birmingham.

A Since machine code is what the machine is supposed to be most comfortable, shouldn't you simply be able to type in the numbers? The answer is that you can, more or less. You just have to set up a kind of Basic inserter first.

There are three ways of doing this and you can take your pick; the loop is probably the most sensible, given that the machine code must be stored in unbroken sequence.

But the most obvious is to POKE the code in byte by byte:

POKE A, B

where A is the start address and B is the item of code.

The loop involves slightly less work:

```
10 FOR I = 1 TO N
20 INPUT B
30 POKE I + start location, B
40 NEXT I
```

Or you can list the code in a DATA statement and READ it in:

```
10 DATA B1, B2, . . Bn
20 FOR I = 1 TO N
30 READ B
40 POKE start location + I
50 NEXT I
```

The best way to check that it's there is to run it. Type: RANDOMISE USR (start address) and away you go.

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TRACEing a Lynx

```
DD EF F5 CB 47 C4 61 9F F1 CB 4F C4 0A 25 DD E1 C9 2A
F6  61 7E FE 80 C8 2A 54 62 E5 21 03 E0 22 54 62 3E 3E
CF 2A F6 61 CD B1 35 CD 59 1D 3E 3C CF CD BD 09 28 FB
E1 22 54 62 C9
```

The Lynx has a very useful debugging facility called TRACE: however, it does have certain disadvantages.

The TRACE routine given below, prints the current line number in the bottom left hand corner, preserving the rest of the screen. It also has a single step facility whereby a key must be pressed before the current line of Basic is executed.

To enter the routine type: RESERVE &9F50, MON, M 9F50

Then enter the above, pressing carriage return after each hexadecimal number. Return to Basic by entering ʃ and type DPOKE &62B6, &9F50

The routine is now ready to be accessed in the usual way.

Mark Glossop, Sheffield.

Newbrain all for nought

Here is my attempt at the definitive description of the Newbrain screen.

In 40 column mode, the first location on screen memory is 642 (in 80 column mode it is 644), with each line consisting of 64 characters, of which 24 are 'invisible' (In 80 column mode there are 128 characters in each line of which 48 are 'invisible').

After each line of printing, a 0 character is inserted, which tells the computer that there are no more characters on the line. Therefore, to enable poking to the screen, the first 'invisible' character in each line must be poked with 0 and then all the 0 characters, in the visible part of the screen, set to spaces (character 32). However, if the screen has been set up like this and then it scrolls, the bottom lines will be back to normal.

Other things which may be of interest are: if the location before the first location of the screen memory (641 for 40, 643 for 80) is poked with 1, then the cursor is made invisible and, if it is poked with a 9, printing will only occur in one line (this can be used to list a program one line at a time). Normal service will be resumed, if the location is poked with 129.

Something which is not mentioned in the manual is that the PEN function will return three more values. PEN(7) and PEN(8) will return the start and end addresses of the graphic screen, PEN(9) will return the horizontal resolution of the graphics screen.

```
10 REM PROGRAM TO CLEAR THE SCREEN FOR POKING
20 FOR N=682 TO 2154 STEP 64
30 POKE N,O
40 NEXT N
50 P=642
60 FOR N=1 TO 24
70 FOR I=O TO 39
80 POKE P+I, 32
90 NEXT I
100 P=P+64
110 NEXT N
120 REM PUT MAIN PROGRAM HERE..
```

George Morrison,
Bridge Of Don,
Aberdeen.

Recovering the Commodore 64

It is not difficult to crash the Commodore 64 so that the RUN/STOP and RESTORE keys fail to recover the computer. There is, however, an alternative to switching off and losing your program.

By momentarily connecting the RESET pin on the user port to the GND pin with a piece of wire, the 64 does a 'cold start'. After a couple of seconds, the familiar screen will be displayed as if the machine had just been switched on. Any machine code program, except those stored in the tape buffer locations, will remain intact. A Basic program can be recovered using an OLD command (*PCN*, issue 35).

Check page 143 of the user manual for the correct terminals of the user port. The GND and RESET pins are marked 1 and 3 respectively on the diagram at the bottom of the page. The operation should be carried out carefully, since a wrong connection could possibly damage the input/output chip. Used wisely, this simple procedure can save many hours and a good deal of frustration.

S A Sassoon,
Long Stratton,
Norfolk.

Stringing along with the Newbrain

The following routine on the Newbrain will output a string of any length, without displaying a continuation cursor. It will also remove any word that is not completed on a line, and place it on the next line.

Make sure that the space bar is pressed once between " " in line 1020 and also once at the end of the string before pressing NEWLINE.

For the routine to be used on an 80 column display, the 40 in line 390 should be changed to 80.

```
390  C=40:PRINT" INPUT STRING BELOW."
400 PUT 10: LINPUT(" ")A$: PUT 31
420 L=LEN(A$)
440 FOR I=1 TO L
460 X=C+J
480 D=J+1
500 GOSUB 1000
520 ON ERROR GOTO 2000
560 PRINT MID$(A$,D,J-D)
580 NEXT I
1000 FOR J=X TO 1 STEP -1
1020 IF MID$(A$,J,1)=
     " " THEN RETURN
1040 NEXT J
1060 RETURN
2000 END
```

D H Jones,
Aberaeron,
Dyfed.

Alternative 64 INPUT

Here is a way of changing the prompt character (normally a question mark) on the Commodore 64. Enter the following few lines into the program, near the begining (before an input is required). When RUN this program copies the Basic ROM to the RAM beneath. When you wish to change the prompt, before an input:

POKE 1,54

Then POKE the location 43846 with the CHR$ code of the character required, thus for a pound sign—

POKE 43846,92

After the INPUT statement, always POKE 1,55

```
10REM CHANGE PROMPT
20FOR T=828 TO 828+25
30READ A:POKE T,A
40NEXT T
50DATA169, 160, 133, 252, 169, 0, 133, 251, 160, 0, 177, 251, 145, 251
60DATA200, 208, 249, 230, 252, 165, 252, 201, 192, 208, 239, 96
70SYS828:REM COPY ROM TO RAM
80REM DEMO
90POKE43846,92:POKE1,54
100INPUT"HOW MUCH MONEY";M
110POKE1,55
```

Note that it is also possible to use colour codes as prompts!

David Gristwood,
Sunderland,
Tyne and Wear.

ZX printer labeller

Having recently acquired a ZX Printer, for my Spectrum, I decided to put it to some practical use. The program shown here will print a cassette label on the screen, which can then be COPYed to the printer.

The label can be numbered and lettered before COPYing using: PRINT AT 4,3: "any number".

```
Cassette label program

  10 PLOT 15,150: DRAW 224,0: DRAW 14,-14: DRAW 0,-98: DRAW -252,0: DRAW 0,98: DRAW 14,14
  20 PLOT 65,105: DRAW 0,-45,PI
  30 PLOT 191,105: DRAW 0,-45,-PI
  40 DRAW -125,0
  50 PLOT 65,105: DRAW 125,0
```

P Niblock, Grimsby, N. Humberside.

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Igor Thomas with an in-depth review of the Sirius' smaller sibling — the elegant Apricot.

Home grown ACT

The basic concept of the ACT Apricot revolves around the current trend for "briefcase" microcomputers. In a space smaller (and possibly lighter) than many executive lunchboxes, the Apricot manages to conceal a full 16-bit 8086 microsystem, complete with up to 768K of RAM, two disk drives, fan-cooled power supply, and a remarkable IBM-descendent keyboard.

In brief, an Apricot is actually made up of three physically separate units: a keyboard, a video monitor, and a central microcomputer section with built-in handle.

By any Japanese/American measure of design (of which the majority of the innards are), the Apricot is a front-running classic. For a British product, it is positively in orbit! Every aspect of the computer's construction, from the confident colour scheme and light-weight moulded casings, to the internal metalwork and printed circuit board assembly, has been crafted by tender and loving engineers and technicians.

Not for Apricot the liability of a built-in monitor display. As a separate item the official Apricot video monitor competently avoids the arm-lengthening and eye-straining habits of the Osbourne age (ah, yes, when men were men, and micros were heeaavvyy). Although you will need two hands to carry both the monitor and the central box keyboard package at the same time, this style of construction allows the dedicated Apricot traveller to buy *two* monitors, and merely transport the brain box (with built-in handle) as easily as you please.

Equally transportable is the remarkable Apricot keyboard, which clings chameleon-like to the underside of the brain box during travel. Yet remarkably, when in position at the business end of things, it not so much resembles a plug-in keyboard as it does a smooth and slick typewriter.

At the centre of it all is the Apricot main unit; this diminutive and deceptively stylish plastic box contains all the processor electronics, (memory and microprocessor chips, etc), connectors for the keyboard, video, mains, parallel and serial printers and knick-knacks, a large loudspeaker, two disk drives, cooling fan, and a hide-away plastic handle. ACT also refers to this central section as the microcomputer, since it does indeed contain the central microprocessor circuitry. With no disrespect to ACT, I find it easiest to address the whole of the Apricot as the microcomputer, and to speak of the central box in a far more technical fashion as the brains box.

All three sections of the Apricot are completely wrapped in an attractive livery of off-white matt plastic, and the monitor is fitted internally with a matt black anti-reflective screen mesh over its glass face. The Apricot would look equally at home in the bedroom or the boardroom, and possibly will find itself commuting between those very places.

Presentation

The Apricot is shipped in two tastefully decorated cardboard cartons, with the smaller containing an Apricot monitor and the larger containing the brain box, keyboard, cables, documentation, and sundries. Getting the two cartons home will require four hands, although everything is packed well enough to withstand anything British Rail may happen to throw at it.

Everything snaps together with millimetre precision; the keyboard and monitor quickly plug in at the rear of the brain box, and so does a standard IEC three-core mains cable.

Documentation

Supplied with our review machine were four smartly dressed manuals, of the accepted spiral bound A5 microcomputer format.

The logical place to start seems to be the Owners Handbook. The first four pages contain an 'illustrated entire history of computing as we know it', followed by a confident and equally well illustrated connecting A to B section. After this comes a brain-reeling high-speed summary of the Apricot's actual fixtures and fittings, sliding nicely into the ubiquitous 'Insert disk number one into the left hand disk drive.'

It is at this point that things become a little confusing, as the splendid colour photography illustrations don't quite match the actual displays produced by Apricot disk number one. Also, some of the suggestions about programming languages, and the definiions given in the technical glossary are very borderline in their accuracy. However, ACT says that new improved manuals are being prepared as quickly as possible, as the first set of manuals were only printed in small quantity.

Moving right along to the Configurator Guide (being slightly less imposing than the MSDOS and Super Calc/Super Planner heavyweights), the going becomes rather more difficult. Apart from the inconvenience of Chapter 8 of 15 being absent without leave, the lack of individual page numbers has evidently caused ACT to render an appendectomy: no index.

None the less, all the Apricot's accompanying utility software is explained in this manual. Or not explained, if you prefer. Anyway it is heavy going, an uphill battle all the way.

After recovering from being configurated, I gingerly peeked into the voluminous MSDOS User Guide. With a great sigh of relief, I spied the well-rounded style of the original Microsoft MSDOS manuals, with some anglicising by ACT. Unfortunately, some things have been intentionally left out particularly with reference to the mapping of the Apricot's memory.

For the more downbeat members of the audience, ACT has avoided explaining the sizes and whereabouts of: user RAM, system BIOS and ROM, text and/or graphics screen memory, definable characters, keyboard mapping, device drivers, and configuration parameters (that's just for starters). However I am assured that all this information will very soon be available, for an additional (undisclosed) sum, from ACT's Edgbaston office.

Immediately after the MSDOS section comes a section on Edlin, the MSDOS text editor program, and gateway to the South. As we leave Edlin, we arrive at the mainstay of this manual, the Microsoft 5.28 Basic manual.

There is very little here which does not owe its soul to Microsoft. Suffice it to say that in spite of the sample programs added by ACT, the Microsoft Basic interpreter is completely and clearly documented. You should not attempt to teach yourself Basic from this text, however, as there are many independent publications available, most of which are less concentrated.

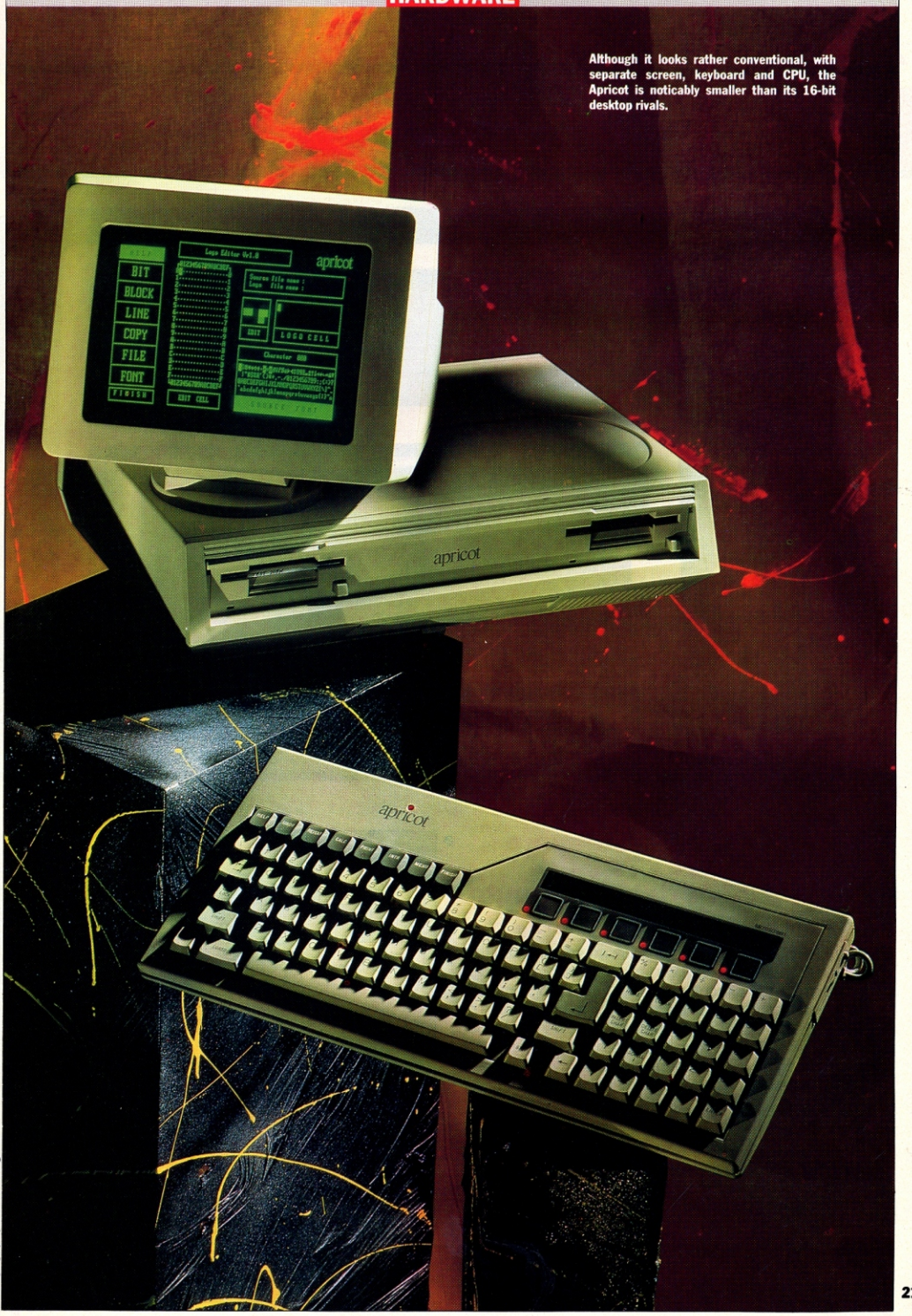
Again, as with the Configurator Guide, the MSDOS User Guide does not contain chronological page numbers. There is an index, but this consists of only two pages, as compared to the balance of 214 pages.

Finally, we arrive at the Super Calc/Super Planner manual which, similar to the Configurator Guide, has also fallen prey to the ACT appendectomist(s). Page one gets off to a bad start by both starting and finishing all the documentation for Super Planner. However, as Super Planner was not supplied with our review machine, I cannot question the accuracy of this very radical style of information.

In summary, the present Apricot documentation runs the gamut of literary style: from the sublime to the ridiculous. It is, of course, not a small task to document such a versatile beast as a microcomputer at the best of times. However, as mentioned earlier, ACT is at this very minute hastening to produce a full set of new and improved manuals, and the numerous omissions and technical details will assuredly be dealt with.

Construction

Contrary to what many engineers may suspect, the aesthetically pleasing exterior of the Apricot conceals an equally pleasing internal construction and layout. Generally speaking, neither the Apricot keyboard, monitor, or brain box is field serviceable, although ACT offers a very respectable



Although it looks rather conventional, with separate screen, keyboard and CPU, the Apricot is noticably smaller than its 16-bit desktop rivals.

Photography by Howard Kingsworth

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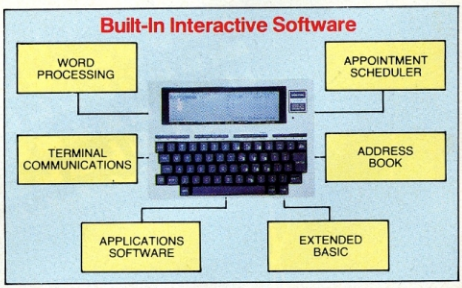

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structure of maintenance and service centers throughout the United Kingdom.

May I highly advise against removing a few screws and having a butchers with any or all parts of the Apricot, unless you actually are the owner. As a rule, aesthetic things are usually held together by magic, and the Apricot is no exception. Be assured that there are no switches, adjustments, or user bits of any use to most owners inside, and anyway, you forget that it's all very high technology and never goes wrong.

The keyboard is a miraculous piece of sculpture, especially as it in fact contains two dedicated microcomputers in itself. One looks after the switch signals from the keyboard keys, and the other creates a very smart display for the built-in LCD micro-screen (of which more later).

Oh yes, not wishing to leave any of the workers out of the photograph, there's also a complete electronic clock which runs all the time, quite happily fed by a 9 volt battery. Manufactured in America, the keyboard contains 90 keyswitch positions, which are used in different combinations to produce an enormous range of signals for the brain box to think about.

Perhaps the most eyecatching features of the Apricot keyboard are the micro-screen display and the touch-sensitive function keys. This innovative bit of keyboard design uses two most remarkable snippets of high technology. The first is the microprocessor controlled liquid crystal display screen which, apart from whatever else you want it to show, generates digital clock, desk calculator, and programmable function key displays.

The second is the touch-sensitive switches which, although you might think they are hidden under some kind of self adhesive plastic cover, actually *are* the self adhesive plastic cover. Just press on the outlined area, and your wish is the Apricot's command. The rather dead feeling received when operating these switches is in fact due to lack of support pillars inside the plastic moulded case (see later comments on the keyboard).

The very aesthetic Apricot video monitor is also very well-constructed, and incorporates a generous amount of metal screening behind its deceptive plastic exterior. In shopping overseas ACT certainly has purchased only the best ingredients, and baked an equally elegant package to put them in. The excellent pedestal/slide mount system which supports the video monitor offers an infinite number of variations to yoga enthusiasts of all ages.

Inside the brain box, as with so many modern microcomputers, all of the thinking is confined to one large printed circuit board, with all components of less than $50 in value soldered directly in place. For the very high technology bits sockets are provided (only the best), and the 8087 numeric co-processor socket is presently supplied empty (see Expansion comments). All cable connections to the printed circuit board are wisely terminated in plugs and sockets, such that only the least amount of same are required, and service should be relatively bloodless.

The disk drives, loudspeaker, and power supply are all assembled onto a lightweight but very rigid plated steel chassis. This is in fact a subchassis, in turn mounted onto an outer steel framework, which principally supplies the overall strength behind the lightweight plastic casing. The protective hatch door at the front of the Apricot also pivots on the outer frame, and the main circuit board is underneath all the above.

Presumably the Apricot will receive most of its use on a desktop, and thus the plastic front hatch will remain hidden. However, should it come down to any kind of travelling, this thin plastic protection does not look very dirt, dust, or water-proof. There certainly is room for some kind of Apricot shoulder-bag arrangement from the enterprising world of third party accessory manufacturers.

The back panel of the Apricot holds all the connectors to the outside world in a neat row, and has two peek-a-boo sections which may be removed for access to the expansion card area. The two expansion connectors (for extra RAM boards, etc.) are somewhat restricted over in one corner, but don't forget, this is already a very small machine.

The general structure of Apricot add-on cards is similar to that of its bulkier parent, the ACT Sirius, but with correspondingly less area available.

Generally speaking, the main brain box of the Apricot looks deceptively delicate, but I am very confident that it could withstand a severe accident far better than its rivals, with little damage other than cosmetic.

Keyboard

The Apricot keyboard is certainly pretty, but once you actually start using it, you may find the beauty only skin deep.

Not even the redoutable ACT can avoid the ever-present temptation to try to make

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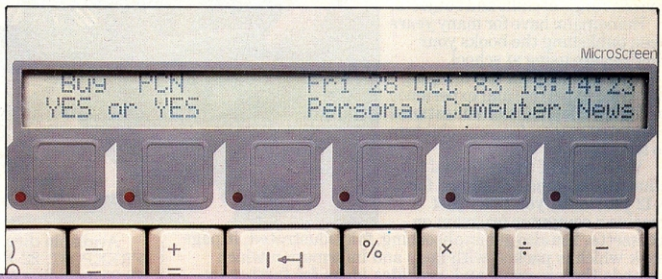
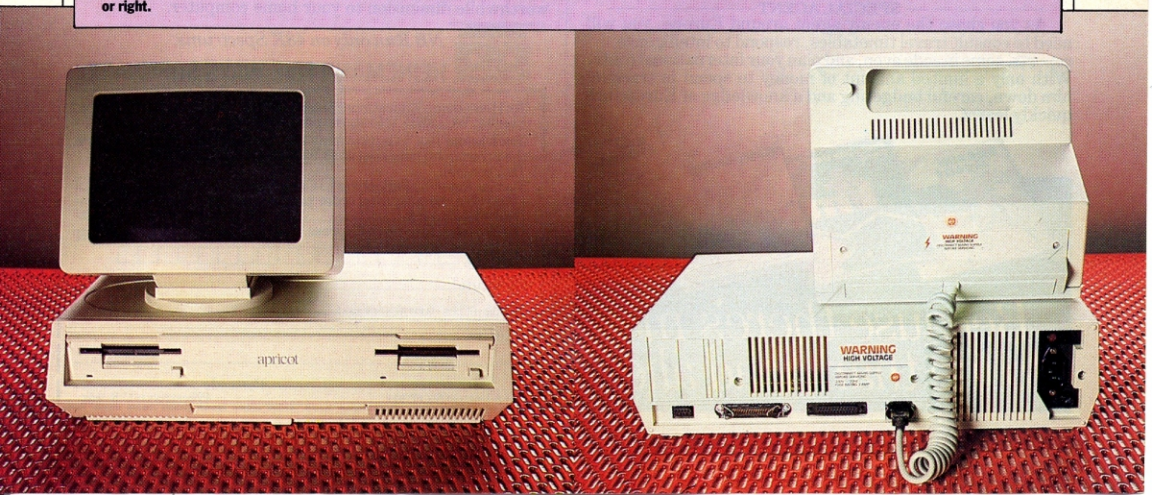


The Apricot's keyboard features enough electronics to run a built-in two-line screen which labels the six touch-sensitive function buttons beneath it (above). The monitor has only one umbilicus — power and picture is provided by a single stretch cord. A hollow on the CPU casing allows the screen to be positioned left or right.



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a keyboard that is all things to all people. Everyone knows that no two people like the same keyboard, so why add another straw to the camel's back? The Apricot carries a DIN Ergonomic Standards pedigree, but we all know what the EEC has gotten us into on other fronts!

Leaving politics side, as regards the advanced features and uses of the Apricot keyboard the Owner's Handbook is none too clear, especially on the subject of what the plain English function keys do at any given time. Quote: 'The exact way in which these keys work will tend to vary according to what you're doing with the Apricot at the time . . .'

Software packages (like the Wordstar word processor) can be arranged to use these keys in a logical fashion, as they say things on them like HELP, UNDO, REPEAT, and MENU. However, until somebody actually writes, or buys, the appropriate programs, these keys happily send funny characters to the screen, and not much more.

The main keyboard has the appearance of being designed by committee, a bit of everything for everybody. This includes keys which generate normal characters, shifted characters, control characters, editing codes, typewriter and numeric keys, and combinations of all the above.

Apricot also offers a number of trend-setting keyboard features, perhaps the most obvious of which is the microscreen display system. This consists of a two lines high by 20 characters wide intelligent alphanumeric liquid crystal display. Programs can display text, numbers, and the day, date, and time on this screen, separately from (or simultaneously with) the main video monitor.

Surrounded by, but physically unconnected with the microscreen itself, the actual display area is adjoined by six flat touch-sensitive function keys. The elegance of this programmable input/output concept must be tried to be believed. Then, as the piece de resistance, each touch-sensitive function key contains a programmable red LED.

If it weren't for the fact that the touch-sensitive keys behave (and feel) more like not-very-sensitive keys, I think I could acquire a taste for the ACT theory of keyboard ergonomics. As it is, my not-insubstantial fingers got rapidly and extremely fed up with having to push so hard, and so awkwardly. Why not move the microscreen down, and place it against some conventional moving keys?

And while I'm in the mood, why do ACT have to join the fray over the IBM keyboard? If you're going to stylize an IBM design, at least be consistent!

The Apricot keyboard on the review machine produced a consistent and unavoidable rattle on every use of the RETURN key, but was otherwise totally silent. One of the philosophies carried over from Sirius days is a user-programmable key-click sound, which may help those of you who need waking up every so often.

Also included in the Apricot man/machine interface is a 'mouse' hole, for the use of. Unfortunately, ACT do not have plans to supply 'mice' so it's back to our good friends the third party crowd. Apparently the mouse supplied by Microsoft (USA) is the only currently available rodent which can fit.

Perhaps unfairly, the last item in this section is the RESET key. According to all the Apricot manuals the RESET keys is a 'small recessed button on the right hand edge of the Apricot's keyboard'. However, recessed it is not, and it has this bad habit of hanging around *so* close to the microscreen's contrast control. As many people practice the 'feel around until you find it' habit, this location may prove to be not a good thing at all.

Screen

The official Apricot video monitor is a 9 inch green display, with one solitary adjustment for brightness. The green phosphor tube is type P23, which is a moderately slow grade. Although this rules out an official Apricot light pen, this intermediate grade does ensure a steady flicker free display, but not so slow as to cause smearing.

As befits the technology, the monitor electronics are about as solid state as you can get. The power supply inside the Apricot supplies the necessary voltage (12 V, 1A) for the monitor, and the result is a very good-looking arrangement which also carries a number of international safety pedigrees (UL, CCA, VDE).

'The Apricot keyboard is certainly pretty, but . . .'

The overall quality of the video monitor is excellent, and almost justifies its £195 price tag.

Unfortunately, on the review machine, whenever the brain box really started to put the pedal down, the whole of whatever was on the display screen suddenly began to grow an electronic equivalent of *snow*. Speaking with ACT about this I was assured that this is a rare production fault, and certainly isn't supposed to happen.

From what I gather, although this fault has happened on a few other Apricots, it is (only) a manufacturing/assembly problem. Rest assured that ACT are swiftly arranging for the latest very high technology *snow* removal equipment to be delivered.

Storage

The Apricot has been designed around the new Sony 3.5 inch microfloppy disk drives. Again ACT has spared no expense on their Japanese shopping trip, and the mechanisms are quite lovely to behold. The rated single-sided disk capacity is 315K, although this may be improved as time passes.

At the moment, ACT is primarily manufacturing dual-drive Apricots, as they have proved this to be measureably more saleable than single-drive Apricots. Even so, a second-drive upgrade is available.

The plan is to have double-sided Sony drives available before the end of the year, and to go all the way into a 3.5 inch 10Mb Winchester drive at some undisclosed point in the future. Again, the only official way to get these upgrades will be through ACT.

Before we leave the subject, it must be said that something in the state of Denmark is not as fresh as it could be. Apart from the distressing lack of 'pop' (sorry if the terms get too technical here) in the 16-bit department, our review Apricot displayed the very disturbing tendancy to go to sleep during any and all disk operations.

In my vast experience of using countless disk operating system interfaces I have never seen such a disk-bound way of operating as that exhibited by the Apricot.

Expansion

The Apricot is supplied with 256K of built-in RAM memory, included on the main circuit board as standard. Two expansion connectors are provided, which you may fill with as much high technology as you can afford. ACT are planning to offer only a few specialist Apricot plug-ins, presumably because of the nature of these things to be supplied by third party manufacturers.

In the ACT pipeline at the moment are a 512K RAM board, and an autodial modem board. These boards are not available yet, however the main holdup on the modem appears to be that Buzby is still deciding if he wants to approve it or not.

No compatability is guaranteed with Sirius-based plug-in cards, although many of the Sirius specifications have been maintained. For another (undisclosed) fee, ACT will also supply technical documentation.

Rumour has it that you will be hearing more from the redoutable third party people soon. Ideas such as colour boards, Z80 boards, and Winchester boards are being discussed at the very highest level.

Software

The only software received with the Apricot was the (apparently) standard three *factory* disks,

As you may appreciate, it is difficult to fully evaluate the performance of the hardware without the software, but these things are sent to try us. Every Apricot is officially documented as contaning the following software: MS-DOS 2.0, Concurrent CP/M-86, Standard CP/M-86, Basic Interpreter, 'Personal' Basic, SuperCalc,. SuperPlanner, and an Apricot communications program.

The ACT approach to software marketing may possibly be criticised by some, due to the unfortunate turns of phrase offered by the Users Handbook. Hopefully, one example will suffice from the section on

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programming languages: 'If you think of Basic as a *family saloon* programming language, then C is a *sports car* language.

Ahem, yes, well. What was actually received with our review machine were three single-sided disks, containing the following software: Master disk:- Operating system, Formatter, Copy, Manager, and other house-keeping programs; Utilities Disk:- logo, character, and keyboard redefiner(s), Setup, and other configurator related programs; Office productivity and languages:- SuperCalc, Microsoft Basic, GSX, Runtime Basic and Cobol programs, and all the ACT Basic examples programs.

Apart from a copy of MicroPro 8086 Wordstar, we were unable to test any of the 'many more software packages which will be shortly available'. If the Wordstar is anything to go by I have to admit that the future looks bleak between MicroPro (the software authors) and Apricot. Would you believe 20 seconds to open (just open, not write to,or close, or anything else) a new, unused, standard word-processing file ('document', D mode)?

Finally, the Apricot is supplied with a voluminous set of utility software. This includes programs which control much of the user definable features of the system such as character sets, keyboard layout, serial port speeds, memory allocation and the bell and keyclick noises.

The Apricot is designed to operate in a 'switch-on and go' manner, and indeed that is precisely how the system disk is arranged to operate. After Apricot has convinced itself that it has indeed been switched on, the disk drive settles into a regular pattern of clicking and whirring which indicates the auto-load process is in charge of the machine.

As ACT is very anxious that the Apricot is 'easy to use' it has adopted a program called Manager to do all the necessary man/machine interfacing. This means that you don't really have to know much about the inner workings, just sit back and wait until the machine comes to you for help.

Manager immediately introduces you to the Apricot *ladder* system, a tidy arrangement of multiple-choice menu screens allowing you to initiate any one of up to 30 pre-arranged tasks. For example, it is possible to display a message to the user, load Basic, load a Basic program, and run the program, all with one keypress.

As supplied, Manager is configured to offer only five choices, although the choice of improving the Manager's knowledge of your personal needs is included under the very first selection, Tools.

The process which Manager uses is a concept well-known to players of adventure, the tree and branch structure. Each one of the 30 selections available on the first screen referred to as a *root* display), may possibly offer you a further 30 selection multiple-choice screen called a *branch* screen). From here, any one of 30 possible further selections may possibly offer you 30 more. What other micro includes a free alternative micro game.

In the meantime, while you're pondering which *ladder* to climb, the Apricot microscreen is doggedly trying to tell you something as well. Whereas the monitor display is arranged with vertical *ladders*, the microscreen is arranged with horizontal *ladders*.

In use

Time (and absent information & software) has not allowed my dirty little fingers to do the walking through the hardware and software design pages, thus I can only offer some very squinty-eyed conjecturing.

'I have never seen such a disk-bound way of operating'

For one, the snow on the video display fortells some unforseen conflicts and timing errors in the deepest 16-bit recesses of the main circuit board. For another, the most central processor of them all, the 8086, is not being run at anything like its claimed speed (3.5MHz instead of 5MHz).

Both the Microsoft Basic and the Wordstar are, without much doubt, computer-translated offspring of their original 8-Bit parents. A lot of debate is available for consultation on computer-translation programs, but the most common end result of such programs is that the finished translation is larger, and slower, than its original.

Microsoft Basic takes about 10 seconds to load, and Wordstar takes about 30! This leaves only one final conjecture, and that is that the Apricot BIOS (the part of the operating system responsible for the disk drives) has got itself tied in proverbial knots.

Every disk operation the Apricot performed caused all members of the *PCN* office audience to wonder if something was wrong with the drives. Although FORMAT is remarkably fast (17 seconds for a single-sided 315K Sony disk), this figure bears absolutely no relation to any other known Apricot disk operation time.

Finally, it must be remembered that all the tests performed have been under the ACT version of MSDOS 2.0. Although promised for the end of October, ACT could not supply either of the remaining two operating systems (see earlier lists). The finger was pointed at Digital Research, apparently doing the installation work on ACT's behalf.

It will be interesting to see which of the three Apricot operating systems will be the most efficient for the nature of the beast. If the MSDOS operating system is the worst of the lot, then my belligerence as regards software and disk speeds may be too harsh. Also, it is possible that the 8086 processor chip may soon be allowed to run at its specified speed, rather than at 33 per cent less.

Verdict

It may just be a figment of my imagination, but as I look, lovingly, even posessively at the Apricot, I hear this little voice saying 'Not so fast, wallet!' Why is it so inexpensive, yet so high-tech? Are appearances so important?

Perhaps I am just too settled in my ways, but if I had to spend even as few sheckles as it costs to buy an Apricot, I would not be very concerned with how the job gets done, but more with how well the job gets done.

ACT is a very large and successful company, and has invested untold pounds in the Apricot. No doubt ACT is confident that as the demand for more memory and bigger number crunchers grows, the long-range vision of today's Apricot will seem a miracle of financial acumen.

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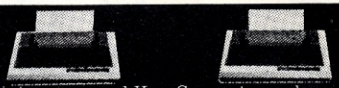

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John (Biggles) Lettice dons flying cap and heads off for the wild blue yonder.

Reach for the sky

If your idea of fun is spending the weekend doing victory rolls over Heathrow's deaprture lounge, you're surprisingly well catered for nowadays. Most of the popular micros have a flight simulation program or two available for them, and although some of them can be pretty feeble, many are very good indeed.

The best flight simulation programs genuinely are simulations. You can operate the various controls of your aircraft and, if the program's good, it will behave in pretty much the same way as a real aeroplane.

A good simulation therefore lets you take off, fly, navigate to the airfield of your choice by sight or radio beacon, and land either visually or on instruments.

So producing an accurate simulation is a complex programming job, and some of the more basic simulations, although fairly accurate as far as they go, won't actually produce realistic effects if you do something daft or intricate.

Try opening the throttle, pulling the joystick back hard then banking suddenly. Are you losing height rapidly? Is the ground spinning round and round? If the answer is no, you're either flying something very large and sluggish, or you've just done something the program wasn't designed to deal with.

Looping the loop is another example — some programs just plain won't do it, and others that will have a bizarre way of doing it. Salamander Software's Nightflight for the Dragon, for example, produced a loop 68 feet in diameter when I tried it . . .

'You are the pilot of a small, radio-controlled aircraft . . .' And looping the loop isn't the only way of getting a program's measure. Hewson Consultants' Dragonfly, which comes from the same stable as the relatively honourable Nightflite, loops the loop quite convincingly, although perhaps a little too easily. So I thought I'd try it in a glide.

Shut off the power and you see speed decrease. You start to lose height. So try dropping the nose a little to get yourself in a shallow dive. The speed continues to decrease, and you continue to lose height. Matter of fact, speed falls to walking, then to zero, at which point you're told you're not flying a helicopter, and asked if you want another go.

This is all very well, but it might be nicer if the programming allowed the plane to behave like a real one, instead of enhancing the meaning of the phrase 'glides like a brick'.

If you fancy something a little hairier, then Psion's Flight Simulation for the Spectrum is the one to fly. This gives you a fairly realistic-looking cockpit display, and also allows you to see where you're going. So if you're flying over a lake, you see something that looks a bit like a lake, and so on.

The graphics aren't anything like as detailed as the Microsoft flight simulator, which shows you a place I'd swear was Tayport (small town on the south bank of the Tay estuary), but if you fancy a bit of flying without instruments, it does allow this.

Psion puts you in charge of a high-performance twin-engined aircraft and allows you to fly between two airfields of differing sizes with the aid of a number of radio beacons. Inbetween times, you've got enough technology at your command — just — to really throw the plane about the sky or, alternatively, to make a very large crater on the ground.

One of the nice things about the Psion simulator is that it's not easy to control. It's supposed to be a small aircraft, so you'd expect the controls to be a lot more responsive than on a large airliner. Although taking off is fairly easy — just a matter of getting the necessary speed up and pulling the stick back — you'll quite probably find it difficult to control at lowish speeds with the nose up (*ie*, climbing away from the runway).

Similarly, it passes the loop-the-loop test with flying colours. Some flight simulators will loop-the-loop if you just pull the stick back hard. You see the sky roll neatly around you, then find yourself back on the same course as you were before.

Psion's effort needs a lot more thought and skill. You need to go into the loop fast enough to retain stability once you bring the nose up, and if you're lucky you'll execute the manoeuvre successfully and wind up *near* where you were before.

If you've gone into the loop with a little less care you'll find yourself doing pretty much what you'd expect the real thing to do. Too little speed on the initial climb and you'll stall and spin down to earth. If you manage to get to the top of the loop but still don't have the speed, you'll find yourself slipping to one side upside-down. So don't try it too near the ground.

With any flight simulator, if you get into trouble and you're not too near the ground, you'll find yourself in a spin. How you get out of this — in a good simulator at least — depends on the type of aircraft. I found the Psion simulator allowed you to get out if you increased power, then pulled the nose up, but I couldn't get out this way on Salamander's 737 simulator.

PCN's resident veteran of the Molimerx Belfast-to-Gatwick run tells me this is because larger aircraft do not always go into a nose-down spin, but can execute a weird pancaking spin on the level, or even with the nose slightly up. So for larger beasts you pull the nose down, get enough speed to stabilise them, then pull out.

Not that you're liable to get into a spin too often with Salamander's 737. The top half-dozen or so lines of the screen are devoted to a series of warning messages. These are innocuous enough when you're flying in a straight line at the right speed, but downright painful if you do anything less than take good care of the passengers out the back.

If you *do* find yourself going too fast, stalling, spinning or running out of fuel, lights start flashing and buzzers start sounding. Behind you, you can imagine, passengers are struggling into lifejackets, penning irate letter about your performance to the chief executive of Microflight Airways, or composing themselves for an unscheduled stopover in perdition.

So if you fancy a bit of stunt flying on the 737 — leaving aside from the likelihood that you'll be grounded for life if you ever get back to the ground — you also have the option of going deaf or putting an axe through the Beeb's speaker. I also found I

tended to crash whenever I tried to do something really wacky — I'd be grateful if any 737 pilots out there could tell me if one *can* loop the loop in the things.

My major objection to 737 Flight Simulator is that it really is too easy to control in flight.

You find yourself sighing for the good old days of goggles, flying helmets and silk scarves getting caught in the propellor, and thinking heretical thoughts on the lines of 'it's just like having a computer flying the thing . . .'

You can punch up your speed, rate of climb and descent, and the 737 will stay at these levels through thick and thin, changing only if something really bad happens.

So unless you really get off on flying in straight lines and gentle curves, the most use you'd make of this program would be in practising take-offs and landings.

There are a couple of nice touches, though — you can design your own runways and position radio beacons. You may also find yourself being asked to go into a holding pattern before you land — this can be bad news, as you have only enough fuel for about 25 minutes' flying time.

If you crash, taking the option to restart at your previous position puts you back where you were, but with full tanks. Remember to restart the engines, though, or you may find Isaac Newton very much in the driving seat.

Of the smaller simulators available, Hewson Consultants produces Nightflite for the 16K Spectrum and Dragonfly for the Dragon 32 (not to be confused with Salamander's Nightflight for the Dragon 32).

Nightflite is a nice little program, but the aircraft's tendency to break up if you go too fast leads one to think it owes more to Bleriot than British Airways. I also found I was getting 'collision' explanations when I was trying to climb too steeply, although I'm pretty sure there's nothing else hanging about out there.

I found landing considerably trickier than on more complex simulators, perhaps because there seems to be only one configuration of speed and attitude that results in a successful landing.

On the more elaborate simulators there will be a range of possible ways of achieving a successful — or semi-successful — touchdown. My patent method for landing the Psion simulator, for example, is to get the thing as low as I can, as slow as I can, approximately over the runway, then cut the power and flop down in a heap. 'That was a bit rough, wasn't it?', says the Spectrum chattily, but it works.

The way things are going, more and more complex simulators are becoming available for at least the more popular micros. The Microsoft Flight Simulator already allows you to get involved in dog-fights, and it's only a matter of time before the others follow suit.

What next — a networked re-run of the Battle of Britain? Over to our Micronet correspondent . . .

Nightflight (£7.95, Dragon) and **737 Flight Simulator** (£9.95, BBC B), from Salamander Software, 0273-771942.
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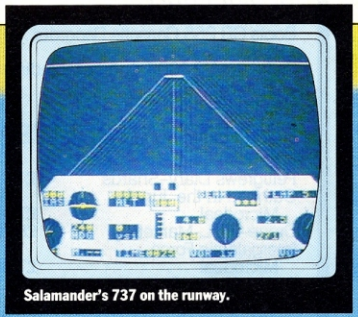
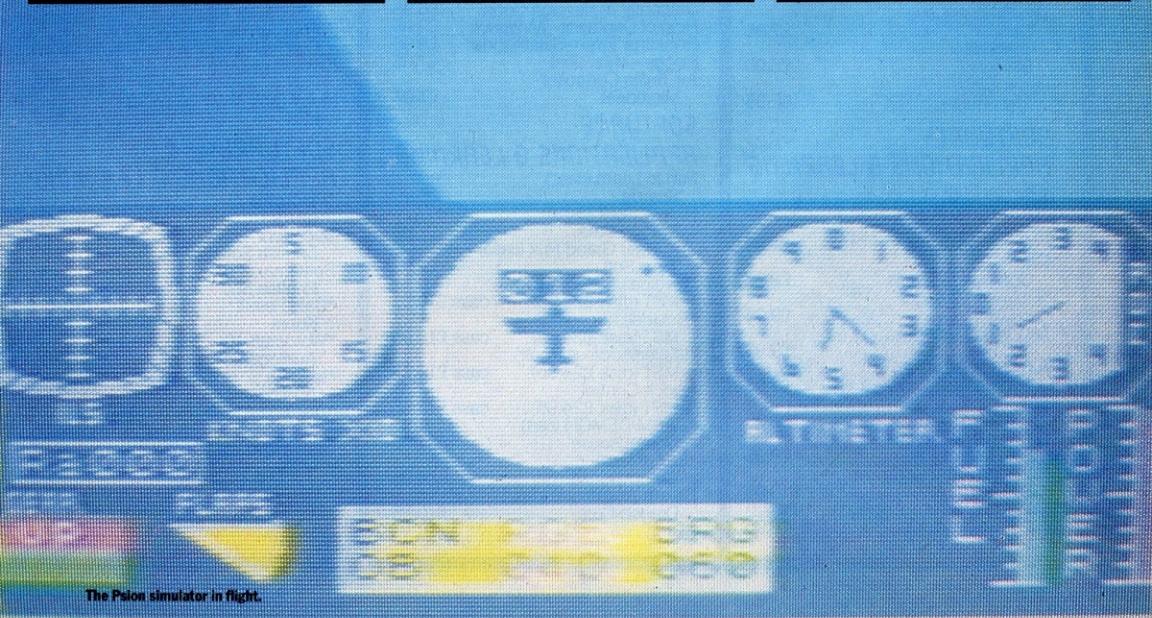
Hewson's Nightflite comes in to land.



Salamander's 737 on the runway.

Dragonfly takes off.



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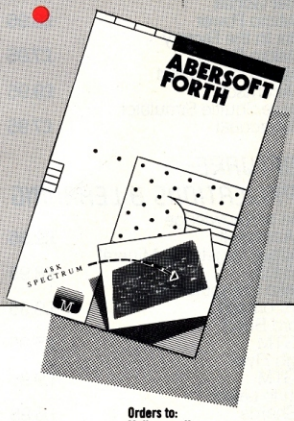

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Change of face

The Spectrum already gives you access to 22 user defined graphics, and you may think that this is surely enough, even for those with the most insatiable of appetites for bug-eyed monsters, spaceships and pacmen. But there is scope for redefining a much larger range of characters, and oddly enough, there are perfectly good reasons for wanting to do so.

For example, you may want to use narrower characters so you can fit more words in a line. The Spectrum's existing alphabet allows a margin on each side of each letter, so you can save space simply by dispensing with one of them.

The secret lies in the system variables at addresses 23606 and 23607. When you switch on, these variables are set at 0 for 23606 (low) and 60 at 23607 (high). Together they point to an address 256 bytes before the character table which is fixed indelibly in the Spectrum's ROM at 15616. So by altering these variables you can get your Spectrum to look elsewhere — including in RAM — for its character table.

All change

You can therefore write in your own character set and get your machine to look for it.

Program 1 allows you to load the Spectrum's character set into RAM at 6200 and to change it.

Instructions are included in the program, and you alter the characters by entering a series of binary numbers which builds into an 8 × 8 grid.

Once you've got all your characters you can use SCREEN$(x,y) to use them in your programs. You add your own redefined characters by entering LOAD-""CODE:LOAD""CODE and playing your saved data through it. You return to the original character set by entering POKE 23606,0: POKE 23606,60. Take care though — if you've redefined the works you may have difficulty seeing what you're doing.

As a final gift, Figure 1 gives a hex dump of a complete alternative character set.

Each line of eight bytes creates one new character. To use the listing with Program 1, you need to convert each byte to its binary equivalent.

Have fun . . .

Program 1

```
10 CLEAR 61999: FOR f=0 TO 759
: POKE 62000+f,PEEK (15616+f): N
EXT f: POKE 23606,48: POKE 23607,2
20: GO SUB 200
30 INPUT "ENTER CHARACTER ";b$
: LET x=62000+(CODE b$-32)*8
40 IF b$="9" THEN STOP
50 FOR f=0 TO 7: PRINT AT f,8;
: NEXT f: PRINT AT 8
,0;"00000000"
60 FOR f=0 TO 7: PRINT AT f,8;
b$
70 INPUT "ENTER BIN ";a$: PRIN
T AT f,0;a$: NEXT f: GO T
O 30
80 IF a$="8" THEN LET f=f-8: N
EXT f
90 IF LEN a$<>8 THEN GO TO 60
: POKE x+f,VAL ("BIN "+a$): P
RINT AT f,0;a$: NEXT f
100 GO TO 30
200 PRINT AT 0,11;"CHARACTER GE
NERATOR"AT 3,11;"1.Enter the
 character that you wi
sh to redefine.Wi
ll then enter
a series of binary
numbers.You want to
 use 1 line,
 or 8 if you
 want one
 byte per
 line.
220 PRINT AT 7,11;"2.Then enter
 a series of binary
numbers.You want to
 use 1 line,
 or 8 if you
 want one
 byte per
 line.
240 PRINT AT 11,11;"3.Enter ""7
 ""to stop"
250 RETURN
```

Figure 1: daunting as it may appear, this is a complete new Spectrum character set.

62000	00	00	00	00	00	00	00	00
62008	00	00	00	00	00	00	00	00
62016	38	56	12	00	00	00	00	00
62032	00	08	3C	48	3C	12	3C	10
62040	61	62	04	08	00	00	00	00
62048	10	28	28	10	28	45	3A	00
62056	0C	04	08	00	00	00	00	00
62064	04	08	10	10	10	08	04	00
62072	20	10	08	08	08	10	20	10
62080	00	00	00	14	7F	14	00	00
62088	00	00	00	08	3E	08	08	00
62096	00	00	00	00	0C	04	08	00
62104	00	00	00	00	7F	00	00	00
62112	00	00	00	00	00	18	18	00
62120	01	02	04	08	10	20	40	00
62128	3E	43	45	49	51	61	3E	00
62136	08	18	28	08	08	08	3E	00
62144	3E	41	01	06	08	41	7F	00
62152	3E	41	01	0E	01	41	3E	00
62160	04	0C	14	24	7F	04	04	00
62168	7F	40	40	7E	01	41	3E	00
62176	3E	41	40	7E	41	41	3E	00
62184	7F	41	02	04	08	10	20	00
62192	3E	41	41	3E	41	41	3E	00
62200	3E	41	41	3F	01	41	3E	00
62208	00	00	18	18	00	18	18	00
62216	00	00	18	18	00	18	10	20
62224	04	08	10	20	10	08	04	00
62232	00	00	00	7F	00	7F	00	00
62240	20	10	08	04	08	10	20	00
62248	3E	41	41	06	08	00	08	00
62256	00	3C	42	5A	5A	3E	00	00
62264	3E	41	41	41	7F	41	41	00
62272	7E	41	41	7E	41	41	7E	00
62280	3E	41	40	40	40	41	3E	00
62288	7C	42	41	41	41	42	7C	00
62296	7F	40	40	7E	40	40	7F	00
62304	7F	40	40	7E	40	40	40	00
62312	3E	41	40	4F	41	41	3F	00
62320	41	41	41	7F	41	41	41	00
62328	1C	08	08	08	08	08	1C	00
62336	02	02	02	02	02	42	3C	00
62344	42	44	48	50	68	44	42	00
62352	40	40	40	40	40	40	7F	00
62360	41	63	55	49	41	41	41	00
62368	41	61	51	49	45	43	41	00
62376	3E	41	41	41	41	41	3E	00
62384	7E	41	41	41	7E	40	40	00
62392	3E	41	41	41	45	42	3D	00
62400	7E	41	41	7E	44	42	41	00
62408	3E	41	40	3E	01	41	3E	00
62416	7F	08	08	08	08	08	08	00
62424	41	41	41	41	41	41	3E	00
62432	41	41	41	41	41	22	14	08
62440	41	41	41	49	49	49	36	00
62448	41	41	22	14	08	14	22	41
62456	41	41	22	14	08	08	08	08
62464	7F	01	02	04	08	10	20	7F
62472	00	00	00	00	00	00	00	00
62480	00	00	00	00	00	00	00	00
62488	00	00	00	00	00	00	00	00
62496	00	00	00	00	00	00	00	00
62504	00	00	00	00	00	00	00	FF
62512	00	00	00	00	00	00	00	00
62520	00	00	00	00	00	00	00	00
62528	00	00	00	00	00	00	00	00
62536	00	00	00	00	00	00	00	00
62544	00	00	00	00	00	00	00	00
62552	00	00	00	00	00	00	00	00
62560	00	00	00	00	00	00	00	00
62568	00	00	00	00	00	00	00	00
62576	00	00	00	00	00	00	00	00
62584	00	00	00	00	00	00	00	00
62592	00	00	00	00	00	00	00	00
62600	00	00	00	00	00	00	00	00
62608	00	00	00	00	00	00	00	00
62616	00	00	00	00	00	00	00	00
62624	00	00	00	00	00	00	00	00
62632	00	00	00	00	00	00	00	00
62640	00	00	00	00	00	00	00	00
62648	00	00	00	00	00	00	00	00
62656	00	00	00	00	00	00	00	00
62664	00	00	00	00	00	00	00	00
62672	00	00	00	00	00	00	00	00
62680	00	00	00	00	00	00	00	00
62688	00	00	00	00	00	00	00	00
62696	00	00	00	00	00	00	00	00
62704	00	00	00	00	00	00	00	00
62712	00	00	00	00	00	00	00	00
62720	00	00	00	00	00	00	00	00
62728	00	00	00	00	00	00	00	00
62736	00	00	00	00	00	00	00	00
62744	E0	10	10	0E	10	10	E0	00
62752	00	14	28	00	00	00	00	00

Bob Chappell finds colourful creations at his fingertips thanks to Paint from Atari.

Artistic Atari

The caveman had his walls, the Egyptians their papyrii and Picasso his canvases. Perhaps you too have sometimes fancied yourself as an undiscovered genius with the camel hair. If so, and you own an Atari, you can forget about the walls, papyrii, canvases, linseed oil, brushes, palettes, easels and the rest of the paraphernalia. All you need is an artist's smock (just to get in the mood) and a copy of Atari's new program Paint. It won't guarantee to turn you into a Gauguin but at least you won't get water-colour all over the three-piece suite.

Features

Paint has three main options: Super Paint, Simple Paint and Art Show. Super Paint lets you paint pictures using a variety of brushes, colours and textures. You can mix your own colours, choose the speed at which your brush paints, and can automatically draw circles, lines and rectangles. Whole areas can be filled with a selected colour and texture. A double-zoom feature takes you into close-up mode; the whole canvas is put under a microscope, allowing you to carry out fine brushwork on any portion of the picture.

Simple Paint is a cut-down version of Super Paint and is intended to get you started. Art Show allows you to save your creations to disk for later viewing. There are also a number of utilities together with a help screen and plenty of sub-menus. Virtually everything in the program can be controlled or accessed by the use of a joystick, although you can use the keyboard if you wish. You can also switch between them at any time.

Presentation

Full marks here. The package comes in an attractive box, the front of which shows a palette with striped and checkered paint oozing from some Atari tubes. On the reverse, Leonardo da Vinci looks a bit pained as he contemplates his completed Mona Lisa but appears a lot more satisfied with the boat drawn using his Atari. Inside the box is the Paint disk and a 175 page spiral bound book.

Documentation

A large chunk of the book is devoted to a potted history of art, the instructions occupying only about 50 pages. It is well laid out and extremely easy to follow. Each facility is tackled a step at a time and each page shows both the commands for joystick and keyboard. There is no index, but as the commands are boldly headlined and explained in alphabetical order (apart from Circle, filed under O because it looks like one), this is no loss.

Other chapters in the book look at how a computer works, the history of painting, computer imaging and computer artists, and a chapter filled with ideas for subjects to paint. Although the book has a goodly number of photographic plates, some in colour, it doesn't include any pictures created using the Paint program.

In use

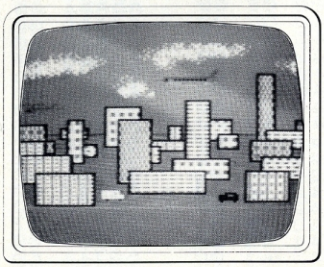
Selecting the Art Show option from the main menu causes the disk to whirr and a list of the saved paintings to appear. The disk already contains five: Boat, Winter, Sunset, City and Space. You can select any amount of pictures, in any order, and limit the amount of time they will be displayed. Having completed your selection the pictures will be displayed one by one and for as long as you have decreed. Pressing the space bar will halt the display at the current picture — a further press sets the show in motion again.

There are options in the utility section of the program for saving, recalling and deleting a picture from disk. All told, a very nice feature.

Simple Paint is a drastically cut down version of Super Paint and is meant to help you become familiar with the brush and paint.

Art Show: Winter.

Selecting Super Paint presents a black screen with a small cross in the centre — this is your brush. At the bottom of the screen is a row of 10 pots (numbered 0-9) followed by two boxes, one with a large H in it, the other with a nest of diminishing squares inside.



Art Show: City.

Pot 0 contains black paint, the same colour as the background. This used to overpaint an area already coloured, and so erase it.

Pots 1-3 contain red, blue and yellow paint while pots 4-9 contain textured paint (striped, crosshatched, polka-dotted, checked — a colourful assortment).

Moving the joystick causes the brush (cross-sight) to move. When it is where you want it to be, holding the fire button down while moving the joystick will cause a trail of paint to follow in the brush's wake. For detailed work you need a smoothly moving joystick with good response as being too heavy-handed can easily ruin a good picture.

Changing colour is simple — the brush is moved above or into the required paint-pot, the fire button pressed and presto — you now have that paint. The texture pots work in the same way. Pulling your brush across the screen when it is loaded with polka-dot paint is a sight to behold.

The hue and brightness of a colour within pots 0-3 can be changed by placing the brush over the pot and pressing the fire button twice (the brush then sinks into the pot). Holding the joystick to the left and moving it up and down changes the hue — holding it to the right and pushing it up and down changes the brightness. You can thus 'mix' any colours you like. The only drawback to this is that any part of the picture already painted with that pot will change to the colour you're currently mixing.

Using the texture pots (4-9) is much more fun. Placing the brush over one of these and pressing twice on the fire button causes your masterpiece to be replace by what at first seems a work of some new school of art. Your pots are still there but dominating the right half of the screen is a large sheet of multi-coloured, multi-textured material. A small white window sits over a tiny portion of this sheet — the windowed portion exactly matches the contents of your texture pot (which now has a flashing white bar beneath it).

Above the sheet is a small square, on either side of which are two long rectangles. The right rectangle shows a swatch of the material currently covered by the window while the centre square is a greatly magnified version of the same piece. The left rectangle contains a swatch of the material already in your pot.

On first entry to this display, they all contain the same textured paint. Now comes the clever stuff. Moving the joystick makes the white window move around the sheet. As it does, the centre and right swatches change to show the currently windowed portion — the left rectangle still shows the original selection. Once the window is sitting over a section that takes

34►

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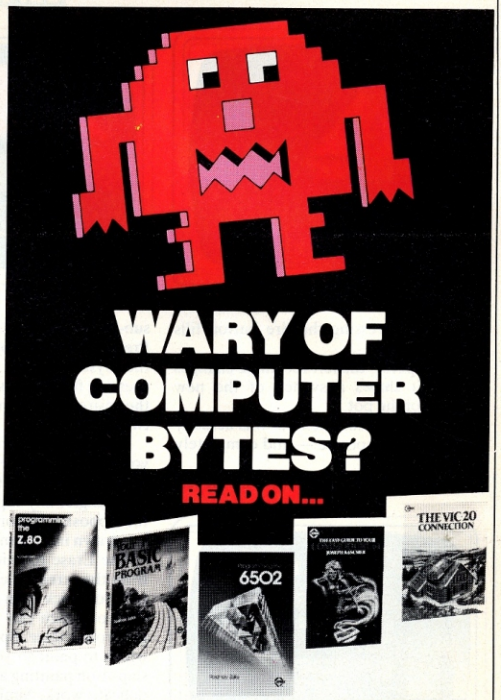

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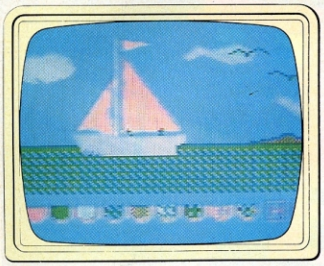
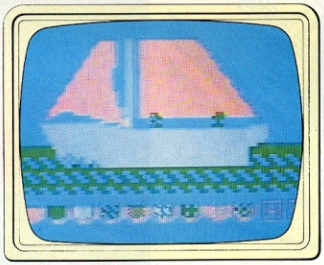
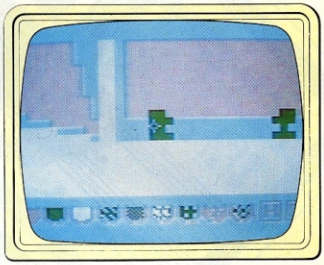


Art Show: Boat.



Close up with zoom.



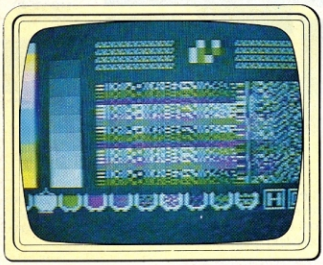
Still closer.

◀32 your fancy, pressing the fire button fills your pot with it.

At this point, the left rectangle changes so that it shows a swatch of the new contents of the pot.

It may sound complex but it is actually very simple to operate — and completely fascinating.

On the same display but over on the left

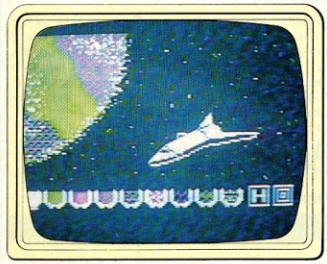


Pick your colour.

side, are two vertical strips, each made up of 16 bars (the 16 Atari colours available). A sort of bracket joins a bar from the left strip with one from the right. Holding the joystick over to the left or right and moving it up and down causes the strips (and current pot) to change their hue or brightness respectively. The number of different coloured and textured paints that can be obtained by using the texture sheet and hue and brightness controls is quite staggering.

Pressing P (for Paint) takes you back to your unfinished masterpiece. Moving the brush to the H (for Help) box and hitting the fire button displays an index of options. These options are: Draw, Erase, Brush, Paint, Speed, Colour, Utilities, Fill and Help.

The Draw option lets you select from a



Art Show: in space.

sub-menu of line, rectangle and circle. Pressing the appropriate letter, or moving the joystick to that part of the menu and pressing fire, selects that facility. To draw the desired figure, the fire button is pressed twice.

For a circle, you fire at the points where you want the centre and circumference to be; for a line, at the beginning and end; for a rectangle, any top corner together with the opposite bottom corner. The figures are drawn instantaneously.

The Erase function wipes your picture from the screen. Selecting Brush lets you take your pick from any of 9 types of brush, each of which can be one of 9 widths, a generous choice. Speed gives you 9 rates at which to paint so you could use 9 for fast slap-it-on painting and switch to 1, say, for delicate work. Similarly, the Quick command allows you to move the brush about (when not painting with it) slowly or quickly, again at a setting of 1-9.

The Colour command switches you to the texture/hue/brightness display already mentioned. The Utility functions let you Keep (save), Junk (delete) and Get (recall) Pictures from a disk.

Fill gives you three methods of automatically filling an area with colour. You can fill a shape with the same (Fill) or different (X-Fill) colour as its boundary and you can I-Fill an area which has different-coloured boundaries. This is accomplished by first selecting the colours (markers appear by the Paint Pots to guide you), moving the brush to the area to be filled and then pressing the fire button. The X and I-Fill commands need a bit of practising, on more than one occasion I obliterated my potential British Academy hanging by filling everything except the desired area.

Selecting the Help function (within the Help menu itself) supplies a complete list of the commands with brief descriptions. Pressing P at any time always returns you to your picture.

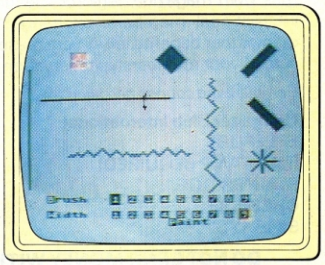
Finally I come to what I think is the best feature in the whole program, the ability to zoom in to a close up of any portion of your painting. Moving the brush onto the Zoom box and pressing fire causes the painting to be greatly magnified. As a result only a portion of it can be shown on the screen at any one time. However, moving the joystick to any edge of the screen causes the whole display to scroll smoothly bringing the desired section into view. It's like moving a giant magnifying glass across your painting.

If the first level of Zoom does not produce enough magnification for your liking, another press of the firebutton while poised over the Zoom box will increase it further. Another press takes you back to normal magnification.

At the highest level of Zoom, what was just a small corner piece of your entire painting will almost fill the whole screen. All the other functions are available to you while in Zoom so you can change brushes, colours, textures, etc and still carry on painting while the picture is magnified. This enables you to work some really fine and delicate detail into your painting. It is a marvellous feature, besides being good fun to play around with.

Verdict

A really fun program, simple to use and completely user friendly. Those with little artistic ability may find they have more talent than they ever believed and will, in any event, obtain a great deal of pleasure



Choice of brush and texture.

from experimenting with the various features in the program.

Those who are already artistically gifted should find that Paint gives them a completely new field in which to express and develop their talents.

Name Paint **System** Atari 600XL/800/400 (48K)
Price £29.99 **Publisher** Atari **Format** Disk
Language Machine code **Other Versions** None
Outlets Centrsoft stockist and Atari dealers.

RATING

Features	
Documentation	
Performance	
User interface	
Reliability	
Overall Value	

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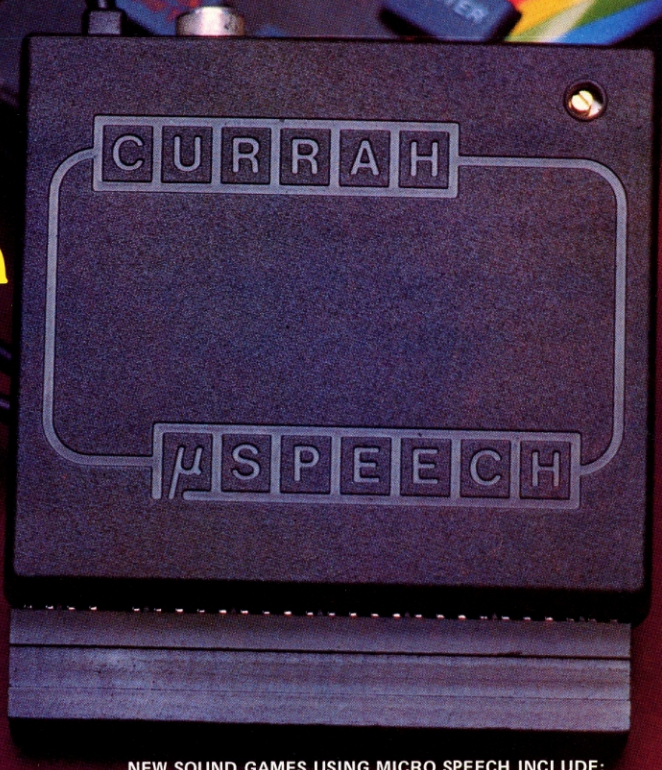

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Garry Marsh opens up a BBC toolbox and sorts out what's really useful.

Beeb aids

Toolbox is a collection of routines and programs written by Ian Trackman of 'Making the most of the micro' fame. Written both in Basic and Assembly language, it was intended to be used as an 'Aide-de-Beeb'.

Presentation

The package consists of a 208-page spiral-bound book, and a cassette tape containing both tape and disk user versions of the programs.

There are two groups of programs; programming utilities which are complete working programs in their own right, and procedures which are located in example programs for you to extract at will. There are a staggering 25 different programs provided; some would probably be used only rarely but others, *ie* the machine code utilities, are extremely useful and could easily be flogged to death.

Features

First there are the 'cruncher's; these are programs designed to cut down on the amount of memory required in which to store your Basic programs.

REM Strip is the first of the cruncher's, and the basic idea of this machine code utility is to remove all of those REM statements that are put in to mark the different sections of programs, but leave alone all other text.

The second cruncher is called Space Remover. Space Remover looks at all of the text, notes the keywords, (PROC, PRINT etc), and then removes all the spaces that are not required. It will still maintain the grammatical sense of the programs, and would still leave a gap if two variables could be mistaken for another new variable.

The third and final crunch program is Packer. It starts at the first line of your program, counts up the number of bytes, and if there are less than 237 it will add the length of the second line.

If this is less than 237 the second line is deleted and the data will be added to the first, thus making it a longer line. This loop will keep going until the limit is reached, when a new line will be created.

The second group of utilities do the opposite to those described above. For instance, Unpacker will go through your Basic program looking for the statement-terminators (colons to you) and when it sees one it will create a new line for anything succeeding it, and so you end up with one statement per line throughout. Spacer will do the reverse of Space Remover; it will put in spaces around the keywords, except PROC (which would cause an error if it did), therefore making the program easier to read and de-bug.

Five other utilities are provided, four to be used on your Basic programs, and RAM Test which will test the entire RAM from &900 up to &7FFF. Each location will be loaded with a byte in the range 0 to &FF. After each new code is used the entire memory will be checked and compared with this known byte. Any failures are stored in two known locations and can be read after clearing the program.

Resequence is a utility which will allow you to move blocks of code about a program with a view to creating a procedure for it, and so being able to easily call it. The last two programs, Xref and Replace, both act on word strings. Xref will locate and print out the line and/or line numbers of all occurrences of the entered string. Replace will enable you to replace any one string with another, after entering them in the form OLD STRING/NEW STRING.

The remainder are mainly demonstration programs that contain useful programming hints and PROCedures, and are intended to be used as such. Circle Draw & Fill for instance show off the new PLOT 77,x,x command, available to operating system 1.2, which fills horizontally as a PROC, and also shows two variations on how to draw a circle.

Double Size Characters shows the principle for creating double size characters in all the modes. The procedures and the machine code routine supplied are easily transported to your own applications. Shape Maker is a very useful program containing a procedure which analyses a shape drawn on the screen and converts it into a number of user defined characters, so that you could easily redraw the same shape anywhere on the screen. The PROC itself is embedded in a demonstration program which draws a circle with a box around it.

The final batch of three programs are all complete working programs, and are not designed to be used anywhere else. In Disassembler all addresses are shown as absolute, and not, as some, the offset, which can become confusing. A great feature of this version is that you can, by a simple process, create a Basic program from the source code.

Graphics Dump is a machine code program which will give a single tone dump of all colours, except the background colour, in any graphics mode to be dumped to an Epson printer.

The last program is another Character Generator program, but this has the edge over others in both presentation and operation and will allow you to define any character in the range 32 to 255; it could therefore be used to create a different typeface, say italics, for the BBC.

Character creation is achieved on a large grid box, with the defined character being shown actual size below. By the use of keys the program allows you to mirror, invert, rotate through 90 degrees, and finally enter it once you are satisfied. The current character's VDU code is displayed at the bottom, and the program gives you the option to obtain a hard-copy of this for later use.

Reliability

Only the utility programs are provided with two versions on the tape, one for the cassette user, and one for the disk user. Both versions of each program were tested. Unfortunately, the disk versions appeared to have some problems in running correctly. The bugs are in two locations; one is in the instructions as given on page nine of the book, the other is with the disk version of GRAPHICS DUMP (a complete line appears to have been missed out).

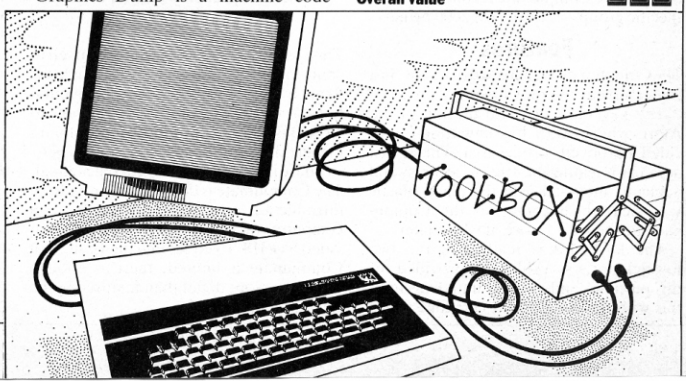
Verdict

The package overall is a good one, but at the moment disk users will have a bit of trouble. All the programs supplied (as tape user versions) work well with no loading problems. The book has lots of useful information as well as the complete listings of all the programs. A good addition to the software library of any serious BBC user.

Name BBC micro Toolbox **System** BBC **Price** £21
Publisher BBC Soft, BBC Publications, 35 Marylebone High Street, London W1M 4AA
Format Cassette **Language** Basic and Assembler
Other versions None **Outlets** Mail order/retail

RATING

Features
Documentation
Performance
Usability
Reliability
Overall value



IAN MARSHALL

Ian Scales looks at the keyboard that turns a games machine into a full micro — or does it?

Key question

The Spectravideo Compumate is a keyboard unit and associated ROM cartridge which enables you to turn your Atari VCS 2600 video games machine into a home computer, with most of the features you'd expect to get if you went out and bought the cheapest computer you could get hold of.

A year ago, it was enough to get a home computer off the drawing board and into the shops to be assured of sales. Things have changed and manufacturers now have to be more selective with their marketing plans. The Compumate arrives in the UK as at least one large US home micro manufacturer, Texas Instruments, announces that it's getting out of the market, while smaller enterprises in the UK are foundering with all hands.

Next year's successful crop of micros are likely to be 'aimed' at specific interest groups. The Compumate is aimed at a very specific group — Atari VCS 2600 owners.

Features

The Compumate is packaged like a toy, in a colourful 'buy me for Christmas' box.

The keyboard fits onto the top of the Atari, where Atari has unwittingly provided a grooved surface area. This is just perfect for seating the otherwise flimsy and liable to move-all-over-the-place plastic sandwich which comprises the Compumate keyboard — more of which later.

The keyboard is read from the two joystick ports — cables are provided for this purpose, and another umbilicus links this with the Basic ROM cartridge which naturally enough fits into the games port. The system is quite simple really. The Atari thinks the Basic ROM cartridge is a game, and the keyboard is the joystick controlling it.

The keyboard could be described as moving and sensitive, it's a bit of both. Whatever it feels like, it does the job for the price. You'd never be able to touch-type on it, but then, given the capabilities of the machine, you probably wouldn't want to.

Documentation

This system is all about teaching yourself to come to grips with computers and this leads to my over-riding gripe — the documentation, or rather lack of it. Learning how to write Basic effectively requires more than a meagre 38 pages — but this is all you get.

There is a clue at the back of the manual. The Compumate is designed to provide an introduction to computers — the real computer will be provided by the Spectravideo SV-318. Even though the Basic with Compumate is limited, there is enough scope for more detail than featured in the slender manual.

The Compumate is designed to give its users a tantilising taste, forcing them to rush out and buy the SV-318. But you have to admire Spectravideo for gall. Like we said earlier, a crowded home computer market makes manufacturers move in mysterious ways.

In use

The user is presented with three modes — Basic, graphics and music. You can jump between these modes by manipulating the keys, which are set up with a keyword system, Sinclair-style. The Basic commands are entered by a single key depression or a key depression after a shift change.

There are three operating modes to the system — text, music and graphics. The modes are known to the user as screens. You begin in the text screen when the Compumate is powered up and then you can move out of this screen to either music or graphics.

The music screen gives you two sound channels and you can enter simple ditties, select scales, change tempo and note duration. It's very simple and easy to use.

The graphic screen offers crude block graphics. You can draw using eight cursor control keys, change the colours and store the results in up to six buffers so they can be flipped through and presented as a simple animation.

The text screen is where all the Basic action takes place. The screen holds just 12 columns so there is a fair amount of wrap-around whenever a reasonably sized print statement is entered. Most of the simpler Basic commands are there — RND, LET, INPUT, PRINT, IF-THEN, FOR-NEXT, GOSUB, GOTO. Not a full set by any means, but not so simple that it couldn't do with a few more explanations, exercises, and example programs in the handbook.

Verdict

Perhaps documentation is a subject a journalist is likely to invest with too much importance. Then again, it's definitely a subject a computer engineer is likely to neglect.

In the case of the Compumate a suspicion of neglect has crept in to compound the endemic home micro handbook problem, given the fact that Spectravideo sees the product as a marketing ploy to nobble Atari's users for its micro.

The Compumate could have been a cheap introduction to micro-computers for anybody with an Atari games machine. As it is it's a frustratingly thin learning package with most of its potential blighted for want of a good guide to learning proper Basic programming.

If you still want to consider it, buy a good programming guide as well.

Item Spectravideo Compumate **Machine** Atari VCS 2600 **Manufacturer** Spectravideo **Price** £49.95 **Contact** Video Palace, 100 Oxford St, London W1, 01-637 0366/7

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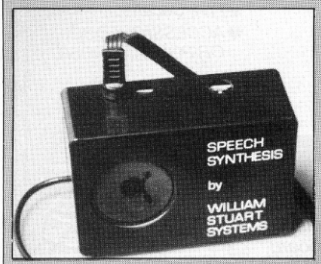
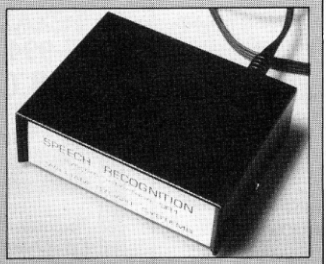
PCN 1

You can talk to your Spectrum, but you won't get a reply — John Lettice looks at Big Ears.

Micros have ears





Two-way computer communication

The Chatterbox — also known, as you can see, as Speech Synthesis by William Stuart Systems — will connect direct to your micro to provide an allophone base speech synthesis facility.

Speech recognition — nom de guerre Big Ears — links up through the Chatterbox, and renders your speech into easily recognisable voiceprints. Allophones may take a little longer . . .

Speech is still something of a new frontier as far as the cheaper micros are concerned. The problems that must be solved are complex, but some of the tools you need are now available. *PCN* looks at a duo from William Stuart Systems.

Speech synthesisers are now so common that the world and his wife's micro seem to have access to them. In the case of mass-market micros like the Spectrum, the range is so wide that users will encounter considerable difficulty making a choice. Assuming one Dalek sounds pretty much like another, you may think that making a choice is simply a matter of the convenience and prices of the various pieces of hardware.

But when you think about the sort of things you'll want to use a speech add-on set-up for, you'll realise that there are other considerations. Speech synthesis at the low-end micro level has been conquered to all intents and purposes, but the problem of cheap speech recognition still remains.

Wouldn't you like to have full verbal control over your micro, with all that implies for control of peripherals? For example, you could stand in the middle of the room bossing a turtle around — and at the really gosh-wow end of the market, you could phone up your ZX81 and tell it to switch on the video recorder. Interested? Well, the good news is that it can be done — the bad news is that it can't.

The reason things are a bit equivocal at the moment is that, while the hardware that makes possible the solution to the problem exists, the software to make it work still has some way to go. For example, William Stuart Systems is currently marketing a speech synthesis unit called Chatterbox, and a speech recognition unit called Big Ears for £49 each, giving you the necessary harware to — in theory at least — produce a very cheap speech system.

Compare the price with the £899 for the Apple Voice Input Module (*PCN, issue 15*) and you'll naturally assume there's a snag. Well there is — Big Ears will recognise your speech quite effectively, but you'll have grave difficulties getting it to produce more than demonstration speech output, because you'll either have to write your own software, or wait.

Presentation

Big Ears can be connected to a wide range of micros through the Chatterbox speech synthesiser or through a number of commercially available input/output ports. The test model was run on a ZX Spectrum through the Chatterbox, and came with a microphone, lead and driver/demo software tapes. We tested it with Chatterbox 1, which can be upgraded to Chatterbox 2 for £5.75.

The whole ensemble came in a tidily packed box, complete with copious quantities of instruction leaflets.

Documentation

The presentation of the instruction leaflets is, to put it mildly, a shade on the rudimentary side. Chatterbox is well documented, but the main manual for Big Ears (15 pages of stapled A5) seems to spend most of its time on the UK101 and Nascom.

Along with the main manual you get two sheets of A4 giving supplementary information for the Spectrum and ZX81. If you're running Big Ears off a ZX81, the POKEs you need are given, but the rest of the machine-specific information seems to be just a variant on the Nascom/101 instructions.

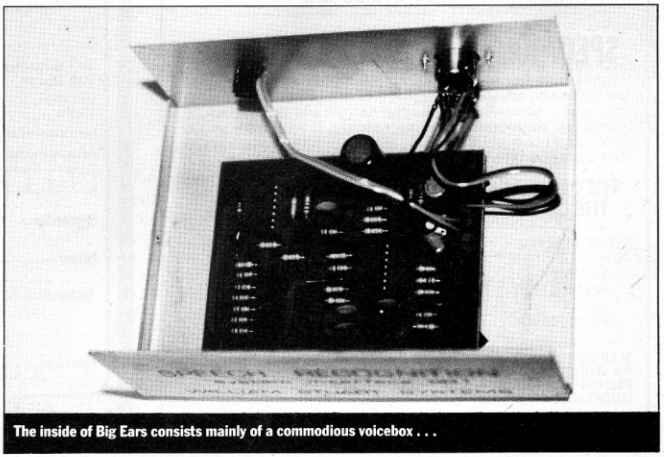
In use

Getting the whole set-up running was relatively easy. You plug Chatterbox into the Sinclair's edge connector, connect it up to Big Ears, plug the microphone into Big Ears, power up and you're away. Load up the Big Ears software, and you can begin teaching your micro to recognise words.

You're initially asked whether you want to 'learn, test, demo or save'. Your first move, logically, is to select 'l', which allows you to place a word in the machine's vocabulary.

Each new word should be assigned a word number, and then the word itself is typed in. You then press Enter and say the

42►



The inside of Big Ears consists mainly of a commodious voicebox . . .

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word, four times, by which time the Spectrum has a fair idea what you're on about.

Once you've got a couple of words stored — with the software supplied the maximum is ten — you can test Big Ears' recognition capabilities. At first I had problems here — I'd hit t, then Enter, and as I was gathering breath to say something, 'You said pig' would flash up on the screen. The manual was silent on this subject, and the main manual itself gives the impression that you'll get a 'Please speak . . . Now!' prompt before having to open your mouth.

However, I tried bellowing at it the moment I'd entered 't', and found I got the required attention. The recognition seems quite good for one voice, but when we tried varying the voices it learned from, it showed a tendency to confuse Igor and pop.

If — as is very likely — you find you need to store more words, instructions are given on how to alter the program to increase its capacity. You can also vary the number of repetitions needed for the program to store a word, bearing in mind that the more repetitions, the better the recognition.

Round about this point you'll start wondering what you could get it to do next, and how. Big Ears stores words as a sort of digitised voiceprint, and you can see this as you teach it words, should you wish. But Chatterbox, and most other cheap speech synthesisers, work on an allophone system, allophones being units of sound that human speech is made up of. The problem is turning your voiceprints into something that the Chatterbox can reproduce in allophone form if, that is, you want to be able to talk to Big Ears and have Chatterbox repeat your words. But note that this is not the same as Big Ears *understanding* you.

What you need to make the device of more immediate use is the software to allow it not simply to repeat words but to act on them. Now, provided you can produce a stable enough sound, and back it up with software that will recognise the 'print' of that sound — obviously not an exact print, but one within a given margin of error — you could get your micro to execute an action.

As the demonstration software included with Big Ears allows you to alter the number of repetitions the device demands before it 'learns' a sound, and as the more you do the more accurate it is, you can probably nail its print down fairly tightly, and bear in mind you don't have to stick to sounds you make with your larynx.

No, don't go away . . . If what you want is a series of simple actions, why not try clapping, a knock on the desk, whistling? Why not be the first on your block to have a micro that dims the lights every time you clear your throat?.

Verdict

The potential for Big Ears is clear, but unfortunately it's still largely unexplored. William Stuart Systems is currently working on applications software for the Spectrum, and UK101 software is probably a little further advanced, but the company says that, because users will tend to want to employ Big Ears for specific applications, it's very difficult to decide what sort of routines to include.

So, really, what you're talking about here is a product that needs a fair bit of programming input before you can use it to its full potential, and if you want to control your environment by voice, you'll also need to be pretty nifty with a soldering iron.

But this isn't a complete disqualification for novices. If you're willing to teach yourself, and if you're clear in your mind that it will take you some time to get the results you want out of Big Ears, then it does represent excellent value for money.

Item Big Ears **Prices** £49 **Machine** Various **Contact** William Stuart Systems, Quarleydown House, Cholderton, Salisbury, Wilt SP4 0DZ

The complete set-up — Big Ears, top left, is linked up to the Spectrum through Chatterbox. Just speak into the mike and your voiceprint appears on the screen.

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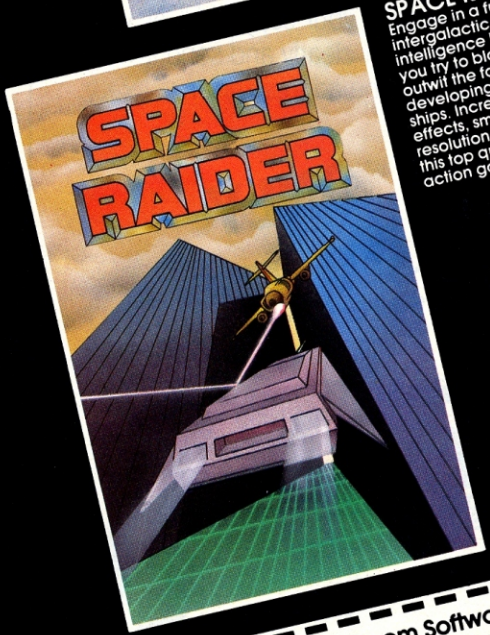

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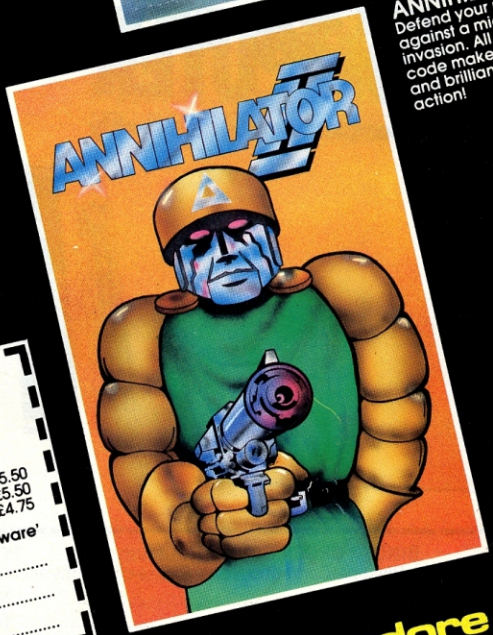

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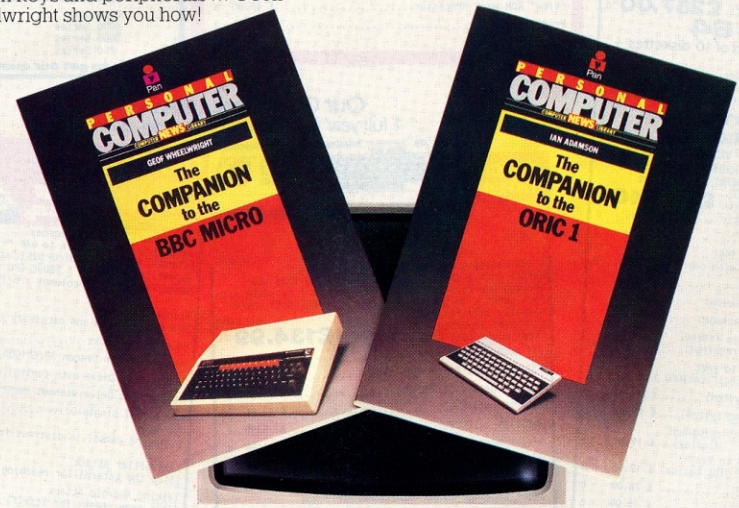

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DRAGON DRAMA

DRAGON 32

Rule the world

Name Empire **System** Dragon 32 **Price** £7.95 **Publisher** Shards Software, 189 Eton Road, Ilford, Essex IO1 2UQ **Format** Cassette **Language** Basic.

Billed as a colourful game of warlike strategy, Empire is a classy version of a well-known board game.

The cassette comes in the standard plastic case with a cover depicting model soldiers at war. Inside is a detailed double-sided instruction sheet.

Objectives

The aim is to 'save mankind from the evil red menace'. This is, of course, the ruthless Dragon Empire, which is intent on world domination. Your brief is to counteract its aggressive policies with those of your own.

In Play

You and the Dragon Empire start out by selecting the countries you are to occupy. A well drawn map of the world is presented.

The next phase is allocating your armies to your chosen areas. You can view the world map by pressing 'W' or browse through continental maps.

To select a country for deployment of your army you again press space and indicate the number of armies you want there. When you've done this, the Dragon Empire makes its allocations, then gets first go at attacking. If you've unwisely chosen level 8 of difficulty it's probably endgame for you.

When attacking the cursor moves around the areas from which you could attack, and you select by using the space bar. It then moves around the areas you could attack and your victim is selected in the same way. It is only now that you see how many armies you actually have there and how many you're up against.

Winning a battle allows you to place armies in your newly acquired land, and conquering a continent gives you extra combat forces.

The graphics — lines linking the two areas involved in the conflict and spreading circles of the colour of the winning army, etc — are neatly done.

It's vital to keep an eye on the status lines at the foot of the screen. It's here that such information as number of victories to date, armies owned, and how the current battle is progressing are displayed

My only complaint is that in the higher levels the Dragon Empire gets the benefit of the doubt most of the time.

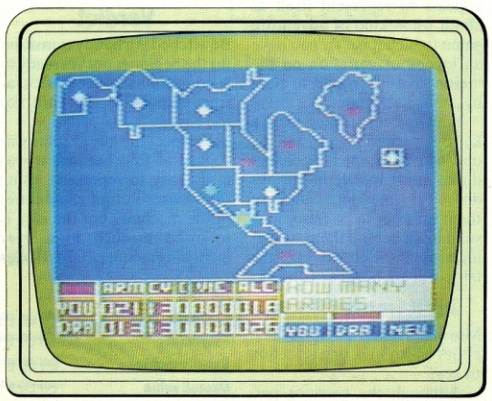
Verdict

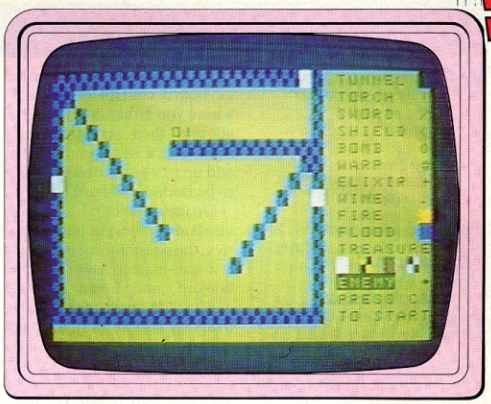
An extremely good game. I have to confess to sitting up very late several nights, determined to beat it at level 8 — I didn't, but will do next time. Highly recommended.

Bryan Skinner

RATING

Lasting appeal	
Playability	
Use of machine	
Overall value	





DRAGON 32

Three of a kind

Name Treasure Tombe, the Crystal Chalice, The Temple of Zoren **System** Dragon 32 **Price** £7.95 **Publisher** Dungeon Software, Milton House, St. John Street, Ashbourne, Derbyshire DE6 1GH **Format** Cassette **Language** Basic **Other versions** None **Outlet** Mail order.

Three adventures no less, and not just from the same company, but by the same person — Mike Meineck. It isn't made clear whether he's the author or the programmer, but he's the chap whose name appears on all three boxes. This explains at least some of the similarities between the adventures here.

Objectives

Adventures seem to have two main aims. The first is that you collect something, and the second is staying alive while doing it. Supplementary aims consist of doing your utmost to slay the various lifeforms that you inevitably encounter and exploring as much of the territory as you can.

In one game you are collecting Merlin's treasure, in another you are regaining the crystal chalice, and in the third you are after a map and a golden orb, and, of course, staying alive is not easy.

In play

With adventures for the Dragon it is very important to judge them against their peers. So it isn't particularly damning of me to say that the graphics on all three leave something to be desired.

The graphics are in Treasure Tombe. These are just character graphics on the text screen, but they are fairly effective. The game is centred around collecting 32 bits of treasure, and killing as many of the 48 guardians of the 90 rooms as you can. The fights may be simple, but the game is entertaining.

The other two aren't such fun to play, and have further similarities. The messages are of the same format, and the replies are all too predictable. Being called a puny wretch for the first time might be quite funny — but it's funny once only.

All three games help you out the first couple of times you get 'killed', which makes the storylines less credible.

Verdict

Treasure Tombe is far and away the most enjoyable, and seems to be about the state of the art for the Dragon at the moment.

The other two are stuck in a place reserved for the real enthusiast, and I wish them luck — they'll need patience and stamina. All three are so-called real time games in that things still happen if you stop for a rest. It keeps you on your toes.

Piers Letcher

RATING	**Treasure Tombe**	**The Crystal Chalice**	**The Temple of Zoren**
Lasting appeal:			
Playability:			
Use of machine:			
Overall value:			

VIC-20 MAZES

VIC 20

Zap the Cobus

Name Cobus Maze **System** Vic 20 (unexpanded) **Price** £5.95 **Publisher** Temptation Software, 27 Cinque Ports Street, Rye, East Sussex, 0797-223642 **Format** Cassette **Language** Basic **Other versions** None **Outlets** Mail order/retail soon.

Now this is a maze for the expert. Indeed, there are eight separate mazes of increasing difficulty in Cobus Maze, ending up with invisible keys to collect and invisible mines to avoid in the nearly impossible final game. The last four mazes require a separate LOAD for each, while the first four all operate on one LOAD, which gives you an idea of their comparative complexity.

Objectives

Cobus Maze begins with a fairly straightforward maze, and you are placed at the centre top. Distributed about the maze are cross-shaped mines, and the deadly Cobus is searching for you. If you're cornered by Cobus, you have five Zogs to zap him into hyperspace, but if he gets his zap in first, you've lost.

If you avoid all these perils, which is by no means easy, you progress to the next, more difficult game, and so on.

One side of the cassette is for joystick, the other for keyboard control.

First impressions

Very rudimentary graphics and sluggish response to either keyboard control or joystick, where you either don't move at all and then suddenly jump right into a mine or monster, add up to a game that promises to be boring and hard to play.

On the other hand, as you get into it and master its idiosyncrasies, the possibility of becoming a maze-master can get you hooked, and I can envisage nationwide post-maze hangovers as people play all night and progress.

In play

The first four mazes are fairly obvious, and if you lose all your lives the first few times it's a help that it always LOADs the same pattern of walls and passages to wander through.

In maze 5 you have to collect a key to get out and in maze 6 you need four keys — in the correct order. In maze 7 the four keys are invisible so you can't see which key fits what door, and in maze 8 there are invisible mines to avoid as well as invisible keys to collect.

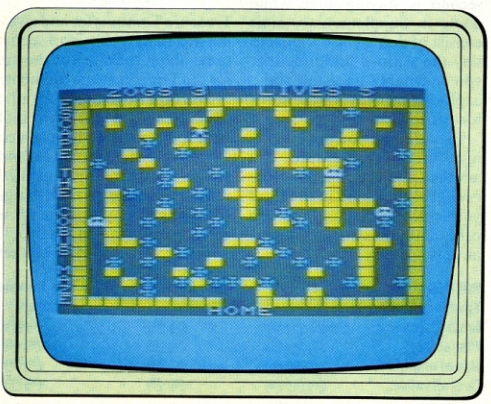
Verdict

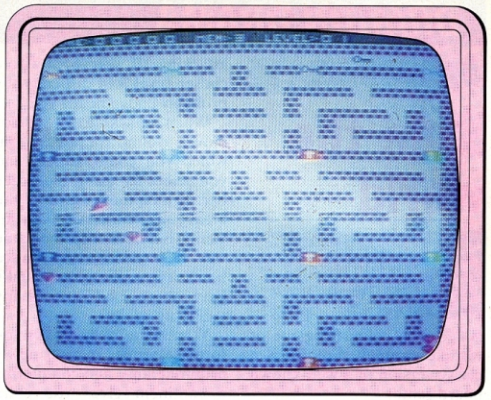
I found the keyboard controls marginally easier to use than the joystick version, but I'd have been happier if there had been something obvious like U-D-L-R — or even W-Z-A-S, which at least makes a logical pattern on the keyboard.

For masochists only, but for them essential. **Karl Dallas**

RATING

Lasting appeal	
Playability	
Use of machine	
Overall value	





VIC 20

A puzzle to unlock

Name Bewitched **System** Vic-20 (unexpanded) **Price** £5.50 **Publisher** Imagine Software Ltd, Imagine House, 5 St Thomas Street, Liverpool, Merseyside L1 4 6BW **Format** Cassette **Language** Machine code **Other versions** None **Outlets** Mail order/retail

The problem with mazes is that, apart from the universal and now rather hackneyed Pac-Man, they have to be horrendously difficult to be interesting. Usually, the easier a maze is the sooner it becomes tedious, all of which tends to dissuade the player from developing the appropriate technique to progress to harder things.

Objectives

When you've got past the preliminary guff, which appears to represent itself as about some kind of adventure game (which it isn't), you have an ingenious variation on the 'being chased around a maze by a monster' game.

You've been turned into a key by a wicked wizard, and the only way to escape is by changing colour to match the various doors to freedom. Some of them turn out to be false, with solid brick behind them. Ranging around the corridors of the labyrinth are hordes of ghosts.

First impressions

Movements can be controlled either by joystick or a selection of keys.

Although the corridor pattern doesn't seem to change from one game to another, which doors are real and which are false does, so you can't learn how to beat the game as you go on.

You are asked whether you want music at the preliminary menu stage, and if you'll take my advice you'll say no, since the electronic 'Greensleeves' becomes very irritating before many bars have elapsed.

In play

The joystick seems to be very sensitive, which means considerable overshoot if you're not careful. Encounters with the ghosts aren't always fatal, since they sometimes just jump over you — something the directions don't prepare you for.

To become the right colour, you have to go back to the beginning (top of the screen) and go through the appropriate colour keyhole — and this can mean scrolling back through kilometres of corridors if you've gone a reasonable distance.

Verdict

Bewitched is a handy transition for the beginner not yet ready to become a maze addict, as it's far from impossible, yet still not too easy.

I suspect the key graphic was chosen at first because it was fairly easy to represent, using the low-resolution capabilities of the machine, but the idea is followed through in a very intriguing manner. **Karl Dallas**

RATING

Lasting appeal	
Playability	
Use of machine	
Overall value	

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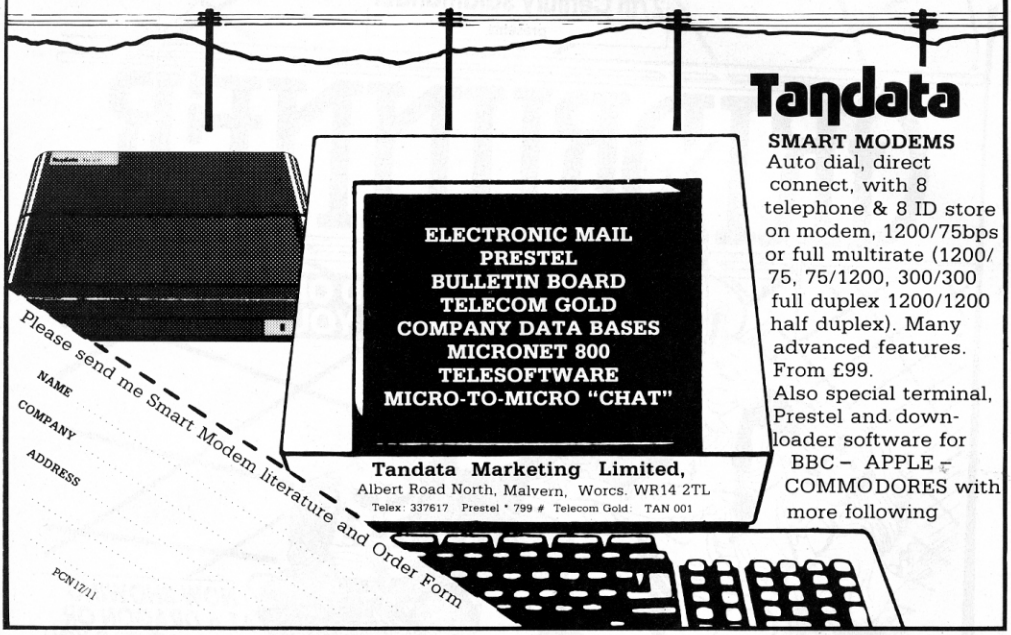

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SPACED OUT

COMMODORE 64

Spaceway pirates

Name Cosmic Convoy **System** Commodore 64 **Price** £6.90 **Publisher** Taskset Ltd, 13 High Street, Bridlington, Yorkshire YO16 4PR **Format** Cassette **Language** Machine code **Other Versions** None **Outlet** Retailers/mail order.

It could be any game with big graphics, and large moving objects lumbering across the screen. Escort your fleet of cargo transporters from one planet to another and become a hero — or an unreal, whatever that is.

From sea to air to space the World War II ideas have percolated, but they're the same ideas.

Objectives

The aim is to get to the next planet and get your slow cargo transporters there in one piece. To stop you doing this fighters appear, and you have to ward them off by blowing them off course. You can choose your level, but it strikes me that level 0 is too hard.

You have three goes at making the crossing, but after three hours' non-stop play I still hand't managed to reach the next planet.

Others who have done so assure me that the procedure thereafter is much the same, *ie* go on to the next planet in the system.

Considering that my high score is now 5,600 it's a bit silly to have a reward for getting to the 50,000 mark to aim for.

In play

It's not easy because of several rather irritating factors: turning your craft round is just too slow — a more responsive craft would make a world of difference.

A scanner gives you some warning of impending doom, but because the graphics are so large the enemy are upon you before you have a chance to do anything about it.

The overwhelming feeling I got while playing was that I'd wasted my time sitting in front of a rather blank-looking 64 for the ten minutes it took to load.

Considering that Taskset has put some very good and worthwhile features into its program, the game is somewhat disappointing.

Cosmic Convoy has such advantages as keyboard or joystick option, a menu option for instructions, and clear instructions when you want them. However, the way to hell is paved with good intentions, and these have been poorly implemented.

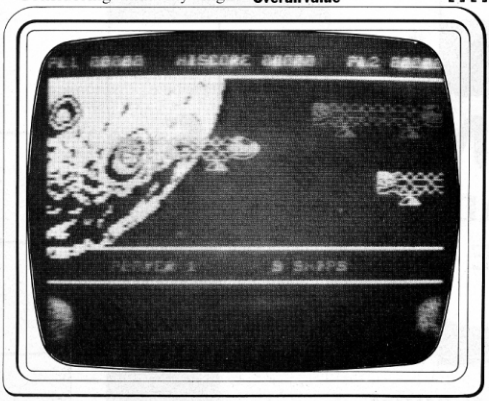
Verdict

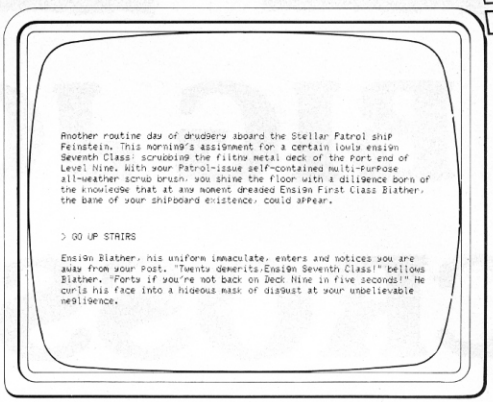
I'd think twice about spending a hard-earned seven quid on this game, but someone else might easily be enthusiastic — the most hardened computer game addicts perhaps.

Piers Letcher

RATING

Lasting appeal	
Playability	
Use of machine	
Overall value	





COMMODORE 64

Diary of a deckhand

Name Planetfall **System** Commodore 64 **Price** £34.95 **Publisher** Infocom **Language** Machine code **Other versions** Atari 400/800 **Outlet** Norwich Camera Centre, 20 White Lion Street, Norwich NR2 1QB Tel (0603 612537)

It's always a noteworthy event when Infocom brings out a new adventure. Planetfall, their latest, is a zany science-fiction saga and is well up to their usual high standard.

Objective

You play the part of the lowest-ranked Ensign aboard the Stellar Patrol Ship Feinstein. Your duties are menial and life is made more uncomfortable by your commander, Ensign Blather, a sort of Captain Bligh of the space fleet. Described by most of his crew as a real Krip (excuse the language), he seems to take perverse delight in assigning you to the worst jobs on board and generally making your life a misery.

For missing two pellets of trot while cleaning out the grotch cages, Blather awarded you 100 demerits and two extra shifts of deck scrubbing. Things are so bad you're even considering abandoning ship.

The Stellar Patrol's motto is 'Boldly Going Where Angels Fear To Tread' and this is what you must do if you want to rise in your profession. In fact, you'll soon find you have little choice in the matter since your space-ship's about to explode.

In play

As with all Infocom Adventures, there are no graphics, just text — but what text! The location descriptions are long and detailed, the dialogue spoken by the characters is rich and colourful and the various incidents and responses full of interest and imagination. Who needs graphics with written detail as good as this?

You are not long scrubbing the decks before that megakrip Blather appears on the scene, venting his spleen on the nearest human — you.

Half the fun of the game is trying out variations, regardless of the likely consequences. That way you squeeze more out of these particular Adventures than you would if you merely aimed for the winning post.

Protocol forbids revealing too much of the plot but it isn't giving away anything to say that you will eventually find yourself in a strange and deserted land of floods and pestilence.

Don't worry about lack of companions — you might be lucky enough to meet up with Floyd, a mischievous robot.

The colourful and humourous documentation that comes with the game sets the atmosphere for the adventure.

Verdict

An adventure that is genuinely humourous as well as challenging. This must be another smash hit for Infocom.

Bob Chappell

RATING

Lasting Appeal	
Playability	
Use of Machine	
Overall Value	

BIG JOHN'S CROSSWORD

14 15

2

8

3 34 35

9

38

TODAY'S CLUES

We don't stock HIFIs, cameras or second hand cars, but deal exclusively in home computers and everything for them.

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SPECTRUM SELECTION

48K SPECTRUM

Frolicking flea

Name Bugaboo **System** 48K Spectrum **Price** £6.95 **Publisher** Quicksilva, Palmerston Park House, 13 Palmerston Road, Southampton SO1 1LL **Format** Cassette **Language** Machine code **Other versions** None **Outlets** Mail order, most dealers

After ants and centipedes and snakes, it was only a matter of time till we saw a flea in the starring role, and the inevitable question is does the game come up to scratch?

Objectives

It take a while to puzzle out that the purpose of the game is to survive and get out of the cave. Not even the controls are fully explained.

The cassette cover is full of rhyming rubbish like "Save from the monster me, else I be a very sad flea, SPOING! SPOING! SPOING! SPOING! SPOING!" Instead of all this tosh couldn't we have had some instructions?

In play

Bugaboo proves, however, to be a compulsive game of great fun. The loading is done in style, with several screens to keep you occupied till you get a note of the controls. One line also says "Best time to exit," but has nothing after it, so I imagine it's a best score record should you ever manage to exit the caves.

Your flea begins on the floor of a series of multicoloured linked underground caverns, full of ledges, bushes, trees, rocks and spiders. At the bottom left a timer starts ticking, and at bottom right it says "Level: 82."

Also beneath the screen are a row of dots which change colour as you press either of the jump keys, and the more that have changed colour when you release the key the further the flea will jump. Again, this takes some working out.

You're not alone in these passages either as there's a monster resembling a pterodactyl trying to make a meal of you. There are one or two nooks and crannies where you can hide, but not so many and it's usually a case of hopping frantically to safety . . . and not making it. You can fall as far and as often as you like without harm, but if the monster gets you then you start again.

There doesn't seem to be a time limit on the action, and you need to be very nifty with the scrolling in order to look all around you.

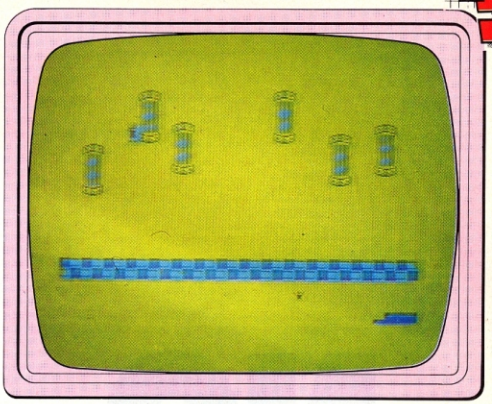
Verdict

The speed and graphics are excellent, with you having to work out optimum routes to progress up the screen . . . though I wish I knew what the Bugaboo was going on.

Mike Gerrard

RATING

Lasting appeal	
Playability	
Use of the machine	
Overall value	



48K SPECTRUM

Back to the Greek

Name Gorgon **System** 48k Spectrum **Price** £4.95 **Publisher** Phipps Associates, 172 Kingston Road, Ewell, Surrey KT19 0SD **Format** Cassette **Language** Machine code, some Basic **Other versions** None **Outlets** Mail order

After space travel, the Greek legends are proving a fruitful plundering ground for software writers, and this graphics game incorporating two different combat sections casts you in the role of Spectrasses — not the local optician but the village hero.

Objectives

A chalice has been stolen by Grang, an ancient Greek mugger, and you must recover this and placate the angry gods, who are threatening to flood your village.

One side of the tape has the scenario and instructions, and when you've digested these you load the game side — but don't forget to write down which keys perform which functions in both sections as this information is not on the cassette insert.

In play

Three levels of play from Super-Hero to Doddle, and you allegedly have three lives, though this is none too sure.

The first section has you challenging Grang's pal Gorgon, who is guarding the entrance to the cave where his mate is hiding. He will pop up behind one of six pillars and stare at you. This is not merely jolly rude of him; it will also turn you to stone, unless you can lift your mirror and reflect the stare back at him.

Two keys move you left and right, and three control the mirror's positions, though don't lift it too soon as it's heavy and soon falls again.

Quite amusing graphics, and quick reflexes are called for, though don't press the Break key to try to see how the program works as your keyboard will get turned to stone and you'll have to reload.

Defeat Gorgon and you'll walk into the cave, where a nice effect has your eyes slowly getting used to the light. Then Grang will approach you, his sword at the ready. You must engage him in combat, matching his strokes and trying to land the occasional thrust.

You each have to be hit several times before you're killed, your respective strengths being shown at the top of the screen. The controls allow you to step back and forward, to move your sword up, down or forward, and to thrust. After a few attempts I did manage to save my village, even if it was the Doddle level.

Verdict

While the game is fairly entertaining and deserves at least two cheers for originality, I can't say it exactly bowled me over or had me yelling for more.

Mike Gerrard

RATING

Lasting appeal	
Playability	
Use of machine	
Overall value	

NO LIMIT

Now, a home computer with virtually no limit to its possibilities. The astonishing new Sharp MZ700. A machine with a dazzling array of talents.

First, it's a 'clean' machine. So you are not limited to any one computer language. You have the flexibility to run and write programs in BASIC, FORTRAN, MACHINE CODE, PASCAL, ASSEMBLER and many others. And the MZ700's 512 predefined characters mean you can build up detailed pictures on the screen, without spending time specifying and designing special characters for games and special effects.

Second, it has a memory of 64K. So as your technique improves and develops, you are able to move forward to more and more advanced programming.

All of which makes this the perfect home computer for parents, as well as children.

The MZ700 gives you access to a wide choice of new software, from only £3·95 per cassette. An additional plotter/printer, costing £129·95, can produce high resolution graphics in 4 colours. A data cassette recorder is an extra at £39·95. Both add-ons fit snugly into this easy to carry compact system with no trailing wires. And you get ten exciting games, free on purchase, including Super Puckman, Circus Star, Snake v. Snake, and Man-Hunt.

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PCN ProgramCards

In ProgramCards this week, we see the completion of the BBC game, Falklands Raid, and the Spectrum game Number Pyramid, and two new programs start: a game for the Oric-1 and a utility for the CBM 64.

From Martin Lightfoot, of Worsley, Manchester, comes a useful little program for the 64. Anybody who owns or used to own a Pet computer (the Commodore kind) will recognise the style of this machine code monitor. This kind of program used to come as standard on the Pet but was dropped on the Vic and the 64.

This program makes up for the loss by allowing you to edit, move, save, list and examine machine code in hexadeximal (hex is a method of counting using base 16 instead of 10 as in decimal). Included in the program is a help menu, accessed by the up-arrow command. This table gives the details of each command. A few of these may need clarification so here goes . . .

To edit the memory, just list it to the screen with the D command. Then move the cursor up to the required position on the screen and edit the data. Note that the numbers are in hex and that each one needs two digits. When you've finished editing, press return and the data between the beginning of the line and the cursor position will be POKEd into memory.

When listing with the D option, the F1 key can be used to return you to command mode. If, at any time, you make a mistake, a question mark will be placed in the left-hand column where the error occurred.

From T W Phoeng, of Utrecht, Holland, comes one of the best Oric games seen in these pages for a long while. City Defense is a version of the popular arcade game of a similar name. You are in charge of the missile defence system and you alone have to stop the attack. You do this by placing your missile-aiming sight in front of the incoming attack flight paths and mark them for your missiles to fire at.

After your defence system has recharged, your missiles start firing and, hopefully, you can stop the incoming attack.

If you miss any of the attackers, they make a real mess of the city and after five hits you will be forced to surrender and a major part of the city will be destroyed. The game is not as easy as it looks, and getting any score at all is difficult (I could not get anything on my first five goes), but keep trying, you may triumph in the end.

We pay for published programs according to complexity, originality and the programming skill demonstrated. So why not give us a RUN for our money?

As well as the cash, you receive the satisfaction of seeing your byline on the ProgramCard — which will, of course, be snipped out and filed away in the libraries of thousands of micro enthusiasts.

Send your contribution, on disk or cassette, together with a plain paper listing and brief summary notes to: *The Programs Editor, Personal Computer News, VNU, 62 Oxford Street, London W1A 2HG.*

All disks and cassettes will be returned as soon as possible after evaluation or publication, at our expense.

PCN ProgramCards

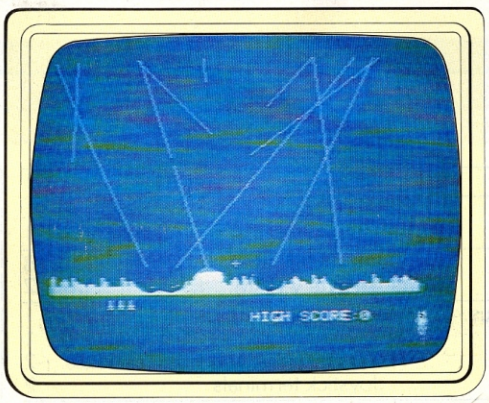
City Defense — Card 1 of 5

8337CD1/5

Oric-1 48K
Tansoft Basic

Application: Game
Author: T W Phoeng

```
10 HIMEM#97FF:PRINTCHR$(17)CHR$(6)
15 DIME(30):DIMF(30)
20 GOSUB2000:GOSUB1000
25 PAPER0:INK7
30 HIRES:PRINTCHR$(17):TS=0:TH=0:R=0
35 N$="HIGH SCORE:"+MID$(STR$(HS),2)
40 CURSET131,190,0:GOSUB750
45 CURSET10,170,0:FORA=1TO37:CHAR108,0,1:
CURMOV6,0,0:NEXT
50 N$="hijkkj jihkhijihjkijhk hikjijkhkj
 iik":CURSET10,162,0:GOSUB750
55 K=0:R=R+1:S=R:IFS>8THENS=8
60 R1=INT(200/(S+4))
65 CURSET0,160,0:FILL17,1,INT(RND(1)*6+1)
70 CURSET45,180,0:FORA=1TO25
75 CHAR109,0,1:CURMOV6,0,0:NEXT
80 X=120:Y=50
85 M=0:SC=0:DH=0:MI=25
90 CURSET0,0,0:FILL160,1,INT(RND(1)*6+1)
95 FORA=0TO9:D(A)=0:NEXT
100 FORA=0TO9
105 A(A)=INT(RND(1)*225+10)
110 B(A)=INT(RND(1)*200+20)
115 C(A)=INT((B(A)-A(A))/8+0.5)
120 NEXT
```



10-15	Set up arrays and initialise screen and memory.
20	Gosub and redifine characters, gosub instructions.
25	Select colours.
30	Select HIRES and initialise scores.
35	Set up high score string.
40	Gosub and print hi-score on screen.
45-50	Display city.
55-60	Initialise attack counter and round counter.
65	Display city colour.
70-75	Display missiles.
80-85	Set variables.
90	Initialise attack colour.
95	Set variables to zero.
100-120	Initialise attack variables.

AT LAST, A HOME COMPUTER THAT IMPROVES WITH AGE.

It's surprising how many first-time relationships with a home computer go sour with age.

You buy an attractive, discounted little machine so that you and the children can learn about computers.

Instead, you learn about its limitations: the dull graphics. The plugs that fall out. The cheap power supply. The unalterable "beginners" language. The stiff, fragile keys. No provision for future developments. If only you'd looked around a bit in the beginning... *"Quality costs a little more, but it's usually worth paying for"* (Personal Computer News – CGL M5 Review, June '83.)

The CGL M5 is designed and built by Sord, one of Japan's leading computer specialists, with three main ideas in mind.

First, to be easy and fun to learn and operate.

Second, to be rugged enough to last through hours and hours of operation.

And third, to form the basis of a powerful, versatile home computer system that won't need replacing until you're ready for a dedicated business system.

Built to learn

The CGL M5 is designed to be easy for non-geniuses to use.

"On the M5, most of the work is done for you, and all that is left is the need to work out what to do next, rather than how to do it." (Personal Computer News, June '83.)

If you make a mistake, you can correct it with a simple movement of the cursor. So you only correct that mistake, not a whole line; nor do you have to indulge in complex edit commands.

Budding video game designers and computer artists will love to get their hands on the 16 colour graphics and 32 moveable images called "sprites."

"The M5 makes professional graphic effects very simple for even the beginner to achieve." (Personal Computer World, Aug. '83.)

Built to last

"It works first time, doesn't need a lot of mollycoddling and jiggery-pokery to persuade it to continue to do so, and what's even better, it continues to work well. You don't have to balance cold cartons of milk on the top, shove matches in the back to keep the plugs in, or press the keys with several pounds force to make them respond." (Personal Computer News, June '83.)

Being able to build things that work and carry on working without endless maintenance is something at which the Japanese seem to excel.

Built to grow

To be truly versatile, a home computer has to understand very different things.

So you need different "languages," which the M5 provides by supplying part of its memory in plug-in cartridges.

"The M5 eliminates the worst limitations on machines at this level, which is that they tend to be stuck with whatever language is provided by the management." (Personal Computer News, June '83.)

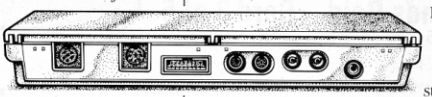
The computer is supplied complete with a Basic-I cartridge, a standard integer BASIC language and a simple learning text.

Plug in the Basic-G cartridge, and you can access the M5's incredibly sophisticated graphic and sound capabilities which are far in advance of similarly-priced computers.

Move on to the Basic-F cartridge, and you have scientific, technological and statistical computing power usually available only on big computers with equally big price tags.

The FALC cartridge provides a tailor-made language for data management, spreadsheet accounts and business problems. Combine FALC with a disc and you could *"turn the M5 into a small business machine"*. (Personal Computer Magazine, August '83.)

Now, take a look at the back of the M5.



Notice the sockets (usually an extra) for a standard Centronics-type printer, the separate video monitor and hi-fi sound output.

Even the language cartridge socket has hidden potential:

"Unlike most such sockets, this one has 56 internal lines connected to it giving access to just about every function in the computer. This means that just about everything you can think of can be added onto the computer, ranging from a Prestel interface to second processor to use as an intelligent terminal on a timesharing computer"... (Electronics – The Maplin Magazine, March '83.)

Take a look at the home computer that will improve with age.

For a full technical specification of the CGL M5, details of the wide range of supporting software and to find out where to see a complete demonstration, send the coupon to: CGL, CGL House, Goldings Hill, Loughton, Essex IG10 2RR. Telephone number: 01-508 5600.

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CGL M5 HOME COMPUTER

BUILT TO LEARN. BUILT TO LAST. BUILT TO GROW.

Falklands Raid Card 2 of 5

8337FM2/5


```
  230IF@%=5THENW%=1ELSEW%=0
  240MOVEL%(@%),ML%(@%):GCOL0,1:VDU59:IF
 ML%(@%)>RND(200)+300 THEN ML%(@%)=ML%(@
%)+RND(10)-5:L%(@%)=L%(@%)+N%/2:ELSE L%(
@%)=L%(@%)+N%+RND(10)-5:ML%(@%)=ML%(@%)+
RND(10)
  250IF INKEY(-97)THEN PROCG
  260VDU4:COLOUR0:PRINTTAB(7,4);FU%;"  "
;TAB(19,4)"  ";H%;"  ":VDU5
  270PROCSM:PROCJ
  280IF MX%>J% MX%=J%
  290IF MY%>J% MY%=J%
  300IF MY%<-J%MY%=-J%
  310IF MX%<-J%MX%=-J%
  320IF X%>1290 X%=-10:Z%=Z%+1:PROCLAND:
FOR K%=1 TO 5:L%(K%)=0:ML%(K%)=0:NEXT
  330IF X%<-10 THEN X%=1280:Z%=Z%-1:PROC
LAND:FOR K%=1 TO 5:L%(K%)=0:ML%(K%)=0:NE
XT
  340IF Y%>950 Y%=950
  350IF INKEY(-105)MX%=MX%+1
  360IF INKEY(-104)MX%=MX%-1
  370IF FU%=0ORFU%=1MY%=MY%-1:GOTO390
  380IF INKEY(-66)MY%=MY%+1
  390IF INKEY(-98)MY%=MY%-1
  400IF Y%<40 Y%=40:S%=200:PROCBANG:PROC
END
  410IF POINT(X%+MX%,Y%+MY%)=2THENPROCHI
T
  420X%=X%+MX%:Y%=Y%+MY%:PROCDS:PROCUDS:
ENDPROC
  430DEFPROCHIT:D%=D%+1:IFD%=2THENS%=200
:PROCBANG:PROCEND
  440IFD%=1THENFU%=FU%-100:SOUND0,-12,60
,3
  450ENDPROC
  460DEFPROCS
  470IF POINT(XS%(T),YS%(T))=1 I%(T)=0
  480IF INKEY(-51)MOVEXS%(T)-16,YS%(T)+1
6:GCOL0,1:VDU241:GCOL0,0:SOUND0,-10,53,3
:FORY=1 TO 90:NEXT:VDU8:VDU241:I%(T)=0:E
NDPROC
```

240	Do flames.
250	Check tab key for firing, if down then PROCG.
260	Disassociate graphics and text cursors, and update fuel and score.
270	Update missile movement.
280-310	J% is max velocity, set up in loader program. Check MX% and MY% as these are the Harrier's velocity.
320	Check whether Harrier is in next section, if so then draw next section.
330	Check if Harrier has flown to previous section.
340	Check Harrier's flying ceiling and make sure that it is not exceeded.
350-360	Check horizontal movement keys.
370	If fuel has run out then ignore up key *ie* dive dive dive!!
380-390	Check vertical keys.
400	Check for ditching in sea.
410	Check whether aircraft has flown into anything. If so take damage (D%).
420	Update position of Harrier, and if no damage, remove previous image.
430-450	Procedure used if Harrier hits something, D% is damage, which is incremented until it reaches 2 in which case Harrier blows up.
460	This procedure checks missile condition.
470	Missile in sea.
480	Missile self destructed.

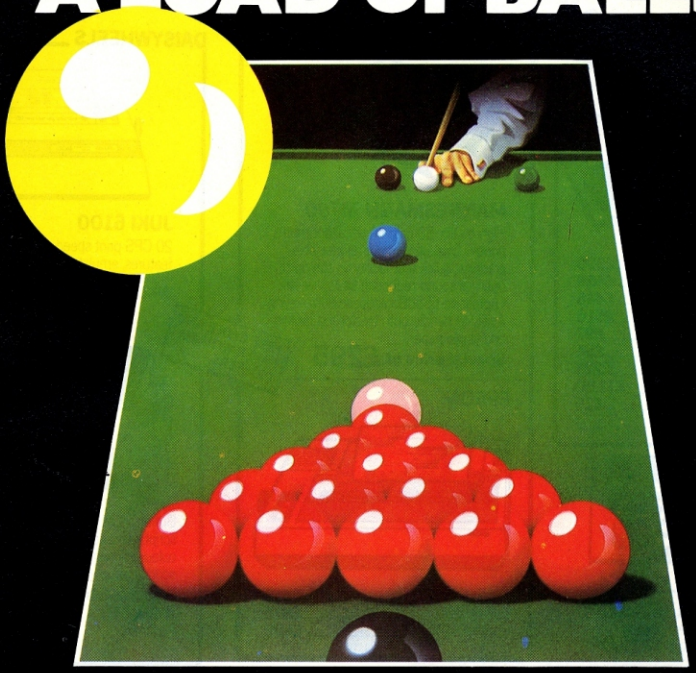
Falklands Raid Card 3 of 5

8337FM3/5

```
  490IF POINT(XS%(T),YS%(T))=2 OR POINT(
XS%(T)+(MSX%(T)/2),YS%(T)+(MSY%(T)/2))=2
 H%=H%+1:MOVEXS%(T)-16,YS%(T)+16:GCOL0,1
:VDU241:GCOL0,0:SOUND0,-11,53,3:FORY=1 T
O 90:NEXT:VDU8:VDU241:I%(T)=0:PROCSMOK:E
NDPROC
  500IF XS%(T)-V%*MSX%(T)>1280 OR XS%(T)
-V%*MSX%(T)<0 OR YS%(T)-V%*MSY%(T)<0 OR
YS%(T)-V%*MSY%(T)>950 THEN I%(T)=0
  510GCOL0,1:MOVEXS%(T),YS%(T):VDU238:EN
DPROC
  520DEFPROCUS:GCOL0,0:PLOT69,XS%(T)-V%*
(MSX%(T)),YS%(T)-V%*(MSY%(T)):ENDPROC
  530DEFPROCBANG:GCOL0,2:MX%=0:MY%=0:X=X
%:Y=Y%:FORC%=1 TO S%:D=RND(C%)-(C%/2):L=
RND(C%)
  540IF C%>100 VDU19,3,12,0,0,0
  550IF ADVAL(-5)=0 THEN570
  560SOUND0,-12+(C%/13),70,5
  570PROCPLOT:PROCUNPLOT:MOVEX%-10,Y%-10
:MOVEX%+10,Y%-10:PLOT85,X%,Y%+10:NEXT:VD
U19,1,1,0,0,0:ENDPROC
  580DEFPROCPLOT:VDU19,2,12,0,0,0:MOVEX+
D,Y+L:VDU42:ENDPROC
  590DEFPROCUNPLOT:VDU19,1,13,0,0,0:MOVE
X,Y:VDU42:ENDPROC
  600DEFPROCBACK:GCOL0,2:MOVE1,1:DRAW127
9,1:DRAW1279,891:MOVE1,891:DRAW1,1:MOVE1
,730:DRAW1279,730:GCOL0,1:MOVE1,40:PLOT2
9,1279,40:PLOT85,0,0:PLOT85,1279,0:MOVE2
0,760:DRAW1260,760:MOVE0,790
  610VDU254,49,32,32,32,32,32,32,32,32,3
2,32,32,32,253,32,253,253,253,253,253,32
,32,32,32,253,253,32,253,253,253,253,32,
32,32,32,50
  620ENDPROC
  630DEFPROCDS:GCOL0,3
  640Q%=239:IF DD%=-2 GCOL0,1
  650MOVEX%-10,Y%+10:VDUQ%
  660A%=X%-MX%:B%=Y%-MY%:ENDPROC
  670DEFPROCUDS
  680IF FU%<1 OR D%=1 OR MX%=0ANDMY%=0DD
%=-2:GOTO700
  690GCOL0,0:MOVEA%-10,B%+10:VDUQ%
  700ENDPROC
  710DEFPROCG
  720IF MX%=0 AND MY%=0 THEN ENDPROC
  730FORT=1 TO 5
```

490	Hit an installation or ship.
500	Missile off-screen.
510	Update position of missile.
530	Procedure to explode Harrier.
540	Change screen colours.
550	Check if sound buffer is empty.
560	Explosion sound.
570	Draw smoke and colour the screen.
580-590	PLOT "★" on screen.
600	Procedure to draw background screen.
610	Draw flying map.
630-660	Procedure to update position of Harrier.
670-700	Procedure that leaves or doesn't leave a trail.
710	Procedure to fire missiles.
720	If no missiles have been fired then end procedure.
730	Maximum of five missiles.

MORE THAN A LOAD OF BALLS



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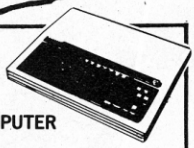

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Model B & Disc Interface	£469
Model B & Econet	£446
Model B & Econet & Disc Int	£516
Disc Interface Kit	£97
* Speech Synthesizer (official BBC)	£54
Teletext Receiver	£225
1.2 Operating System (incl. fitting)	£11.50
Basic 11	£15

* *New in stock. Price incl. fitting.*

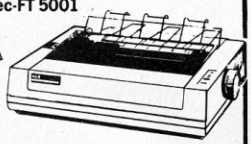
NOW AVAILABLE
THE ACORN ELECTRON
ONLY £199.00

WORD PROCESSORS

View Word Processor	£59
Word Wise Word Processor	£45

Logitec-FT 5001

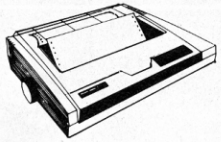
STAR BUY



Friction and adjustable sprocket feeding, variety of printing models, (PICA & ELITE pitch) user font registry command, automatic paper insertion, 96 ASCC11 with descenter, 8 international character sets, 48 semi graphics!

At the very low price of £330

DOT MATRIX PRINTERS



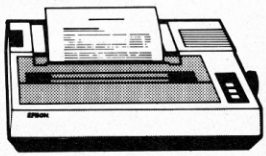
MANNESMANN MT80

High quality 80 column serial dot matrix printer. Dual density dot addressable graphics, quick tear facility as standard, optional sound reduction kit to give an impressive L55dBa acoustic noise rating. Ability to handle both tractor-fed fanfold and single paper.

Special price of £295

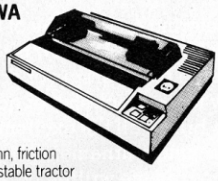
FREE CABLE AND PAPER WITH ALL PRINTERS.

EPSON



Epson FX80 F/T	£415
Epson RX80 F/T	£315
Epson FX100 T/T	£499

SHINWA CP80



80 column, friction and adjustable tractor feed, bidirectional logic seeking, HI-RES graphics and block graphics, sub and superscripts, condensed and emphasised print, and underlining, vertical and horizontal tabs, self test, italic print, etc.

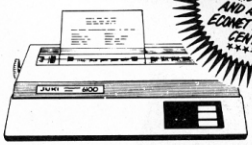
Shinwa CP80 F/T	£289
Parallel Printer Lead	£13
2000 Sheets Fanfold Paper	£15

ODDS

Official Joysticks	£13
Compatible Joysticks Damping Control	£15
Dust Covers – for various machines – from	£3.95

NEWS FLASH! ACORN APPOINTED AND APPROVED ECONET SERVICE CENTRE

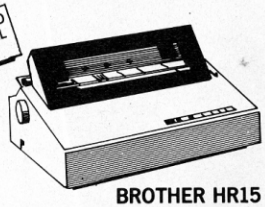
DAISYWHEELS



JUKI 6100

20 CPS print speed, supports all wordstar features, emulates diablo protocols.

Juki 6100 Daisywheel with 2K Buffer £395



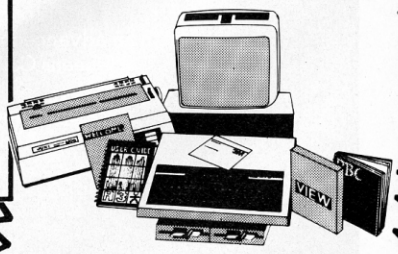
BROTHER HR15

Buffer ... 3K byte, shadow printing, super/sub script, carriage skip movement, text reprinting, colour printing (red and black), auto underscoring, proportional spacing, clear buffer—

Also available with keyboard.

Brother HR15	£431
Keyboard	£176

*STAR BARGAIN!



BBC Model B plus Disc/Interface fitted view, V.D.U. Green Monitor, Juki Daisywheel Printer, 200K Dual Disc Drives and manual and formating disc. ONLY £1,360 (incl. all cables)

ALL PRICES INCLUSIVE OF VAT.

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Greycoat Street, London, SW1
Dec 8, 9, 10, 11, 1983
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Ask for your complimentary ticket now! Come and see us to pick a special gift for Christmas!
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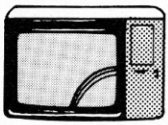
PHILIPS TP200 Green Monitor

You can use this latest Philips Green Monitor for personal computers, business computers, control systems, automatic test equipment. The picture quality of the TP200 means not only 80 x 24 lines of information but also usage for high resolution graphics.

At the bargain price of **£79**

NORMANDE 14" TV/ MONITOR



This TV/Monitor is not a modified television as many TV/Monitors are, but a 14" TV/Monitor which has been designed to perform both functions. It has RGB and Composite video and sound. An RGB cable for a BBC is supplied as standard.

Cost	£249
With Remote Control	£269

OTHER

Microvitec 14" 1431	£247
BBC Official 12"	£95

TORCH DISK PACK

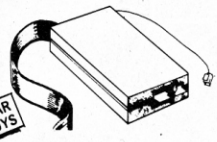
Torch Z80 Disk Pack

4MH3 Z80 Application Processor
Perfect Software

At New Low Price

£835.00 Inc. Installation

SLIM DISK DRIVES



STAR BUYS

TEAC 55A. S/S 40 TRACK

100K SD Single	£169
200K DD Dual	£339

TEAC 55E S/S 80 TRACK

200K Single	£220
400K Dual	£440

TEAC 55F D/S 80 TRACK

400K S/D Single	£269
800K D/D Dual	£539

MITSUBISHI

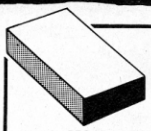
400K D/S DD Single	£269
Dual	£539

FORMATTING DISK & MANUAL £10

*ALL DRIVES CASED WITH FREE CABLES

- * SERVICE CONTRACTS TO EDUCATION AUTHORITIES AT DISCOUNT
- * OFFICIAL ORDERS FROM DEALERS, GOVERNMENT DEPARTMENTS, COLLEGES AND SCHOOLS WELCOME
- * ALL PRICES INCLUSIVE OF VAT

KOMORI — MICROPROCESSOR CONTROLLED



Ideal for BBC Micro, and any other computers with standard interface. 5¼" Slimline, on-board single chip microcomputer reduces TTL count by 70%, extra low power requirement, direct drive (no belts!), guide rail means completely quiet operation, unique eject mechanism, fast 6ms track to track access time, fully guaranteed. Cased with leads.

Priced at the **STAR BARGAIN PRICE** of **£169**

Power supply	£40
Cables Single	£9.50
Cables	£13.50

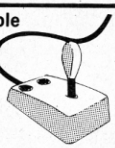
FLOPPY DISKS

Floppy Disks in packs of 10

Single sided 40 Track	£20
Double sided 80 Track	£35

BBC Compatible

KLIK STIK JOYSTICK — SELF CENTRING



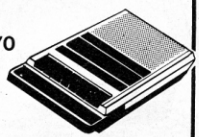
Two Fire Buttons

Single — £17.95

Dual — £34

STAR BUY

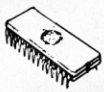
SANYO SLIM 3G



The slim 3G Sanyo Cassette Recorder only recently available in the market - ONLY **£28.95**

Official BBC Cassette Recorder	£29.95
Cassette Recorder lead	£2.50

UTILITY SOFTWARE



Screen Dump Rom **£17.25**

Analyse Disk **£15**

Compatible for MX80, FX80 etc.

NEW BOOKS AND SOFTWARE IN STOCK

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Word Hunt	£11.90
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Chemical Structures	£13.80
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Creative Graphics	£7.50
Graphs & Charts	£7.50
Lisp	£7.50
Forth	£7.50
View Guide	£2.50
Into View	£2.50
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BBC GAMES SOFTWARE (BUG BYTE)

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Red Lord	£7.50
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Graphics Package	£9.50
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(COMPUTER CONCEPT)

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PCN-2

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Let your Spectrum be your guide in a totally new dimension in adventures in the true spirit of traditional role playing games where YOU design the scenario.

"I have been a Dungeons and Dragons fan for several years...The package provides excellent entertainment for all fans of the cults and should prove a good introduction to the game".
....Sinclair User.

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ZX Spectrum 48K **£7.50**

Written by Graham Stafford.

What the real critics say. . . .

Very rarely have software titles produced such universal acclaim as 'Halls of the Things' and 'The Dungeon Master'. Now, with three brand new programs, Crystal continues to set the standard of software excellence. The difference is obvious - the choice is yours:

The Best or The Rest.

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A stunning multi-level maze 'arcade - adventure'.

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....Popular Computing Weekly.

ZX Spectrum 48K **£7.50**

Written by Neil Mottershead, Simon Brattel and Martin Horsley.

THE ISLAND

The ultimate test of logic and deduction! Can you solve the hidden mysteries of the South Pacific Island on which you have been stranded - and escape alive! A brilliant classic style adventure game to facinate and frustrate you for months!

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At last! a version as fast and furious and as frustratingly addictive as the arcade original. Landers, Mutants, Bombers, Pods, Swarmers and much much more combine to produce the ultimate space game!

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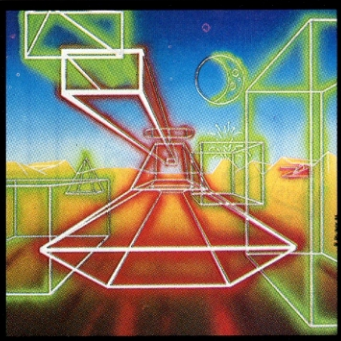

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ZX Spectrum 48K **£6.50**

Written by Martin Horsley.

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Halls of the Things ☐ The Dungeon Master ☐
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PROGRAMMERS! Written any good software? send it to us for evaluation and details of our excellent royalty scheme.

PCN ProgramCards

Falklands Raid Card 4 of 5

8337FM4/5

```
  740IFI%(T)=1 THEN NEXT
  745IFT>5 THEN ENDPROC
  750I%(T)=1:MSX%(T)=2*MX%:MSY%(T)=2*MY%
:XS%(T)=X%:YS%(T)=Y%:T=5:NEXT:ENDPROC
  760DEFPROCJ:GCOL0,5:FOR T=1 TO 5
  770IF I%(T)=0 THEN790
  780XS%(T)=XS%(T)+MSX%(T):YS%(T)=YS%(T)
+MSY%(T):PROCS:PROCUS
  790NEXT:ENDPROC
  800DEFPROCSMOK:E%=E%+1:IF E%>5 THEN E%
=1
  810L%(E%)=XS%(T)-20:ML%(E%)=YS%(T):END
PROC
  820DEFPROCSM:FORI%=1 TO 7
  830IF POINT(C%(I%)+16,CC%(I%)-10)=1MOV
EC%(I%),CC%(I%):GCOL0,0:VDU253
  840NEXT:ENDPROC
  850DEFPROCLAND:K=1:CLG:COLOURO:VDU4:PR
INTTAB(26,1)"SECTION ";Z%:VDU5
  860IF Z%<1 AND RND(5)=1 RESTORE1150 EL
SE RESTORE1160
  870IF Z%=1 RESTORE1110
  880IF Z%=2 RESTORE1160
  890IF Z%=3 RESTORE1120
  900IF Z%=4 RESTORE1130
  910IF Z%=5 RESTORE1140
  920IF Z%=6 RESTORE1150
  930IF Z%>6 RESTORE1160
  940FOR X=0 TO 1280 STEP32
  950READA$
  960IF A$="C3"C=3:GOTO950
  970IF A$="C1"C=1:GOTO950
  980IF A$="SS"GCOL0,2:MOVEX,72:VDU249
  990IF A$="AC"GCOL0,2:MOVEX,72:VDU246:G
COL0,3:VDU247:GCOL0,2:VDU248:MOVEX,104:V
DU242
 1000IF A$="S"GCOL0,2:MOVEX,72:VDU244,24
5:MOVEX+16,104:VDU243
 1010IF A$="L"THEN PROCL
 1020IFA$="@@"READI%:X=X+(I%*32):GOTO104
0
 1030IF A$="@"THEN1040
 1040NEXT:ENDPROC
 1050DEFPROCL:K=0:READH,R$:GCOL0,C:FOR K
=K TO H:MOVEX,K*32+10:VDU253:NEXT
 1060IF R$="0" ENDPROC
 1070IF R$="V"MOVEX,(H+1)*32+10:GCOL0,2:
VDU111
 1080IF R$="R"MOVEX,(H+1)*32+10:GCOL0,2:
VDU252
```

750	Fire missile.
760-790	Procedure to move missiles.
800-810	Procedure to do smoke.
820-840	Procedure to rub out land.
850	Procedure to draw sections.
860-930	Restore appropriate line.
950	Read string.
960-970	Select C.
980	Print cruiser.
990	Aircraft carrier.
1000	Battleship.
1010	Check for land.
1020-1040	Spaces.
1050	Procedure to draw land.
1060	Check for o.
1070	Draw o.
1080	Draw radar.

PCN ProgramCards

Falklands Raid Card 5 of 5

8337FM5/5

```
 1090IF R$="B"MOVEX,(H+1)*32+10:GCOL0,2:
VDU253
 1100ENDPROC
 1110DATAC1,@,@,@,AC,@,SS,@,@,@,AC,@,@,@
,S,@,@,S,@,@,SS,@,@,SS,@@,20
 1120DATA@@,S,S,@,@,@,@,S,@,@,SS,@@,8,S,
L,1,O,L,1,R,L,2,B,L,3,R,L,3,B,L,3,O,L,4,
R,L,7,R,L,5,O,L,5,B,L,5,O,L,5,R,L,5,B,L,
6,O
 1130DATAL,4,O,L,3,B,L,2,R,L,1,R,S,@,SS,
@,@,@,SS,@,@,SS,@,@,SS,@,S,@,@,SS,@,L,1,
R,@,S,L,1,R,L,1,B,L,2,B,L,1,O,@,L,O,B,L,
1,O,L,2,B,L,3,R,L,4,O,L,3,O,L,3,B,L,3,O,
L,3,B,L,3,O
 1140DATAL,4,O,L,5,B,L,7,R,L,5,O,L,6,O,L
,4,B,L,4,O,L,6,R,L,3,O,L,1,R,S,SS,SS,@,@
,SS,@,@,@,SS,@,@,@,@,@,@,@,@,@,@,@,@,@,@
,@,@,@,@,@,@,@
 1150DATA@@,20,SS,@,@,@,S,@,AC,@,@,SS,@@
,20
 1160DATA@@,50
 1170DEFPROCLANDED:D%=0:MX%=0:MY%=0:IF Z
%<20RZ%>5THEN1180ELSES%=200:PROCBANG:PRO
CEND
 1180MOVEX%,Y%+100:GCOL0,3:PRINT"LANDED"
:VDU4:FORFU%=FU% TO 500 STEP2:COLOURO:PR
INTTAB(7,4);FU%:SOUND2,-12,FU%+200,2
 1190IF FU%>100 VDU19,3,6,0,0,0:COLOUR3:
PRINTTAB(25,4)"FUEL LOW"
 1200NEXT:FU%=501
 1210VDU5:MOVEX%,Y%+100:GCOL0,0:PRINT"LA
NDED":ENDPROC
 1220DEFPROCLIV:FU%=FU%-1:IF FU%<100 VDU
4:COLOURO:SOUND1,-5,160,1:PRINTTAB(25,4)
"FUEL LOW":VDU19,3,12,0,0,0:VDU5
 1230ENDPROC
 1240DEFPROCEND:FORX=1TO5:I%(X)=0:NEXT:V
DU19,3,6,0,0,0,19,2,3,0,0,0:VDU4:IFH%>HI
%HI%=H%:GOTO1250ELSE1280
 1250Z%=1
 1260*FX15,1
 1270PRINTTAB(4,14)"Please type in your
name "TAB(5,15):INPUTH$:H$=LEFT$(H$,11)
 1280COLOUR3:PRINTTAB(25,4)"FUEL LOW":CO
LOUR1
 1290PRINTTAB(5,25)"Press space-bar to p
lay"
 1300IF INKEY(-99)CLG:GOTO30 ELSE1300
```

1090	Draw fuel dump.
1110-1160	Data for sections.
1170	Procedure used when landed on a carrier, also check speed of landing.
1180	Refuel.
1190	Remove warning when fuel is greater than 100.
1200	Set fuel to 501.
1210	Remove 'landed'.
1220	Procedure to check fuel level.
1240	Procedure used at end of game, also checks hi-score.
1250	Set section back to 1.
1260	Remove characters from buffer.
1270	If hi-score then enter new name.
1280	Remove fuel low warning.
1290	Press space bar prompt.
1300	Get space bar and restart game.

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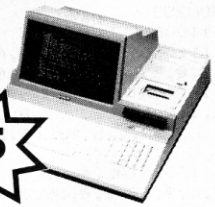

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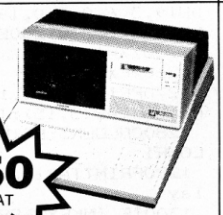

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Pyramid

Card 3 of 4

8337PY3/4

ZX Spectrum Spectrum Basic SA Wring Cont'd

```
1075 REM Prints result grid-----
-------------------------------
1080 PRINT INK 0,AT 0,0;"--Green
 shading shows my route--"
1090 LET A=17: FOR B=1 TO 30: PR
INT PAPER 2; INK 1;AT A,B;"▄";AT
 A+4,B;"▀": NEXT B
1100 FOR A=18 TO 20: FOR B=1 TO
5: PRINT INK 1;AT A,B;"▀";AT A,2
5+B;"▀": NEXT B: NEXT A
1110 IF GUESS=TOTAL THEN GO TO 1
300
1200 REM Incorrect final total--
-------------------------------
1210 PRINT FLASH 1; BRIGHT 1; OV
ER 1; INK 1;AT 19,9;" Total Wron
g "
1220 GO TO 1400
1300 REM Correct final total----
-------------------------------
1310 BEEP .15,5: BEEP .15,10: BE
EP .15,15: BEEP .15,22: BEEP .15
,17: BEEP .15,22
1320 PRINT FLASH 1; BRIGHT 1; OV
ER 1; INK 1;AT 19,10;" Well Done
"
1400 REM Re-run routine---------
-------------------------------
1410 PAUSE 250: PRINT OVER 1; IN
K 7;AT 19,1;"press";AT 19,26;"en
ter"
1420 PAUSE 0
1430 PAPER 0: CLS
1440 PRINT INK 2;AT 21,14;"©"; I
NK 5;AT 21,16;"Steve Wring"
1450 PRINT INK 4;AT 11,4;"--pres
s 'S' to stop--";AT 12,5;"-any
 other to repeat-": PAUSE 0
1470 IF INKEY$=CHR$ 83 OR INKEY$
=CHR$ 115 THEN CLEAR : BORDER 7:
 PAPER 7: INK 0: CLS : STOP
1480 CLEAR : GO TO 1
1490 STOP
1500 REM Shading for difficulty
choice-------------------------
1510 FOR A=1 TO 12 STEP DIFF+1
1520 PRINT OVER 1; PAPER 4;AT V(
A),H(A);" "
1530 NEXT A
1540 RETURN
1600 REM Routine to delete playe
rs route & re-start------------
1610 FOR R=2 TO A-1
1620 PRINT OVER 1; PAPER 7;AT E(
R),D(R);" "
1630 BEEP .25,50
1640 NEXT R
1650 RETURN
```

1080-1110	Print the result grid.
1200-1220	Incorrect total.
1300-1320	Correct total.
1400-1490	Prompt for another game.
1500-1540	Shade the computer's route according to the difficulty.
1600-1650	Rub out player's route and restart.

Pyramid

Card 4 of 4

8337PY4/4

```
2000 REM SETTING UP TITLE PAGE--
-------------------------------
2015 BORDER 0: PAPER 0: CLS
2020 PRINT INK 3;AT 1,3;"THE PYR
AMID NUMBER PUZZLE"; INK 6;AT 2,
2;"-----------------------------"
2025 PRINT INK 4;AT 5,4;"I will
draw a pyramid full";''"of numbe
rs;then by dropping down";''"one
 row at a time to an ajoining";'
'"square will add up their total
."
2030 PRINT INK 4;AT 14,4;"Your t
ask is to find a path";''"giving
 the same total as mine on";''"r
eaching the bottom row."
2035 PRINT INK 5;AT 21,8;"--pres
s enter--": PAUSE 0
2040 CLS : PRINT INK 4;AT 1,4;"Y
ou can move by:";AT 4,2;"1) pres
sing '5' to drop left";AT 6,2;"2
) pressing '6' to drop down";AT
8,2;"3) pressing '8' to drop rig
ht"
2045 PRINT INK 5;''"also";'"----
"; INK 4;AT 15,2;"'R' will let y
ou start from";''"the top again.
";AT 19,2;"'S' shows you my rout
e."
2050 PRINT INK 5;AT 21,8;"--pres
s enter--": PAUSE 0: CLS
2060 PRINT  INK 4;AT 3,2;"But be
ing a friendly spectrum";''"I wi
ll give you some squares";''"(sh
aded green)"
2070 PRINT INK 4;AT 10,3;"You ca
n also choose the";''"difficulty
 -(1:easy to 5:hard)-"
2080 PRINT INK 4;AT 18,3;"Enter
a value 1 to 5": INPUT DIFF: IF
DIFF>5 OR DIFF<1 THEN BEEP 2,35:
 GO TO 2080
2090 PRINT INK 5;AT 21,7;"--pres
s enter--": PAUSE 0: CLS
2999 RETURN
3000 REM Routine to display prog
ram total & players total------
3010 FOR C=18 TO 20
3020 FOR A=1 TO 14
3030 PRINT PAPER 0;AT C,A;"▀";AT
 C,A+16;"▀"
3040 NEXT A: NEXT C
3050 PRINT PAPER 0; INK 4;AT 19,
2;"My total";AT 19,18;"Your tota
l"
3060 PRINT PAPER 0; INK 5;AT 19,
11;TOTAL
3090 RETURN
9000 BORDER 7: PAPER 7: INK 0: C
LS : STOP
```

2000-2999	Instructions for the game.
3000-3090	Display the running totals.

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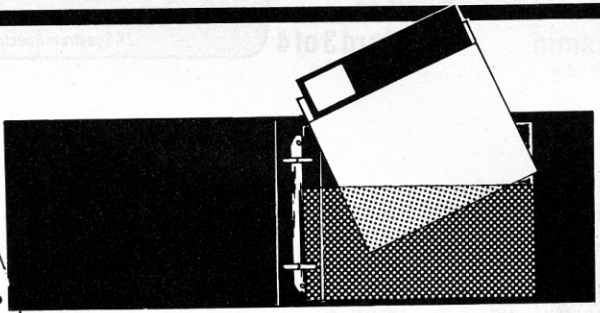

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EMS

Monitor 64 — Card 1 of 8

8337MO1/8

Commodore 64
CBM Basic

Application: Utility
Author: Martin Lightfoot

```
5 POKE51,0:POKE52,159:POKE55,0:POKE56,159:CLR
10 REM************************************
11 REM  DATA FOR MACHINE CODE 'FILL'
12 REM************************************
15 DATA160,0,165,2,145,251,230,251,208,2,230,252,165,251,197
16 DATA253,208,240,165,252,197,254,208,234,165,2,145,253,96
17 FORG=40710TO40738:READA:POKEG,A:NEXT
20 REM************************************
21 REM  DATA FOR MACHINE CODE 'MOVE'
22 REM************************************
25 DATA160,0,177,251,145,253,230,251,208,2,230,252,230,253,208,2
26 DATA230,254,165,251,205,52,3,208,233,165,252,205,53,3,208,226,96
27 FORG=40740TO40772:READA:POKEG,A:NEXT
100 DEFFNHEX(X)=(XAND15)+48-((XAND15)>9)*7
110 DEFFNDEC(X)=X-48+(X>57)*7
120 POKE53280,12:POKE53281,0
130 PRINT"■■■MACHINE CODE MONITOR - MARTIN LIGHTFOOT "
190 OPEN1,0
200 PRINT"■":INPUT#1,CO$:IFCO$=""THEN200
```

5	Lower top of memory	27	Set up at 40740		black and print title
15-16	Data for first machine code routine	100-110	Define two functions for conversion from hex to	190	Open the keyboard as an input device
17	Set up machine code at 40710		decimal and vice-versa	200	Set text colour to white. Input
25-26	Second routine data	120-130	Set border to gray, screen to		command string

Monitor 64 — Card 2 of 8

8337MO2/8

```
205 IFCO$="↑"THEN6000
210 L$=LEFT$(CO$,1)
220 IFL$="D"THEN1000
230 IFL$="S"THEN2000
240 IFL$="L"THEN3000
250 IFL$=","THEN4000
260 IFL$="G"THEN800
270 IFL$=";"THEN5100
280 IFL$="F"THEN4500
290 IFL$="M"THEN4600
300 IFCO$="R"THEN5000
310 IFCO$="X"THENPOKE53280,14:POKE53281,6:PRINT"■■";:END
500 PRINT:PRINT"■?■";:GOTO200
600 REM************************************
601 REM     CONVERT HEX TO DECIMAL
602 REM************************************
605 H=0
610 FORX=1TOLEN(H$)
620 T=FNDEC(ASC(MID$(H$,X,1))):H=H*16+T
630 IFT>16-1ORT<0THENER=1
640 NEXT
650 IFER=1THENER=0:H=-1
660 RETURN
```

205	Up arrow acts as help key. Displays syntax for commands	220-310	Determine command and branch to routine	605-660	error line Convert hex number in H$ to
210	Get initial letter only of input	500	Print question mark at start of		decimal number in H

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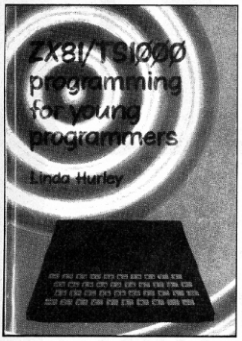


'ZX81/TS1000 Programming for Young Programmers' by Linda Hurley, published by McGraw-Hill at £4.95 (paperback, 88 pages).
You'd have thought that all the possible titles to have been written for the ZX81 were already on the market. Apparently not.

There's nothing original in this book, but what it does give is a clear and concise understanding on how to use your micro. Written for the ZX81 user and TS1000 owner in the US, this book gives a step by step introduction to using Basic on your computer.

After a brief introduction, the book unravels some of the mishmash meanings of the keys on the keyboard and gets the user to familiarise himself with them.

The chapters that follow each begin with a short easy program that does something straightaway. As you work your way through the chapter the programs get longer, and to polish it off, suggestions for changing programs and adding your own ideas are given. **SG**

'Mastering the Commodore 64' by Mark Greenshields, published by Interface at £7.95 (paperback, 219 pages).
The common or garden writer of books for the micro owner seems to fall into two main categories: the ones who can write but don't know a lot about computers, and the micro whizkids who aren't really at home in writing a book on the subject.

Mark Greenshields falls into the latter category. Mastering the Commodore 64 is a mine of information for owners of the machine but buyers should be prepared for the somewhat clumsy style. There is no reason why programmers of this calibre should not break into book publishing — on the contrary, their expertise is more than welcome — but publishers must accept the responsibility of having the accompanying words properly edited.

Passing lightly over yet another introduction to Basic, you'll find the worthwhile material here in the sections on sound and graphics. More valuable still is the 60-page section on machine code.

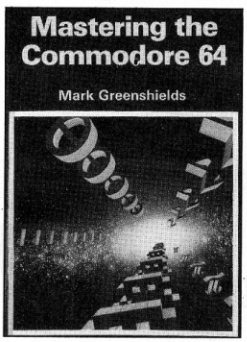
With just enough theory to make things clear, Mr Greenshields offers one of the most lucid introductions to machine code I've found and backs this up with some illustrative and useful programs, including chapters on using sound, colour, graphics and sprites in your machine code programs.

The final part of the book includes listings of several programs including a few utilities, a maze game and a full adventure. All programs have been

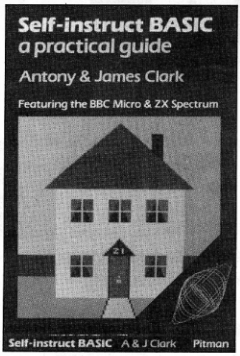
Also included are a full complement of appendices but these largely duplicate those of Commodore's own Programmer's Reference Guide, which throws up the question of whether this book is enough in itself.

The answer, I think, is no.

However, it is useful as a companion volume and anyone struggling with machine code on the 64 should consider buying it on the strength of its coverage of that subject alone. **PW**



'Self-Instruct Basic (A Practical Guide)' by Antony and James Clark, published by Pitman Publishing Ltd at £4.50 (paperback, 125 pages).
There are many ways to learn computer programming, and there are many more ways to teach it. In the face of this



slightly foreboding situation, Messrs Clark and Clark (senior and junior) have produced an interesting approach. Very similar to other schools titles from the same publishers, 'Self-Instruct Basic' is written expressly for you to 'try it and see what happens' rather than just blindly copy the examples. This includes making delibrate mistakes as part of the education of your grey matter.

Use of this style relies on actually having your computer in front of you, and learning more from the computer than from the text itself.

The first half of the book quickly covers the most often-used words in the Basic vocabulary, and includes references to both the Spectrum and BBC microcomputers.

In the latter part of the book comes the Ideas and Exercises section. This is where you can get lost for six months, trying out all the experiments, and generally building a Charles Atlas brain.

Over 200 ideas for programs are given, including word processing, statistical analysis, graphics, and games. With only a few exceptions, these programs are offered as learning exercises, not as full programs. However, each idea is referenced to the preceding chapters, so you should be able to answer all your own questions.

Since the book is here to help you learn about Basic, very little time is spent on lesser things like using cassettes and disks, structured programming, and how microcomputers work.

Self-instruction may not be a guaranteed way to learn, but this book makes a thorough job of it, and £4.50 is a small price to pay if it works. **IT**

'Software 64' by Owen Bishop, published by Granada at £5.95 (paperback, 137 pages).
After the games comes the useful stuff. Or in the words of the subtitle: 'Practical programs for the Commodore 64'. Well, possibly.

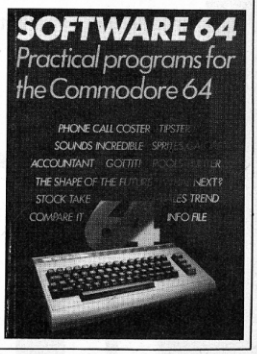
It really depends on how much call you have for a pools prediction program or a racing tipster or a program to turn your 64 into a large, expensive, electronic poster. To be fair, there are more helpful offerings among the 13 programs here although they do raise the old question of whether it is truly useful to have certain applications carried out on a micro.

Even the programmer's utilities of sprite editor and sound experimenter have drawbacks. The former is extremely limited and many better programs have appeared in magazine listings. The latter is a powerful way of trying out different SID chip settings for possible inclusion in other programs, but there are no built-in instructions so you need to have the book open before you when using it.

Of the rest there are two useful programs in Accountant and Info File, and a couple of clever but pretty pointless exercises in Compare It (a data comparison program) and Sales Trend.

Prize for the most pointless goes to Phone Call Coster. Would you really take the trouble to load up and run a program every time you use the phone?

In conclusion then, not a book that lives up to its title. But — and it's not much in the way of qualification — it might be worth looking at with the aim of improving your programming technique because there are some useful ideas on data storage and manipulation. **PW**



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If your association has something special on the agenda or if you've just started a new one, contact us at *Clubnet, Personal Computer News*, VNU, 62 Oxford Street, London W1A 2HG.

Micro fans in Wales

The organisers of the Pencoed Amateur Computer Club in South Wales are getting stuck into the role of agony aunts, unravelling various problems that come their way as they seek to broaden members' experience and knowledge of micros.

They see their role basically as an educational one and hope to get members away from arcade games long enough to teach them things like Basic. Members' machines include the Vic 20, Spectrum, BBC, Sharp and Atari.

'We are helping people write their own programs and we generally help out with problems like loading tapes,' said main organiser Steve Brokenshire, who works as a computer engineer—much to the envy of various younger members who, he says, express an interest in going into computing as a career.

The club has had a few women joining and Mr Brokenshire says the club would welcome more, adding that he hopes the almost-all male membership won't put off potential female members.

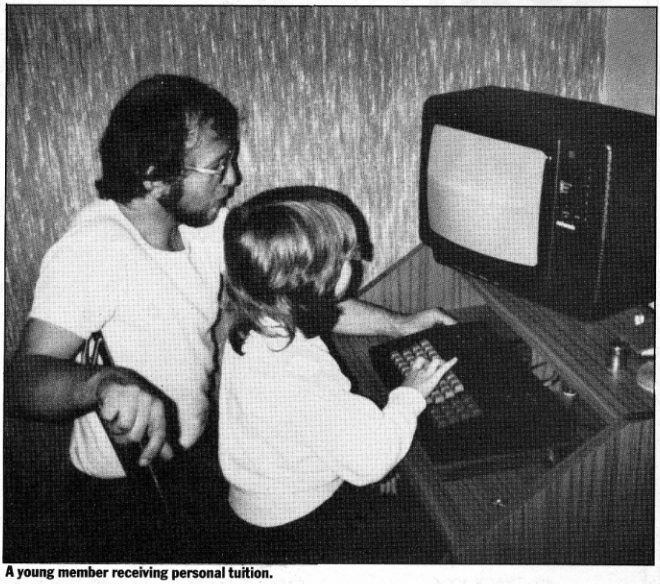
He and chairman Philip Williams started off the club for friends a year ago. It now has 20 members, most of whom are under 18, with meetings held fortnightly on Saturdays between 2 and 5pm at the local welfare hall.

Hopefully this hall will go to further good use soon, when the club gets together with Cardiff's ZX User Group and the Llantwit Major Club to have a joint meeting there. At this meeting, they hope to exchange ideas, hints, tips, etc.

The Pencoed club is also planning an open day so people can come in and play on the micros, and Mr Brokenshire hopes those attending will learn something useful this way.

The club runs a competition for its members at each meeting called Adventure Shield. This consists of two people playing a game on two micros—you might have, say, a Vic owner playing a Spectrum and vice versa, since these are the most commonly owned machines. They play for an hour and the winner receives a shield.

Wendie Pearson



A young member receiving personal tuition.

Name Pencoed Amateur Computer Club **Venue** Pencoed Welfare Hall **Meetings** Bi-weekly on Saturday afternoons **Contact** Philip Williams, 0656 860307

CLUBS

AVON

Bristol Berkeley Nuclear Laboratories Club. Contact Neil Walker, 53 Wolfridge Ride, Alveston, Bristol, 0454 414262.

Bristol Micro Computer Club. Meets at the Pavilion, Southend Road, Filton, Bristol, every other Tuesday. Darryl Collins, 60 Mackie Rd, Filton, Bristol BS12 7NA, 0272 792982.

Bristol Format 40/80 Disc Club, for BBC disk users. Contact Peter Hughes, Format 40/80 Disc Club, c/o The Lending Library, Five Marshal Street, Bristol BS1 4AA.

Multi-User Club Valerie Boyde-Shaw, Nailsea 851337.

Worle Computer Club. Meets at Woodspring Inn Functions Rooms on alternate Mondays at 7-10.30pm. H Bennett, 0934 514902 or F Feeney, 0934 833122.

BEDFORDSHIRE

Bedford Amateur Computer Club. Meets at Star Rowing Club, Bedford, on the first and third Tuesday of month 8pm. Rowan Bird, 74 High Street, Great Barford, MK44 3LB, 0234 870763.

Chiltern Computer Club. Meets at Five Bells, Eaton Bray, Near Dunstable, Leighton Buzzard on second and fourth Monday of each month. Contact Steve Betts, 42 Wallace Road, Eaton Bray, OU6 2DF, 0525 220922.

Luton College Computer Club. John Rodger, 0582 3411.

Luton Computer Club. J P Fletcher, 1 Trowbridge Gardens, Luton, LU2 7JY, 0582 450687.

BERKSHIRE

Bracknell Computer Club meets second and fourth Thursday of each month at Easthampstead Community Centre, 7pm. Contact Paul Tilsley, 31 Pembroke, Hanworth, Bracknell, Berkshire.

Easthampstead Computer Club. Meets at Easthampstead Park School, Bracknell, on the first Wednesday in month at 8pm. Brian Poulton, 0344 84423.

Crown Wood Computer Club. Meets at Crown Wood Community Centre, Bracknell, each Thursday at 8pm. Ray Ayrton 0344 59264.

BIRMINGHAM

Birmingham Amateur Computer Club. Meets at Free Church Hall, Land Lane, Marston Green, Birmingham on first and third Thursday of each month at 7.30pm. Contact Les Moore, Secretary, Wolverhampton 725340.

Primrose Hill Centre Micro Club. Meets Wednesday at 7.15pm at the Primrose Hill Centre, Shannon Road, Kings Norton, Birmingham. Contact Keith Belfield. Tel: 021-459 8995.

BUCKINGHAMSHIRE

Aylesbury Computer Club. Meets at Quarrendon Youth Club every Friday at 7.30pm and at Mandsville County Secondary School the first Thursday of each month at 7pm. Ken Knight, 22 Mount Street, Aylesbury, 0296 5181.

Chiltern Microcomputer Club. Meets at the Garden Centre, School Lane, Chalfont St Giles, on the first Wednesday of each month. Mrs W Tibbitts, Ellwood, Deanway, Chalfont St Giles. 024 07 4906.

Iver Computer Club. P A Seal, 1 Ormonde Flats, Church Road, Iver Heath, 0753 652792.

Iver Computer Society meets at Huntsmoor room, Iver Village Hall on the second and fourth Thursday every month at 7.30. John Haigh, 141 Leas Drive, Iver, SL0 9RP.

CAMBRIDGESHIRE

Cambridge Microcomputer Club, meets on the third Wednesday of month. Derek Tripp, 3 Spurgeons Avenue, Waterbeach. 0223 315662.

Peterborough Personal Computer Club meets at Crosfield Electronics Social Club, fortnightly on Mondays. Andrew Pike, 0733 44342 after 5pm.

CHESHIRE

Altrincham Computer Club. Meets at N. Cestrian Grammar School, Durham Road, Altrincham, fortnightly. Martin Hickling, 39 Barrington Road, Altrincham, WA14 1H2, 061 941 4547.

Brunel Computer Club. Meets at St Werburgh Community Centre on alternate Wednesdays at 7 to 10pm. Mr R Simpson, 4 The Coots, Stockwood.

Chester Computer Club. Contact W Collins, 37 Garden Lane, Chester, Cheshire.

Crewe Computer Users Club meets at Buffaloes Club, Earl Street, Crewe, on the third Thursday of each month at 8pm. Bram Knight, 0270 623375.

Holmes Chapel Micro Club meets at Leisure Centre, Holmes Chapel at 7.30 to 9.30pm on the first and third Tuesday of month. Margaret Baker, 1 Helton Close, Crewe. 0477 34238.

Kinder Peek Computer Club meets at Bew Mills School every Monday. John Eary, New Mills 43870.

Kettleshulme National Computer Buyer's Club. Send SAE to Barry Edwards, Laneside House, Paddock Lane, Kettleshulme, nr Stockport, Cheshire.

New Mills & District PCC meets at New Mills School, fortnightly on Fridays at 7 to 9.30pm. Mr G M Flanagan, 11 Sundown Close, New Mills, Stockport, SK12 3DH, 0663 44051.

Northwest Computer Club meets fortnightly. John Lightfoot, 13 Aston Drive, Frodsham, Warrington, WA6 7PU. 0728 31519.

Northwest Computer Club, weekly meetings. Tom Wyatt, 29 Summer Lane, Halton, Runcorn Cheshire WA7 5PG. Runcorn 77545.

Mid-Cheshire Computer Club meets at Winsford Library on the second Friday every month at 7.30pm. Simon Sadler, Winsford 53339.

Stockport Software Exchange Club. Send SAE to P Redford, 53 Cavendish Road, Hazel Grove, Stockport, Cheshire.

CLEVELAND

Cleveland Micro Club meets on the second and third Tuesday of each month, under 18s on second of month, over 21s on third Tuesday of month. J Telford, 13 Weston Crescent, Norton.

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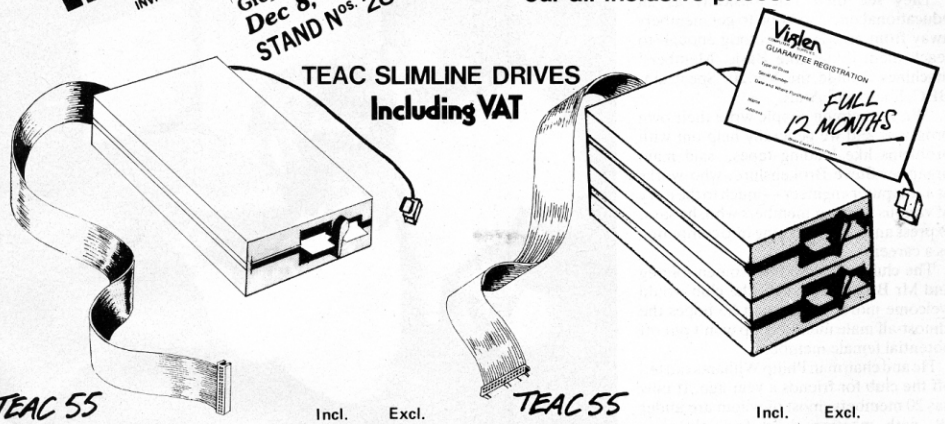

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Stockton Amateur Computer Club meets at YMCA, Stockton, each alternate week at 7-9pm. Peter Cheshire, 60 Croft Road, Eaglescliffe, Stockton-on-Tees, TS16 0DY.

CORNWALL

Cornish Radio Amateur Club — Computing Section. Bob Reason, 24 Mitchell Road, Camborne.
Cornwall Area PAICC meets at the Penzance Micro Centre every Friday. S Zenith. Hayle 754845.
St Austell Computer Club and Computer Town meets at ECIP Labs, Penpewan Road, fortnightly on Mondays at 7.30pm. N G Day, 2 Cilendale Close, St Austell.

CUMBRIA

Ambleside Computer Club. Contact Jeremy Westerman, 8 Hill Top Road, Ambleside, Cumbria. Tel: Ambleside 2452.

DERBYSHIRE

Chesterfield Micro Club. Meets each Friday at 7pm. John Charter 37555 or Alan Crofts 30262.
Derby Micro Society meets at Littleover Church Hall, Sheperd Street, first and third Thursday of each month at 7pm. Frank Taylor, 0332 559334.
Glossop Computer Club. John Dearn, 2 Spinney Close, Glossop.

DEVON

Brixham Computer Users Club. Meets at Computer Systems (Torbay), Pump Street, Brixham, Saturdays at 2.30pm. Ian Chipperfield, 22 Brookdale Court, Brixham, Devon (Brixham 59224).
Computers Against the Bomb. Contact Paul Couchman, 29 Clifton Place, North Hill, Plymouth, Devon.
Exeter & District Computer Club meets at Exeter School, Magdalene Road, Exeter, on the second and fourth Tuesday every month. T G Holden, 14 Greenville Avenue, Teignmouth, TQ14 9NT.
Exeter & District Amateur Computer Club meets second Tuesday every month. Doug Bates, Fortescue House, Stoke Cannon, Exeter. Specialist meetings on third and fourth Tuesday.
Okehampton Computer Club. Contact Cherri Graebe, Okehampton 3523, or Okehampton Community College, Okehampton 3800. Meets 7pm each Monday during term time.
South Molton Computer Club. Meets at South Molton Tool Hire, Dootson House, Cooks Cross Industrial Estate, South Molton, North Devon, each Thursday at 7pm. Contact Nick Hews on 07695 3446.
Torbay Users Computer Club meets at Devon Computers, 39 Totnes Road, Paignton on Mondays fortnightly.

DORSET

Bournemouth Area Computer Club meets at Kinson Community Centre on the third Wednesday every month. Peter Hibbs, 54 Runnymede Avenue, Bournemouth, BH11 9SE. 0202 576547.
TOPIC meets at Canteen English Truck Centre on the second and fourth Wednesday every month at 7pm. David Washford, 1 Alexander Road, Bournemouth, BH6 5JA.
Purbeck Computer Club, contact 31 North Street, Wareham, Dorset BH20 1AD.

DURHAM

Darlington Computer Club, weekly meetings. L Boxell, 8 Vane Terrace, Darlington DL3 7AT. 0325 67766.

ESSEX

Genius Computer Club. 30 Webber House, North Street, Barking.
Great Dunmow Computer Club. Contact T Coombs, 4 Oakroyal House, Oakroyal Avenue, Great Dunmow, Essex CM6 1HQ.
Brentwood Amateur Microcomputer Club, meets once a month. A R Holland, 0277 221620.
Springfield Computer Club meets on the first Friday of every month. Stephen Cousines, 1 Aldeburgh Way, Springfield, Chelmsford, CM1 5PB. 0245 50155.
Canvey Computer Club. Contact Dean Williams, 17 Mornington Road, Canvey Island, Essex SS8 8AT.
Colchester Microprocessor Group meets at University of Essex on the second and fourth Wednesday of every month at 7.30pm. Information Centre, University of Essex, near Colchester.
Colchester Computer Society. Meets at Severalls Hospital Social Club, Colchester. Contact A Potten, 14 Foxmead, Rivenhall, Witham, Essex CM8 3HD, Witham 516335.
Elsenham Computer Club meets on first Tuesday of each month. Contact Ray Franklin on 0279 815088.
National Westminster Personal Computer Society, 412 Eastern Avenue, Gants Hill, Ilford. P J Moore, 01-554 9699.
Stanway School Computing Club, only school members at present. G Floyd, c/o Physics Department, Stanway School, Stanway, Colchester.
Modem 80 Computer Link Club, meets Wednesday evenings. Contact E Ferrant, 55 South Street, Barming, Kent, 0622 27885.
Nailsea Multi-User Club. Contact Valerie Boyde-Shaw, 0272 851337.
Romford Club, a new club. Mr D Norden, 138c Church Road, Romford.
Roundacre Micro Computer Users Club. Meets at the Roundacre Youth House, Laindon Link, Basildon every Wednesday at 7.30pm. Contact Mrs L Daden, Basildon 285119.
South East Essex Computer Society meets at Hockey Club at Roots Hall, near Southend Football Stadium on Wednesday at 7.30pm. Robin Knight, 128 Little Wakering Road, Little Wakering, Southend-on-Sea. 0702 218456.

GLOUCESTERSHIRE

British Amateur Electronics Club. Mr J Margetts, 3 Bishopstone Close, Golden Valley, Cheltenham.
Cheltenham Amateur Computer Club meets on the third Tuesday of each month at 7.30pm. Mike Pullin 0242 25617.
GCHQ. D W Adam, 16 Court Road, Prestbury, Cheltenham.
Cheltenham Amateur Computer Club meets at Prestbury Scout Headquarters, on the third Tuesday of every month at 7.30pm. M Hughes, 36 Riverviews Way, Cheltenham.

HAMPSHIRE

Commodore Computer Club. Meets on the first Friday of every month at Bury House, Gosport Community Centre, Bury Road, Gosport at 7pm. Brian Cox. Fareham 280530.
Fareham and Portsmouth Amateur Computer Club. Alan Smith, c/o Francis Close, Lee-on-the-Solent, Gosport, Hants PO13 8HB. 0705 550907.
RAF Odiham Computer Club. Contact c/o Officer i/c, Royal Air Force, Odiham, Nr Basingstoke, Hants.
Southampton Amateur Computer Club meets at Crestwood Centre, Shakespeare Road, Boyatt Wood, Eastleigh, Hants. on the second Wednesday of every month at 7.30pm. Paul Blitz. Chandlers Ford 69050.

HEREFORD

Hereford Amateur Computer Club, proposed new club. Stuart Edinborough, 2 Warwick Walk, Bobblestock, HR4 9TG. 0432 269700.

HERTS

Elsenham Computer Club. Meets on second Wednesday of each month at the New Village Hall Committee Room, Elsenham, Bishop's Stortford. R. Franklin 0279 815088.
Sawbridgeworth Computer Club, meets at Sawbridgeworth Parish Hall, 7pm, Fridays. M. Marwood, 38 Sayesbury Road, Sawbridgeworth, Herts, CM21 0EB.

HUMBERSIDE

Bridlington Microcomput.r Club. Meets 7.30pm alternate Fridays at Old Star Inn, High Street, Bridlington. Contact D Compleman, 0262-601859.
Grimsby Computer Club meets at Grimsby Central Library fortnightly on Mondays at 7.30pm. Ian Fell, 0472 49248.
Scunthorpe & District Microprocessor Society meets at Community Centre, Lindun Street, Scunthorpe, every Tuesday at 7.30pm. G Hinch, 21 Old Crosby, Scunthorpe, South Humberside DN15 8PU.

KENT

Canterbury ACC proposed new club. Contact L Fisher, 21 Manwood Avenue, St Stephens, Canterbury, CT2 7AH.
Gravesend Computer Club. Meets at School Room Extra Tuition Centre, 39 The Terrace, Gravesend. Contact c/o The Extra Tuition Centre, 0474 50677.
Medway Amateur Computer & Robotics Organisation. Meets at 7.30pm on first Tuesday and third Wednesday of every month. Annual subs £5. Contact Paul Cameron, Unit 3, Waldershade Centre, Waldershade Road, Chatham, Kent, 0634-63036.
North Kent Amateur Computer Club meets at Lecture Theatre, Charles Darwin School, Jail Lane, Biggin Hill, on the first Thursday of every month at 7.30pm. Iain House, 28 Canadian Avenue, Catford SE6 3AS. 01-690 5441.
Orpington Computer Club meets at The Large Hall, Christ Church, Chaterhouse Road, Orpington, every Friday at 8pm-10.30pm. Mr R Pyatt, 23 Arundel Drive, Orpington, Kent BR6 9JF. Orpington 20281.
National Personal Computer User Association. Eric Keeley, 11 Spratling Street, Manston, Ramsgate, Kent.
Sevenoaks School Computer Club. G Sommerhoff, Technical Centre, Sevenoaks School, Sevenoaks, Kent. 0732 456340.
Tonbridge & Tunbridge Wells ACC. Ray Szatkowski, 1 Cromer Street, Tonbridge. 0732 355960.

LANCASHIRE

Blackburn Micro Computer Club. Roger Longworth, 12 Sharp Close, Accrington.
Bolton Computer Club meets at Bolton Institute of Higher Education, Deane Road, Bolton, on Thursdays. Bill or Suzi Hatton, 0204 792803.
Burnley Computer Club. Meets at Burnley Technical College on Tuesdays, 7.30-11pm. Contact Clive Tallon, 27 Basnett Street, Burnley, Lancs.
Chorley Computer Club meets at Townley Arms, Chorley, every other Tuesday at 8pm. Tony Higson, 23 Brock Road, Chorley, Lancs. Chorley 68429.
Ribble Valley Computer Club meets at Staff Canteen, Pendle Carpets Ltd, West Bradford, on the second and fourth Monday of month at 7-9pm. Contact Ian Thornton-Bryar, 25 Southfield Drive, West Bradford, Clitheroe, BB7 4TU.
Lancaster & Morecambe Computer Club. Sarah Blackler. 0524 33553.
South Chadderton Computer Club meets at Turf Lane Centre, Turf Lane, Chadderton, on Thursdays at 7-9.30pm. David Sholes, 18 Beech Avenue, Oldham, Lancs.

LEICESTERSHIRE

East Leake Computer Club. Andrew Jones, 59 Bateman Road, East Leake, Loughborough, LE12 6NN.
Hawker Siddeley Computer Club. Contact R Wrathall, 6 Naseby Drive, Loughborough LE11 0WU.

LINCOLNSHIRE

Lincoln Computer Club, meets at The Cardinal's Hat, 238 High Street, Lincoln (entrance on Grantham Street) on first and third Wednesday of each month, except August. Contact Jeffrey Joy, 23 Cross O'Cliff Hill, Lincoln, 0522 28252.
Skegness Computer Club, meets at County Hotel every other Monday, 7.30-9.30pm. Reg Potter, 118 Beresford Avenue, Skegness. 0754 3594.

LONDON

Association of Computer Clubs. Contact Rupert Steele, 17 Lawrie Park Crescent, London SE26, 01-778 6824. National Club.
Croydon Microcomputer Club. Meets at Croydon Central Reference Library. Contact Vernon Gifford, 01-653 3207.
East London Amateur Computer Club meets at Harrow Green Library, Cathall Road, E11, on the second and fourth Tuesday of month at 7-10pm. Fred Linger on 01-554 3288.
Forum-80 London. Leon Jay, 01-286 6207.
Forum-80 Wembley. Victor Saleh, 01-902 2546.
The Foundation, c/o Princes Street, Tottenham, London N17. Postal club for science fiction/fantasy software. Contact David Hodson, 01-808 4053.
Harrow Computer Group meets at Harrow College of Higher Education, Room W24, Northwick Park, on alternate Wednesday at 7pm. Bazyle Butcher, 01-950 7068.
Imperial College Micro Club meets at room 401 in the Royal School of Mines on Wednesdays at 2pm. Jan-Simon Pendry, Micro Club, c/o Imperial College Union Office, Prince Consort Road, London SW7 2BB.
London School Computer Club. Burlington Danes School, Dane Building, DuCane Road, Hammersmith.
Metropolitan Police Amateur Computing Club meets on the first Thursday of month at 7pm. S Farley, 01-725 2428.
68 Microgroup meets at Regents Park Library, Robert Street, NW1, on the third Tuesday of month at 7.30pm. Jim Anderson, 41 Pebworth Road, Harrow, Middlesex.
North London Computer Club meets at the Polytechnic of North London, Holloway, N7 8DB, on Monday, Tuesday, Wednesday and Thursday during term time and one evening a week during holidays. Robin Bradbeer, 01-607 2789.
Paddington Computer Club meets at Paddington College, 25 Paddington Green, W2 1NB. Peter Hill, 01-723 5762.
Post Office HQ Microcomputer Club meets at room B145, River Plate House, 12-13 South Place, off Moorgate, on the second Thursday of month. Vernon Quaintance, British Telecom Enterprises, Cheapside House, 138 Cheapside EC2U 6JH. 01-726 4716.
Queens Crescent Computer Club. Meets at Queens Crescent Library, 165 Queens Crescent, London NW5, 01-485 4551.
The SOBAT Computer Club meets once a fortnight. Mr T Kayani, 12 Calderon Road, London E11.
South East London Microcomputer Club meets at Thames Polytechnic, Greens Ends, Woolwich SE18, on alternate Wednesdays at 7pm. Peter Phillipps, 61 Graigerne Road, SE3. 01-853 5829.
Southgate Microcomputer Club meets at Room B106 Southgate Tech, fortnightly on Wednesdays at 7.30pm. Kevin Pretorius 01-882 2282. See Prestel page 25820645.
West London Personal Computer Club meets at Back room, Fox & Goose pub, Hanger Lane, Alperton, on the first Tuesday of month at 7.45pm. Graham Brain, 01-997 8986.

MANCHESTER

Manchester Computer Club meets at the Department of Computer Science, Manchester University, Oxford Road, on the first and third Thursday of month at 7.30pm. David Wade, 061-941 2486.
Small Business Computer Users Club. Proposed new club to meet the last Tuesday of month. K Wadsworth, 061-740 7232 after 5pm.
South Trafford Microcomputer Club. Meets fortnightly. Contact Ian White, 16 Leicester Avenue, Timperley, Altrincham WA15 6HR, 061-969 2080.

MERSEYSIDE

Merseyside Microcomputer Group meets at Merchant Taylor's School, Crosby, on second Thursday month. Mr F Shaw, 14 Albany Avenue, Eccleston Park, Prescot. 051-426 5536.
Southport Computer Club meets weekly. Ian Bristone, 28 Weld Road, Southport, Merseyside PR8 2DL. 0704 64524.
Wirral Microcomputer Users Group meets at Birkenhead Technical College every Monday. J Phillips, 14 Helton Close, Birkenhead, Merseyside L43 9HP.
Wirral Computer Club. Contact Gary Metcalfe, 24 Marlston Avenue, Irby, Merseyside.

MIDDLESEX

Brigadier Computer Club. Meets on the first and third Monday of every month at Brigadier Youth Centre, Brigadier Hill, Enfield at 7.30 pm. Contact Steve Ward, 28 Brodie Road, Enfield, Middx EN2 0EU, 01-363 3786.
Micromodeller User Association. Meets three times a year. Contact Phillip Matthews, Phillip Morris House, 21 High Street, Feltham TW13 4AD, 01-751 6388.
Sunbury Computer Club meets at St Benedicts Hall, Napier Road, Ashford, on the last Tuesday of month at 8pm. Simon Taylor, 8 Priory Close, Sunbury-on-Thames, Middlesex. Simon Clark, 83 Watling Street, Towcester, Northants NW12 7AG.
Middlesex Micro Club. Contact Pete Kavner, 17 Manor Vale, Brentford, Middlesex.

NORTHAMPTONSHIRE

Corby Universal Micro Club. Meets at Lodge Park Sports Centre fortnightly on alternate Wednesdays and Thursdays. Contact Peter Wilson, 26 North Cape Walk, Corby, tel: Great Oakley 742622.
Kettering Microcomputer Club. Meets every Wednesday at 7pm. Details from Stephen Bickle on 0536 514381.
South Northants Computer Group meets at Anchor House, Moat Lane, Towcester, on Wednesdays at 7.30pm.

NOTTINGHAMSHIRE

Ashfield Computer Club meets at Carsic Junior School, St Mary's Road, Sutton in Ashfield on the first and third Thursday month. Derick Daines, c/o Cuttings Avenue, Sutton in Ashfield, Notts.
Eastwood Town Micro Computer Club meets at Devonshire Drive Junior School Wednesday at 5.45pm. Ted Ryan, 15 Queens Square, Eastwood, Nottingham NQ16 3BJ.

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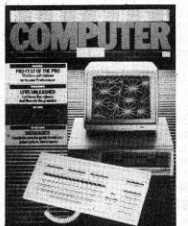
BACK ISSUES

Issue 1, March 11-18.
Pro-Tests: Apple's Lisa, Texet TX8000; Spectrum speech synthesiser, Apple printer, Commodore network; 3D on Spectrum, graphs package for Apple and IBM, BBC graphics system.
Features: computer chess, Occam parallel processing language, Victor/Sirius function keys.
ProgramCards: Towers of Bramah (Pascal), Biorhythm (Apple II), Roman Year (Apple II), Shape Utility (Apple II).
Gameplay: Darts, Soccer (Atari); Castle of Riddles (BBC Model B): Pimania (Spectrum); Flight Simulator (IBM PC).
Databasics: micros and peripherals.



Issue 2, March 18-25.
Pro-Tests: Toshiba T100, Casio PB100, ZX81/Basicare, Vic speech synthesiser, Spectrum spreadsheet, IBM graphics, BBC word processing.
Features: Colecovision, micro backgammon, nursery computing.
Gameplay: Ultima II (Apple), Trader (ZX81), Starquest (Vic 20), Hungry Horace (Spectrum).
ProgramCards: String editor (Spectrum), Analogue Clock (BBC Model B), Chart generator (Spectrum), String extract/replace.
Databasics: full software listings.

Issue 3, March 25-April 1.
Pro-Tests: TI Professional, Apple speech synthesiser, Facit 410 printer, IBM keyboards, Petspeed compiler, Sirius toolkit, Dragoncalc.
Features: Atom upgrade, Lynx programming, Apple music.
Gameplay: Mangrove (Vic 20), Mutant Herd (Vic 20), Compendium (Dragon), Patience (Spectrum), Noughts and Crosses (Dragon), Great Britain Ltd (Spectrum), Ulysses (IBM PC).
ProgramCards: Magnify (Spectrum), Spider (Vic 20), Firing Range (BBC).
Databasics: micros.
Micropaedia: Anatomy of the BBC, part 3.

Issue 4, April 1-8.
Pro-Tests: Pied Piper Communicator, Olympia ESW3000 printer, Namal Supertalker, Commodore Calcresult, Spectrum Pascal, Cashbook (BBC).
Gameplay: Dark Crystal (Apple II), St George (Dragon), Wizard War (Dragon).
ProgramCards: Fruit Machine (C64), Tunesmith (Oric), Array Editor.
Databasics: peripherals.
Clubnet: Clubs and user groups.
Micropaedia: Go Forth, part 1.

Issue 5, April 8-15.
Pro-Tests: Commodore 700, Ikon Hobbit, 1-2-3 (IBM), ZX81 machine code.
Features: speech packs, monitors.
Gameplay: Grand Prix (Dragon), Derby Day (Spectrum), Deadline (Apple).
ProgramCards: Wacky Racers (Oric), Fruit Machine (C64), Parse Integer.
Databasics: Software.
Clubnet: full list of user groups.
Micropaedia: Go Forth, part 2.

Issue 6, April 15-22.
Pro-Tests: Tycom Microframe, IBM PC, Scorpio Disks, Dragon sound module, ZX81 graphics, Bottom Line Strategist (CP/M), PaperClip word processor.
Features: IBM PC DOS, BBC word processing, PC-1251.
Gameplay: Mined Out (Spectrum), Transylvanian Tower (Spectrum), Lunar Leeper (Apple II), Evolution (Apple II).
ProgramCards: Wacky Racers (Oric), Mortgage Comparison (Sharp MZ80K), Computer Set Up (BBC), Day of Week.
Databasics: micros.
Micropaedia: Graphics, part 1.

Issue 7, April 22-29.
Pro-Tests: Mattel Aquarius, Epson FX80, Olivetti JP101, Lisp on Spectrum, Vic 20 assembler, Supergraf on Victor/Sirius.
Features: Dealer support, Atari graphics.
Gameplay: Krakit (ZX81), Cruising On Broadway (Spectrum), Kaktus (Vic 20), Fantastic Voyage (ZX81).
ProgramCards: CBM controls, Computer Set Up (BBC), Wacky Racers (Oric), Julian Dates.
Databasics: Peripherals.
Micropaedia: Graphics part 2.

Issue 8, April 29-May 6.
Pro-Tests: Atari Home Files Manager, Kobra's Vic Stat for the Vic 20, Hestacrest's Accounts for the Spectrum; Epson RX80 printer. NCR's Decision Mate V. Future Computer's FX20.
Features: Micronet, Compact programming on the TI99/4A.
Gameplay: Harvester (Vic 20), Strategic Command (Dragon 32), A first Book of Micro Rhymes (BBC), Telling the Time/Money (Spectrum).
ProgramCards: Program Indexer (BBC B), CBM Database cards 1-4, Sort/Extract.
Databasics: software.

Issue 9, May 6-13.
Pro-Tests: Structured Basic on the Apple, Pixel Power on the Vic 20; Star DP510 printer, Dams and Interpod interfaces for Commodore 64; Micro-Professor.
Features: BBC function keys, Atari word-processing part 1.
Gameplay: Dungeons of Intrigue (Oric), The Castle (Oric), Starship Command (BBC B), Dragon Trek, Nowotnik Puzzle (Spectrum).
ProgramCards: Lower case (Dragon 32), CBM database cards 5-6, Monster (Spectrum), Wildcard Search (MBasic).
Databasics: hardware.
Micropaedia: Graphics, part 4.

Issue 10, May 13-20.
Pro-Tests: Infomast on Commodore 64, Dragon Mace; MC202 and CML1800 music synthesisers (Apple), Prism directly coupled modem; Epson QX10.
Features: ZX81 graphics part 1; Atari word-processing part 2.
Gameplay: Rescue (Spectrum), Dictator (Spectrum), Roman Empire (Spectrum), Choplifter (Vic 20), Skyhawk (Vic 20).
ProgramCards: Union Jack (Lynx), Escape (Spectrum), CBM Database cards 7-9, Evaluate (MBasic), Formula (BBC B).
Databasics: peripherals.
Micropaedia: Graphics, part 5.

Issue 11, May 20-26.
Pro-Tests: BBC Vufile, PFS:File for IBM, Apple Pascal; printer comparison, Pickard Joystick Controller for ZX81 and Spectrum; C9E Computer Board.
Features: ZX81 graphics part 2, Basic on the Sharp MZ80K.
Gameplay: Motor Mania (Commodore 64), Oric Flight, BBC Music Synthesiser, Music Maker (Spectrum), Embassy Assault (Spectrum), Tobor (Spectrum).
ProgramCards: Homeward Bound (ZX81), Connect Four (Dragon 32), CBM Database, cards 10 — end.
Micropaedia: Keyboards.

Issue 12, May 27-June 2.
Pro-Tests: Spectrum word processor, PFS:Report on IBM, File Handling for Colour Genie; CTI CP80 type 1 printer, TG Trackball; Sord M5.
Features: Epson Basic, Oric sound part 1, Tandy Colour graphics.
Gameplay: Mad Martha (Spectrum), Frenzy (Spectrum), Headbanger (Spectrum), Oric roundup.
ProgramCards: Election Barchart (Commodore 64), Memory Utility (BBC B), Munch (Spectrum).
Databasics: Hardware.
Clubnet: clubs (Cambridge Microcomputer Club special).
Micropaedia: Disk Drives, part 1.

Issue 13, June 3-9.
Pro-Tests: Telewriter for Dragon 32, Abersoft Forth for Spectrum, GPS graphics processing system for Apple II+; joysticks, rulers; Ajile.
Features: Dragon meets Tandy, Oric music part 2, transferring Basic for Colour Genie and Genie 1.
Gameplay: Everest Ascent (Spectrum), Colour Genie roundup, Micro Maze (Jupiter Ace), Qix (Atari).
ProgramCards: Cupid (Oric), Alien (Dragon 32), Time Bomb (Atari).
Databasics: peripherals.

Issue 14, June 10-June 15.
Pro-Tests: Apple Accelerator II board, Modula-2 (Apple II), Oric-Base, Joystick Control Unit J6, Kempston Centronics Interface. BBC Speech Synthesiser.
Features: Newbrain Basic part 1, Sirius designing.
Gameplay: Ah Diddums (Spectrum), Monopole (Commodore 64), Automonopoli (Spectrum), Dragon dramatics.
ProgramCards: Time Bomb (Atari, cont), Sheep Drive (BBC B).
Databasics: Software.
Micropaedia: Spectrum, Part 1

Issue 15, June 16-June 22.
Pro-Tests: Comx 35, Address Manager (Spectrum), Sysres (Commodore 64), MST Database (Epson HX-20), Voice Input Module (Apple II).
Features: Newbrain Basic part 2, Genie scene.
Gameplay: Cleared for Landing, Playing the Ace (Apple II), Vultures, Star Jammer (Dragon 32).
ProgramCards: Mover (BBC B), Sprite Clock (Commodore 64), Pirate Island (Atari, 3 of 9), Micro-mind (Colour Genie), Brickbat (Dragon 32).
Databasics: Hardware.
Micropaedia: Spectrum, part 2.

Issue 16, June 23-June 29.
Pro-Tests: Atari v Acorn, word processing for the Commodore 64, Simplifile (CP/M), MPF-II printer, Z80 Pack for BBC.
Features: ZX81 Maths, US mail order, Atari graphics.
Gameplay: Computer Scrabble (Spectrum), Education (BBC), Horace and Spiders (Spectrum), Catcha Snatcha (Vic 20).
ProgramCards: Video Titler (T199/4A 3 of 6), Bowling (Spectrum), Pirate Island (Atari cont).
Micropaedia: Spectrum, part 3.

Issue 17, June 30-July 6.
Pro-Tests: Duet-16, The Organizer (CP/M), Trace and ZX Text (Spectrum), Juki 6100 daisywheel, Videx Ultra Term (Apple II).
Features: Leasing part 1, Atari screen action.
Gameplay: Oric chess, Grand Master (Commodore 64), Escape from Orion (BBC), Jet Pac (Spectrum), The Ring of Darkness (Dragon 32), Spectrum spectacle.
ProgramCards: Video Titler (T199/4A cont), Pirate Island (Atari cont) Word processor (BBC).
Micropaedia: Sound, part 1.

Issue 18, July 7-July 13
Pro-Tests: Tandy 100, RS232 interface (ZX81), ROM pager (Commodore), Interface printer buffer, IBM Personal Basic, Spectrum assembler, Newbrain WP.
Features: Leasing Part 2, Lynx music.
Gameplay: Spectrum Backgammon, BBC Snooker, Commodore 64 round-up, Serpentine (Vic 20), Psst (Spectrum), Spectrum Safari.
ProgramCards: Word Processor (BBC), Fruit Machine (Spectrum).
Micropaedia: Sound Part 2.

Issue 19, July 14-July 20
Pro-Tests: 16-bit chips, Stock control (Epson HX20), Mailplus (Torch), Smith-Corona daisywheel, ZX81 word processing.
Features: Insurance, buying secondhand.
Gameplay: Escape MCP (C64), Escape from Perilous (Atari), Apple round-up, Temple of Apshai (C64), Airline (Spectrum), Heathrow (Spectrum).
ProgramCards: Colour Code (Atari), Wreck (Dragon).
Micropaedia: Sound, part 3.

Issue 20, July 21-July 27
Pro-Tests: Rade bareboard, Vic digital tape drive, Seikosha colour printer, Toolkit (Spectrum), Bonus (Pet payroll), Newbrain monitor.
Features: Computer art, Dragon scrolling.
Gameplay: Rabbit Trail (TI99/4a), Aztec Challenge (Atari, Vic 20, T199/4a), BBC round-up, Joust (Spectrum), Molar Maul (Spectrum), Print Shop (Spectrum), Time-Lords (BBC).
ProgramCards: Tumbler (Oric), Wreck (Dragon), Atari Errors, Speed Race (Vic 20).
Micropaedia: Sound, part 4.

Issue 21, July 28-August 3.
Pro-Tests: BBC graphics, Newbrain assembler, BBC turtle, Oric printer, Triumph printer.
Gameplay: Franklin's Tomb (Dragon), Hummer House of Horror (Spectrum), Jumpman (64), Jumping Jack (Spectrum), Fourth Encounter (Vic), Cyclons (64).
ProgramCards: Collection (Vic), Bomber (64), Definer (BBC).
Micropaedia: Sound, part 5.

Issue 22, August 4-August 10.
Pro-Tests: Spectrum Forth, BBC graphics, Music synthesisers, IBM plotter, Brother daisywheel, Maltron keyboard, Mupid.
Features: Genie assembler, Dragon machine code.
Gameplay: River Rescue, Orc Attack (Atari), Zork (64), Knot in 3D, 3D Combat Zone (Spectrum), Moria (Oric), Velnor's Lair (Spectrum).
Micropaedia: CP/M part 1.

Issue 23, August 11-August 17.
Pro-Tests: Sord Basic-G, Tasword, BBC microfloppies, Microdrive, Tandy Model 4.
Features: Dragon machine code, Atari controllers.
Gameplay: Bridge Master, Styx, Manic Miner (Spectrum), Atari roundup, Candy Floss/Hangman (Oric), Everest (Dragon).
Micropaedia: CP/M, part 2.

Issue 24, August 18-August 24.
Pro-Tests: T-Maker III, Spectrum Fifth, daisywheels surveyed, Spectrum digital tracer, Laser.
Features: Videotex, Dragon machine code.
Gameplay: Oric roundup, Cookie, Egg Farm. Xadom (Spectrum), Sea Lord (BBC), Lusitanic (Dragon), The Island (64).
Micropaedia: Commodore 64, part 1.

Issue 25, August 25-August 31.
Pro-Tests: Electron, Simons Basic, Oric monitors, Microdrive.
Features: Newbrain map, Acorn Atom, Dragon machine code.
Gameplay: Suspended (64), Terror Daktils, Tranz AM (Spectrum), Dragon roundup, Jogger (Oric), Frogger (IBM).
Micropaedia: Commodore 64.

Issue 26, September 1-September 7.
Pro-Tests: Microtan 65, BCPL, BBC tracer, 80 column Pet, Oric interfaces.
Gameplay: Magic Mountain, Smugglers Cove (Spectrum), Spectrum roundup, Matrix), (64), Ninja Warrior (Dragon), Dallas, (Oric), Call to Arms (IBM).
Micropaedia: Commodore 64.

Issue 27, September 8-September 14.
Pro-Tests: Sharp MZ700, BBC Lisp, Apple editor, IBM mice, ZX81 surgery.
Gameplay: Zip-Zap, Zoom (Spectrum), Spectrum roundup, Hovver Bovver, Benji-Space Rescue (64).
Micropaedia: Dragon, part 1.

Issue 28, September 15-September 21.
Pro-Tests: Zenith Z100, Snail Logo, Atari Supergraphics, Newbrain CP/M, IBM mice.
Gameplay: The Witness, Super Scramble, Stix (64), Harrier Attack (Oric), Morocco Grand Prix (Dragon), Pharoah's Tomb (Spectrum.
Micropaedia: Dragon, part 2.

Issue 29, September 22-September 28
Pro-Tests: Portico Miracle, Dragon editor, BBC toolkit, Dragon drives. Apple light pen.
Features: HX20 disassembles, TI transformations.
Gameplay: Gridder, Gloopert, California Gold Rush (64), Oric roundup, Bomb Alley (BBC), Splat, General Election (Spectrum).
Micropaedia: Dragon, part 3.

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Nottingham Microcomputer Club meets at Congregational Federation Centre, Castle Gate Centre, Nottingham, second Monday of each month at 7.30pm. Mr E Harvey, 68 Roseleigh Avenue, Nottingham NG3 6FH. Nottingham 608491.
Retford Computer Club meets bi-weekly at the Ivy Leaf Club, Retford, at 7.30pm. Contact John Lannigan on Retford 700134.
Worksop Computer Group. Mr Andrews, Worksop 487327.

NORFOLK

Anglia Computer User Group. Jan Rejzl, 128 Templemere, Sprowton Road, Norwich. 0603-29652.
Brecklands Computer Club. Contact Andrew Hiom, 11 Annafewes Close, Thetford, Norfolk. Meets each Saturday, 5pm at this address.
Dereham & District Computer Club. Meets at Middle School, Westfield Road, Toftwood, East Dereham on every second Wednesday at 7.30pm. Contact Mrs Fran Cook, Dereham 67732.
East Anglian Computer User's Group meets at Crome Community Centre, Telegraph Lane, Norwich. Gill Rijzi, 88 St Benedicts, Norwich.
Gorleston Computer Club meets at Unit 26, Longs, Englands Lane, Gorleston, Great Yarmouth on Fridays at 6.30pm. Tel: 0493-6000003.
Yarmouth Computer Club meets each Friday at 7pm. Contact the club at Unit 26, Longs Estate, Englands Lane, Gorleston, Great Yarmouth, Norfolk, 0983 662871.

NORTHERN IRELAND

Belfast Computer Club meets 7pm on first Monday of each month at Ashby Institute, Stranmillis Road, Belfast 9. Contact Patrick Roddie on Holywood 3212.
North Down Micro Users Club. Meets at Bangor Central Library, Hamilton Road, every fourth Tuesday. Contact A Robson, 0247 67060.

OXFORDSHIRE

Association of Computer Clubs. Rupert Steele, St John's College, Oxford OX1 3JP.
Microsoc meets at Clarendon Lab, Parks Road, Oxford, every week during term. Rupert Steele, St John's College, Oxford OX1 3JP.
Oxford Personal Computer Club. Len Phelps, Southport Cottage, Sutton Courtenay, Nr Abingdon, Oxon OX14 4AU.
Ridgeway Computing Club meets at Swan Hotel, East Ilsley, on the second Tueday month. Mike Magney, Beavers, South Street, Blubury, Didcot, Oxon OX11 0JU.

SCOTLAND

Bishopton Computer Club meets at 'Cwa Ben', Sachelcourt Avenue, Bishopton, Renfrewshire, on Sunday once a month Alasdair Law, 10 Dunglass Road, Bishopton, Renfrewshire PA7 5EF.
Dundee — Kingsway Amateur Computer Club. Meets in rooms C11 & C12, Kingsway Technical College, Old Glamis Road, Dundee on Thursdays at 6.30pm. Contact J. Cook at the college on 0382 819021 or C. Macleod, 101 Peddie Sreet, Dundee.
Edinburgh Home Computing Club meets at Crosswinds Community Centre, Tollcross, Edinburgh, on the 2nd, 3rd and 4th Thursday of month from 7-10pm. I. Robertson, 031 441 2361.
Scottish Amateur Computer Society, Mike Anthony, 46 Moredun Park Gardens, Edinburgh EH17 7JR.
Central Scotland Computer Club meets at Falkirk College of Technology, Grangemouth Road, Falkirk, on the first and third Thursday of month. James Lyon, 78 Slamannan Road, Falkirk FK1 5NF.
Fife Computer Users Club meets fortnightly. Murray Simpson, 31 Tom Steward Lane, St Andrews, Fife, KY16 8YB.
Grampian Amateur Computer Society meets at 35 Thistle Lane, Aberdeen, on the second and fourth Monday every month at 7.30pm. Alan Morrison, 21 Beech Road, Westhill, Skene, Aberdeenshire AB3 6WR.
Kemnay Computer Club meets weekly. S Stubbs, 15 The Glebe, Kemnay, Inverurie, Aberdeenshire.
Inverness Personal Computing Club meets every second Tuesday at 7.30pm. Gyl Mackenzie, 38 Ardconnel Street, Inverness IV2 3EX, 0463 220922.
Perth & District Amateur Computer Society meets at Riverside Lounge, Bridgend, Perth, on the third Tuesday of month at 7.30pm. Alastair McPherson, 154 Oakbank Road, Perth PH1 1HA.
Skye and Lochaish Computing Society. Contact C Manvell, Tigh na Pairc, 25 Lower Breakish, Isle of Skye IV42 8QA, 04712 317.
Strathclyde Computer Club meets at Wolfson Centre, 106 Rottenrow, Glasgow, on the third Wednesday of month. B Duffy, 24 Lomand Drive, Condorrat, Cumbernauld G4 8NW.

SHROPSHIRE

Ludlow & District Microcomputer Club meets at Diocesan Education Centre, Lower Galdeford, Ludlow, on the second Monday of month at 7.30pm.
Shrewsbury Micro Club meets at Shrewsbury Shirehall once a month. Mr V Ives, 6 Bramley Close, Severn Meadows, Shrewsbury SY1 2TP.
Telford Computer Club meets at Telford ITEC on Monday 6-9pm. John Murphy, 10 Brichmore, Brookside, Telford TF3 1TF. 0952 595959.

SOMERSET

Sharp MZ80 Club, Tim Powell, Computer Centre, Yeovil College, Yeovil, Somerset.
Taunton Computer Club, meets 6pm on Tuesdays during term time at Somerset College of Arts and Technology. Contact David Elliott at Fir Tree House, Back Lane, Westbury-sub-Mendip, Wells, Somerset.
Yeovil Computer Club. D G Carrington, 2 Romsey Road, Yeovil, BA21 5XN.

STAFFORDSHIRE

Alsager Computer Club, meets at Alsager Comprehensive School, Stoke-on-Trent, Staffs, fortnightly on Tuesday. Rex Charlesworth, 09363 77270.
North Staffs Amateur Computer Club meets on the third Wednesday of each month. J Roll, 16 Hill Street, Hednesford, Staffordshire WS12 5DS.
ICL Birmingham Branch Micro Club, c/o WBA Ecclestone, 26 Browns Lane, Tamworth, Staffs.
Tame Valley Computer Club, Tim Marshall, 32 Milton Avenue, Leyfields, Tamworth, Staffordshire B79 8JG.

SUFFOLK

Haverhill Microcomputer Club, meets at St Marys' Church Hall, Camps Road, Haverhill, on the second, third and fourth Wednesday of month at 7.30 to 10pm. Andrew Holliman, 5 Trinity Close, Balsham, CB1 6DW, 022 029 583.
Newmarket Home Computer Group. Meets at Anchor House, Moat Lane, Towcester, at 7.30pm. Contact Simon Clark, 83 Watling Street, Towcester, Northants NN12 7AG, 0327 52191.
Suffolk Microcomputer Club meets monthly. Mr S Pratt, c/o Microtek, 15 Lower Brook Street, Ipswich.

SURREY

Ashtead Computer Club meets on the last Thursday of month. Contact P Palmer, 8 Corfe Close, Ashtead.
Deaf Microcomputer Users Group. Contact Chris Marsh, 3 Delaporte Close, Epsom, Surrey KT17 4AF.
Thames Valley Amateur Computer Club meets at Griffon, Caversham, on the first Tuesday of month. Brian Quarrm, 25 Roundway, Camberley, GU15 1NR, Camberley 22186.
Ewell Micro Club, Dave De Silva, 316 Kingston Road, Ewell, KT19 0SU.
Farnham Computer Club, meets at Farnham 6th Form College, Morley Road, Farnham, on the second Wednesday of month. Adam Sharp, 14 Thorn Road, Boundstone, Farnham.
West Surrey Computer Club meets at Paddock Room, Green Man Public House, Burpham, Guildford, the first Thursday of month. Chris Karney, 0483 68121.
ITN Computer Club meets on Fridays. A Bond, 54 Farnham Road, Guildford, Surrey GU2 5PE, 0485 62035.
CBBS London meets on Sundays 4-10pm. P Goldman, PO Box 100a, Surbiton, KT5 8HY.
Richmond Computer Club meets at Richmond Community Centre, Sheen Road, on the second Monday of month at 8pm. Bob Forster, 18a The Barons St Margarets, Twickenham, Middlesex, 01-892 1873.
Sutton Library Computer Club meets at Central Library, St Nicholas Way, Surrey, on the first Friday of month and third Tuesday of month at 8.30pm. Dave Wilkins 01-642 3102.
Association of London Computer Clubs, Len Stuart, 89 Mayfair Avenue, Worcester Park, KT4 7SJ.

SUSSEX

Arun Microcomputer Club meets at Wick Amenity Centre, Wick Farm Road, Littlehampton, on the first Monday of month at 8pm, and third Sunday of month at 6pm. P Cherriman, 7 Talbot Road, Littlehampton, West Sussex DN17 7BL
Bognor Computer Club meets at RAFA club, Wateroll Square, Bognor Regis, West Sussex at 7.30pm on last Thursday of each month. BBC subgroup meets second Thursday. Contact Leo Hughes, 20 Pinehurst Park, Aldwick, West Sussex.
Brighton, Hove & District Computer Club. Meets 7.30pm every second Wednesday at Southwick Community Centre. Contact J Smith, 30 Leicester Villas, Hove, E Sussex.
Crowborough Computer Club meets first, second and fourth Tuesday of each month. Contact Bruce Piggott on 089 26 62970.
CVGC Video Games Club. Contact G Bond, 7 Swift Lane, Langley Green, Crawley Sussex.
Eastbourne & District Computer Club meets at 7.30pm on last Wednesday of each month at the WRVS Centre, Hyde Road, Eastbourne. Jim Booth, 0323 51437.
Horsham Microcomputer Club. Meets at the Forest Community School, Comptons Lane, Horsham on second Wednesday of each month from 7.30pm. Philip Dickinson 0403 60965 or Jim Laing 0403 67522.
Midhurst & District Computer User Group. Meets at the Grange Centre, Midhurst, at 7pm on the second and fourth Thursday of every month. Contact Val Weston, tel: Midhurst 3876.
Mid-Sussex Microcomputing Club. Contact Jeff Hayden, 2 Hillary Close, East Grinstead, RH19 3XQ.
West Sussex Microcomputer Club meets at Room RO6, Robinson Road Annexe, Crawley, on the first and third Monday of month. J Clarke, 31 Hyde Heath Court, Pound Hill, Crawley, 0293-884207
Worthing & District Microcomputer Club meets at Rose Wilmot Youth Centre, Littlehampton Road, Worthing, on alternate Sundays 11am-1pm. B. Thomas, 11 Gannon Road, Worthing, W. Sussex, BN11 2DT, 0903 36785.

TYNE & WEAR

Newcastle upon Tyne Personal Computer Society meets at Room D103, Newcastle Polytechnic on the first Tuesday of every month. Pete Scargill, 21 Percy Park, Tynemouth, 0632 573905.

WEST MIDLANDS

Cannock Computer Society meets at Cannock Computer Systems, Old Penkridge Road, Cannock, fortnightly. Terry Sale, 20 Redwood Drive, Chase Terrace, Walsall WS7 8AS.
Coventry Computer Circle. Contact Chris Baugh, 9 Hillman House, Smithford Way, Coventry CV1 1FZ.
Coventry Micro Club meets on Wednesdays at 7.30pm at Walsgrave Junior School. Jack Hewitt, 3a Boswell Drive, Walsgrave-on-Sowe, Coventry, Tel: 615543.
Walsall Computer Club meets at Park Hall Community School on the second and fourth Monday month 6.45-9.45pm. Alison Hunt, 58 Princes Avenue, Walsall, WS1 2DH, 0922 23875.
West Midlands Amateur Computer Club meets at Enfield School, Love Lane, Stourbridge, on the second and fourth Tuesday of month. John Tracey, 100 Booth Close, Brierley Hill, Kingswinford, 0384 70097.

WILTSHIRE

Chippenham and Calne, proposed new club. Matthew Jones, Pinhills, Calne SN11 0LY.
Chippenham Computer Club. Contact Peter Knaggs, 12 Seymore Road, Chippenham or call Chippenham 654940.

WORCESTER

Worcester & District Computer Club meets at Old Pheasant Inn, New Street, Worcester, on the second Monday month at 8pm. D Stanton, 55 Vauxhall Street, Rainbow Hill, WR3 8PA.

YORKSHIRE

Barnsley Co-Operative Computer User Group meets at Co-Op Social Club, Pogmore, Barnsley, on the last Tuesday month at 7.30pm. James Bridson, c/o 39 Kereforth Hall Road, Barnsley, South Yorks S70 6NF, 0226 41753.
Calderdale Computer Club meets on first Tuesday of each month. Contact Ray Franklin on 0279 815088.
Greenhead Grammar School Computer Club. Brian Smith, Greenhead Road, Keighley, West Yorks BD20 6EB, 0535 62828.
Huddersfield Computer Club meets every Monday. Chris Townsend, 760/4 Manchester Road, Linthwaite, Huddersfield, 0484 657299.
Keighley Computer Club. Meets each Wednesday at 7.30pm at Methodist Church Hall, Market Street, Keighley, West Yorks. Contact Simon Midgley on 0535 681463.
Leeds Microcomputer Users Group meets at 8 Regent Street, Chapel Allerton, fortnightly on Thursday at 6pm. David Parsons, 22 Victoria Walk, Horsforth LS18
Program Power, R Simpson, 5 Wemsley Road, Leeds LS7 2BX, 0532 683186.
Shipley College Computer Group meets on Tuesdays. Paul Channell, tel: 0274 595731.
South Yorkshire Personal Computer Group meets at General Lecture Theatre, St Georges Building, Mappin Street, Sheffield, on second Wednesday month at 7.30pm. Paul Sanderson, 8 Vernon Road, Tetley, Sheffield S17 3QE.
Thurnscoe & District Micro Users' Club meets at Thurnscoe Comprehensive School, Physics Lab, Clayton Lane, Thurnscoe, Wednesday at 7.30pm during school term. Mr James Davis, 62 Tudor Street, Thurnscoe East, 0709 893880.
West Yorkshire Microcomputer Group meets on Tuesdays. Phillip Clark, c/o Suite 204, Crown House, Armley Road, Leeds LS12 2ES, 0532 632532.
York Computer Club meets at the Enterprise Club every Monday at 8pm. K Thomas, Green Lea, Ripon Road, Harrogate, HG1 2BY, 0904 38239.

WALES

Abergele Computer Club meets at Abergele Cl Offices every Thursday at 7.30-10pm. W Jones, 77 Millbank Road, Rhyl, Clwyd.
Beddau & District Computer Club, meets at Beddau Community Centre, 7pm, Mondays. Nigel Butters, Newtown, Llantwit 206305.
Clwyd '80 Computer Club. Contact Allan Jones, The Island, 1 High Street, Connah's Quay, Deeside, Clwyd, 0244 816893. Meets at Deeside Community Centre, Queensferry, Deeside on Thursday at 7pm.
Colwyn Computer club meets at the Greens Hotel, Colwyn Bay, at 7pm. Contact D Bevan, c/o Abergele Road, Colwyn Bay, Clwyd LL29 7PA.
Gwent Amateur Computer Club meets at St Mary's Institute, Stow Hill, Thursday at 7.30pm. Rothery Harris, 16 Alanbrook Avenue, Newport, Gwent, Wales NPT 6QJ.
Llantwit Major Computer Club. Meets at Adult Education Centre, Llantwit Major, every Tuesday. Contact Douglas Mountain, 16 Denbigh Drive, Llantwit Major, South Glamorgan CF6 9GQ.
Mold Computer Club. Meets 7.30pm on first and third Thursday of each month at the Daniel Owen Centre, Earl Street, Mold. Contact G Johnson, 18 Daytona Drive, Northop Hall, Mold, Clwyd, Wales. Tel Deeside 821945.
Milford Central Computer Club. Open to schoolchildren, meets every lunch hour and evening. Contact Harry Evans, Milford Central School, Prioryville, Milford Haven, Dyfed, 043 784 571.
Newtown & District Computer Club meets first and third Friday of each month. Contact John Dale on 068 688 502.
Pencoed Amateur Computer Club meets fortnightly on Saturdays at Pencoed Welfare Hall. Philip Williams, 38 Bryn Rhedyn, Pencoed, Bridgend, Mid-Glamorgan CF35 6TL, 0656 860307.
Pontypool Computer Club meets at The Settlement, Roackhill Road, Pontypool, Gwent, on Friday. Graham Loveridge, on Pontypool 2827.
Swansea & Southwest Wales Amateur Computer Club meets on the last Friday every month. Paul Griffiths, 1 Prescelli Road, Penlan, Swansea SA5 8AF.
Swansea Computer Club. Meets at No 10 (pub), Union Street every Tuesday at 7.30pm. Contact Robert Palmer, 044 123 602.
Wrexham & District Computer Club. Meets each Thursday. Contact Mike Houghton, 1 Snerwell Avenue, Wrexham, Clwyd, Wales.

WARWICKSHIRE

Stratford Computer Club meets at the Wesley Hall, Stratford upon Avon, on the second Wednesday of each month at 7pm. Details from Chris Parry on 0789 68080.

Clubnet keeps you in touch with enthusiasts throughout the country. It is divided into clubs and user groups and lists of both will be published every four weeks.

If your association has something special on the agenda or if you've just started a new one, contact us at *Clubnet, Personal Computer News*, VNU, 62 Oxford Street, London W1A 2HG.

Teenagers do it themselves

Computer enthusiasts in Welwyn Garden City — take note. A bright, young, new user group has started up called the Basic User Group—or BUG for short—and the unusual thing is that the organiser is female.

Debi Colthorpe, studying computer science at A level, was inspired to start the club after a microfair at her school. She got in contact with Paul Harper, who works in computers, and he helped fix up a room at Campus West Library for the club to meet in. The venue will be free until the end of the year.

The night *PCN* visited, the group had its first meeting and was trying to get things organised. Around 20 people had turned out with a hard core of teenagers acting as organisers and Debi as leader.

The group decided on a committee of six to include a chairman and a treasurer, to be responsible for a proposed bank account for a projected annual subscription. Another proposition was that guests would pay a fee for each attendance.

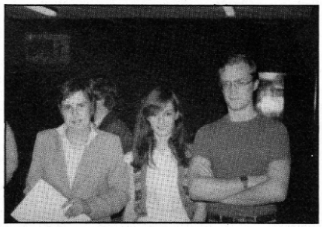
The group hopes to hold lectures and discussions, to take up the first half of meetings which would then lapse into general chat. More serious talks could also be held on separate nights.

At the first meeting there were three BBCs in evidence plus a Spectrum, but Debi said she hoped it could become a mixed group and not just BBC based.

To get the group going, Debi, together with two school friends Paul and Mark, put out a leaflet which was produced in their school computer room and distributed to local libraries and centres. The leaflet contained a few suggestions on subjects for meetings including a pen-friend facility, software swapping and a games league, the results to be published on the notice board.

This group is an ambitious project which deserves every success. The people are intelligent and enthusiastic, so if you live in or around this garden city, go along.

Janice McKenzie



Club members in conference.

Name Basic User Group (BUG) **Venue** Campus West Library, The Campus, Welwyn Garden City, Herts. **Meetings** The last Friday in the month **Contact** Debi Colthorpe on 963 0082

USER GROUPS

Acorn

Coventry Acorn Atom User Group. Peter Frost, 18 Frankwell Drive, Coventry, 0203 613156.
Kent Medway Acorn User Group. Meets at St John Fisher School on last Monday of month at 7pm. Sessions at 9pm Thursday at the Fox and Hound, Chatham. Clem Rutler, c/o St John's Fisher School, Ordance Street, Chatham, Kent, 0634 42811 (day), 0634 373459 (evenings).
Manchester Acorn User Group. Meets at AMC, Crescent Road, Crupsall, Manchester 8 on Tuesday except school holidays. John Ashurst, 192 Vendure Close, Failsworth, Manchester, 061-681 4962.

Apple

Ashtead Apple User Group. Meets first Monday of every month. Contact M Lawrence, 15 Petters Road, Ashtead, Surrey.
British Apple Systems User Group, PO Box 174, Watford WD2 6NF.
British Apple Systems User Group. Meets first Tuesday evening and third Sunday afternoon every month at Old School, Branch Road, Park Street, St Albans. Subs: £12.50+£2.50 joining. Contact D Bolton, 0727 72917.
Birmingham & Region Apple Group. Contact Mel Golder, 021-426 2275.
Bristol Apple Users and Dabblers. Meets at 10 Waring House, Redcliffe Hill, Bristol BS1 6TB, once a month. Ewa Dabkowski, c/o Datalink, 10 Waring House, Redcliffe Hill, Bristol BS1 6TB, 0272 213427.
Buckinghamshire Apple User Group. Steve Profitt, The Granary, Hill Farm Road, Marlow Bottom, Buckinghamshire, 062 84 73074.
Chelmsford Apple Users Club. Proposed new club. Contact D Beckingham, 571 Galleywood Road, Chelmsford, tel: Chelmsford 66948.
Croydon Apple User Group. Meets at Sidda House, 350 Lower Addiscombe Road, Croydon, on second Monday of month. Paul Vernon, 60 Flawkhurst Way, West Wickham, Kent, 01-777 5478.
London Apple Music Synthesis Group. Dr Davis Ellis, 22 Lennox Gardens, London SW1.
South-East London Apple User Group (Appletree). Contact John Grieve at 106 Maran Way, Erith, Kent or phone 01-311 7681.
Milton Keynes Microcomputer User Group. Meets every Tuesday, 7.30pm. Brian Pain, Sir Frank Markham School, Woughton Centre, Chaffron Way, Milton Keynes.
Warrington Apple User Group. Meets at Horse & Jockey on first Monday of the month. Contact Jim Roscoe, Warrington 38101.

Atari

Birmingham User Group. Meets at the Malaga Grill, Matador Public House, Bull Ring shopping centre, Birmingham, on second and fourth Thursday every month at 7.30pm. Mike Aston, 42 Short Street, Wednesbury, West Midlands.
Carshalton Atari User Club. Paul Deegan, 01-642 5232.
Lea Valley Atari User Group. Meets every month. Details from Matthew Tyderman, 125 Cadmore Lane, Cheshunt, Herts.
South Cheshire Atari User Group. Meets at the Earl of Crewe, Nantwich Road, Crewe, on first Thursday of each month at 7.30pm. Contact A Davies, 48 Blagg Lane, Nantwich, Cheshire, 0270 626969.
Essex. Contact John Sarrar, 138 Frederick Road, Rainham, Essex, tel (76) 22077. Meets at Rainham Town Football Club, 7.30pm, second and fourth Friday of each month.
London Silica Atari 400/800 User Club. Richard Hawes, 01-301 1111.
Manchester Atari Computer Enthusiasts. Meets at The Ellesmere, Worsley Road, Worsley, on the second and last Thursday of every month. Contact Martin Davies, Bolton 700757.
Nottingham Atari User Group. Meets second and fourth Monday of each month at the Congregational Federation Centre, Castle Gate. Contact Richard Rose on Nottingham 623766.
South Middlesex Atari Club. Meets fortnightly, Tuesdays, at Staines Methodist Church Hall, Kingston Road, Staines. Contact Brian Milligan, 50 Linkscroft Avenue, Middelesex. Tel: Ashford (69) 45387.
Norwich Atari User Group. Ken Ward, Norwich 661149.
Preston Atari Computer Enthusiasts. Meets at KSC Club, Merrion House, Beach Grove, Ashton, Preston, on third Thursday of month at 7.30pm. Roger Taylor, 0253 738192.
UK Atari Computer Owners Club. Contact PO Box 3, Raleigh, Essex.

Atom

Liverpool BBC and Atom User Group. Meets at Old Swan Technical College, Room C33 on first Wednesday of month at 7.30pm and at Birkenhead Technical College on third Thursday of month at 7.30pm. Nick Kelly, 051-525 2934 (evenings).

BBC

Inverclyde BBC Micro User Group. Meets on third Monday of each month at 9 St John's Road, Gourock, Renfrewshire. Contact Robert Watt on Gourock 39967.
Laserbug is an international user group for the BBC micro. Paul Barbour, 10 Dawley Ride, Colnbrook, Slough, Berks, 02812 30614.
Beebug. Sheridan Williams or David Graham at PO Box 50, St Albans, Hertfordshire AL1 2AR.
Bolton BBC micro and Electron User Group. Meets in Room E5/15, Bolton Institute of Higher Education, Deane Road, Bolton, Lancs. Contact Chris Snee on 0942 720984.
Bournemouth BBC User Group. Meets at Lansdowne Computer Centre, 5 Holdenhurst Road, Bournemouth on first and fourth Wednesday of month at 7.30pm. Norman Carey, 0202 749612.
Brent/Barnet User Group. Meets on last Sunday of month. Joseph Fox, 4 Harman Close, London NW2 2EA.
Charlton & District (South Manchester) BBC Micro User Group. Contact Philip Harrison, 34 Holwood Drive, Manchester M16 8WS.
Chelmbug. Contact Ian on Chelmsford 69174.
Cardiff BBC Microcomputer Club. Meets alternate Wednesdays at Applied Science Lecture Theatre, University College, Newport Road, Cardiff.
Format 40/80 Club (BBC Disk User Group). Send SAE to Peter Hughes, Five Marsh Street, Bristol BS1 4AA.
Huddersfield BBC User Group meets third Wednesday of each month. Contact Stuart Mallinson on 0484 685395, eves. or write to 34 Ryefield, Scholes, Huddersfield, West Yorks.
Liverpool BBC & Atom Group. Meets on the first Wednesday of every month at Old Swan Technical College, Room C33, 7.30-9.30pm, and on the third Thursday at Birkenhead Tech. College, 7.30-9.30pm. Contact Nik Kelly, 56 Queens Drive, Walton, Liverpool L4 6SH.
North London BBC Micro Users Group. Meets at The Prince of Wales, 37 Fortune Green Road, on Tuesdays at 7pm. Dr Leo McLaughlin, Westfield College, University of London, Kidderpore Avenue, London NW3 7ST, 01-435 0109.
Northern North Sea User Group. Potential members with helicopters welcome. Contact Ian Wilkins on board MSV Stadive, Brent Field, East Shetland Basin, Northern North Sea (100 miles off Shetland Islands).
Nottingham BBC User Group meets second Monday of each month. Contact Roy Hampton on Nottingham 254056.
Norwich & District BBC Microcomputer User Group. Meets at Norwich City College on the first and third Tuesday of every month at 7pm. Subs: £3; students and OAPs £1.50. Contact Paul Beverley, Department of Electronics, Norwich City College, Ipswich Road, Norwich NR2 2LJ.
Preston area BBC Micro User Group. Meets at Plough Hotel, Lea, Preston, on last Tuesday of month at 7.30pm. Duncan Coulter, 8 Briar Grove, Ingol, Preston, Lancashire, 0772 725793.

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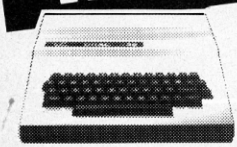

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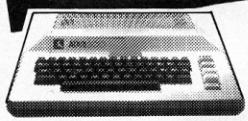

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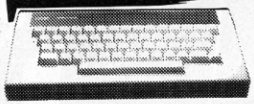

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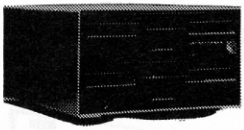

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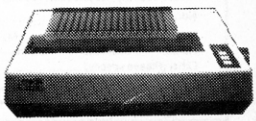

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15. Shadowfax	£7.95	£7.16
16. Fourth Encounter	£25.00	£22.50
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18. Conqueror	£15.95	£14.36
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20. Omega Race	£9.99	£9.00

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1. Zepelin (import)	£28.95	£26.06
2. Planet Fall	£41.35	£37.22
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1. Valhalla	£14.95	£13.46
2. Hobbit	£14.50	£13.05
3. Black Crystal	£7.50	£6.75
4. Jungle Fever	£6.90	£6.21
5. Penetrator	£6.95	£6.26
6. Halls of Things	£7.50	£6.75
7. The Train Game	£5.95	£5.36
8. Cookie	£5.50	£4.95
9. Jungle Trouble	£5.50	£4.95
10. Pssst	£5.50	£4.95
11. Terror-Daktil 4D	£6.04	£5.44
12. Chucky Egg	£6.90	£6.21
13. 3D Combat Zone	£5.95	£5.36
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17. Z Zoom	£5.50	£4.95
18. Digger Dan	£5.95	£5.36
19. Xadom	£6.95	£6.26
20. Dungeon Master	£7.50	£6.75

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1. Road Frog	£6.90	£6.21
2. Centerpede	£6.95	£6.26
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4. Candy Floss + Hangman	£7.50	£6.75
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6. Light Cycle	£6.95	£6.26
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8. Harrier Attack	£6.95	£6.26
9. Killer Cavens	£5.95	£5.36
10. Reverse	£6.50	£5.85

ZX TOP 10

1. 3D Defender	£4.95	£4.46
2. Starfighter	£3.95	£3.56
3. Black Crystal	£7.50	£6.75
4. Invaders	£4.95	£4.46
5. M Coder	£8.95	£8.06
6. Zombies	£5.95	£5.36
7. Jumping Jack	£4.95	£4.46
8. Inca Curse	£5.95	£5.36
9. Maze Death Race	£3.95	£3.56
10. Zok's Kingdom	£5.95	£5.36

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WSR/12

Tyne & Wear BBC User Club. Contact Ian Waugh, 13 Briardene Drive, Wardley, Tyne & Wear NE10 8AN.
Wakefield BBC Micro User Group. Meets at Holmfield House, Clarence Park, Wakefield, on first Wednesday of each month at 7.30pm. Contact R Bilton tel: Wakefield 382274.
Wellingborough BBC Owners User Group. Contact R Houghton, 49 Addington Road, Irthlingborough.
Witham (NAMEBUG) BBC Micro User Group. Meets at comprehensive school, Witham on second Thursday each month at 7.30pm. Dave Watts 0245 358127 after 7pm.

Basic

Welwyn Basic User Group meets at Campus West Library, Welwyn Garden City, Herts, on last Friday of each month at 7pm. Contact Debi Colthorpe, 36 Birds Close, Welwyn Garden City, Herts, 96 30082.

Colour Genie

International Colour Genie Users Group. Write with SAE to The Secretary, NCGUG, 46 Highbury Avenue, Bulwell, Nottingham, 0602 278791.
National Colour Genie User Group. Marc Leduc, 46 Highbury Avenue, Nottinghamshire NG6 9DB.

Comal

London Comal User Group. Meets at Polytechnic of North London, Holloway, second Wednesday of month, term time. John Collins, 75 74111.

CUA

CUA User Group. Adrian Waters, 9 Moss Lane Romford, Essex.

Commodore ICPUG

Basildon. Contact Walter Green, 151 The Hatherley, Basildon, Essex.
Bloxham. Contact John Temple, Kirabanda, Rose Bank, Bloxham, Oxon.
Barnsley. Bob Wool, 13 Ward Green, Barnsley, South Yorkshire, 0226 85084.
Blackpool. Meets at Arnold School, Blackpool, on third Thursday of month. David Jarrett, 197 Victoria Road, Thornton Cleveleys, Blackpool FY5 3ST.
Birmingham. Contact J A McKain, PPI Ltd, 177 Lozells Road, Birmingham, tel: 021-544 0202.
Bournemouth & Poole. Contact Douglas Shave, 97 Canford Cliffs Road, Poole, Dorset BH13 7EP.
Bury St Edmunds. Contact Alan Morris, 30 Kelso Road, Bury St Edmunds, Suffolk.
Burnley. Contact John Ingham, 72 Ardwick Street, Burnley, Lancashire.
Canterbury SE. Meets at The Physics Lab, Canterbury University, on first Tuesday and Wednesday of month. R Moseley, Rosemount, Romney Hill, Maidstone, 0622 37643.
Carrickfergus. David Bolton, 19 Carrickburn Road, Carrickfergus, Antrim BT38 7ND, 09603 63788.
Chelmsford. Contact A G Surridge, 97 Shelley Road, Chelmsford, Essex.
Cheltenham. Meets at the Cheltenham Ladies College on last Thursday of month at 7.30pm. Alison Schofield, 78 Hesters Way Road, Cheltenham, Gloucester, 0242 580789.
Clwyd. John Poole, 6 Ridgway Close, Connah's Quay, Clwyd CH5 4LZ.
Corby. Peter Ashby, 215 Wincohn Way, Corby, Northamptonshire, 05363 4442.
Coventry. Meets at Stoke Park School and County College at 7pm on fourth Wednesday of month except July, August, December. Will Light, 22 Ivybridge Road, Stvyechale, Coventry, Warwickshire.
Derby. Meets at Derby Professional Colour every other Tuesday at 7pm. Robert Watts, 03322 72569.
Derbyshire & District. Meets every other Monday 7-9pm at Davidson Richards Ltd, 14 Duffiied Road, Derby. Contact Raymond Davies, 105 Normanton Road, Derby DE1 2GG.
Devon. Contact Matthew Stibbe, The Lawn, Lower Woodfield Road, Torquay, Devon.
Durham. North-East Pet and ICPUG. Meets at Lawson School, Burnley at 7pm second and third Mondays. Jim Cocallis, 20 Worcester Road, Newton Hall Estate, Durham, 0385 67045.
Dyfed. Simon Kniveton, 097 086 303.
Gosport. Meets at Bury House, Bury Road, Gosport, Hants at 7pm. Contact Tony Cox, 10 Staplers Reach, Rowner, Gosport, Hants.
Hainault. Meets at Grange Remedial Centre, Woodman Path, Hainault. Carol Taylor, 101 Courtlands Avenue, Cranbrook, Ilford, Essex.
Glasgow. Dr Jim MacBrayne, 27 Daidmyre Crescent, Newton Mearns. Glasgow, 041-639 5696.
Gloucester and Bristol Area. Meets last Friday of each month. Contact Janet Rich, 20 Old Court, Spring Hill, Cam, Gloucester.
Hampshire. Meets at 70 Reading Road, Farnborough, on third Wednesday of month. Ron Geere, 109 York Road, Farnborough, Hants, 0252 542921.
Hants. Contact Tony Cooke, 7 Russell Way, Petersfield, Hampshire GU31 4LD.
Hertfordshire North. Meets at Provident Mutual Assurance, Purwell Lane, Hitchin, on last Wednesday of month. B Grainger, 73 Minehead Way, Stevenage, Herts SG1 2HS, 0438 727925.
Kilmarnock. Meets at Symington Primary School on first and third Thursday of month at 7pm. John Smith, 19 Brewlands Road, Symington, Kilmarnock KA1 5RW, 0563 830407.
Liverpool. Meets at The Merchant Taylor School for Boys, Crosby, on second Thursday of month at 7pm. Tony Bond, 27 Ince Road, Liverpool L23 4UE, 051-924 1505.
Llandyssul. Contact F Townsend, The Hill, Rhydowen, Llandyssul, 05455 5291.
London. Alan Birks, 135 Queen Alexandra Mansions, Judd Street, London WC1, 01-430 8025.
London North. Barry Miles, Department of Business Studies, North London Polytechnic, Holloway Road, London N7, 01-607 2789.
Maidstone. Meets on the first Wednesday of every month contact Ron Moseley, Lord Romney Hill, Weavering Maidstone, Kent, 0622 37643.
Mapperley. Meets at Arnold & Carlton College, Digby Avenue, Mapperley every Friday. Contact Mark Graves, 8 Digby Hall Drive, Gunthorpe Road, Gedling, Notts NG4 4JT.
Merseyside. Meets fortnightly. Contact P Leather, 27 St Luke's Drive, Formby, Merseyside, tel: 36 74694.
National. Contact Membership Secretary, 30 Brancoates Road, Newbury Park, Ilford, Essex 1G23 7EP.
Norfolk. Proposed new club. Contact J Blair, 7 Beach Road, Cromer, Norfolk.
Norfolk. Peter Petts, Bramley Hale, Wretton, King's Lynn, Norfolk PE33 9QS, 0366 500692.
Northampton. Contact Peter Ashby, 215 Lincoln Way, Corby, Northants.
Northern Ireland. Meets last Wednesday of each month. Contact David Weddell, 9 Upper Cavehill Road, Belfast BT15 5EZ, 0232-711580.
Northumberland. Graham Saunders, 22 Front Street, Guide Post, Northumberland.
Nottingham Commodore User Group meets fourth Monday of each month — contact Christopher Solomon on Nottingham 873228.
Rhyl. Contact Frank Jones, 77 Millbank Road, Rhyl, Clywd, 0745 54820.
Slough. Meets at Slough College on second Thursday of month at 7.30pm. Brian Jones, 53 Beechwood Avenue, Woodley, Reading RG5 3DF, 0734 661494.
Somerset. Contact Paul Montague, 12 Laxton Close, Taunton, Somerset.
South-East. Regional Group. Meets at Charles Darwin School, Jail Lane, Biggin Hill, Kent, on third and fourth Thursday of month at 7.30pm. Jack Cohen, 30 Brancaster Road, Newbury Park, Ilford, Essex, 01-597 1229.
South Midlands. Meets at 12 York Street, Stourport-on-Severn on last Thursday of month. M J Merriman at above address.
Staffordshire. 57 Clough Hall Road, Kidsgrove, Stoke-on-Trent.
Stourport-on-Severn. Meets last Thursday of each month. Contact M Merriman, 12 York Street, Stourport.
Teddington. G Squibb, 108 Teddington Park Road, Teddington, Middlesex, 01-977 2346.
Watford. Meets on second Monday of month. Stephen Rabagtiati, c/o Institute of Grocery Dist. Grange Lane, Letchmore Heath, Watford, Herts, 01-779 7141.
Witney. Contact Ian Blyth, 40 Wilmot Close, Witney 5171.
Wolverhampton. Meets on first and third Thursday of each month. Contact J Bowman, 6 The Oval, Albrighton, Wolverhampton, W Midlands.

Commodore 64

National Commodore 64 Independent Users Club. Contact Clive Embrey, 17 Santon Ave, Fallowfield, Manchester or Keith Bowden, 47 Park Ave, Barking, Essex, enclosing SAE.

Commodore Pet

Southern Users of Pets Association. Howard Pilgrim, 42 Compton Road, Brighton BN1 5AN.
Pet User Group Crawley. Richard Dyer, 33 Parham Road, Ilfield, Crawley.
Pet Users Education Group. Dr Chris Smith, Department of Physiology, Queen Elizabeth College, Camden Hill Road, London W8 7AH.
UK Pet Users Club. 360 Euston Road, London NW1 3BL.
Pet User Club. Margaret Gulliford, 818 Leigh Road, Slough Industrial Estate, 0753 74111.

Commodore Vic

National Association of Vic-20 Owners. Contact S Tomananek, 20 Milner Road, Sherwood, Nottingham.
Clwyd. Contact A Stanners, 192A Willow Park, Queensferry, Deeside, Clwyd, Wales.
London. Vic Users Group. Meets on alternate Tuesdays at 6.30pm at Polytechnic of North London, Community Centre. Robin Bradbeer.
London. Contact Jim Chambers, Department of Psychology, University College London, Gower Street, London, WC1, 01-387 7050 x 413. Meets at University College, 26 Bedford Way, London WC1, third Tuesday of each month at 8pm.
Norfolk. J Blair, 7 Beach Road, Cromer, Norfolk, 0263 512849.

Compucolour

Caversham. Compucolour Users Group UK. Meets at Community Centre, Caversham Park Village twice a year. Peter Hiner, 11 Pennycroft, Harpenden, Hertfordshire, 05827 64872.

CP/M

Chiltern CP/M User Group. Contact Kenneth Hirst, Welwyn Garden City 28723.
Irish CP/M Users Group. Meets monthly in Dublin area. Doug Notley, Gardner House, Ballsbridge, Dublin 4, Dublin 686411.
London. CP/M User Group (UK). Subs £7.50. Produces newsletter. Contact David Powys-Lybbe, 01-247 0691.
UK CP/M Users Group. Lesley Spicer, 11 Sun Street, London EC2M 2QD, 01-247 0691.

COSMAC

COSMAC Users Group. James Cunningham, 7 Harrowden Court, Harrowden Road, Luton, Bedfordshire, 0582 423934.

DAI

DAI UK User Group, Manchester. Contact Dave Atherton, 16 Douglas Street, Atherton, Manchester. Tel: 0942 876210.

d-BASE 11

UK d-Base 11 User Group. Contact Ian Turner at Ashton Tate (UK) Ltd, on 0908 568866.

Decus

Decus UK & Ireland. Contact Tracey Pardoe, DECUS, PO Box 53. Reading,

Digital Equipment

Digital Equipment Users Society. The Secretary, PO Box 53, Reading, Berkshire, 0734 387725.

Dragon

Slough. Contact J Griffin, 1 Garrard Road, Britwell Estate, Slough. Tel: 75 35268.
Brixham Dragon Owners Club. Meets at Computer Systems (Torbay), Pump Street, Brixham, every Saturday at 2.30pm. Ian Chipperfield, 22 Brookdale Court, Brixham, Devon, Brixham 59224.
Greater Manchester. Contact Melvin Franklin, 40 Cowlees, Westhoughton, Bolton, Lancs.
Nottingham Dragon User Group. Meets second Monday of each month. Contact Mike Johnson on Nottingham 288541.
Ware Dragon User Group. Contact Paul Kennedy, 61 Broadmeads, Amwell End, Ware, Herts. Tel: Ware 68264.

Epson HX20

London. Contact Terence Ronson, 25 Sawyers Lawn, Drayton Bridge Road, Ealing, W13, 01-998 1494.
Luton. The Dragon's Den. Contact D Buckingham, 83 Neville Road, Limbury, Luton, Beds.

Education

Birmingham. Education ZX80/81 User Group. Eric Deeson, Highgate School, Balsall Heath Road, Highgate, Birmingham B12 9DS.
Birmingham. MUSE. National body for co-ordinating activity in schools, colleges. Lorraine Boyce, MUSE Information Office, Westhill College, Weoley Park Road, Birmingham, 021- 471 3723.
Dublin. Computer Education Society of Ireland. Dairmuid McCarthy, 7 St Kevins Park, Kilmacud, Blackrock, Co. Dublin.
Middlesex. Educational Users Group. Offshoot of National TRS-80 Users Group. Dave Fletcher, Head Teacher, Beaconsfield First and Middle School, Beaconsfield Road, Southall, Middlesex.
Worcestershire. Mini and Microcomputer Users in Education. National organisation. R Trigger, 48 Chadcote Way, Catshill, Bromsgrove, Worcestershire B61 0JT.

Forth

Forth Users Group. David Husband, 2 Gorleston Road, Branksome, Poole, Dorset BH12 1NW, 0202 764724.
Forth Interest Group UK. Meets at Room 408, South Bank Polytechnic London SE1 on the first Thursday of the month. Contact K Goldie-Morrison, Bradden Old Rectory, Towcester, Northants.

Forum

Forum 80 Users Group. Frederick Brown, 421 Endike Lane, Hull HU6 8AG.

FX-500P

FX-500-P Users Association. Max Francis, 38 Grymsdyke, Great Missenden, Buckinghamshire HP16 0LP.

Genealogists

Society of Genealogists Computer Interest Group. Anthony Camp, 01-373 7054.

Intel MDS

UK Intel MDS Users Group. Lewis Hard, c/o S.P.A.C.E., The Old Coach House, Court Row, Upton-on-Severn, Worcester WR8 0NS.

Ithaca Audio S100

Ithaca Audio S100 Users Group. Dave Weaver, 41 Dore Avenue, North Hykenham, Lincoln LN6 8LN.

Jupiter Ace

Jupiter Ace Users Group. John Noyce, Remsoft, 18 George Street, Brighton

CLUBNET

Lynx
National Independent User-Group. Subs £9. Contact Robert Poat, 53 Kingswood Avenue, Sanderstead, South Croydon CR2 9DQ.

Mattel
Mattel Intellivision TV Game Group. Warrington 62215 after 4pm.

Medical
Durham. Primary Health Care Group. Dr Alastair Malcolm, British Computer Society, Cheveley Park Medical Centre, Belmont, Durham, 0385 64282.
London. Medical Micro Users Group. Medicom, 1-2 Hanover Street, London W1.
Middlesex. TRS-80 Medical and Laboratory Users. Dr Robinson, The Residency, Northwick Park Hospital, Harrow, Middlesex.

Micronet
Micronet Independent User Group. Contact George Foot, Prestel Mailbox No. 892852867.

Nascom
Berkshire. Nascom Thames Valley User Group. Meets at Frogmore Hotel, Windsor, on Thursday fortnightly, 8pm. Mike Rothery, 37 Eaton Wick Road, Eton Wick, Windsor, Berkshire, Windsor 56106.
Birmingham Nascom User Group. Meets at Davenports Social Club, Granville Street, Birmingham on the last Thursday of month, 8pm. Martin Sidebotham, 021-744 3093.
International Nascom Microcomputer Club. 80 Oakfield Corner, Sycamore Road, Amersham, Buckinghamshire HP6 5EQ.
Merseyside Nascom User Group. Meets at Mona Hotel, St James Street, Liverpool, on the first Wednesday of month, 7.30pm. Mr T Searle, 051-526 5256.

Newbrain
Wakefield Independent Newbrain User Group. Anthony Hodge, 15 St John's Court, Wakefield WF1 2RY.
Welwyn. Contact Angela Watkiss, 4 Ninnings Lane, Rabley Heath, Welwyn, Herts AL6 9TD.

Ohio
Ohio Scientific User Group. Tom Graves, 19a West End, Street, Somerset, 0458 45359.

Oric
Avon. Contact Bob Green, 1 Marlborough Drive, Worle, Avon, tel: 0934 21315.
International Oric Owners' User Group. Send £1.00 plus SAE for details to R. Green, 1 Malborough Drive, Worle, Avon or phone 0934 510279.
Oric Owners Group. Paul Kaufman, 3 Club Mews, Ely, Cambridgeshire.
Cardiff. 12 Tregarth Court, Creigiau, Cardiff.
Kent. Contact Roger Pyatt, 23 Arundel Drive, Orpington, Kent with SAE or call 66 20281.

SCOTLAND
West Lothian Oric User Group. Contact Stuart Wilson at 21 Loch Aweway, Whitburn, West Lothian EH47 0RJ with SAE, or phone 0501 42673 (eves).
Strathkelvin Oric 1 User Group. Contact Colin Failes on 041-776 3654, or SAE to him at 24 Muirside Ave, Kirkintilloch, Glasgow G66 3PR.

Osborne
British Osborne Owners Group. J Anglesea, Flat 19, Rowan House, Mitton Road, Handsworth, Birmingham B20 2JR.

OSI
OSI UK User Group. Richard Elen, 12 Bennerley Road, London SW11 6DS.
OS-9 User Group, 1st Floor, 16 New North Parade, Huddersfield. Contact Mr. Ellis, Tel: 0484 516179 day or 0484 864130 after 6pm.

Pascal
Pascal User Group. Nick Hughes, PO Box 52, Pinner, Middlesex HA5 3FE.

PDP
Buckinghamshire. PDP8 User Group. Nigel Dunn, 21 Campion Road, Widmer End, High Wycombe, Buckinghamshire, 0494 714483.
Hertfordshire. PDP11 User Group. Pete Harris, 119 Carpenter Way, Potters Bar, Hertfordshire EN6 5QB, 0707 52091.

Pilot
UK Pilot User Group. Alec Wood, Wirral Grammar School for Boys, Cross Lane, Bebington, Wirral, Merseyside LG3 3AQ.

Prestel
ACC National Prestel Committee. Administrates Club Spot 800 (hobbyists on Prestel). Rupert Steele, St John's College, Oxford OX1 3JP.

Research Machines
Leamington Spa. West Midland RML User Group. Spencer Instone, c/o 59 Avenue Road, Leamington Spa.
Newcastle. NERML 380Z User Group. Meets monthly at Micro-Electronics Education Centre of the Polytechnic Coach Lane Campus. Mr Hatfield or Mr Reed, Computer Unit, Northumberland Building, Newcastle Polytechnic, 0632 326002.
Research Machines National User Group. Contact Jim Cooley, RMNUG, c/o Research Machines Ltd., PO Box 75, Oxford.
West Midlands RML User Group. Contact 0926 38751.

Sharp MZ80
Aberdeen. International Sharp Users Group. Graham Knight, c/o Knights Computers, 108 Rossemount Place, Aberdeen, 0224 630526.
Essex. Sharp MZ80K User Group. Joe Street, 16 Elmhurst Drive, Hornchurch, Essex RM11 1PE.
Leeds. Sharp PC1211 Users Club. Jonathan Dakeyne, 281 Lidgett Lane, Leeds LS17 3AQ.
Leeds, Sharp User Group. Postal only. Enquiries to Craig Kennett, 17 Moseley Wood Way, Cookridge, Leeds 16 7HN.
Somerset. Sharp MZ80 Users Club. Tim Powell, Computer Centre, Yeovil College, Yeovil, Somerset BA21 4AE.

Sinclair
Aylesbury. Sinclair ZX Computer Club. Ken Knight, 0296 5181.
Brighton. ZX Users Group. J Ireland-Hill Jnr, 145 Godwin Road, Hove, Brighton.
Colchester Sinclair User Group. Meets fortnightly. Richard Lawn, 102 Prettygate Road, Colchester, Essex.
Cardiff. ZX Club. Meets on last Sunday of month, 2pm. Mike Hayes, 54 Oakley Place, Grangetown, Cardiff, 0222 371732.
Doncaster & District Sinclair User Group meets each Wednesday evening. For details call 0302 853124.
Folkestone. ZX Spectrum User Group for under 16s. Contact D. J. Parish, Brookhouse, Etchinghill, Folkestone, Kent.
Glasgow. ZX80/81 User Group. Ian Watt, 10 Greenwood Road, Clarkston, Glasgow, 041-638 1241.
Liverpool. ZX Computer Club. Meets each Wednesday at 7pm in the Youth Activities Centre. Contact Keith Archer on 051-236 6109.
London. National ZX User Club. Tim Hartnell, Interface, 44-48 Earls Court, London W8.
London. Sinclair User Group. Meets at Polytechnic of North London, Room 2-5 Tower Block. Monday, 6.30pm. Irving Brand, Polytechnic of North London, Holloway Road, London.
Manchester Sinclair Users Club. Meets at Longsight Library, 519 Stockport Road, Longsight, Manchester, every Wednesday at 7.30pm. Call 061-225 6997 or 061-445 6316.
Nottingham ZX Spectrum Club. D Beattie, 63 Kingsley Crescent, Sawley, Long Eaton, Nottingham NG10 3DA.
Nottingham Sinclair User Group meets third Monday of each month. Contact Graham Basford on Nottingham 654522.
Scunthorpe. Grange Farm ZX Computer Club, Scunthorpe, South Humberside. Meets first and third Tuesday of month. Contact Sheila & Fred Wilkinson, 0724 842970.
Staffordshire. ZX80 National Software Association. 15 Woodlands Road, Wombourne, Staffordshire WV5 0JZ.
Suffolk. ZX Amateur Radio User Group. Paul Newsman, 3 Red House Lane, Leiston, Suffolk, SAE essential. No telephone inquiries.
Surrey. Guildford ZX80/81 Users Group. Meets Fridays. A Bond, 54 Farnham Road, Guildford, Surrey GU2 5PE, 0483 62035.
Surrey. ZX80/81 User Club. David Bigden, PO Box 159, Kingston-upon-Thames, Surrey KT2 5UQ.
West Sussex. Hassocks ZX Micro User Club. Paul King, 25 Fir Tree Way, Hassocks, West Sussex.

Sirius
Sirius User Group. Ray D'Arcy, Sirius User Club, The Microsystems Centre, Enterprise House, 7-71 Gordon Street, Luton, 0582 412215.

68XX
68 User Group. Meets every fourth Tuesday throughout the year. Contact 41 Pebworth Road, Harrow, Middlesex.

6809 User Group
6809 User Group. Produce bi-monthly newsletter. Contact Mr Gibbons, Clarence Lodge, Hurdon Road, Launceston, Cornwall PL15 9DB.

Software
London. Software Group. Meets at Polytechnic of North London, Room 2-3 Tower block Thursday, 6pm. Mike Duck at Polytechnic of North London, Holloway, London N7.
Oxford. Program of the Month Club. Mr Durrant, 55 St Thomas Street, Oxford OX1 1JG, 0855 250333.

Sorcerer
Liverpool European Sorcerer Club. Monthly meetings. Colin Marle, 32 Watchyard Avenue, Formby, near Liverpool L37 3JU, 07048 72137.
Surrey. Exidy Sorcerer User Group. Andy Marshall, 44 Arthurs Bridge Road, Woking, Surrey GU21 4NT.

Spreadsheet
International Electronic Spreadsheet Users Group. UK Alpha House, 7th Floor, Rowlandsway, Manchester M22 5RG.

Tandy
Tandy Model 100 User Group. SAE to Remsoft, 18 George Street, Brighton, tel: 0273 602354.

Tangerine
Avon. Tangerine Users Group. Bob Green, 1 Marlborough Drive, Worle, Avon, 0934 21315.
Bristol. Tangerine Homebrew. A Coales, 35 Mogg Street, St Werburghs, Bristol BS2 9UB.

Texas Instruments
Brighton. Contact Clive & Audrey Scally, 40 Barrhill, Patcham, Brighton, Sussex.
Ireland. Proposed new club. Contact Mrs Ann Flynn, 53 Georgian Close, North Road, Drogheda, Co. Louth, Eire.
Leeds. TI99/4A User Group. Meets at 30 Gipton Wood Road, Leeds 8, Mondays 7pm. I Youlden, 0532 401408.
Manchester. TI User Group. T Grimshaw, 21 Allingham Street, Longsight, Manchester.
Manchester. TI9900 User Group. Chris Cadogan, Department of Computer Science, University of Manchester M13 9PL.
Maidenhead — UK Texas Instruments User Group. Contact Katie Lomax, PO Box 190, Maidenhead, Berks, Tel: 0628 71696.
Nationwide TI Users Group. Contact TI99/4A Exchange, Independent TI Users, 40 Barrhill, Patcham, Brighton BN1 8UF.

Triton
Triton User Group. Nigel Stride, Transam Ltd, 12 Chapel Street, London NW1, 01-402 8137.

TRS-80
Birmingham. National TRS-80 User Group. Meets at Adam & Eve Pub, 1st Floor, Bradford Street, Birmingham on last Friday of month. Michael Gibbons, 1 New Street, Castle Bromwich, Birmingham B38 9AP, 021-747 2260.
Chelmsford. TRS-80 User Group. Michael Dean, 22 Roughtons, Galleywood, Chelmsford, Essex.
Durham. North East TRS-80 User Group. Meets at Information Technology Centre, Gateshead on the third Wednesday of month, 7pm. J Dunn, 8 Ettrich Terrace, North Gateshead, County Durham.
Edinburgh. Scottish TRS-80 and Genie User Group. Meets at Mansion House Hotel, Milton Road, second Thursdays of month. Dick Mackie, 72 Morningside Drive, Edinburgh EH9 1DX, 031-447 6651.
Herts. Contact Reg Smith, 24 Sempill Road, Hemel Hempstead, Herts, 0442 60085.
Hull & District TRS-80/Beeb Users Group. Meets second Tuesday of month and Thursday 16 days later at Psychology Dpt, Hull University. Contact J Lawrence, 2a Hall Road, Hull HU6 8SA.
Isle of Wight. TRS-80 User Club. Meets at London Hotel, Ryde on last Friday of month. 7.30pm. Sean Coulson, 0903 614589.
Kent. TRS-80 User Group. Alan Reid, 22 Woodeys Road, Rainham, Kent, 0634 367012.
Greater Manchester. Northwest TRS-80 User Group. Meets at Barton Aero Club, Barton Aerodrome, Irlam, near Manchester on last Wednesday of month, 8pm. Melvin Franklin, 40 Cowlees, Westhoughton, Bolton, Lancs.
Lancs. TRS-80 Colour Computer Group. Subs: £3. Contact Ian Wild, 53 Darnton Road, Ashton-U-Lyne, Lancs OL6 6RL.
Liverpool. Merseyside TRS-80/Video Genie User Group. Meets second Thursday of month. 7.15pm. Peter Toothill, 101 Swanside Road, Liverpool L14 7NL. 051-220 9733.
London, SW. TRS-80 User Group. Ron Everitt on 01-394 2123.
Merseyside. TRS-80 User Group. N Rushton, 123 Roughwood Drive, Northwood, Kirby, Merseyside.
Milton Keynes. National TRS-80 and Genie User Group. Brian Pain, 24 Oxford Street, Stony Stratford, Milton Keynes.
Nottingham. TRS-80 Genie Users Group. Meets at Wilford Moderns Rugby Club House on first and third Wednesday every month at 7.30pm. Contact Geoffrey Hillier, 5a Gregory Street, Lenton, Nottingham NG7 2LR, Nottingham 783938.
Nottingham. East Midlands TRS-80 User Group. Mike Costello, 15 Langbank Avenue, Rise Park, Nottingham NG5 5BU, 0602 751753.
London. TRS-80 Genie Group. Meets at Central Common Room, The Residency, Northwick Park Hospital on first Sunday of month. Dr Nick Robinson, Central Room, The Residency, Northwich Park Hospital.
Northants. TRS-80 User Group. Meets at Welwyn Park Community Centre on alternate Thursdays at 7pm. Neil Griffiths, 0858 65718.

UCSD
Hants. UCSD System Users Society. John Ash, Dicoll Data Systems Ltd, Bond Close, Kingsland Estate, Basingstoke, Hants RG2 0QB.
Oxford. UCSD Pascal UK Users Group. Malcolm Harper, Oxford University Computing Laboratory Programming Research Group, 45 Banbury Road, Oxford OX2 6PE.

6502
Bedfordshire. 6502 User Group. Walter Wallenborn, 21 Argyll Avenue, Luton, Bedfordshire LU3 1EG, 0582 26927.
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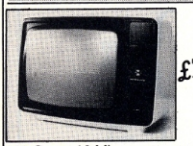

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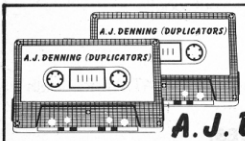

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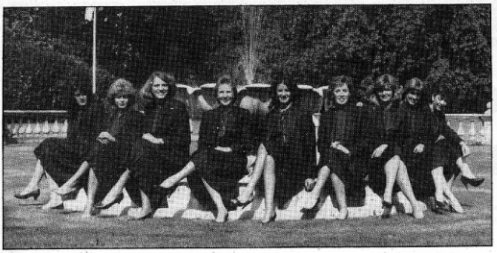


Laughline

With the Miss World contestants being given computer tests you could be forgiven for thinking that this is a snap of the girls receiving their honorary degrees at Cambridge.

But no, it is the Oric Angels preparing to hit the road and give Oric's 1,000 dealers some extra after-sales service and support. We'll give £20 for the funniest suggestion of what they might be saying (or perhaps singing, in chorus, to the tune of 'Hark the Oric Angels').

Send your entries to PCN at Evelyn House, 62 Oxford Street, London W1. We'll announce the winner in issue 40.

SYNTAX ERRORS

TV blues

Our report in *PCN Monitor, issue 35*, wrongly described a new Solavox colour television set as a monitor. Comet, which is selling the unit, has asked us to point out that it is a straightforward television.

Ajile price

More egg on faces in *Issue 35* — the report of the Hyperion's price out referred to the Ajile, Anderson Jacobson's version, costing £2,995. But the Ajile checks in at £2,599, the same price as the Hyperion.

Spectrum IQ failure

Red faces at Sinclair Research this week. Review copies of Cattell's IQ test for the Spectrum had to be recalled due to a bug that wouldn't let you get past the first question.

The program was written by Victor Serebriakoff, who is international president of MENSA — the society for people who can guess the next number in the series 2, 4, 19, 1, 45, 37 . . .

Sir Clive Sinclair is president of that same organisation.

NEXT WEEK

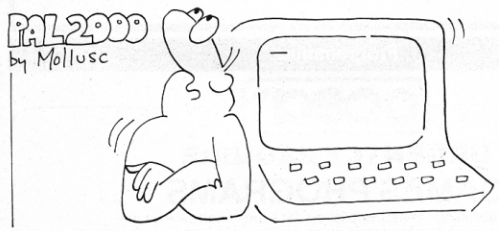
Adam *A UK exclusive Pre-Test of Coleco's attention-grabbing home computer.*

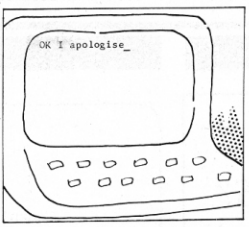
Newbrain *Part 1 of a look at a word processor for the born-again micro.*

Spectrum *We tot up the balance sheet for an accounting package.*

Games *A Dragon round-up and reviews of games for the Atari, BBC, and Commodore 64 systems.*

Micro-paedia *PCN's pull-out zooms in on monitors.*





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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

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COMPEC	November15-18	London Olympia	Reed Exhibitions, 01-643 8040
Computer Aided Design for the Building Professional	November 16	RIBA, 66 Portland Place, London W1	Helen Carpenter, 01-637 8991
Humberside Computer Fair	November 20	Winter Gardens, Cleethorpes	Jenson Lee, 0472 42559
Northern Computer Fair	November 24-26	Belle Vue, Manchester	Reed Exhibitions, 01-643 8040
BBC Micro User Show	December 9-11	Westminster Exhibition Centre	Database Publications, 061-456-8383
Your Computer Christmas Fair	December 15-18	Wembley Conference Centre	Reed Exhibitions, 01-643 8040
Which Computer? Show	January 17-20	NEC, Birmingham	Clapp & Poliak Europe Ltd., 01-747 3131
Northern Home Entertainment Show	January 19-22	Excelsior Hotel, Manchester Airport	Stamley Wire Advertising Ltd., 01-253 6637
Acorn Education Exhibition	January 25-27	Central Hall, Westminster	Computer Marketplace (Exhibitions) Ltd, 01-930 1612
Communications & Computer Systems Fair — CABLES	February 2-4	Pontin's, Prestatyn, Wales	Pontin's Ltd., 07456 2267
LET '84	February 13-15	Heathrow Penta Hotel	Anthony Farrar, 0923 774262
International Home Computers, Video Games & Software Exhibition	February 13-15	Heathrow Penta	Wheatland Journals Ltd., 0923 774262

OVERSEAS EVENTS

Event	Dates	Venue	Organisers
Gulf Computer Exhibition	November 21-24	Dubai	Trade Centre Management, 01-930 3881
Computer Indonesia	Nov 22-25	Jakarta	Overseas Exhibition Services Ltd., 01-486 1951
Computer Dealers Exhibition	November 28-Dec 2	Las Vegas, USA	Interface Group Conference & Exposition Management, 160 Speen St., Framingham, MA 01701, USA

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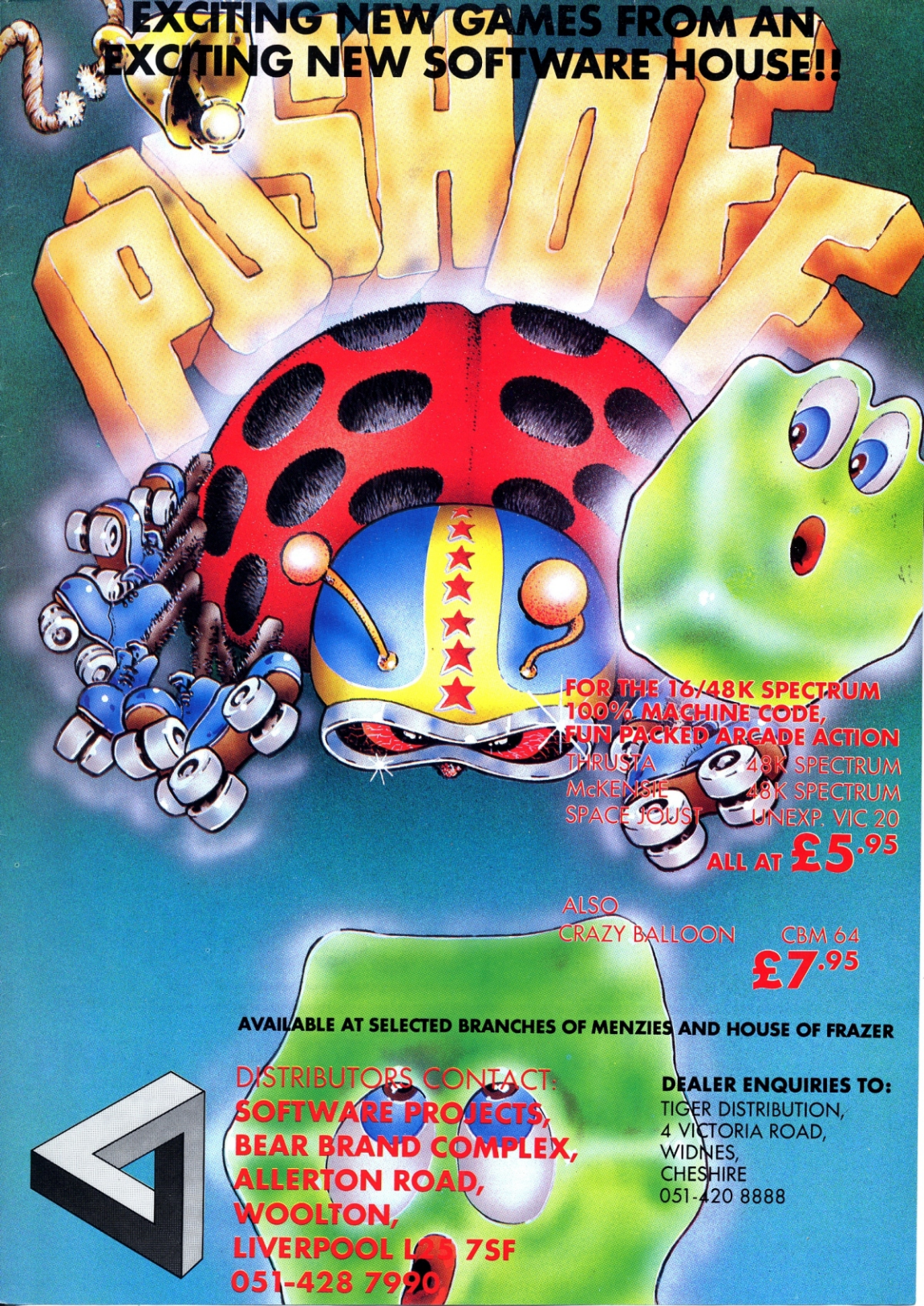

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▼	3 (1)	Jet Pac	Ultimate	Spectr
▶	4 (4)	Zoom	Imagine	Spectr
▲	5 (8)	Hobbit	Melbourne	Spectr
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