

# PERSONAL

EVERY THURSDAY

50p

NOV 17-23 1983 Vol 1 No 37

## NEWS

THE COMPLETE COMPUTING WEEKLY



**Micropaedia competition**  
**WIN A SPECTRUM!**

### THIS WEEK

#### ATARI ART

The paint palette with close-up control

#### FLIGHT FANTASY

Simulators for the Dragon, Spectrum & BBC

#### BBC TOOLKIT

Take the tedium out of programming

#### MYTHS, MAZES...

... games for Vic20, 64, Spectrum & Dragon

### EVERY WEEK

#### LATEST NEWS

PCN Monitor keeps you ahead

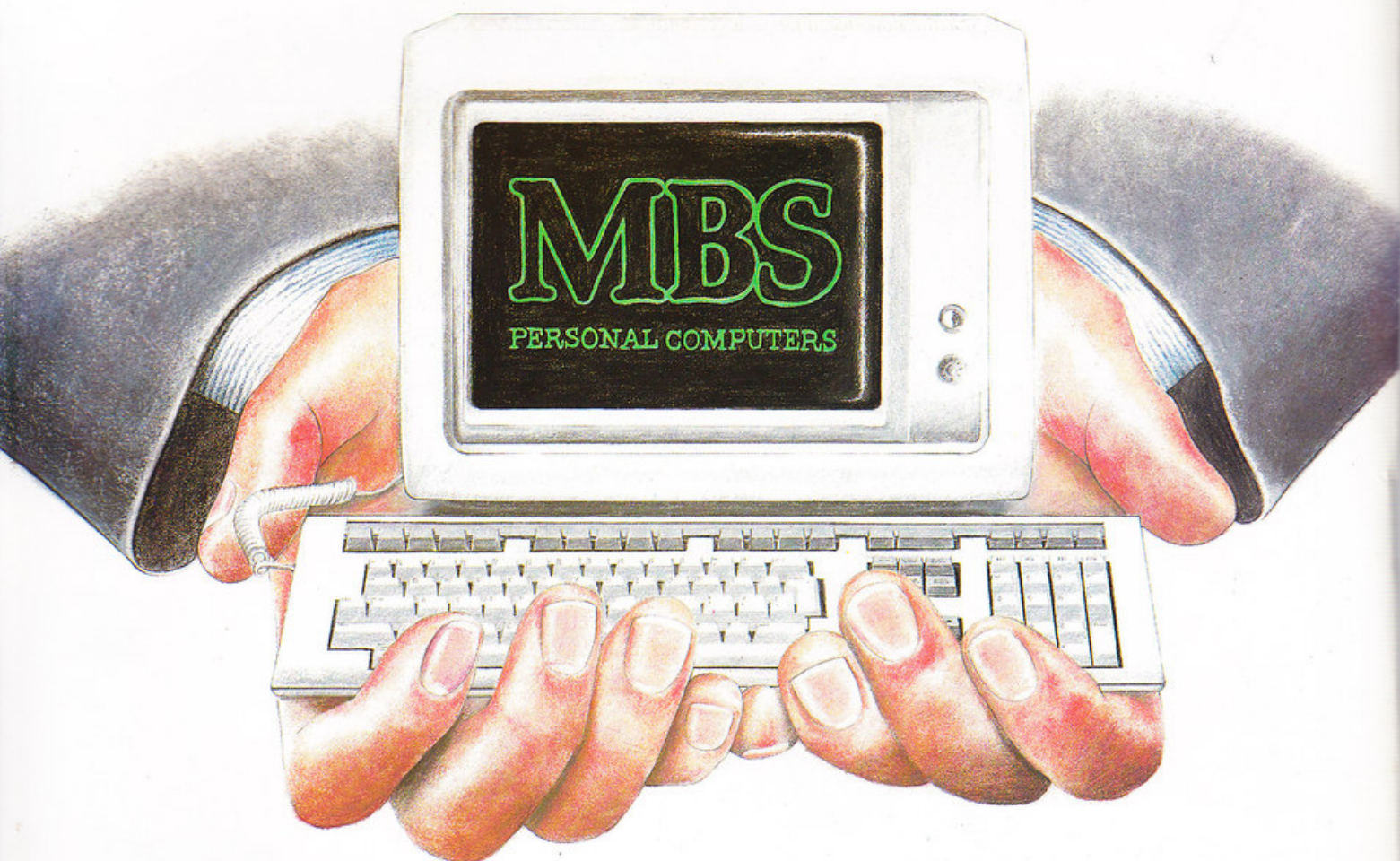
#### FREE PROGRAMS

This week for Oric, BBC, Spectrum & 64

**Does ACT's Apricot**  
**deserve star status?**







## Thinking of a personal computer? Try it first by renting from us.

You probably know just how much the right personal computer could help you in your business or profession.

But how do you decide on the right machine without making expensive mistakes?

We have a very simple solution. See the very best personal computers and software in action at one of our demonstration centres. Make your selection and then rent your chosen system from us until you're sure you've made the right decision.

When you are ready, simply convert to a purchase agreement. If the system isn't right for you, we'll help you choose a more suitable one.

Naturally, you can continue to rent long term... which may be financially advantageous to you. Alternatively, we can arrange leasing or, of course, direct purchase at the outset.

However you purchase, you'll have a good deal with MBS. And you can rely on unbiased, expert guidance from the computer professionals at our centres.

Call in today.

Nationwide MBS personal computer centres:

**London** St. Mary Abchurch House  
123 Cannon Street London EC4N 5AX  
Telephone 01-621 1122 (Jim Duffy)

**Bristol** 14-16 Baldwin Street Bristol BS1 1SR  
Telephone 0272 277243 (Martin Allan)

**Glasgow** Burlington House  
183 Bath Street Glasgow G2 4HU  
Telephone 041-248 5665 (Jim Brown)

**Eton** 119/120 High Street Eton  
Windsor Berkshire SL4 6AN  
Telephone 07535 68171 (Duty sales desk)

**Warrington** The Genesis Centre Garrett Field  
Birchwood Science Park Warrington WA3 7BH  
Telephone 0925 822261 (Chris Moran)

**Wirksworth** Blind Lane Wirksworth  
Derbyshire DE4 4EZ  
Telephone 062 982-3120 (Geoff Dalton)

**For more information telephone  
07535 68171 the friendly personal  
computer company**

# MBS

MBS Personal Computers Ltd  
119/120 High Street Eton Windsor Berkshire SL4 6AN

Altos

Hewlett  
Packard

Superbrain

Digital

ACT  
Sirius

Torch

it Andromeda

IBM

On demonstration at  
Eton centre only.

Texas  
Instruments

Osborne





## Pull-out and keep Micropaedia

Design, debugging and program structure in our teach yourself programming course

## REGULARS

### Monitor 2

Advance moves in on IBM territory — page 2; Ten green bottles: the shakeout — page 3; Marriage guidance from Acorn — page 4; Applefest report — page 5; Pertec extends multiuser base — page 6; Fujitsu comes in from the cold — page 7.

### PCN Charts 10

Which game comes straight in at Number 1? Find out here.

### Random Access 12

The assault on micro shops continues in your letters.

### Routine Inquiries 14

Three questions answered for 64 owners; machine code and interfacing on the Spectrum; and the finer points of Oric Basic.

### Microwaves 16

Hints and tips for the Lynx, Newbrain, 64 and users and of ZX printers.

### ProgramCards 56

BBC and Spectrum owners can complete their games, there's a new one for the Oric, and a free machine code monitor for the Commodore 64.

### Clubnet 72

Our complete nationwide directory of clubs and user groups.

### Billboard 82

### Quit/Datelines 88

Cash for grabs if you make us laugh.

Cover photo by Howard Kingsworth.

## MENU

November 17-November 23, 1983 Volume 1 No 37

## PCN PRO-TEST: HARDWARE

### Ripe Apricots

Igor Thomas peels ACT's good-looking sibling of the successful Sirius but asks: Does performance match appearance?



18

## PCN SPECIALS



### Micros in flight

Flight simulators have become one of the most popular types of computer pastime. John Lettice goes for a spin in BBCs, Spectrums and Dragons, among others.

26

### Spectrum facelift

Make the most of user-defined graphics and give your micro a complete new character set with Andrew Stanton's routines.

31

## PCN PRO-TEST: SOFTWARE

### Paint your Atari

Cubist, abstract, impressionist — the world of art is yours with Atari's new software package. Bob Chappell picks up brush and palette.

32

### BBC Toolbox

Garry Marsh sorts through a handy collection of programmer's aids for Acorn users.



37

## PCN PRO-TEST: PERIPHERALS



### VCS to computer

Can a simple add-on turn your video games machine into a full-fledged micro? Ian Scales checks out Spectravideo's claims for its new add-on.

38



### Spectrum speaking

Speech synthesis is commonplace now, but how about getting your computer to listen when you talk. John Lettice finds a product called Big Ears has possibilities.

40

## GAMEPLAY

World domination and multiple adventures for Dragon owners

47

Into the depths of the maze with your Vic 20

48

64 owners meet the scourges of the spaceways.

51

From Greek myth to pest control on the Spectrum

53

## CHARACTER SET

**EDITORIAL:** Editor Cyndy Miles **Deputy editor** Geoff Wheelwright **Managing editor** Peter Worlock **Sub editors** Harriet Arnold, Leah Batham **News editor** David Guest **News writers** Ralph Bancroft, Sandra Grandison **Hardware editor** Ian Scales **Features editor** John Lettice **Software editor** Bryan Skinner **Programs editor** Kenn Garroch **Listings Editor** Wendie Pearson **Editor's assistant** Nickie Robinson **Art director** Jim Dansie **Art Editor** David Robinson **Assistant art editor** Floyd Sayers **Publishing manager** Mark Eisen **Assistant publishing manager** Sue Clements **ADVERTISING:** Group advertisement manager Pat Dolan **Advertisement manager** Nic Jones **Assistant advertisement manager** Mark Satchell **Sales executives** Christian McCarthy, Marie-Therese Bolger, Julia Dale, Dik Veenman, Alison Hare, Deborah Quinn **Production manager** Eva Haggis **Microshop Production** Nikki Payne **Advertisement assistant** Jenny Dunne **Subscription enquiries** Gill Stevens **Subscription address** 53 Frith Street London W1A 2HG 01-439 4242 **Editorial address** 62 Oxford Street London W1A 2HG 01-636 6890 **Advertising address** 62 Oxford Street London W1A 2HG 01-323 3211 **Published by** VNU Business Publications, Evelyn House, 62 Oxford Street London W1A 2HG © VNU 1983. No material may be reproduced in whole or in part without written consent from the copyright holders. Photoset by Quickset, 184-186 Old Street, London EC1. Printed by Chase Web Offset, St Austell, Cornwall. Distributed by Seymour Press, 334 Brixton Road, London SW9, 01-733 4444. Registered at the PO as a newspaper

Win a Spectrum  
Your chance to win one  
of ten free Spectrums.  
See page 44



# 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 Christmas 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 Computers, 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 Macintosh.

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 circuit 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



by Serge Powell

## Enough to make your eyes pop out

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.

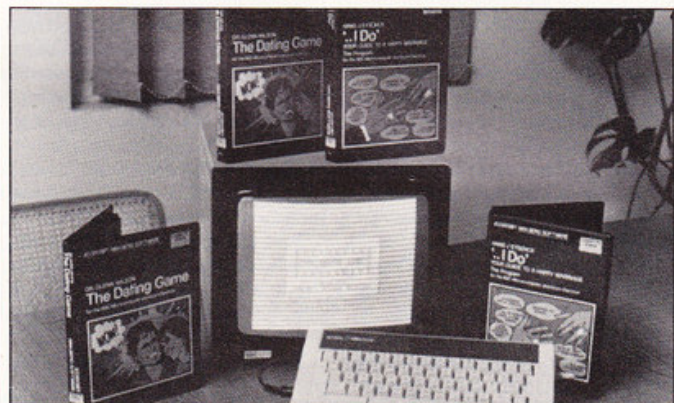
With I Do and The Dating Game Acornsoft launches its own contribution to true love and world happiness. These programs, it says, 'could improve people's love lives and help bring down the divorce rate'.

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 — Vindex 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 PDO 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, PDO 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 x 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 Macmillan 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, through 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 micro-processor 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.

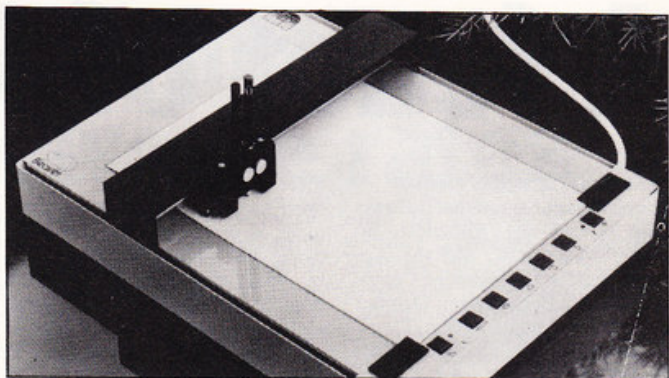
Because of the power of the 68000 there is little noticeable drop in speed of operation of the terminals over a stand-alone micro, and because you can share the same hard disk you are saved the cost of attaching floppy disk drives to each terminal.

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' Beaver.

## 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 Interna-

tional (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

**APPLE II:** If you've still got some empty expansion slots in your 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



Big Buffer Mark II

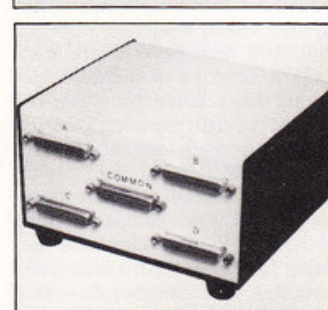
width of 10in. The WP 550 daisywheel printer has a print-speed of 14cps and uses cut sheet or fan fold paper up to 13in wide. You can also get an RS232 interface.

**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 compatibility 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

## PCN rounds up the latest add-ons.



Aims': five card trick specialist.

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 1/4in tape that stores 21.6Mb unformatted on a single 555ft cartridge at £2012.50. Contact Alloy (0285) 68709.



## Disk bleeper

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

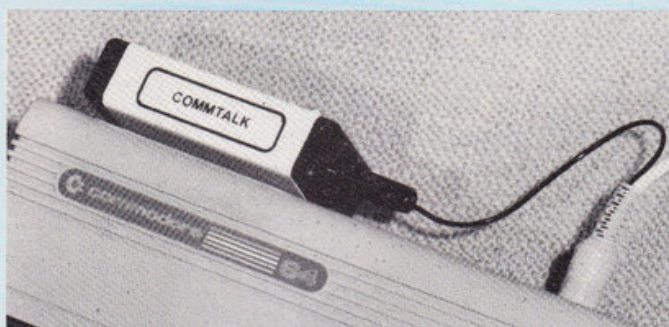
Many users would like an audible warning of disk errors, in addition to the red light.

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 versitil 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 out 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 accommodate 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 the present day by creating graphic maze games for each period. Besieged, 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).



# IMPOS

## Duet-16... A16-bit

*from*

- Leading Japanese Manufacturer
- Modular, Compact Design
- Powerful 128K 8MHz 8086 16-bit Processor
- Up to 2 Large Capacity 722K Disk Drives
- High Resolution Graphics Screens, Colour or Amber
- Over 60 Software Programmes Available
- 12 Months Warranty
- Nationwide Servicing Network
- 7-Day Money Back Guarantee

# FAST DELIVERY



**COMPUTER EXCHANGE  
INTERNATIONAL LIMITED**

50 Moorbridge Road, Maidenhead, Berks. SL6 8BN

For a demonstration appointment, write or phone Julian Cox or Jon Stuart

# (0628) 753555



# Business Computer System

**£995**

# We've made the Impossible possible!

128K Processor 1 x 720K Disk Drive	£995.00
128K Processor 2 x 720K Disk Drives	£1395.00
Amber Monitor	£400.00
Colour Monitor	£600.00
10mb System Expansion Unit	£2055.00

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

<b>DATABASES</b>	<b>Price</b>	Macro 80	<b>£138</b>	Business Basic	<b>£460</b>	Spellstar	<b>£145</b>	Postmaster	<b>£650</b>
MDBS III	from <b>£2085</b>	Toolbox	<b>£500</b>	Cobol	<b>£575</b>	Star Index	<b>£116</b>	Bottom Line Strat'st	<b>£250</b>
d.Base II	<b>£438</b>	Datasafe	<b>£100</b>	Fortran	<b>£344</b>	Perfect Writer	<b>£295</b>	<b>Graphics</b>	
d.Graph	<b>£200</b>			C	<b>£384</b>	Perfect Speller	<b>£150</b>	Graphite CAD	<b>P.O.A.</b>
Quickcode	<b>£200</b>	<b>LANGUAGES</b>	<b>Price</b>	Pascal	<b>£269</b>	Supowriter	<b>£255</b>		
Autocode	<b>£225</b>	<b>Digital Research</b>		<b>Micropro</b>		<b>Accounting Systems</b>		<b>RETAIL SYSTEMS</b>	<b>£950</b>
Friday!	<b>£195</b>	C	<b>£234</b>	Level II Cobol Compiler	<b>£750</b>	Datascene	<b>P.O.A.</b>	<b>All prices ex VAT</b>	
Intostar	<b>£295</b>	C Basic Compiles	<b>£234</b>	Level II Cobol Animator	<b>£375</b>	Accounting			
Datatar	<b>£175</b>	Pascal MT+	<b>£400</b>	Level II Cobol Forms 2	<b>£95</b>	Made Simple	<b>P.O.A.</b>		
Cardbox	<b>£155</b>	SPP	<b>£167</b>	Level II Cobol RTS	<b>£150</b>	Financial Director	<b>P.O.A.</b>		
Rescue	<b>£295</b>	PL/1	<b>£500</b>	<b>Other</b>		<b>Spread Sheets</b>			
Perfect Filer	<b>£339</b>	<b>Microfocus</b>		S'soft Fortran	<b>£300</b>	Supercalc.	<b>£129</b>		
Knowledgeman		Level II Cobol	<b>£965</b>	RM-Cobol	<b>£520</b>	Supercalc.	<b>£199</b>		
Retrieve	<b>£395</b>	Forms -2	<b>£110</b>	C 86	<b>£299</b>	Financial Planner	<b>£438</b>		
		Animator	<b>£475</b>			Multipan	<b>£190</b>		
<b>UTILITIES</b>	<b>Price</b>	<b>Microsoft</b>		<b>APPLICATIONS</b>	<b>Price</b>	Perfect Calc.	<b>£150</b>		
TSS Support (Comms)		Advanced Basic	<b>£249</b>	<b>Word Processing</b>		<b>Statistics</b>			
Programme	<b>£355</b>	Macro Assembler	<b>£99</b>	Busipost	<b>£195</b>	Microstat	<b>£250</b>		
B STAM	<b>£130</b>	M Basic Interpreter	<b>£269</b>	Wordstar	<b>£295</b>	<b>Other</b>			
INTERLINK	<b>£130</b>	Basic Compiler	<b>£303</b>	Mailmerge	<b>£145</b>	Padmede	from <b>£249</b>		

# 15% OFF

**LISTED PRICES**  
Subject to availability.



# LLAMASOFT!!

awesome games software



VIC 20  
CBM 64  
ATARI  
SPECTRUM

NOW IN BOOTHS, LASKEYS &  
MANY RETAILERS, OR FROM  
49 MT. PLEASANT, TADLEY, HANTS

TEL. 07356 4478

## TI-99/4A GAMES

WITH HI RES GRAPHICS  
FOR THE BASIC 16K  
COMPUTER

### ADVENTUREMANIA G10

A fascinating game set in London. You must find the hidden computer to discover your ultimate quest. Features: mazes, dungeons, casinos & mote.

### SANTA AND THE GOBLINS G11

Christmas fun for all the family. Very challenging with fat black goblins trying to outwit you. And Elvin your faithful friend there to guide and help you. Set in a large mansion you have to deliver your Christmas presents... beware those goblins are everywhere.



Send PO/Cheque  
For £5.95 each  
or £10.95 for both  
plus 25p p&p  
to Intrigue Software  
Cranbrook Road, Tenterden,  
Kent TN30 6UJ.  
Tel: 05806 4726.

Trade Enquiries Welcome

# 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	Quicksilver	Spectrum	£5.95
▲	13	(28) Heathrow ATC	Hewson	Spectrum	£5.50
▲	14	(—) Chuckie 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	Quicksilver	C64	£7.95
▲	22	(—) Splat	ISL	Spectrum	£5.95
▼	23	(7) Harrier Attack	Martech/Durell	Oric	£6.95
▶	24	(24) Xadom	Quicksilver	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	Quicksilver	Spectrum	£6.95
▲	30	(—) Transylvania Tower	Shepherd	Spectrum	£6.00

\*Denotes available on other machines

## HALLS OF THE THINGS

The first totally animated graphic adventure ever. Highly recommended by the computing press. Just one of a fabulous range of Spectrum games available from Crystal Computing.

Available from your local dealer or direct from:

**CRYSTAL COMPUTING**  
2 Ashton Way, East Herrington, Sunderland SR3 3RX  
Send SAE for catalogue



# 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 — Computers. 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.

## ELIMINATE FAULTY CASSETTES

DataClone is one of the first companies in the UK established specifically for the duplication of data cassettes.

Most other duplicating houses are audio oriented — DataClone has a duplicating system designed from scratch purely to handle computer information.

The result?

Greatly improved reliability in data transfer rates from 300 to beyond 2400 baud — previously unattainable.

All formats catered for. Quantities from 200 to infinity.

Contact us now for brochure.

DataClone — the first specialist service for computer cassettes.

DATACLONE HAS  
EXPANDED, PRODUCING  
AN EVEN FASTER  
TURNAROUND. NOTE  
NEW ADDRESS.



**DATACLONE**  
UNIT 1  
ROSLIN SQUARE  
ROSLIN ROAD  
ACTON, LONDON W3

TEL: 01-993 2134  
TELEX: 21879

**No.1  
SOFTWARE  
RETAILER**  
ADAMS WORLD OF SOFTWARE LTD  
100, STATION ROAD, EDOUARD  
WIDEN, HANTS RG2 7AB  
TELEPHONE 01992 0451

Looking for the P.C.N. top thirty programs or something a little different? Choose from thousands of cassettes. BBC, C64, VIC20, Spectrum, ZX81, Oric, Dragon, and others. North London's No 1 software retailer...



TELEPHONE ORDERS  
**01-952 0451**





## 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 'boggles' 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.

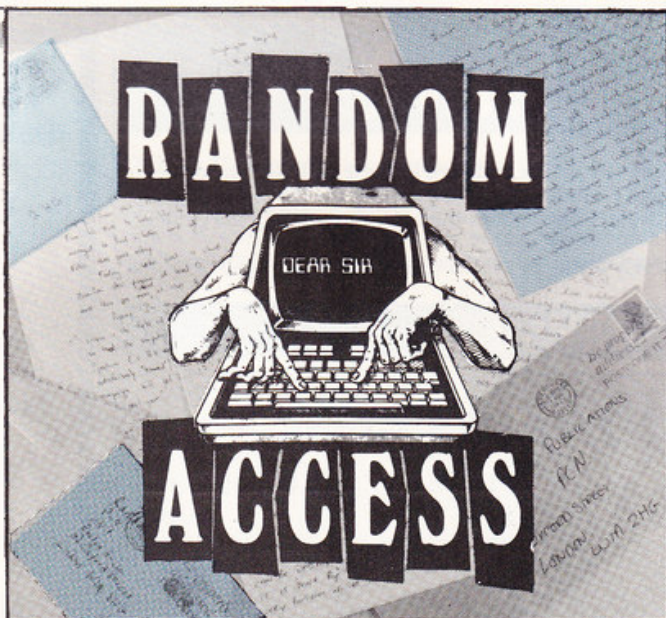
The Spectrum requires a very high input level from a cassette recorder, and not all recorders will drive it hard enough. When I changed from a ZX81 to the Spectrum I had to change from a Tandy recorder to a W H Smith data recorder specifically sold for use with the Spectrum. This has given perfect performance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



Don't carry a LOAD on your shoulders, unburden yourself on PCN's letters page.

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 salesperson to know what they're talking about so why not have the same level of competence in computing.

I totally agree that the more knowledgeable 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. WH 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

Share your thoughts in the UK's liveliest micro weekly letters columns. Funny, feisty or fanciful, your letter could win you £10 if it's of star status.

WRITE TO: Random Access,  
Personal Computer News,  
VNU, Evelyn House, 62  
Oxford Street, London W1A  
2HG.





**..the name  
of the game**

## **SITUATIONS AVAILABLE AT**

**IMAGINE SOFTWARE LTD** is the largest and most successful game software house outside of the U.S.A. with more than 100 staff occupying 19,000 square feet of premises throughout Liverpool. Imagine Software are at the forefront of today's exciting software industry. As a result of Imagines' advanced and imaginative expansion program the following positions have become available. In all cases remuneration is commensurate with ability and seniority and is above industry standards. In many cases a new car and numerous fringe benefits will be part of the package. Relocation assistance will be given to successful candidates wherever needed.

### **SENIOR SOFTWARE MANAGER**

A position exists for a Senior Manager who will be responsible for several departments working in diverse areas of software design and production. Applicants must have proven experience in commercially orientated software environments and a wide range of technical knowledge and skills.

This is a very senior position with many exciting and rewarding aspects. Career prospects are excellent.

### **SOFTWARE MANAGERS**

Two positions exist to manage large software departments at the forefront of the games industry. Applicants must have a proven knowledge and interest in computer games. A wide range of software skills and experience in managing programming staff.

### **SOFTWARE ARTISTS/GAMES PROGRAMMERS**

Eight positions are available for programmers with both the technical ability and the creative skills needed to invent and code best selling games.

Fluency in at least one assembly language, artistic ability plus proven experience are the necessary qualifications. The successful applicants will be working in an innovative environment with the best available development software and equipment and will be provided with a high level of technical back up. This is the ultimate career opening for games programmers.

### **SYSTEMS SOFTWARE PROGRAMMERS**

Two positions exist for systems software programmers working on very advanced products. Both positions are exciting and innovative. For the first, applicants must be fluent in the 'C' language and MCS68000 assembler and be familiar with Unix type operating systems. Applicants must be able to demonstrate a wide knowledge of advanced development tools.

The second position requires a fluency in pascal and MCS68000 assembler and familiarity with the UCSD operating system. Experience of computer graphics and general business orientated applications software will be an advantage.

### **PROGRAMMERS**

Thirty positions exist for programmers working in a team environment on many diverse aspects of microcomputer software, including the conversion and adaption of games to new microcomputers.

Applicants should be fluent in at least one assembly language and have great familiarity with at least one currently popular consumer microcomputer. Experience is not necessary but provable ability is a qualifying factor.

### **GRAPHICS PROGRAMMERS**

Two positions are available for programmers with skills, experience and knowledge of microcomputer graphics as applied to games software.

Applicants must be fluent in at least one popular microcomputer assembly language and preferably have a working knowledge of one other, plus familiarity with currently available microcomputer capability. Provable experience and/or ability essential.

### **COMPUTER MUSICIANS**

Two openings are available for programmers who have the ability to write music and sound effects for popular micros. The applicants must have a good knowledge of an assembly language and proven musical skills.

### **GAME DESIGNERS**

Two positions exist for game designers to design a wide variety of entertainment software. Applicants will have both experience in general games design and theory plus a working knowledge of microcomputers.

### **TECHNICAL WRITER**

An opening exists for a technical writer to prepare software manuals for both commercial products and internal development tools. A recognised writing qualification will be necessary for applicants as will a very wide working knowledge of microcomputers.

### **GRAPHIC ARTISTS**

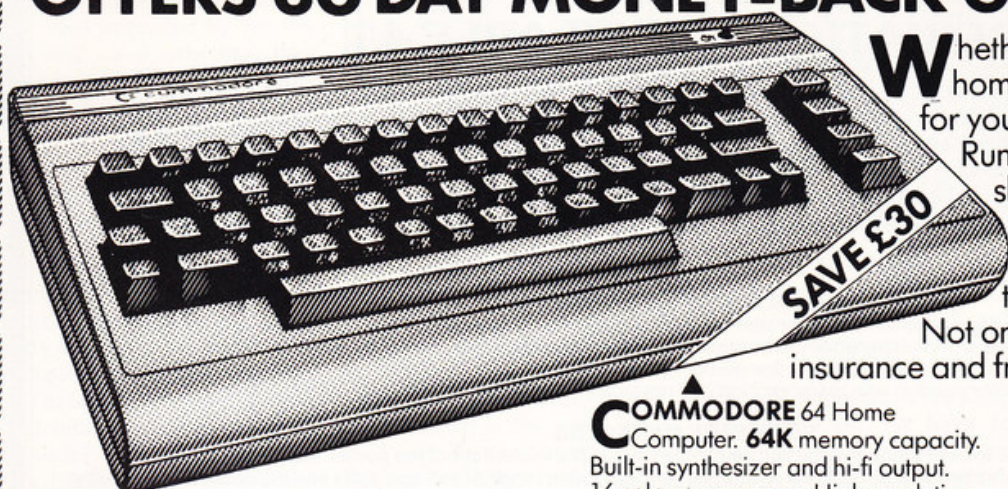
There are six positions available for artists working on games design and production using computer based graphic tools. A knowledge of microcomputer graphics plus excellent artistic skills are the qualifications for these positions.

Applicants should in the first instance send their C.V. to:  
**PERSONNEL DEPARTMENT, IMAGINE SOFTWARE LIMITED**  
**IMAGINE HOUSE, 5 SIR THOMAS STREET, LIVERPOOL L1 6BW**  
or ring for an application form:- **051-236 8100 (20 lines)**



# YOUR LOCAL COMPUTER SHOP

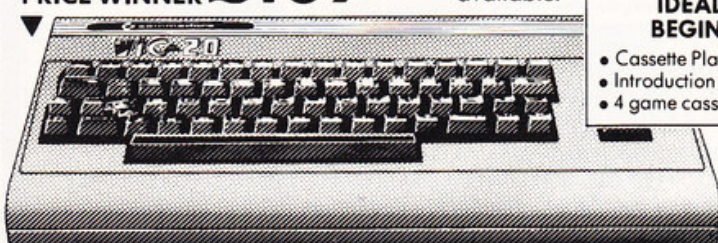
## OFFERS 30 DAY MONEY-BACK GUARANTEE



**ORIC 1** – Home Computer **48K** Ram  
57 typewriter like keys. RGB monitor socket.  
**PRICE WINNER £139.99**  
Easy terms available.



**COMMODORE VIC 20** Home Computer. Easy to operate with a wide variety of programmes available. Simple connection to TV set via aerial socket.  
**PRICE WINNER £139.99** Easy terms available.



**ALSO AVAILABLE**  
**SHARP MZ711** Home Computer with cassette player and software package. Typical retail price £75.00

**SINCLAIR Spectrum 16K** Ram.

**TEXAS 16K** Home Computer T1994A.

**PRICE WINNER**  
**£289.99**  
**£99.99**  
**£89.99**

**UP TO £750 INSTANT CREDIT**  
SUBJECT TO STATUS. TYPICAL APR 41.2%. ASK FOR DETAILS.

DETAILS AND WRITTEN QUOTATION FOR CREDIT TERMS AVAILABLE FROM ANY RUMBELOWS BRANCH. OFFERS SUBJECT TO AVAILABILITY. PRICES CORRECT AT TIME OF GOING TO PRESS. REDUCED PRICE ITEMS ARE LOWER THAN OUR NORMAL PRICE BUT MAY NOT HAVE BEEN SOLD AT A HIGHER PRICE FOR A PERIOD OF 28 CONSECUTIVE DAYS IN THE PREVIOUS 6 MONTHS. HEAD OFFICE, TRINITY HOUSE, TRINITY LANE, WALTHAM CROSS, HERTS. EN8 7E2

**W**hether you're shopping for a home computer or software for your existing machine Rumbelows are the only shop to let you try it at home and, if it's not exactly what you want, to return it for a full refund. Not only that but we offer free insurance and free service for a year.

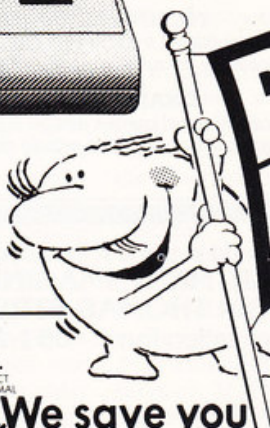
**COMMODORE 64** Home Computer. **64K** memory capacity. Built-in synthesizer and hi-fi output. 16 colours on screen. High resolution graphics. Normal Price £229.99  
**PRICE WINNER £199.99**  
Easy terms available.



**FREE STARTER PACK**  
WORTH OVER £70  
IDEAL FOR BEGINNERS

- Cassette Player
- Introduction to Basic part 1
- 4 game cassette

**SINCLAIR Spectrum 48K** Ram Home Computer. Life action keyboard with silent moving keys. Includes free demonstration cassette with 14 pre-recorded programmes.  
**PRICE WINNER £129.99** Easy terms available.



**RUMBELOWS.**  
**BRITAIN'S BEST DEAL.**

**LOW PRICES**  
**PLUS FREE DELIVERY**  
**FREE SERVICE FOR A YEAR**  
**FREE INSURANCE FOR A YEAR**  
**FREE REMOVAL OF OLD PRODUCT**  
**30 DAY MONEY-BACK GUARANTEE**

**We save you money and serve you right.**



Lost in a maze of bits and bytes, trapped in a forest of errors, bugged by Basic? Whatever the problem, CALL on us. Our panel of experts is at your command.

**Write to:** Routine Inquiries,  
Personal Computer News,  
VNU, Evelyn House, 62  
Oxford Street, London W1A  
2HG.

## 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 there, 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, B
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.





Scaled a new PEEK in microcomputing? If printed your tip will earn you a fiver.

If you've got something to crow about . . . a bit of magic that'll make the world a better place for micro users, then send it to *PCN* Microwaves—our regular readers' hints and tips page. We'll pay you £5 if we print it. We'll pay you even more if your little gem gets our vote as microwave of the month. Think on . . . and write to Microwaves, *PCN*, 62 Oxford Street, London W1A 2HG.

## 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
```

## 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 CB 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 J and type DPOKE &62B6, &9F50

The routine is now ready to be accessed in the usual way. Mark Glossop, Sheffield.

```
30 POKE N,O
40 NEXT N
50 P=642
60 FOR N=1 TO 24
70 FOR I=0 TO 39
80 POKE P+I, 32
90 NEXT I
100 P=P+64
110 NEXT N
120 REM PUT MAIN PROG-
RAM 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.

## 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: DR
AW 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,-P
I
40 DRAW -125,0
50 PLOT 65,105: DRAW 125,0
```

P Niblock, Grimsby, N. Humberside.

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(" ")AS:
PUT 31
420 L=LEN(AS)
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$(AS,D,J-D)
580 NEXT I
1000 FOR J=X TO 1 STEP -1
1020 IF MID$(AS,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 beginning (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.



# **apple® PRICES SLICED**

## **APPLE IIE 64K RAM £549**

(Send cheque for £654.35 including VAT & Carriage)

## **APPLE III 256K RAM, Monitor & System Software £1799**

(Send cheque for £2103.35 including VAT & Carriage)

### OTHER PROCESSORS

IBM Personal Computer .....	from £2599.00	DEC Rainbow with Peachcalc .....	from £2299.00
Epson QX-10 .....	from £1735.00	DEC Professional 350 .....	from £3299.00
Tycom Microframe .....	from £2900.00	DEC Mate II .....	from £2899.00
Epson HX-20 with either Epsoncalc or Intext .....		from £402.00	

### SOFTWARE SELECTION

IBM Wordstar/Mailmerge .....	£419.00	EPSON Supercalc .....	£169.00
dBASE II .....	£399.00	dBASE II .....	£395.00
Lotus 1-2-3 .....	£319.00	Wordstar .....	£275.00
DEC Multiplan .....	£165.00	Microframe Micromodeller .....	£589.00
Finar .....	£595.00	Wordstar .....	£269.00
Wordstar/Mailmerge .....	£415.00	Multiplan .....	£169.00
Dectext .....	£325.00	dBASE II .....	£375.00

### APPLE PERIPHERALS & SOFTWARE

Disc Drive + Controller .....	£249.00	PFS IIE .....	£75.00
Disc Drive - Controller .....	£199.00	Monitor II .....	£119.00
Additional Disc III .....	£245.00	Apple Dot Matrix Printer .....	£365.00
80 Column Card IIE .....	£49.00	Apple Daisy Wheel Printer .....	£1150.00
Multiplan .....	£149.00	Simon Parallel Printer Card .....	£39.00
80 Column Card/64K IIE .....	£140.00	Apple Parallel Card + Cable .....	£95.00
Kaga 12" Green Monitor .....	£89.50	Super Serial Card + Cable .....	£100.00
Visicalc III .....	£149.00	Eurocolour Card (II + only) .....	£50.00
Apple Writer III .....	£112.50	U-Term 80 Column Card (II + only) .....	£130.00
Wordstar/Mailmerge .....	£335.00	U-Ram 16 (II + only) .....	£49.50
dBASE II .....	£350.00	CP/M-Z80 Card .....	£220.80

### PRINTERS

Epson RX 80 .....	£279.00	Epson FX 100 .....	£569.00
Epson FX 80 .....	£438.00	Qume 9/45 .....	£1750.00
Epson MX 100 .....	£475.00	Qume 11/40 .....	£1450.00
Anadex 9501A .....		£1025.00	

\*Special one off offer-2 ex-demonstration Qume Sprint 5 printers @ £750.00 each

### TERMS AND CONDITIONS

Prices exclusive of VAT. Add £10.00 to order price for carriage. Order by telephone or by completing the coupon. Payment with order, either by cheque (allow 10 days to clear) or by Access, Visa, or American Express. Allow 14 days for delivery.

TO: GUESTEL LTD. 40 NEW BRIDGE STREET LONDON EC4V 6BE. TEL: 01-248 0416

PLEASE SEND ME \_\_\_\_\_

I enclose cheque number \_\_\_\_\_ for £ \_\_\_\_\_ (including VAT at 15% and carriage) made out to Guestel Ltd.

OR please debit my Access/Visa/American Express Card No \_\_\_\_\_ for £ \_\_\_\_\_

NAME \_\_\_\_\_ ADDRESS \_\_\_\_\_

TELEPHONE \_\_\_\_\_

SIGNATURE \_\_\_\_\_ PCN 18 NOV

VAT No. 328 2810 63. Reg. No. 1467301. Guestel reserve the right not to accept any order. Any acceptance will be subject to Guestel's terms and conditions.

# **GUESTEL**



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

# Home grown ACT

**T**he 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 heeaaavvy). 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 definitions 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 configured, I gingerly peeked into the voluminous MSDOS User Guide. With a great

sign 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 appendectomy(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 noticeably smaller than its 16-bit desktop rivals.





# Introducing The Tandy®

## Micro Executive Workstation

- Powerful Built-In Software
- Retains Memory Data When "Off"
- 8K RAM—Expandable to 32K

Cat. No. 26-3801

**£499**

8K RAM Inc. VAT

Cat. No. 26-3802

**£649**

24K RAM Inc. VAT



### User Friendly Software Makes The TRS-80™ Model 100 Portable Computer Truly Revolutionary

Imagine a computer on your desk so small, it can fit in your in-tray. The second you turn it on, imagine seeing a menu of built-in executive management programs and your own files, ready for immediate use. All revealed on an eight-line by 40-character LCD display positioned just above a full-size keyboard. And when you leave the office, imagine a four-pound computer you can take along, because it works on mains or batteries.

Stop imagining! The new TRS-80 Model 100 is the computer you've been waiting for. As a desk organizer, it's a phone directory, address book and appointment calendar. It's a personal word processor, as well. There's even built-in communications software to access other computers by phone, using an acoustic coupler.

Come and see the most revolutionary computer since the TRS-80 Model I at over 340 Tandy stores and dealers, including over 25 Tandy Computer Centres nationwide.

#### Built-In Interactive Software



# Tandy

*The Biggest Name  
in Little Computers*

#### Call In Today Or Send For Further Information

Computer Marketing, Tandy Corporation (Branch UK), Tameway Tower, Bridge Street, Walsall, West Midlands. WS1 1LA.

Name \_\_\_\_\_

Address \_\_\_\_\_

(PCN5)



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 microscreen (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 eye-catching features of the Apricot keyboard are the microscreen 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 waterproof. 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.

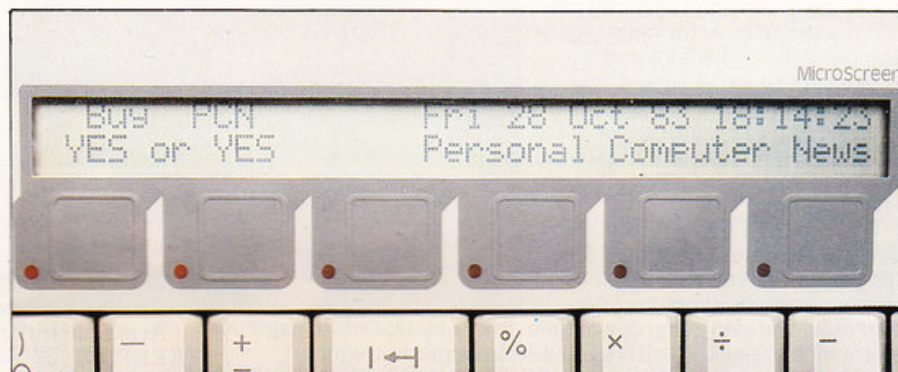
The general structure of Apricot add-on cards is similar to that of its bulkier parent, the ACT Sirius, but with correspondingly less area available.

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.

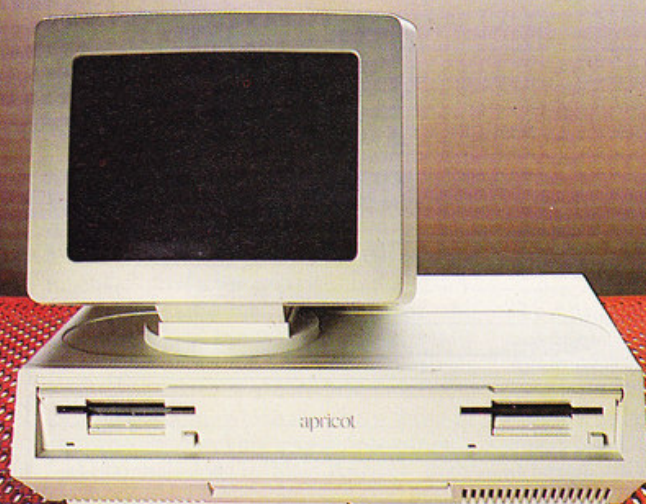
## Keyboard

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

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



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.







## "Software"



## "Cleverware"

# Is your ZX Spectrum making the most of your child's intelligence?



Will your child be taking an 'O' level in Space Invaders? Of course not. That's why Heinemann have introduced a range of computer games specially designed to help your child's future.

They're both educational and fun, because as all good teachers will tell you children learn more effectively when they are having fun.

So the beauty of it is, your child will think he's mastering a new game. But you know he's really improving his Maths, or English, or Geography or any one of a range of skills and subjects.

Heinemann have for many years been publishing the books your children are using at school.

Now Heinemann are bringing the same expertise and experience to the development of educational computer games for your children to use at home.

With each of these special educational games, designed for 8-12 year olds, you don't just receive a computer program on a cassette. You also get an absorbing, fully illustrated, 16 page book which is packed with facts and information which extends the program and provides ideas for further exciting and educational activities.

The four programs are:

### SPECIAL AGENT

As you chase the enemy agent around Europe, you will need to consult travel timetables, respond to intelligence reports, some in code even, and plan your international route. With only a limited amount of money to spend in tracking him down, careful budgeting and a knowledge of Europe are quickly learnt.

**BALLOONING**  
You are flying high above an unknown landscape in a hot air balloon. Will you have enough fuel to climb over the mountain? Can you master the principles (and physics) of lighter-than-air flight and land safely, avoiding the hazards? Enjoy exploring the science of such flight as you learn to fly the balloon on a series of adventures.

**CAR JOURNEY**  
How quickly could you drive from Exeter to Glasgow, without getting caught for speeding and without running out of petrol? What is the best route from Dover to Liverpool and how much petrol will you need? Could you manage the necessary calculations and decisions to run a successful delivery service? Travel the roads of Britain and enjoy finding out!

**PUNCTUATION PETE**  
Your program to make the acquisition and practice of language skills a real joy! 'Pete' is your guide through a carefully structured series of passages which need punctuating.

Available direct from Heinemann Educational Books, FREEPOST, 22 Bedford Square, London WC1 3BR at only £9.95 including postage and VAT.

Also available from Boots, Dixons, Menzies, W. H. Smiths and other leading retailers. These games will bring a new and worthwhile dimension to your home computer.



NB Run only on 48K Spectrums.

### HEINEMANN FIVE WAYS SOFTWARE

To: Heinemann Educational Books, FREEPOST, 22 Bedford Square, London WC1 3BR. (No stamp needed).

Yes I would like to improve my child's education. Please send me the program(s) indicated at £9.95 each inc. VAT & postage.

Tick box(es):

Special Agent ☐ Ballooning ☐ Car Journey ☐ Punctuation Pete ☐

I enclose a cheque/postal order payable to Heinemann Educational Books Ltd., for £ \_\_\_\_\_ Or please debit my Access/Barclaycard/American Express

aPCN11

Card No.

Signature

Name (BLOCK CAPITALS PLEASE)

Address

Postcode

Reg in England No. 677944

Prices apply to U.K. only.



## Because there's more to life than dead aliens.



◀ 21 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 aside, 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 key 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

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

very good-looking arrangement which also carries a number of international safety pedigrees (UL, CCA, VDE).

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 measurably 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 tendency 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 compatibility 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 redoubtable 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 containing 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



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 ponder-

ing 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 unforeseen 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 possessively 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 shekles 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.

However, it may be just a little too soon to tell whether or not the Apricot will be able to do all that is claimed of it, with any notable improvement in cost/performance ratio over its forerunners and its current competition. The wonderful reaction to an encounter with an Un-plugged Apricot is a joy to behold. It is not as easy to maintain the euphoria after one is offered the opportunity of getting something done with it.

### PRICES (ex VAT)

Keyboard, main box, and 2S/S drives, £1,690

Keyboard, main box, and 1 S/S drive, £1,495

Additional S/S drive, £295

Video monitor (not included with above), £195

Keyboard, dual-drive main box, and monitor, £1,890

### SPECIFICATION

**Price:** £1,890 (see box for breakdown)

**Processor:** 8086 Primary CPU, with true 16-bit handling

**RAM:** 356K on-board dynamic type

**ROM:** 8K \* 16-bits Power-On Diagnostics and Bootstrap (EPROM)

**Monitor:** Detachable, 9 inches P23 green phosphor

**Text screen:** 25 lines, 80 columns, RAM character set

**Graphics screen:** 400 x 800 pixels, memory mapped (Sirius, GSX compatible)

**Keyboard:** Detachable, 40 character LCD screen, clock, battery; 90-point switch layout, RAM definable; 6-point touch layout, RAM definable

**Storage:** 1 or 2 Sony 3.5 inch single sided 315K microfloppy drives

**Operating system:** MS-DOS 2.0 supplied as standard, CPM-86 when available, Concurrent CP/M-86 when available

**Distributor:** ACT (International) Ltd, ACT House, 111 Hagley Road, Birmingham B16 8LB. Tel: 021-454 8585. Telex: 339396.



Clean your computer with

**Microkit**



A Personal Computer Cleaning Kit containing a selection of computer cleaning products and FLOPPICLENE the disposable Diskette Drive Head Cleaning System.

AUTOMATION FACILITIES LTD.  
Blakes Road Wargrave  
Berkshire RG10 8AW England  
Wargrave (073 522) 3012



COMPUTER CLEANING PRODUCTS

**PRINTER BONANZA!**

**EPSON**

PRINTERS AT UNBEATABLE PRICES

EPSON RX80T £225 + VAT	STAR510 £245 + VAT
EPSON RX80FT £250 + VAT	STAR515 £355 + VAT
EPSON FX80 £334 + VAT	CT1CP80 £255 + VAT
EPSON FX100 £485 + VAT	MT80 £270 + VAT
EPSON MX100 £390 + VAT	

SEIKOSHA GP 700A £377 + VAT

THE NEW 'STAR' AND 'CP' PRINTERS -  
AS GOOD AS EPSON

STAR & EPSON - THE BEST ON THE MARKET.



All printers carry a 1 Year Guarantee and come with paper. Shipment is by TNT Overnight Express to your door - Please add £7 + VAT carriage.

Payment by Cheque, Access, Visa etc.

As our prices vary from week to week send for our full weekly stock/price sheet which will cost you only a sae.

Shipments throughout UK. We can export to most countries in the world. Please phone for Access or Visa buying details.



**IMMEDIATE DELIVERY.**

**Micro-Spares**

We cannot and will not be beaten on Price!

Note our change of address  
104-106 Hanover Street, Edinburgh EH2 1DR  
031-226 3345

THE FABULOUS  
**CASSETTE**



**50 GAMES  
ON ONE GREAT  
CASSETTE**

**DON'T MISS THIS  
INCREDIBLE OFFER**

ONLY  
**£9.95**  
(INC. P&P and VAT)

DRAGON **BBC** A/B

Spectrum **apple** ATARI

ORIC-1 **ZX81** VIC-20

**EXPRESS DELIVERY -  
ORDER NOW**

Please send me by return of post,  
Cassette 50 at £9.95 per tape.  
I enclose a cheque/postal order for  
made payable to  
Cassette Games Ltd.

£

SPECTRUM ☐ ZX 81 ☐  
BBC A/B ☐ ATARI ☐  
ORIC-1 ☐ VIC 20 ☐  
DRAGON ☐ APPLE ☐

Please  
tick  
appropriate  
box.

Name \_\_\_\_\_  
Address \_\_\_\_\_

Post Code \_\_\_\_\_

Country \_\_\_\_\_

Dealers & Stockists enquiries welcome.



Cassette Games Ltd.,  
Suite 4, 1-3 Haywra Crescent, Harrogate,  
North Yorkshire, HG1 5BG, England.  
Telephone: (0423) 504526.

PCN 17/11/83



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 departure 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 Nightflight, 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.

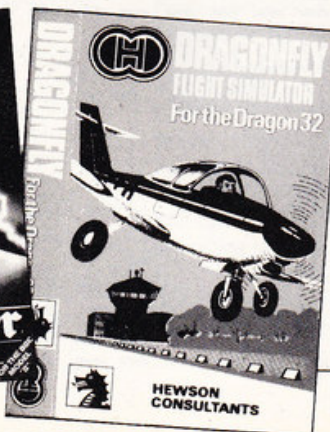
With any flight simulator, if you get into trouble and you're not too near the ground, you'll find yourself in a spin. How you get out of this — in a good simulator at least — depends on the type of aircraft. I found the Psion simulator allowed you to get out if you increased power, then pulled the nose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





## MICROS IN FLIGHT

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 Nightflight for the 16K Spectrum and Dragonfly for the Dragon 32 (not to be confused with Salamander's Nightflight for the Dragon 32).

Nightflight 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.

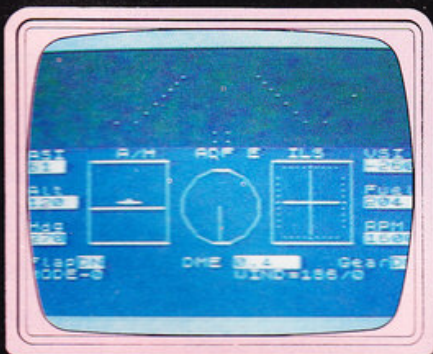
The way things are going, more and more complex simulators are becoming available for at least the more popular micros. The Microsoft Flight Simulator already allows you to get involved in dog-fights, and it's only a matter of time before the others follow suit.

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

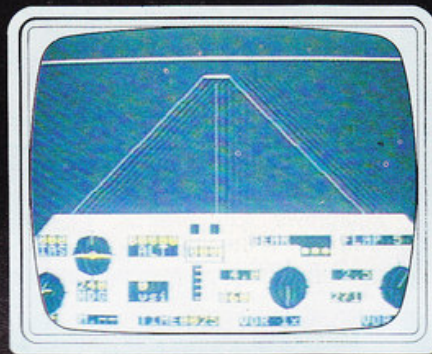
**Nightflight** (£7.95, Dragon) and **737 Flight Simulator** (£9.95, BBC B), from Salamander Software, 0273-771942.

**Nightflight** (£5.95, Spectrum) and **Dragonfly** (£6.95, Dragon), from Hewson Consultants, 60a St Mary's Street, Wallingford, Oxfordshire OX10 0E1.

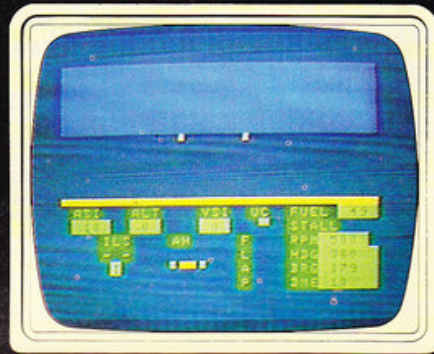
**Flight Simulation** (£5.95, Spectrum), from Psion/Sinclair Research, 0276-685311.



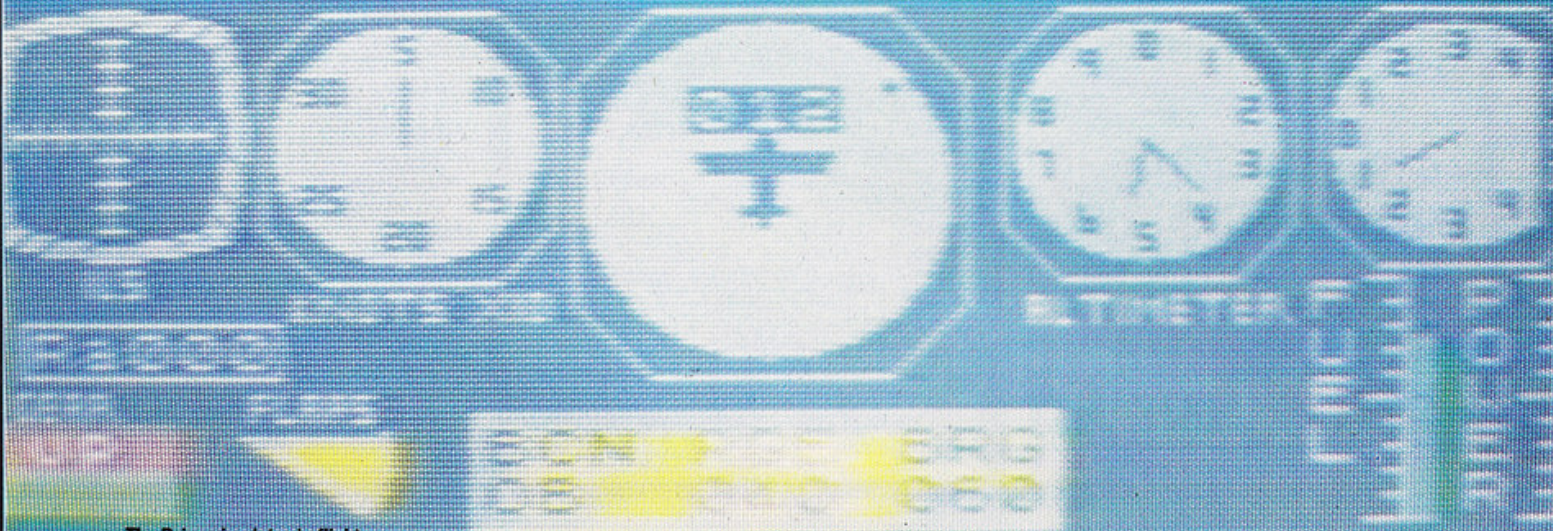
Hewson's Nightflight comes in to land.



Salamander's 737 on the runway.



Dragonfly takes off.



The Psion simulator in flight.



# sinclair ZX Spectrum

48K RAM Computer with colour,  
sound and high resolution graphics

**£129.95** (16K version: £99.95)

# DRAGON 32



32K RAM Computer  
with extended Microsoft® colour basic.  
**£175.00** 'Special Deal' price  
(see details below)

# COMMODORE



64K RAM Computer  
with high-resolution graphics.

**£199.00**

# BOOTS YOUR HIGH STREET

## PERIPHERALS

**SPECIAL DEAL: Sinclair ZX  
Printer with five paper rolls FREE  
(normal RP £11.95): all for £39.95**

Boots CR 255 Cassette Recorder:  
£21.95

32K RAM upgrade for 16K Spectrum:  
£39.95

## SOFTWARE-ENTERTAINMENT

The Hobbit	
Melbourne House	£14.95
Nightflight II	
Hewson	£5.95
Lunar Jetman	
Ultimate	£5.50
Transversion	
Ocean	£5.90
Scrabble	
Sinclair	£15.95
Harrier Attack	
Martech Games	£5.50
Snooker	
Visions	£8.95
The Oracle's Cave	
Doric	£7.95
Armageddon	
Silversoft	£5.90
Lunar Crabs	
Micromega	£6.95

## SOFTWARE- APPLICATIONS & LEARNING

Weather Station	
Arnold Wheaton	£14.95
Numberfun	
Griffin & George	£7.99
Fifth	
Computer Rentals	£9.95
*Finance Manager	
O.C.P.	£9.95
*Address Manager	
O.C.P.	£9.95
A.B.C. Lift Off	
Longmans	£7.95
Ballooning	
Heinemann	£9.95
D-Logic Functions	
Sci Cal	£9.95
*Floating Point Compiler	
Softek	£19.95
Bridge Player	
C.P. Software	£8.95

**Dragon 32: exclusive Boots deal:  
Computer plus 'Basic Tutorial'  
2-cassette pack (normal RP £19.95)  
plus 3 games/adventure cassettes  
(normal retail value £29.85): all for  
£175.00**

## PERIPHERALS

Boots CR 255 Cassette Recorder  
£21.95  
Seikosha GP 100A printer, including  
cable £229.00  
Dragon Disk Drive £275.00

## SOFTWARE-ENTERTAINMENT

(Cassette)	
Pettigrews Diary-Shards	£7.95
Cuthbert in the Jungle	
Microdeal	£7.95
Drone-PS.L. Marketing	£8.95
Intergalactic Force	
Microdeal	£7.95
Space Shuttle Simulator	
Microdeal	£7.95
Dragonfly II-Hewson Cons.	£6.95
Ring of Darkness-Wintersoft	£9.95
Franklin's Tomb-Salamander	£9.95
Frogger-Microdeal	£7.95
Air Traffic Controller	
Microdeal	£7.95

## SOFTWARE- APPLICATIONS & LEARNING

Fun to Learn (cass)	
Shards	£6.95
Hide & Seek (cass)	
Dragon Data	£7.95
The Tiger Grand Prix (cass)	
Tiger Soft	£7.95
*Invoices/Statements	
MST (disk £24.95)	cass £19.95
*Business Accounts	
MST (disk £24.95)	cass £19.95
*Mailer/Address Book	
MST (disk £24.95)	cass £19.95
*Stock Control	
MST (disk £24.95)	cass £19.95
*DASM/DEMON (cart)	
Compusense	£34.95
*Edit + (cart)	
Compusense	£34.95
Dream Assembler (cass)	
Dragon Data	£10.95

## PERIPHERALS

Cassette Recorder C2N £44.95  
Seikosha GP 100VC Printer (including  
cable) £229.00

**SPECIAL DEAL: Commodore  
Disk Drive plus FREE 'Easy Script'  
word processing package (normal  
R.P. £75) plus FREE six-game disk  
(normal RP £29.70): all for £229.00**

## SOFTWARE-ENTERTAINMENT

Attack of the Mutant Camels	
Llamasoft	£7.50
Escape MCP	
Rabbit	£5.99
Hovver Bovver	
Llamasoft	£7.50
Frogger	
Interceptor Micro	£7.00
Pakakuda	
Rabbit	£5.99
Grandmaster Chess	
Audiogenic	£17.95
Krazy Kong	
Interceptor Micro	£7.00
Purple Turtles	
Quicksilver	£5.95
Krystals of Zong	
PSS	£7.95
Moby Dick	
PSS	£7.95

## SOFTWARE- APPLICATIONS & LEARNING

*Practicalc	
MMSI	£39.95
Superfont 4.0	
English Soft	£6.95
Spritemaker 64	
English Soft	£6.95
*Calc Result	
Kobra	£125.35
*Wordcraft 40	
Audiogenic	£89.95
*Magpie	
Audiogenic	£99.95
*Diary	
Kobra	£44.85
Gortek and the Microchips	
CBM	£12.95
Introduction to Basic	
CBM	£14.95



**BBC**

## microcomputer system

BBC-B 32K RAM Computer

**£399.00**

(with disk interface £469.00)

**NEW**600XL 16K RAM Computer  
with excellent graphics capabilities**£159.00**

CHECK YOUR  
LOCAL CENTRE  
FOR OUR  
LATEST DEALS

# HOME COMPUTER CENTRE

## PERIPHERALS

Boots CR 375 Cassette Recorder  
£29.95 (interface cable £3.75 extra)  
Smith Corona TPI daisy-wheel printer,  
including interface cable £399.00  
BBC Disk Drive £265.00

## SOFTWARE-ENTERTAINMENT

(Cassette)	
Galactic Commander	
Micro Power	£6.95
Rocket Raid	
Acomsoft	£9.95
Sphinx Adventure	
Acomsoft	£9.95
Hunchback	
Superior Soft	£7.95
7.3.7. Simulator	
Salamander	£9.95
The Hobbit	
Melbourne House	£14.95
Killer Gorilla	
Micro Power	£6.95
Felix in the Factory	
Micro Power	£7.95
Philosophers Quest	
Acomsoft	£9.95
Space Shuttle Simulator	
Microdeal	£7.95

## SOFTWARE-APPLICATIONS & LEARNING

Tree of Knowledge	
Acomsoft	£9.95
Animal, Vegetable, Mineral	
B.E.S.	£8.95
Peeko Computer Pack	
Acomsoft	£9.95
Word Build	
GTM	£5.95
High Flyer	
GTM	£9.95
Fun to Learn	
Shards	£6.95
EDG Graphics Pack	
Salamander	£19.95
*Beeb Calc (cass/disk)	
Gemini	£19.95
Graphs & Charts	
Acomsoft	£9.95
*Desk Diary	
Acomsoft	£9.95

## PERIPHERALS

Atari Cassette Recorder	£49.95
Atari Letter Quality Printer	£299.00
Atari Disk Drive	£279.00
Pointmaster Joystick	£12.95

## SOFTWARE

Dig Dug (Atari)	£29.99
Donkey Kong (Atari)	£29.99
Juggles Rainbow (Atari)	£29.99
Pacman (Atari)	£29.99
Qix (Atari)	£29.99
Star Raiders (Atari)	£29.99
Diamonds English Soft	£9.95
Airstrike II English Soft	£9.95
Steeple Jack English Soft	£9.95
Krazy Kopter English Soft	£9.95

\*Larger Branches only

All systems available at your major  
Boots branch in these towns, except for  
the BBC-B which is only available in  
towns marked †

ABERDEEN • ALTRINCHAM • ARBROATH • ASHFORD •  
ASHTON-UNDER-LYNE • AYLESBURY • BALLYMENA •  
BANBURY • BARNESLEY • BASILDON • BASINGSTOKE •  
BATH • BEDFORD • BELFAST • BERWICK-ON-  
TWEED • BIRMINGHAM • CHELMSLEY WOOD •  
BIRMINGHAM (NEW STREET) • BLACKBURN •  
BLACKPOOL • BOGNOR REGIS • BOLTON • BOSCOMBE •  
BOURNEMOUTH • BRADFORD • BRIDGEND •  
BRIGHTON • BRISTOL • BROMLEY • BROMSGROVE •  
BURNLEY • BURTON-ON-TRENT • BURY •  
EDMUNDS • CAMBRIDGE • CANTERBURY • CARDIFF •  
CARLISLE • CHATHAM • CHELMSFORD •  
CHELTENHAM • CHESTER • CHESTERFIELD •  
COLCHESTER • COLERAINE • COVENTRY • CRAWLEY •  
CROYDON • DARTFORD • DERBY • DONCASTER •  
DOVER • DUNDEE • DUNFERMLINE • EAST KILBRIDE •  
EASTBOURNE • EDINBURGH • ELGIN • EXETER •  
FALKIRK • FAREHAM • FOLKESTONE • GLASGOW •  
GLOUCESTER • GREAT YARMOUTH • GRAVESEND •  
GRIMSBY • GUERNSEY • GUILDFORD • HAMILTON •  
HAMMERSMITH • HANLEY • HEMEL HEMPSTEAD •  
HENDON • BRENT CROSS • HIGH WYCOMBE •  
HORSHAM • HOUNSLOW • HUDDERSFIELD • HULL •  
ILFORD • INVERNESS • KENSINGTON HIGH STREET •  
KETERING • KIDDERMINSTER • KING'S LYNN •  
KIRCALDY • LANCASTER • LEAMINGTON SPA • LEEDS •  
LEICESTER • LEWISHAM • LINCOLN • LIVERPOOL •  
LILANELL • LOUGHBOROUGH • LOWESTOFT •  
LUTON • MAIDENHEAD • MAIDSTONE •  
MANCHESTER • MANSFIELD • MARGATE • MIDDLES-  
BROUGH • MILTON KEYNES • MONTROSE • NEWARK •  
NEWBURY • NEWCASTLE-UNDER-LYNE • NEWCASTLE-  
UPON-TYNE • NEWPORT (GWENT) • NEWPORT (IOW) •  
NORTHAMPTON • NORWICH • NOTTINGHAM •  
OLDHAM • ORPINGTON • OXFORD • PAISLEY •  
PERTH • PETERBOROUGH • PICCADILLY CIRCUS •  
PLYMOUTH • PORTSMOUTH • PRESTON • RAMSGATE •  
READING • REGENT STREET • ROCHDALE •  
RUGBY • ST ALBANS • ST HELENS • SCARBOROUGH •  
SEVENOAKS • SHEFFIELD • SHREWSBURY •  
SLOUGH • SOLIHULL • SOUTHAMPTON • SOUTHPORT •  
STAFFORD • STIRLING • STOCKPORT • STOCKTON-  
ON-TEES • STOURBRIDGE • SUDBURY • SUTTON •  
SUTTON COLDFIELD • SWANSEA • SWINDON •  
TAUNTON • TELFORD • TRURO • TUNBRIDGE WELLS •  
UXBRIDGE • WAKEFIELD • WALSALL • WARRINGTON •  
WATFORD • WELLINGBOROUGH • WEST BROMWICH •  
WESTON-SUPER-MARE • WOKING • WOLVER-  
HAMPTON • WOOD GREEN • WORCESTER •  
WORTHING • YEovil

## BEFORE YOU BUY, COME AND TRY

In over 165 Boots branches you can  
now run your own tests on all the  
systems you see.

And our staff will be only too pleased  
to give you any help and advice you  
require.

## LEARNING WITH HOME COMPUTERS

Every Boots Home Computer Centre  
stocks a wide range of educational  
cassettes and tapes.

## INSTANT PERSONAL LOAN

Boots Personal Loan instantly  
available subject to qualifying  
conditions. Loans are available in the  
range £50-£500.

A.P.R. 23.9% (variable).

Please ask for details from our larger  
branches.

Or write to Sales Promotion Dept.,  
Boots the Chemists Limited\*\*,  
Nottingham NG2 3AA.

\*\*Credit Broker

All items subject to stock availability.

Availability and prices refer to Great Britain and  
may not apply in the Channel Islands and  
Northern Ireland.



**THE BEST FOR LESS**



# WHEN YOU BUY FORTH MAKE IT THE BEST!

“Forth is closer to machine code and more than 10 times faster than BASIC. A game of Space Invaders written using it would be almost as if it is written in machine code.” Sinclair User. ● “Abersoft Forth has no known bugs, gives you more Forth words, and because it allows 12 screens in memory at once it is easier to load and save programs.” Personal Computer News. ● “Abersoft Forth is a complete version of the language with added colour, attribute and graphics instructions. It is also possible to define your own characters just as you can in Spectrum BASIC.” S.U. ● “Forth is an easy language to use, and the graphics commands in Abersoft Forth allow you to do anything in Forth that you can do in BASIC.” P.C.N. ● “Abersoft Forth is the only Spectrum package which has been endorsed by the Forth Interest Group.” S.U. ● “Its features make it well worth the price.” P.C.N. ●

## TEACH YOUR SPECTRUM A NEW LANGUAGE



MELBOURNE HOUSE

FANTASTIC



### Melbourne House Publishers

#### SPECTRUM Books

<input type="checkbox"/> Understanding Your Spectrum	NEW LOW PRICE £6.95
<input type="checkbox"/> Spectrum Machine Language for the Absolute Beginner	NEW LOW PRICE £5.95
<input type="checkbox"/> Over The Spectrum	NEW LOW PRICE £4.95
<input type="checkbox"/> The Complete Spectrum ROM Disassembly	£9.95
<input type="checkbox"/> Spectrum Hardware Manual	£5.95
<input type="checkbox"/> Spectrum Microdrive Book	£5.95
<input type="checkbox"/> Supercharge Your Spectrum	£5.95
<input type="checkbox"/> Please send me your free 48 page catalogue	

#### 48K Spectrum Cassettes

<input type="checkbox"/> Penetrator	£6.95
<input type="checkbox"/> The Hobbit	£14.95
<input type="checkbox"/> Terror-Daktil 40	£6.95
<input type="checkbox"/> Melbourne Draw	£8.95
<input type="checkbox"/> H.U.R.G.	£14.95
<input type="checkbox"/> Computer Bridge	£8.95
<input type="checkbox"/> Abersoft Forth	£14.95

I enclose my cheque/money order for £

Please debit my Access Card No.

Expiry Date

Signature

Name

Address

Postcode

All prices include VAT where applicable. Please add 80p for post and pack.

£

£ + p/p .80

Total

£

Orders to:  
Melbourne House  
131 Trafalgar Road  
Greenwich, London SE10

Correspondence to:  
Melbourne House  
Church Yard  
Tring, Hertfordshire HP23 5LU

Trade enquiries welcome

PCN 2/11

All Melbourne House cassette software is unconditionally guaranteed against malfunction.

Access orders can be telephoned through on our 24 hr ansafone (01) 858 7397.





Tired of your Spectrum's on-screen appearance? Andrew Stanton gives it a whole new character.

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

# Change of face

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 SCREENS(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 . . .

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

00	01	02	03	04	05	06	07
08	09	0A	0B	0C	0D	0E	0F
10	11	12	13	14	15	16	17
18	19	1A	1B	1C	1D	1E	1F
20	21	22	23	24	25	26	27
28	29	2A	2B	2C	2D	2E	2F
30	31	32	33	34	35	36	37
38	39	3A	3B	3C	3D	3E	3F
40	41	42	43	44	45	46	47
48	49	4A	4B	4C	4D	4E	4F
50	51	52	53	54	55	56	57
58	59	5A	5B	5C	5D	5E	5F
60	61	62	63	64	65	66	67
68	69	6A	6B	6C	6D	6E	6F
70	71	72	73	74	75	76	77
78	79	7A	7B	7C	7D	7E	7F
80	81	82	83	84	85	86	87
88	89	8A	8B	8C	8D	8E	8F
90	91	92	93	94	95	96	97
98	99	9A	9B	9C	9D	9E	9F
A0	A1	A2	A3	A4	A5	A6	A7
A8	A9	AA	AB	AC	AD	AE	AF
B0	B1	B2	B3	B4	B5	B6	B7
B8	B9	BA	BB	BC	BD	BE	BF
C0	C1	C2	C3	C4	C5	C6	C7
C8	C9	CA	CB	CC	CD	CE	CF
D0	D1	D2	D3	D4	D5	D6	D7
D8	D9	DA	DB	DC	DD	DE	DF
E0	E1	E2	E3	E4	E5	E6	E7
E8	E9	EA	EB	EC	ED	EE	EF
F0	F1	F2	F3	F4	F5	F6	F7
F8	F9	FA	FB	FC	FD	FE	FF



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

# Artistic Atari

**T**he caveman had his walls, the Egyptians their papyrus 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, papyrus, 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.

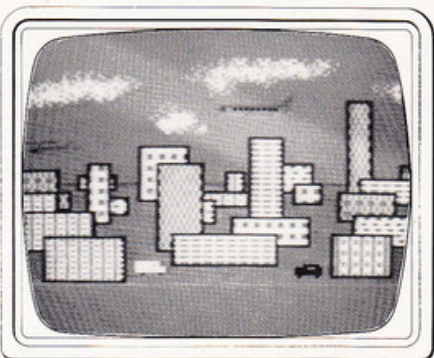
Simple Paint is a drastically cut down version of Super Paint and is meant to help



Art Show: Winter.

you become familiar with the brush and paint.

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 replaced 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





## COMPUTER CLUB INTERNATIONAL

### Reserve YOUR Membership today

CCI is a NEW COMPUTER CLUB specifically for you—the home computer enthusiast—whether or not you own a computer.

Members will enjoy a wide range of facilities, including their own magazine, regional meetings, contact with international members, exchange of software and many other benefits, all at very reasonable cost. Make sure of your membership reservation today.

Complete the coupon and send to—

Computer Club International  
FREEPOST  
(NO STAMP REQUIRED)  
STALYBRIDGE  
CHESHIRE  
SK15 1YD

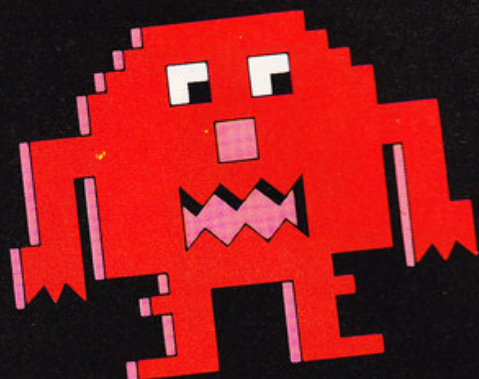
**DO NOT SEND MONEY WITH COUPON**

#### MEMBERSHIP RESERVATION

Please include my name on the CCI Membership Reservation List and send me further details without any obligation on my part to join.

SURNAME \_\_\_\_\_  
FORENAME/S \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
TOWN \_\_\_\_\_  
COUNTY \_\_\_\_\_  
POSTCODE \_\_\_\_\_  
COMPUTER OWNED \_\_\_\_\_

PCN



## WARY OF COMPUTER BYTES?

**READ ON...**



Are you missing out on all that your computer can do. These books show you how easy it is to improve your programming. Clear and concise, they will help you make the most of your computer's memory power, for more advanced uses and more exciting graphics.

#### YOUR FIRST BASIC PROGRAM

"How-to-Program" book for the first time computer user with colourful illustrations and simple diagrams to help you write your own first program in just one hour.

#### PROGRAMMING THE Z80

Instructive text, clear, precise diagrams and easy to follow examples explain everything you need to know about programming using Z80 microprocessors. Important for Sinclair, ZX81, Spectrum and TRS80 Model users.

#### PROGRAMMING THE 6502

You need no prior programming knowledge to make use of this detailed book. By applying simple assembly language, you will quickly learn to make your microprocessor perform the way you want it to. Important for BBC users wishing to extend their programming capability, plus Apple, Atari and VIC 20 users.

#### THE VIC 20 CONNECTION

Learn the simple techniques for putting your VIC 20 computer to work controlling external devices. Control lights, electricity, burglar alarm system and other non-computer devices in your own home or office.

#### THE EASY GUIDE TO YOUR COMMODORE 64

A jargon-free publication that explains the practical operation of your Commodore 64 in word processing, maths, budgeting, filing and more. This friendly guide explains how to use commercially available software, as well as teaching you the basics of programming.



All these books are published by Sybex, renowned for their excellent, helpful publications for computer users and distributed by Computer Bookshops Limited, the UK's specialist computer book and program wholesaler. All are available from good bookshops and computer stores including Lewis's and John Menzies. Request for catalogues:

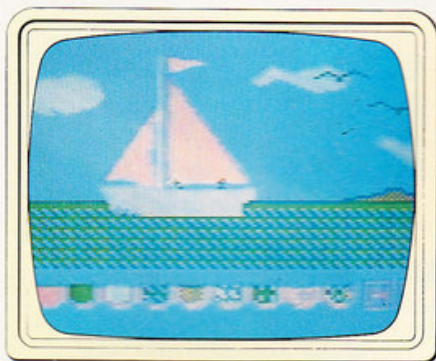
Send SAE to:- Dept: PCN. 17.11.83

**Computer Bookshops Ltd**

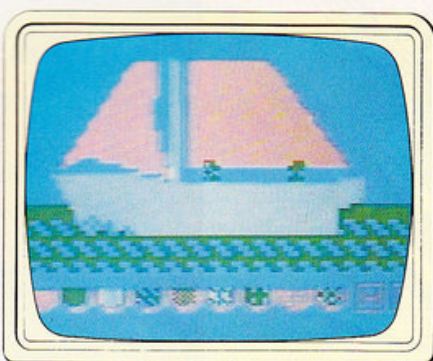
30 Lincoln Road, Olton, Birmingham B27 6PA.



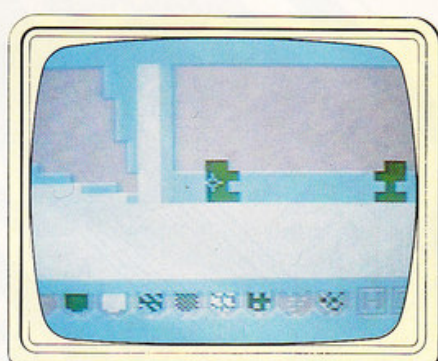




Art Show: Boat.



Close up with zoom.



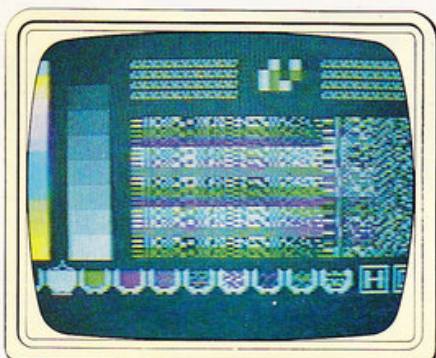
Still closer.

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

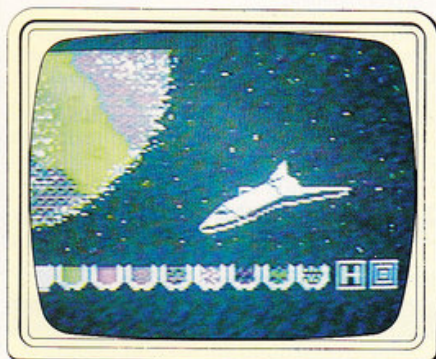


Pick your colour.

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

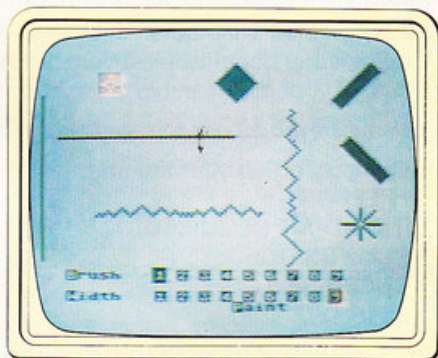
your painting.

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** Centrisoft stockist and Atari dealers.

## RATING

**Features**  
**Documentation**  
**Performance**  
**User interface**  
**Reliability**  
**Overall Value**





# Never before has so much been available from so little, to so many.



Never before in the history of modern computers has there been available a totally portable machine with the ability to cope with so many demands, to so many people, in so many different business areas.

Epson, with over 20 years experience in designing and manufacturing high quality printers, have produced the HX-20, a precision machine with its own rechargeable power supply that can be used for just about any task within today's discerning business: from data capture to word processing, from card indexing to sales order entry. Communicating with other machines is no problem and the HX-20 is easily coupled to one of our fine printers. You can even link in another main computer system by using an acoustic coupler.

Don't be fooled by its size, the HX-20 has all the software back-up you'd expect from a much larger machine and incorporates many "bigger computer" features - 16k RAM expandable to 32k with serial interfaces, a full size typewriter keyboard, its own built in

LCD screen and a dot matrix microprinter. A micro-cassette facility is available as an optional extra.

A complete computer that will either stand on its own or could be the obvious extension to your existing system.

More and more people are finding out just how big the small compact HX-20 is. Why don't you find out for yourself - you owe it to your business.



## EPSON

**Extraordinary product.  
Exceptional quality.**

Epson (UK) Limited, Freepost,  
Wembley, Middlesex HA9 6BR.  
Sales Enquiries: Freephone EPSON.  
General Enquiries: 01-902 8892.  
Telex: 8814169.

- ☐ I would like a demonstration of the HX-20 Portable Computer.
- ☐ Please send me details of my local stockist.

Name

Position

Company

Address

Tel:

PCN 17/11/20



# SPEECHLESS??

## Micro Speech lets ZX Spectrum talk!!

### ☐ JUST PLUG IN AND USE

Micro Speech is easy to use — simply plug into your Spectrum and TV and enjoy a new dimension; instant voicing of all the keys ..... infinite vocabulary at your command ..... intonation to add character to speech ..... exciting new range of sound and speech games .....

### ☐ IT'S AS EASY AS THIS!

LET S\$= "me(rr))EE) krismus"  
will say "MERRY CHRISTMAS"

### ☐ QUALITY SOUND

Micro Speech talks through your TV's loudspeaker, ensuring top quality sound.

### ☐ WHAT CAN'T IT DO!

Unlimited vocabulary means that Micro Speech can say **anything** ..... it can even be made to yodel!  
There is nothing it cannot say!



### NEW SOUND GAMES USING MICRO SPEECH INCLUDE:

- ☐ Attic Attack : Lunar Jetman (*Ultimate*)
- ☐ Colour Clash : Shark Attack : 3D Monster Chase (*Romik*)
- ☐ Fire Birds : Lunar Rescue (*Lyversoft*)
- ☐ Voice Chess (*Artic*)   ☐ Mined Out (*Quicksilver*)
- ☐ Mysterious Adventures Part 1 - 4 (*Digital Fantasia*)
- ☐ The Birds and the Bees (*Bug Byte*)
- ☐ Blastermind (*Martech Games*)

## Adding a new dimension with

Available nationwide or  
direct from Currah

CURRAH ☐ μSPEECH

Send to: MICRO SPEECH OFFER, P.O. BOX 1, GATESHEAD NE8 1AJ  
or telephone: NEWCASTLE (0632) 824683

Please send me ..... MICRO SPEECH units.

Name (Print clearly) .....

Address.....

.....Postcode.....

I enclose Cheque/Postal Order payable to "Micro Speech Offer"

or debit my Barclaycard/Access account No.

I understand that I can have my money back within 10 days of purchase if I am not delighted.  
Please allow 21 days for delivery. 12 months parts and labour guarantee.

Signed.....

Ref

ONLY **£29.95** EACH

INCLUDING

- ☐ FREE SOUND GAME
- ☐ COMPREHENSIVE MANUAL
- ☐ DEMO CASSETTE



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

# Beeb aids

**T**oolbox 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 'crunchers'; 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 crunchers, 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.

Resequencer 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).

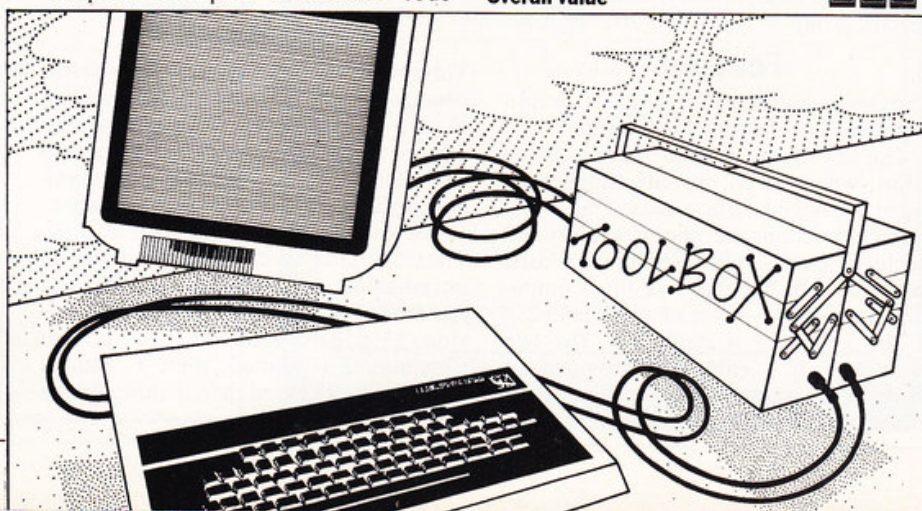
## Verdict

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 W1M4AA  
**Format** Cassette **Language** Basic and Assembler  
**Other versions** None **Outlets** Mail order/retail

## RATING

**Features**  
**Documentation**  
**Performance**  
**Usability**  
**Reliability**  
**Overall value**





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

# Key question



**T**he 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 tantalising 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

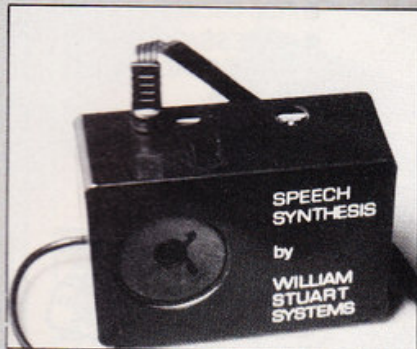






You can talk to your Spectrum, but you won't get a reply — John Lettice looks at Big Ears.

# 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 hardware 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.

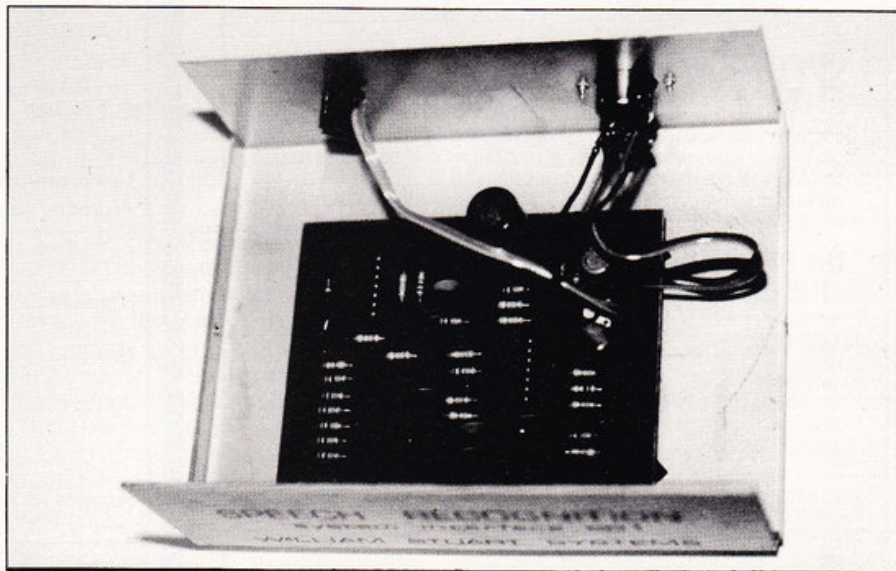
Along with the main manual you get two sheets of A4 giving supplementary information for the Spectrum and ZX81. If you're running Big Ears off a ZX81, the POKes you need are given, but the rest of the machine-specific information seems to be just a variant on the Nascom/101 instructions.

### 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



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





# MOGUL

## THE HOTWARE PEOPLE

### METAMORPHOSIS

VIC 20 • COMMODORE 64

You have stumbled into the nest of the Cyglorx and find yourself fighting off the Robot Tanks!

£7.95

### KONGO KONG

VIC 20 • COMMODORE 64

Climb ladders, avoid the barrels thrown by the Crazy Ape—rescue the Damsel.

£6.95

### ZEUS

COMMODORE 64

Your Cone of Cold protects you as you become the Wizard fighting off the Thunderbolts of the angry god—Zeus.

£6.95

### EARTHQUAKE

VIC 20 • COMMODORE 64

A great adventure, you are in a shopping centre during an earthquake. To save yourself you must first help the others!

£6.95

### CREATORS REVENGE

COMMODORE 64

Penetrate the depths of Robot City and kill the Creator. Destroy the robots—but watch out for new robots as they hatch!

£7.95

### SUPERTREK

VIC 20 • COMMODORE 64 • ORIC

Commanding the bridge of your Starship, you explore the Galaxy. Fend off the Klingon attacks with your Phasers.

£6.95

### ANNIHILATOR

VIC 20 • COMMODORE 64

Defend your Planet against Invading Aliens. All machine code makes for fast and furious arcade action!

£5.99

### PYRAMID

VIC 20 • COMMODORE 64

TI 99/4A

A really tough adventure game as you try to ransack the Pyramid. However the builders have left clues everywhere.

£6.95

### POLLYWOG

VIC 20

Help your Pollywog across danger to the safety of his home.

£6.95

### ANNIHILATOR 2

COMMODORE 64

Another Great Game from the author of Annihilator and Metamorphosis—Mike Wacker.

£7.95

### GREAT ADVENTURE PACK

VIC 20 • COMMODORE 64

Three Great Adventures in One Package. African Escape, Hospital Adventure, Bomb Threat. Great Action, Great Value, Great Fun.

£6.95

PLUS

Four Great Games for the Spectrum 48K

**POTTY PLANTER • ADDER ATTACK • LAS VEGAS LADY • CRASH**

All at **£5.50**

**AVAILABLE FROM ALL GOOD DEALERS  
TRADE ENQUIRIES WELCOME**

MOGUL COMMUNICATIONS LIMITED • 90 REGENT STREET • LONDON W1R 5PT  
Telephone 01-437 3156/7



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 SP40DZ



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.



# SKI RUN



**SKI RUN**  
All the excitement and skill of the ski slopes with downhill, slalom and giant slalom. Put yourself to the test and record the fastest time! Nine levels of difficulty. High quality graphics and brilliant sound effects!!

# Boom Software

## It will blow your mind

**LOGGER MANIA**  
Can you dodge the traffic, jump your logs, slip the bears, and get home before sunset? A game with a difference written in all machine code with high quality graphics.

# LOGGER MANIA



**SPACE RAIDER**  
Engage in a furious intergalactic intelligence battle. As you try to blast and outwit the fast developing alien star ships. Incredible sound effects, smooth high resolution graphics in this top quality arcade action game.

# SPACE RAIDER



**ANNIHILATOR II**  
Defend your planet against a mighty alien invasion. All machine code makes for fast and brilliant arcade action!

# ANNIHILATOR II



Post this coupon now to Boom Software  
2-4 Chichester Rents, Chancery Lane,  
London WC2A 1EG

Please send me the following:

Ski Run	£5.50	Annihilator II	£5.50
Logger Mania	£5.50	Space Raider	£5.50
Annihilator II (VIC 20)	£4.75	Trek (VIC 20)	£4.75

Total cheque/PO enclosed £..... payable to 'Boom Software'

Name .....  
Address .....

**commodore 64**  
and VIC 20



# Do you suffer from PCNitus?

Thousands do! So, specially for all you sufferers who want to keep PCN immaculate, easily accessible and out of reach of grubby hands, we've designed this attractive PCN binder.

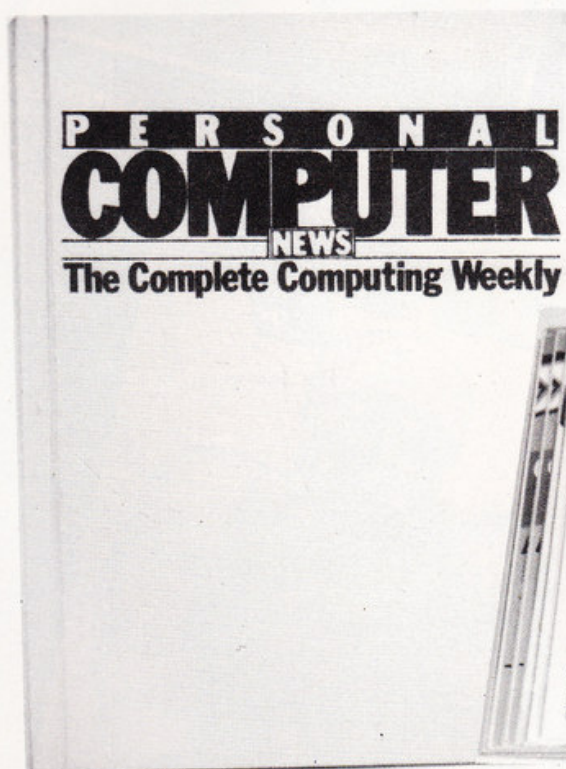
It's red, yellow and silver and will hold four month's copies.

No more grappling in the back of cupboards; no more bent and creased pages!

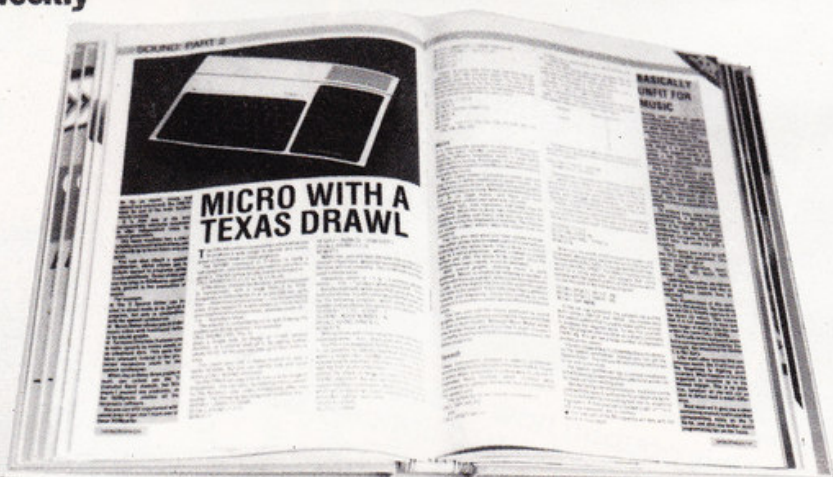
Your copies lie completely flat,

even when the binder is full. You'll be able to read them easily and refer to them quickly. And we'll post the binder to you in a batter-proof package at no extra cost.

It's an attractive price, too. Only £3.50, including postage, VAT and handling. Use the coupon here or, to avoid defacing your copy of PCN, write out your order clearly and send it with payment to the address given.



**ONLY  
£3.50**



BINDER ORDER CARD. Please rush me \_\_\_\_\_ PCN binder(s) at £3.50 each. I enclosed my cheque made payable to Personal Computer News. Please charge my Access/Visa/Diners/American Express card (delete where not applicable)

Account No. .... Name .....  
Address ..... Town ..... Postal code .....  
Signed .....

Send to Personal Computer News, Binders Department, 53/55 Frith Street, London W1A 2HG



# TWO GREAT NEW BOOKS!

## THE COMPANION TO THE BBC MICRO

**The first book** to explore the scope of the BBC Micro. **Geoff Wheelwright** evaluates the wealth of software and peripherals which have been produced and shows you how all this can be exploited, whatever your experience or expectations.

**Not simply an overview** of BBC BASIC or a compendium of hints and tips, but an invaluable reference book which illuminates for the first time the full potential of your spectacular micro.

**Take your BBC to the limits** – graphics, sound, word-processing and communications facilities, function keys and peripherals ... Geoff Wheelwright shows you how!

## THE COMPANION TO THE ORIC 1

**This is the first book** for the Oric 1 which can be used with the original 1.0 ROM and the revised version 1.1 ROM.

**Ian Adamson** introduces ORIC's BASIC language in an easy-to-follow fashion, giving you a graduated introduction to programming backed up with advanced BASIC techniques and an introduction to machine code programming.

**Program storage**, printer use, programming techniques are all covered, with extensive chapters that offer command of the superb high resolution graphics, colour and sound facilities and much much more.



Where can you get them?

From all good bookshops. Or fill in the coupon below and return it to: Pan Books Ltd, FREEPOST, PO Box 109, 14/26 Baker Street, High Wycombe Bucks HP11 2TD.

*For immediate 24 hour service phone 01-200 0200 and use your credit card.*

GET MORE OUT OF YOUR MICRO WITH...

## COMPANION BOOKS

**POST NOW, NO STAMP NEEDED** To Pan Books Ltd., FREEPOST, P.O. Box 109, 14-26 Baker Street, High Wycombe, Bucks HP11 2TD. YES Please send me the following **COMPANIONS** ... paperbacks at £5.95 each plus 35p for the first book ordered plus 15p for each additional book to a maximum charge of £1.25 to cover postage and packing.

name(Mr/Mrs/Miss/Ms) \_\_\_\_\_

address \_\_\_\_\_

post code \_\_\_\_\_

I enclose my cheque/postal order for £ \_\_\_\_\_ payable to Pan Books Ltd or debit my Access/Barclaycard/Visa/Trustcard



no. \_\_\_\_\_

Signature \_\_\_\_\_

Allow up to 15 days for delivery. This offer available within UK only.

Pan Books Ltd. Registered in England Registered No. 389591

☐ Companion to the BBC Micro

☐ Companion to the Oric 1



PCN



# \* Christmas prices have never been this good.

4

## SPECIAL OFFER PACKAGES

### 1. commodore 64 + cassette deck

If purchased separately these items would cost £278.85  
Buy now for 2 yrs guarantee. OUR PRICE **£217.90** d

### 2. commodore 64 + cassette deck + Introduction to Basics Part I (Manual and 2 cassettes to take you through the first steps in computing) + DFM Data Base (Information Storage Programme) + 2 dust covers.

If purchased separately these items would cost £313.00.  
OUR PRICE **£257.00** d

### 3. commodore 64 + VIC 1541 disk drive + Box of 10 diskettes +

If purchased separately these items would cost £490.00  
OUR PRICE **£387.85** d

### 4. Businessman's Starter System.

Comprises Commodore 64 + VIC 1541 disk drive + Box of 10 diskettes + VIC 1525 Printer + Box of paper + EasyScript

If purchased separately these items would cost £735.00  
OUR PRICE **£660.40** d

NEW 64 Printer VIC 1526 with cable ..... £310.00 d

NEW Printer/Plotter (4-colour) ..... £152.99 d

NEW LOW PRICE - Disk Drive VIC 1541 with cable ..... £210.00 d

Printer VIC 1525 with cable ..... £212.75 d

Book: 'Programmer's Reference Guide' ..... £ 9.95 b

Easy Script (Word processing package) ..... £ 75.00 b

DFM Data Base - Disk or Cassette (state which required) ..... £ 19.50 b

DFM Mail labels (Print labels to your specification) ..... £ 9.50 b

Catalogue (Dedicated filing system) ..... £ 16.50 b

Datalog (User orientated filing system) .. £ 17.50 b

Journal (A financial diary with permanent display) .. £ 19.50 b

Gortek & Microchips (Designed to teach 10/13 year olds basics) ..... £ 12.95 b

Sales Ledger ..... £ 75.00 b

Purchase Ledger ..... £ 75.00 b

Easy Stock ..... £ 75.00 b

Attack of the Mutant Camels (Try and beat hostile Aliens) ..... £ 8.50 a

Motor Mania (A thrilling cross country car race) ..... £ 8.95 a

Dust cover for 64/VIC 1525 ..... £ 2.95 a

Joystick ..... £ 6.90 b

Introduction to Basics Part I (see above) ..... £ 14.95 b

Many other titles in stock. Free list with first delivery. Or send S.A.E. for full list.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

Prices correct at time of going to press.

**BBC**

'Special Offers'

Model 'B' with FREE dust cover **£399.00** p&p code d

**Torch Z80 Disk Pack.**  
800 K plus Z80 Processor running Torch's own CP/M. Comes complete with FREE Perfect™ Writer, Speller, Calc and Filer.

**£839.50** d

Cumana Teac Drives with power supply & including Disc Formatter, manual & cables.

100K Drive 40 Track ..... £225.00 d

200K Drive 80 Track ..... £257.00 d

800K Dual Drive 80 Track ..... £632.50 d

Disk Interface (including fitting charge) ..... £ 95.00 d

"View" ROM Word Processor ..... £ 59.80 a

Printer Driver ..... £ 9.95 a

Graphs & Charts on cassette ..... £ 9.95 a

Speech Interface ..... £ 55.00 b

Lisp Language ..... £ 14.65 a

Forth Language ..... £ 14.65 a

Paddles ..... £ 13.00 b

Cassette Lead ..... £ 1.99 a

Dust Cover ..... £ 3.95 a

Econet Network Interface ..... £ 59.80 d

Econet System ..... £198.95 d

BBC Chess ..... £ 8.00 a

BBC Multifile ..... £ 15.00 a

BBC Space Invader ..... £ 5.00 a

**MONITORS**

MICROVITEC 1431 "14" Colour Monitor .... £264.50 d

SANYO HI-RES Green Screen Monitor ..... £114.00 d

## For BUSINESS USE

At Very Competitive Prices the full range of Commodore & Apple Equipment.

Commodore Apple IIe  
4000 Series Apple III  
8000 Series  
700 Series

Be sure to get our quote before you buy!!!

Our Guarantee (2 years on 64's)  
1 full year for labour and parts on all Hardware.

## SPECIAL OFFER PACKAGE

**commodore VIC 20**

+ C2N cassette recorder + Introduction to Basics Part I (Manual and 2 cassettes to take you through the first steps in computing) + 1 cassette with four games + Only from Chromasonic. FREE DUST COVER normally sold for £2.95. If purchased separately these items would cost £249.99

OUR PRICE **£134.99** d

VIC 1525 Printer with cable ..... £212.75 d

VIC 1541 Disk Drive with cable ..... £210.00 d

16K RAM pack ..... £ 28.95 b

24K RAM pack ..... £ 47.95 a

Joystick ..... £ 6.90 a

4-slot motherboard ..... £ 33.35 c

Dust cover for VIC 20/VIC 1525 ..... £ 2.95 a

NEW Printer/Plotter (4-colour) ..... £152.99 d

Super Expander (High resolution cartridge with 3K RAM) ..... £ 31.00 b

Programmers Aid cartridge (Adds more than 20 commands) ..... £ 28.00 b

C2N cassette unit with cable ..... £ 39.10 c

Sargon Chess (6 levels of play) ..... £ 23.00 b

Choplifter (Rescue your men and then return to base) ..... £ 24.95 b

VIC Programmer's Reference Guide ..... £ 12.50 b

Introduction to Basics Part I ..... £ 13.50 b

Send SAE for FREE hardware/software booklet.

## DRAGON 32

Free Basic Training Manual supplied

\* 9 colours \* 32K RAM memory as standard, expandable to 64K \* Extended Microsoft colour basic as standard \* Typewriter Keyboard \* 6809E CPU \* Advanced sound feature \* 32 columns x 6 lines \* p&p code

**£157.50** d

Printer & Cable ..... £232.30 d

Seik osha GP100A and necessary cable ..... £ 14.95 b

Pair of Joysticks ..... £ 2.95 a

Dust cover for Dragon 32/GP100A ..... £275.00 d

Single Disk Drive with controller ..... £225.00 d

Single Disc Drive without controller ..... £200.00 d

Additional Single Drive ..... £ 7.95 a

The King (Save the damsel in distress from the gorilla) ..... £ 7.95 a

Katerpillar Attack (Stop the katerpillar reaching the bottom) ..... £ 7.95 a

Talking Android Attack (This game speaks for itself) ..... £ 7.95 a

Telewriter (Word processor that gives 51 cols. x 24 lines) ..... £ 49.95 b

DFM (A powerful easy to use database) ..... £ 19.50 a

Racer Ball (Defend your moon base from enemy lasers). ..... £ 7.95 a

Scarfman (Run around a maze eating blocks as nasties chase you) ..... £ 7.95 a

Many other titles in stock. Free list with first delivery. Or send S.A.E. for full list.

Official DRAGON sales and service agents for the whole Greater London Area.

# CHROMASONIC PERSONAL COMPUTERS

48 Junction Road, Archway, London N19 5RD

TEL: 01-263 9493 or 5

- FREE ADVICE on all aspects of Personal Computers. You only have to ask.
- DELIVERY: On P.O.'s, Access or Barclaycard, dispatch usually within 24 hrs. Or we'll advise by return. On cheques allow about 5 days.
- If not completely satisfied, return the goods to us undamaged within 14 days for a full refund including p&p. VAT included in all prices.

## CHROMASONIC PERSONAL COMPUTERS

Send to: Chromasonic Personal Computers, 48 Junction Road, Archway, London N19 5RD.

Please send me the following items.

All prices include VAT

£ .....

£ .....

£ .....

p&p code d = £8.00, c = £3.50, b = £2. and a = 60p

(if more than one item ordered, add only one p&p amount - the highest)

p&p £ .....

Total £ .....

I enclose my Cheque/P.O. for £ .....

Please debit my Access/Barclaycard no .....

Name: .....

Address: .....







# 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.

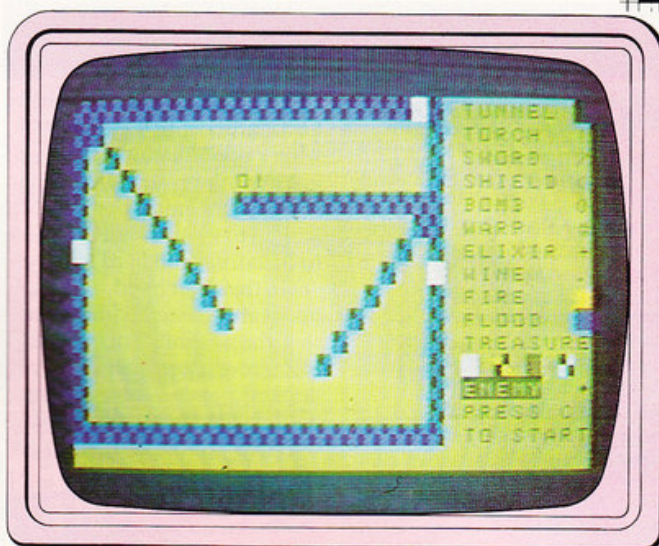
#### Verdict

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.

#### RATING

**Treasure Tombe**  
**Lasting appeal:** ★★★★★  
**Playability:** ★★★★★  
**Use of machine:** ★★★★★  
**Overall value:** ★★★★★

#### 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.

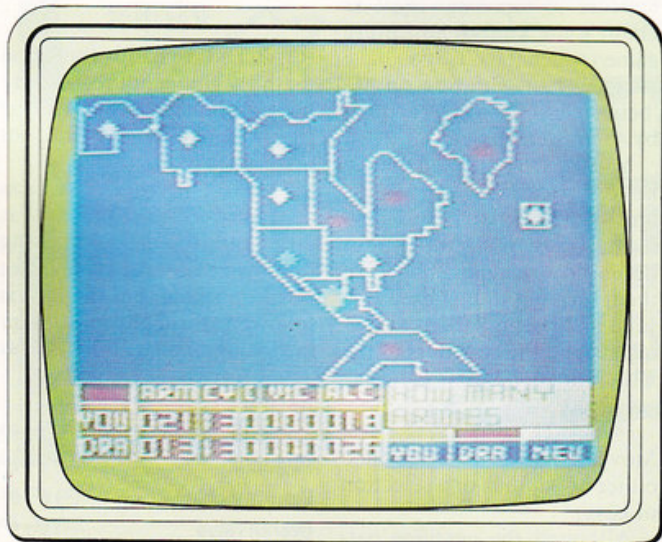
Piers Letcher

#### The Crystal Chalice

★★★★★  
★★★★★  
★★★★★  
★★★★★

#### The Temple of Zoren

★★★★★  
★★★★★  
★★★★★  
★★★★★





# 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

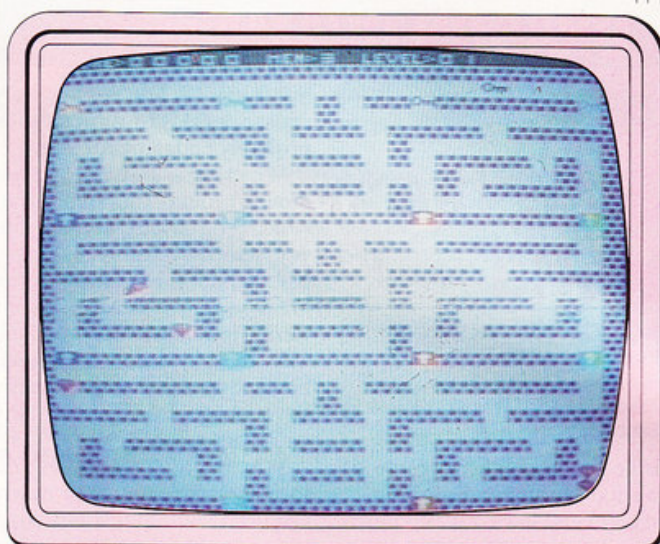
I found the keyboard controls marginally easier to use than the joystick version, but I'd have been happier if there had been something obvious like U-D-L-R — or even W-Z-A-S, which at least makes a logical pattern on the keyboard.

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 L14 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 pat-

tern 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

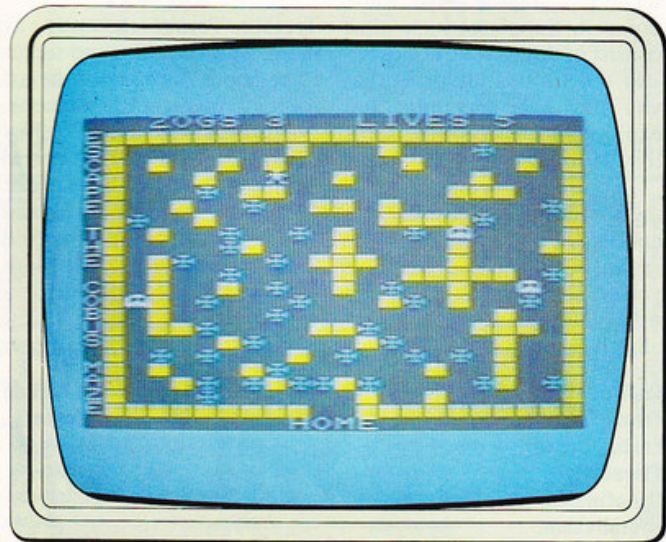
Bewitched is a handy transition for the beginner not yet ready to become a maze addict, as it's far from impossible, yet still not too easy.

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	☆☆☆☆





27th Century Salamander  
presents

# GRIDRUNNER

ON THE GRID ONLY DROIDS CAN  
HEAR YOU SCREAM!

NOW SHOWING  
AT A DRAGON OR  
SPECTRUM NEAR YOU

Awesome original awesome screenplay and  
Llamas by Jeff Minter.

## STARRING

**Hank Hunk** as the Grid Pilot **Truly Scrumptious** as the Blonde  
and **Ivor Notion** as the Mad Professor

with supporting cast – **Mungo Martin** – **Nibs Norman** – **Nimrod Cain** – **Damien Danvers**  
featuring **X, Y Zappers**, **Mutating Pod**, and a cast of thousands (mostly droids)  
and introducing **Gloria Goofbuns** as the Lady Astarte

**Gridrunner £7.95.** Please add 50p p&p to all orders *Dragon version only*. Send A5 SAE for full catalogue.

**Direction:** This, and other remarkable productions, are available at  
selected branches of Boots, and other computer dealers nationwide,  
or direct from:

\* Spectrum versions  
marketed by **Quicksilver**.

# Salamander

## SOFTWARE

Salamander Software, 17 Norfolk Road, Brighton BN1 3AA

COMING SOON from the same awesome team:

**LASER ZONE**

quality software for the Dragon 32, Oric-1 and BBC Model B microcomputers.



# COMMUNICATIONS

## Tandata

### SMART MODEMS

Auto dial, direct connect, with 8 telephone & 8 ID store on modem, 1200/75bps or full multirate (1200/75, 75/1200, 300/300 full duplex 1200/1200 half duplex). Many advanced features. From £99.

Also special terminal, Prestel and downloader software for BBC - APPLE - COMMODORES with more following

**ELECTRONIC MAIL  
PRESTEL  
BULLETIN BOARD  
TELECOM GOLD  
COMPANY DATA BASES  
MICRONET 800  
TELESOFTWARE  
MICRO-TO-MICRO "CHAT"**

**Tandata Marketing Limited,**  
Albert Road North, Malvern, Worcs. WR14 2TL  
Telex: 337617 Prestel \* 799 # Telecom Gold: TAN 001

Please send me Smart Modem literature and Order Form

NAME .....

COMPANY .....

ADDRESS .....

PCN/17/11

## SIR COMPUTERS LTD CARDIFF



### SIR ROM EXTENSION BOARD

THE ROM BOARD FOR THE BBC MICRO

- ★ Easy to install, no soldering, full instructions provided.
- ★ Allows up to 256K ROM space.
- ★ Fits easily inside BBC case.
- ★ Price: £40.25 (+ £1 p+p).

### electron.

Acorn ELECTRON Computer £199  
THE SIR ELECTRON PERIPHERALS  
RANGE: now available:

- ★ PRINTER/JOYSTICK PORT
- ★ ROM EXPANSION BOARD

Please telephone for full details.  
Coming soon: 'MODE 7' ADAPTOR

### BBC MICROCOMPUTER

BBC Micro Model B ..... £399  
BBC Micro Model BD ..... £469

### SOFTWARE

Our range covers over thirty software houses. Please write for further details.

### COMPARE OUR PRICES!

#### PRINTERS

Dot Matrix:  
Epson FX-80 ..... £399.00  
Epson RX-80 ..... £270.00  
Epson RX-80 F/T ..... £289.00  
Shinwa/CT1 CP-80 ..... £263.35

Daisywheel:  
Juki 6100 ..... £399.00

#### DISC DRIVES

100K (Single) ..... £199  
2x100K (Dual) ..... £349  
2x400K (Dual) ..... £669

#### MONITORS

Sanyo Black/Green 12' ..... £85  
Microvitec CUB 14' Colour  
P.O.A.

ALL PRICES ARE INCLUSIVE OF V.A.T.

Address all enquiries to: **SIR COMPUTERS LTD. (DEPARTMENT H12)**  
91 WHITCHURCH ROAD, CARDIFF CF4 3JP  
Tel: (0222) 621813



# 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 hadn'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**



Another routine day of drudgery aboard the Stellar Patrol ship Feinstein. This morning's assignment for a certain lowly ensign Seventh Class: scrubbing the filthy metal deck of the Port end of Level Nine. With your Patrol-issue self-contained multi-purpose all-weather scrub brush, you shine the floor with a diligence born of the knowledge that at any moment dreaded Ensign First Class Blather, the bane of your shipboard existence, could appear.

> GO UP STAIRS

Ensign Blather, his uniform immaculate, enters and notices you are away from your Post. "Twenty demerits, Ensign Seventh Class!" bellows Blather. "Fifty if you're not back on Deck Nine in five seconds!" He curls his face into a hideous mask of disgust at your unbelievable negligence.

## 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 humorous documentation that comes with the game sets the atmosphere for the adventure.

### Verdict

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

Bob Chappell

### RATING

**Lasting Appeal**



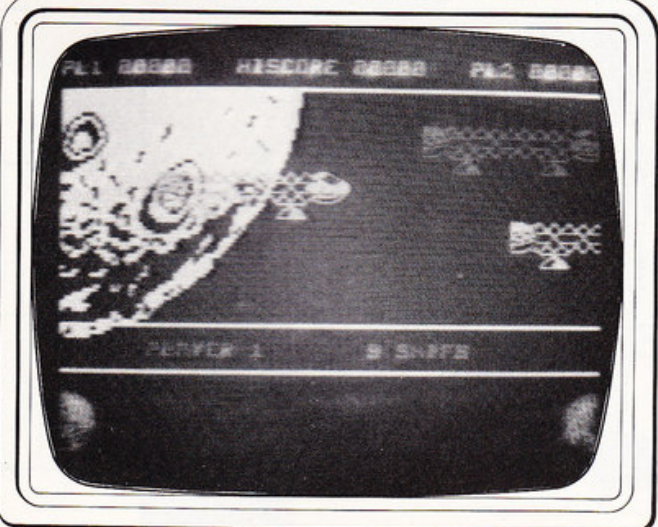
**Playability**



**Use of Machine**



**Overall Value**





# BIG JOHN'S CROSSWORD

## TODAY'S CLUES

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

Today's solution has ten micros, over one thousand software titles, books, magazines, plus lots of add ons and advice. I think it would be fair to say that we do have plenty of MICRO ANSWERS.

Service is high on our list of priorities — we have four fully trained Staff who will be happy to demonstrate any piece of software, though I hear that Flight Simulators are their favourites.

Our shop is only two minutes walk from Victoria Station which is covered by both mainline and underground trains, as well as over twenty inner London bus routes. In fact MICRO ANSWERS is so obvious that you don't have to look below for today's solution.

## MICRO ANSWERS

70-71 WILTON ROAD

LONDON SW1V 1DE

01-630 5995

MONDAY-FRIDAY 10AM-8.30PM  
SATURDAY 10AM-7PM





# SPECTRUM SELECTION

## 48K SPECTRUM

### Frolicking flea

**Name** Bugaboo **System** 48K  
**Spectrum Price** £6.95 **Publisher**  
Quicksilver, 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 takes 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!" 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.

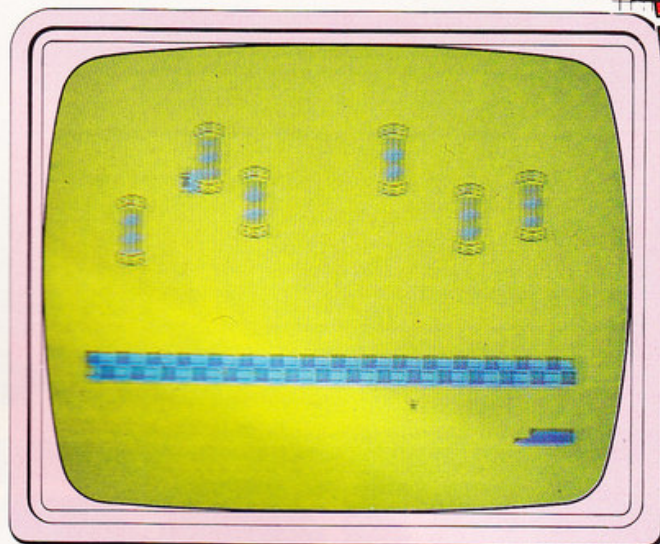
#### Verdict

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 Doodle, 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 Doodle 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.

The brilliant new MZ700. The no-limit computer. £249.95. From Sharp. Where great ideas come to life.





CPU:	Z80A.....	1
ROM:	Monitor 4K byte ROM..	1
	Character generator 4K byte ROM..	1
RAM:	64K byte D-RAM.....	8
	4K byte V-RAM.....	2
1/O bus:	Expansion 1/O bus.....	1
	Additional printer 1/O bus.....	1
	Cassette READ/WRITE terminals.....	2
	Joystick terminals.....	2

RGB MONITOR/VIDEO MONITOR/RF OUTPUTS



Look for this logo on  
software denoting  
Sharp Compatible Software.

To: Sharp Electronics (UK) Ltd,  
Home Computer Division,  
Sharp House, Thorp Road, Newton Heath,  
Manchester M10 9BE. Tel: 061-205 2333

*Please send me details of the Sharp MZ700.*

Name

Address

PCN3

The world of  
**SHARP**  
where great ideas come to life.





# 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 hexadecimal (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

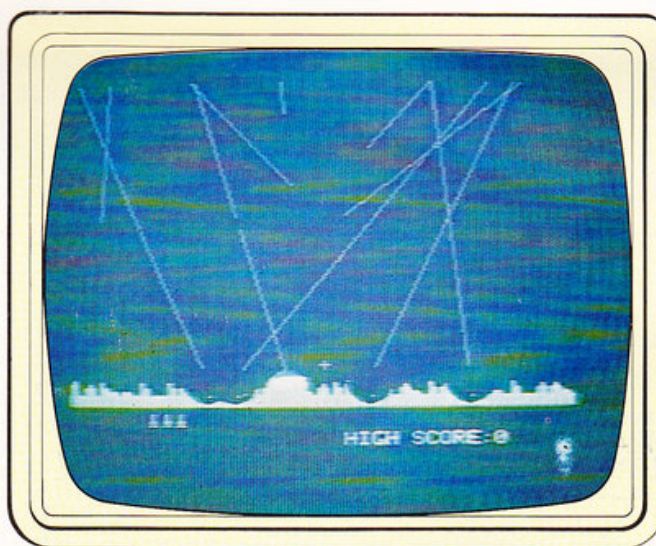
### Card 1 of 5

8337CD1/5

```
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$="hijkj jhkhijhjkijhk 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
```

### Oric-1 48K Tansoft Basic

Application: Game  
Author: T W Phoeng



10-15 Set up arrays and initialise screen and memory.  
20 Gosub and redefine 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.

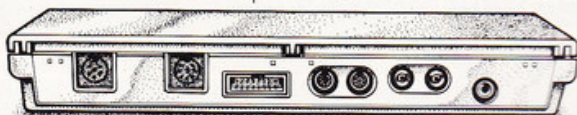
Plug in the Basic-G cartridge, and you can access the M5's incredibly sophisticated graphic and sound capabilities which are far in advance of similarly-priced computers.

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.

I'd like to know more about the CGL M5. Please send me a brochure and a list of dealers. PCN 3

Name \_\_\_\_\_

Address \_\_\_\_\_

**CGL M5**  
HOME COMPUTER

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



# PCNProgramCards

## Falklands Raid Card 2 of 5

8337FM2/5

BBC Model B/BBC Basic/AD Poole/cont'd

```

230IF@%=5THENW%=1ELSEW%=0
240MOVE%(@%),ML%(@%):GCOL0,1:VDU59:1F
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 PROC G
260VDU4:COLOUR0:PRINTTAB(7,4):FUZ:" "
:TAB(19,4)" ":"H%":" ":VDU5
270PROC SM:PROC J
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:PROCL
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 FUZ=0ORFUZ=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:PROCDS:
ENDPROC
430DEFPROC HIT:D%=D%+1:IFD%=2THENS%=200
:PROCBANG:PROCEND
440IFD%=1THENFUZ=FUZ-100:SOUND0,-12,60
,3
450ENDPROC
460DEFPROC S
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.	370	If fuel has run out then ignore up key ie dive dive dive!!
250	Check tab key for firing, if down then PROC G.	380-390	Check vertical keys.
260	Disassociate graphics and text cursors, and update fuel and score.	400	Check for ditching in sea.
270	Update missile movement.	410	Check whether aircraft has flown into anything. If so take damage (D%).
280-310	J% is max velocity, set up in loader program. Check MX% and MY% as these are the Harrier's velocity.	420	Update position of Harrier, and if no damage, remove previous image.
320	Check whether Harrier is in next section, if so then draw next section.	430-450	Procedure used if Harrier hits something, D% is damage, which is incremented until it reaches 2 in which case Harrier blows up.
330	Check if Harrier has flown to previous section.	460	This procedure checks missile condition.
340	Check Harrier's flying ceiling and make sure that it is not exceeded.	470	Missile in sea.
350-360	Check horizontal movement keys.	480	Missile self destructed.

# PCNProgramCards

## Falklands Raid Card 3 of 5

8337FM3/5

```

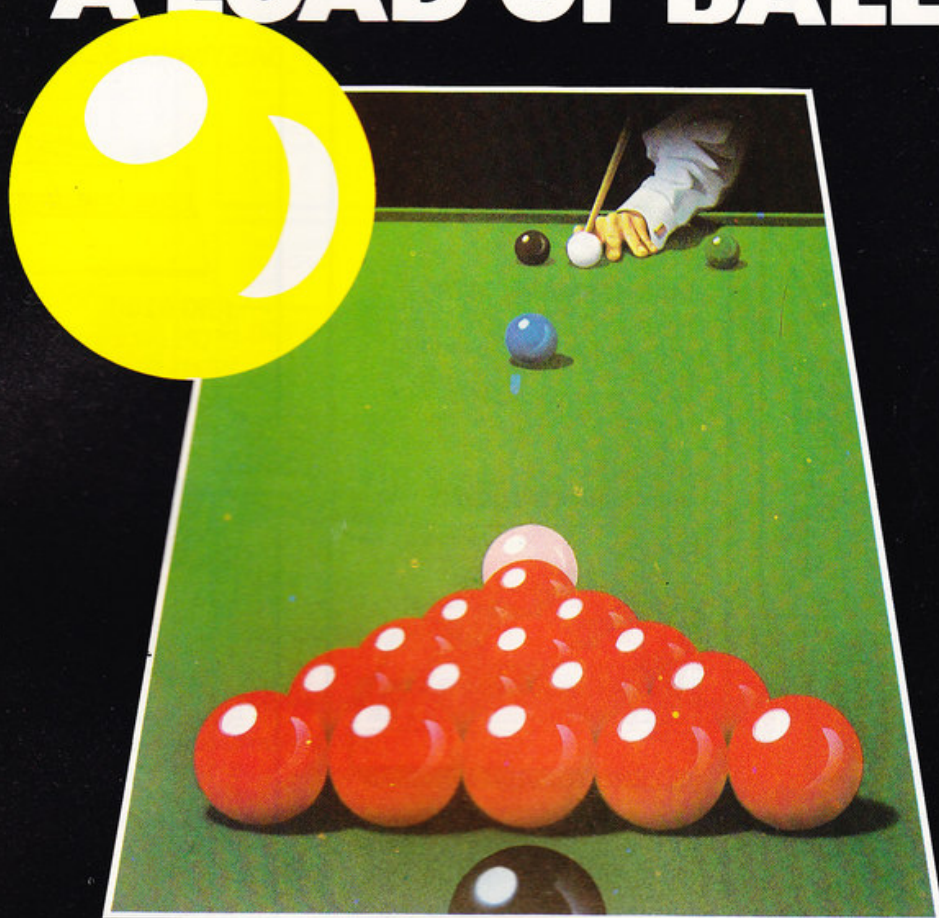
490IF POINT(XS%(T),YS%(T))=2 OR POINT(
XS%(T)+(MSX%(T)/2),YS%(T)+(MSY%(T)/2))=2
H%=H%+1:MOVEXS%(T)-16,YS%(T)+16:GCOL0,1
:VDU241:GCOL0,0:SOUND0,-11,53,3:FORY=1 T
O 90:NEXT:VDU8:VDU241:I%(T)=0:PROC SMOK:E
NDPROC
500IF XS%(T)-V%*MSX%(T)>1280 OR XS%(T)
-V%*MSX%(T)<0 OR YS%(T)-V%*MSY%(T)<0 OR
YS%(T)-V%*MSY%(T)>950 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
530DEFPROC BANG: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
570PROC PLOT:PROC UNPLOT:MOVEX%-10,Y%-10
:MOVEX%+10,Y%+10:PLOT85,X%,Y%+10:NEXT:VD
U19,1,1,0,0,0:ENDPROC
580DEFPROC PLOT:VDU19,2,12,0,0,0:MOVEX+
D,Y+L:VDU42:ENDPROC
590DEFPROC UNPLOT:VDU19,1,13,0,0,0:MOVE
X,Y:VDU42:ENDPROC
600DEFPROC BACK: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
670DEFPROCDS
680IF FUZ<1 OR D%=1 OR MX%=0ANDMY%=0DD
%=-2:GOTO700
690GCOL0,0:MOVEA%-10,B%+10:VDUQ%
700ENDPROC
710DEFPROC G
720IF MX%=0 AND MY%=0 THEN ENDPROC
730FORT=1 TO 5

```

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



# MORE THAN A LOAD OF BALLS



The pink's teetering on the edge of the pocket, the red's partially blocked, and now it's make or break.

Do you add a touch of spin or do you play safe?

Do you try for the trick shot or go for the snooker?

Visions Snooker brings all the excitement and all the tension of big time tournaments to your TV set.

With an advanced programme written by a 19 year old undergraduate at Queens College Cambridge, it makes Pot Black look like a load of old balls.

Visions **Snooker**. It's an exciting test of your skills on the cue. And it's yet another great game from Visions.

The ultimate name in video games.

ZX SPECTRUM/BBC MODEL B & ELECTRON  
VIC-20 3K/COMMODORE 64



SNOOKER VS-03-1/4  
£8.95

ZX SPECTRUM



SHEER PANIC VS-02-16  
£5.95

ZX SPECTRUM



PITMAN SEVEN VS-01-48  
£6.95

*Visions*

FANS PLEASE NOTE! ALSO AVAILABLE MAIL ORDER  
FROM VISIONS (SOFTWARE FACTORY) LTD  
1 FELGATE MEWS, STUDLAND STREET, LONDON W6

01-7487478



# ONE-STOP SHOPPING

**KEENEST PRICES,  
PROMPT, RELIABLE  
SERVICE ---  
That's TWILLSTAR!**

## BBC MICROCOMPUTER



Model B.....	£399
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



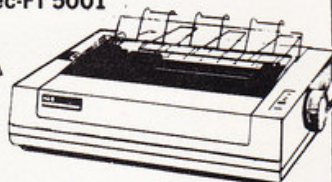
**NOW AVAILABLE  
THE ACORN ELECTRON  
ONLY £199.00**

## WORD PROCESSORS

View Word Processor.....	£59
Word Wise Word Processor.....	£45

## Logitec-FT 5001

**STAR  
BUY**



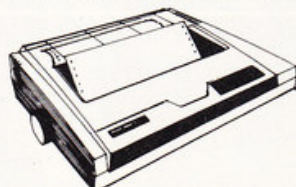
Friction and adjustable sprocket feeding, variety of printing models, (PICA & ELITE pitch) user font registry command, automatic paper insertion, 96 ASCC11 with descender, 8 international character sets, 48 semi graphics!

**At the very low price of £330**

INVITATION TO **MICRO USER SHOW**  
Westminster Exhibition Centre  
Greycoat Street, London, SW1  
Dec 8, 9, 10, 11, 1983  
STAND Nos. 97, 98, 107, 108  
Ask for your complimentary ticket  
now! Come and see us to pick a  
special gift for Christmas!  
\* BARGAINS \* SPECIAL PRODUCTS

Just look at our prices and selections: but if you don't see what you want please telephone us, as we are unable to list all the items we stock. We will be more than pleased to give you our Best price, and our very best wishes for Christmas!

## DOT MATRIX PRINTERS



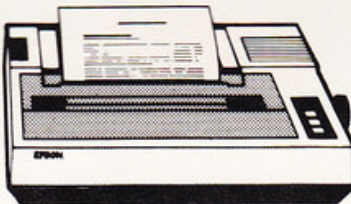
### MANNESMANN MT80

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**

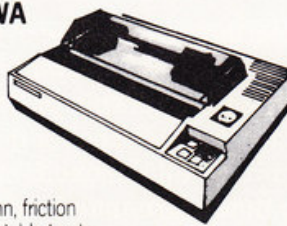
**FREE CABLE AND  
PAPER WITH ALL  
PRINTERS**

## EPSON



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

## SHINWA CP80



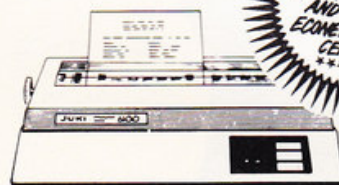
80 column, friction and adjustable tractor feed, bidirectional logic seeking, HI-RES graphics and block graphics, sub and superscripts, condensed and emphasised print, and underlining, vertical and horizontal tabs, self test, italic print, etc.

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

## DAISYWHEELS



### JUKI 6100

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

Juki 6100 Daisywheel with 2K Buffer..... **£395**



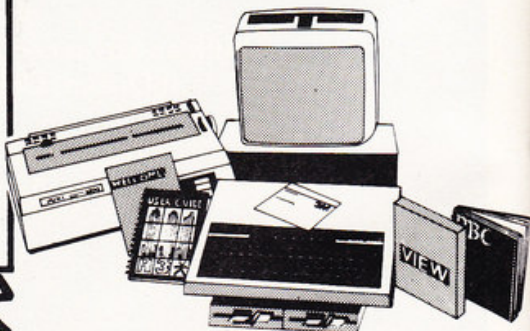
### BROTHER HR15

Buffer ... 3K byte, shadow printing, super/sub script, carriage skip movement, text reprinting, colour printing (red and black), auto under-scoring, 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 formatting disc. **ONLY £1,360 (incl. all cables)**

**TCL**

**ALL PRICES INCLUSIVE OF VAT.**

**Twillstar Computers Limited**

Microcomputers Peripherals Software Service Contracts



# \* to fill your Christmas MICRO stocking!

## MONITORS

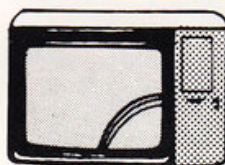
### PHILIPS TP200 Green Monitor

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

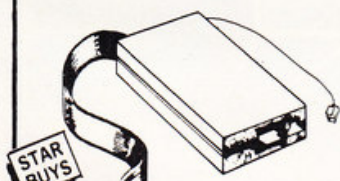
Microvitec 14" 1431 ..... £247  
BBC Official 12" ..... £95

## TORCH DISK PACK

**Torch Z80 Disk Pack**  
4MHZ Z80 Application Processor  
Perfect Software

At New Low Price  
£835.00 Inc. Installation

## SLIM DISK DRIVES



**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

### KOMORI - MICROPROCESSOR CONTROLLED



Ideal for BBC Micro, and any other computers with standard interface. 5 1/4" 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

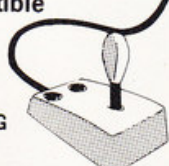
## FLOPPY DISKS



Floppy Disks in packs of 10  
Single sided 40 Track ..... £20  
Double sided 80 Track ..... £35

## BBC Compatible

### KLIK STIK JOYSTICK - SELF CENTRING

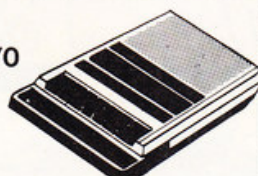


Two Fire Buttons

Single - £17.95  
Dual - £34



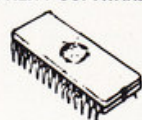
## SANYO



### 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

\*\*\*\*\*

## FITTING SERVICES AVAILABLE

## SOFTWARE ACORN SOFT GAMES

Creative Graphics ..... £9.95  
Graphs & Charts ..... £9.95  
Desk Diary ..... £9.95  
Monsters ..... £9.95  
Snappers ..... £9.95  
Planetoid ..... £9.95  
Arcade Action ..... £11.50  
Rocket Raid ..... £9.95  
Meteors ..... £9.95  
Arcadians ..... £9.95  
Siding Block ..... £9.95  
Cube Master ..... £9.95  
Chess pack ..... £9.95  
Super Invaders ..... £9.95  
Missile Base ..... £9.95  
Snooker ..... £9.95  
Starship Command ..... £9.95  
Draughts/Revers ..... £9.95

## ADVENTURES

Sphinx Adventure ..... £9.95  
Philosophers Quest ..... £9.95  
Castle of Riddles ..... £9.95  
Countdown to Doom ..... £9.95

## LANGUAGES

Lisp ..... £16.85  
Forth ..... £16.85  
Microtext ..... £49.85  
BCPL ..... £99.00

## EDUCATION

Algebraic Manipulation ..... £9.95  
Peeko Pack ..... £9.95  
Business Games ..... £9.95  
Tree of Knowledge ..... £9.95  
Sentence Sequencing ..... £11.90  
Word Sequencing ..... £11.90  
Missing Signs ..... £11.90  
Number Balance ..... £11.90  
Word Hunt ..... £11.90  
Speed & Light ..... £11.90  
Density & Circuit ..... £11.90  
Chemical Analysis ..... £13.80  
Chemical Simulations ..... £13.80  
Chemical Structures ..... £13.80  
Jars ..... £11.90

## BOOKS

Creative Graphics ..... £7.50  
Graphs & Charts ..... £7.50  
Lisp ..... £7.50  
Forth ..... £7.50  
View Guide ..... £2.50  
Intro View ..... £2.50  
BCI Manual ..... £15.00

## BBC GAMES SOFTWARE (BUG BYTE)

Galaxy Wars ..... £7.50  
Oblivion ..... £7.50  
Red Lord ..... £7.50  
Music Synthesizer ..... £9.50  
Graphics Package ..... £9.50  
Old Farmer Tyne ..... £9.50  
City Defence ..... £9.50

## (COMPUTER CONCEPT)

Asteroid Belt ..... £8.99  
Characters ..... £6.65  
Hitch-Hiker ..... £6.85  
Snake ..... £8.95  
Space Hawks ..... £8.95

## PROGRAM POWER

Felix in the Factory ..... £7.95  
Felix and the Fruit Monsters ..... £7.95  
Escape from Moonbase Alpha ..... £7.95  
Danger UXB ..... £7.95  
Moon Raider ..... £7.95  
Bandits at 3 O'clock ..... £6.95  
Swoop ..... £7.95  
Croaker ..... £7.95  
Alien Swirl ..... £6.95  
Chess ..... £7.95  
Asteroid Storm ..... £7.95  
Command ..... £7.95  
Wall ..... £5.95  
Beebtoe ..... £5.95  
Caveman Adventure ..... £6.95  
Reversi ..... £5.95  
Physics ..... £6.95  
Chemistry ..... £6.95  
World Geography ..... £6.95

## BUSINESS SOFTWARE

**Word Processors Room Based**  
Word Wise ..... £44.85  
View ..... £59.30

## GEMINI

Cash Book Accounts ..... £59.95  
Final Accounts Program ..... £59.95  
Invoices and Statements ..... £19.95  
Commercial Accounts ..... £19.95  
Mailing List ..... £19.95  
Data Base ..... £19.95  
Stock Control ..... £19.95  
Home Accounts ..... £19.95

## Spread Sheet Analysis

Beebcalc Rom ..... £39.00  
(Also available on 40/80 Disc)

## BOOKS

30+ Programs - BBC Micro ..... £4.95  
30 Hour BASIC (BBC Micro) ..... £6.00  
6502 Application Book ..... £10.25  
Advanced 6502 Interfacing ..... £10.95  
BBC Micro Revealed ..... £7.95

Basic programming of BBC micro ..... NEW! £5.95

BBC basic (For Beginners) ..... NEW! £6.95

Putting your BBC to work ..... NEW! £4.95

Creative Graphics on BBC Micro ..... £7.50

Easy Prog. for BBC Micro ..... £6.50

Further Prog. for BBC Micro ..... £5.95

FORTH Programming (Sams) ..... £12.50

Advance BBC Micro user Guide ..... £12.95

Basic Programming for BBC Micro ..... £9.95

21 Games for BBC Micro ..... £5.95

Intro to Micro Beginners Book (3 Ed) ..... £9.90

Let Your BBC Teach You to Program ..... £6.75

Micros in the Classroom ..... £4.90

Practical Prog. for BBC & ATOM ..... £5.95

Programming the 6502 ..... £10.75

Structured Prog. with BBC BASIC ..... £9.50

The BBC Micro an Experts Guide ..... £7.90

6502 Games ..... £9.75

Basic Handbook (2nd Ed) ..... £15.75

Advanced BASIC ..... £9.95

BASIC Computer Prog. for the Home ..... £9.70

ALP for BBC Computers ..... £8.95

BCPL for the BBC Micro User Guide ..... £15.00

Games BBC Computer Play ..... £6.95

Basic Programming on the BBC Micro ..... £5.95

30 Hours Basic ..... £5.95

35 Educational Programmes for BBC Micro ..... £6.95

## HOW TO ORDER

You may purchase any of the items listed by cheque, Barclaycard or Access. All you have to do is fill in the details in the coupon below and list your requirements on a separate sheet of paper. Post to us and we will despatch within 7 to 14 days. All prices inclusive of 15% VAT.

Add £2.50 P&P for orders below £150, over, add £8 P&P.

## TELEPHONE ORDERS (01) 574 5271

Credit card holders may order by telephone. Give Card No., Name, Address and item required.

Post to:

TWILLSTAR COMPUTERS LTD,  
17 REGINA ROAD, SOUTHAL, MIDDLESEX.

I have enclosed my list of requirements along with my cheque/P.O. for £ .....

I prefer to pay with my ACCESS/BARCLAYCARD (Delete whichever not applicable)

CARD NO. ....

SIGNATURE .....

NAME .....

ADDRESS .....

TEL: (Day) .....

TEL: (Eve) .....

CREDIT CARDS VALID IF SIGNED BY CARD HOLDER. ADDRESS ABOVE MUST BE THE SAME AS CARD HOLDER.

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

17 REGINA ROAD · SOUTHAL  
MIDDLESEX · TEL: (01) 574 5271

(OPEN SIX DAYS A WEEK - 10 a.m. to 8 p.m.)



# SPOT THE DIFFERENCE!

Choosing which game to buy from the mountain available is a difficult job, especially when everyone claims to produce the best on the market. But how can you tell the best from the rest? To help you decide, read on. . . .



## THE DUNGEON MASTER

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.

"Highly recommended for its versatility, originality and quality. Definately well worth obtaining".

...ZX Computing.

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.



## HALLS OF THE THINGS

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

"Excellent and dangerously addictive - could change the Spectrum games scene overnight".

...Sinclair User.

"Spectacular - One of the best games I've seen, finely balanced between simplicity and addictiveness - superb graphics and colour - I CAN'T RECOMMEND IT HIGHLY ENOUGH".

...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 fascinate and frustrate you for months!

ZX Spectrum 48K

£7.50

Written by Martin H. Smith.



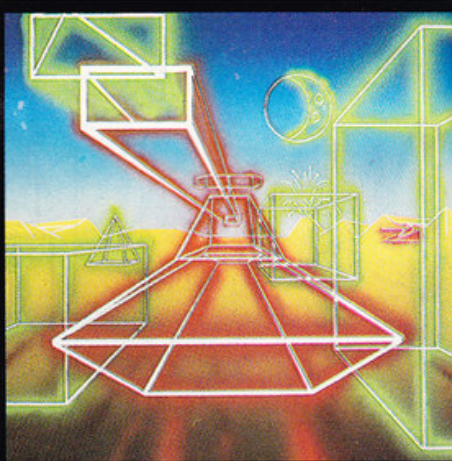
## INVASION OF THE BODY SNATCHAS!

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

ZX Spectrum 48K

£6.50

Written by Simon Brattel and Neil Mottershead.



## ROMMEL'S REVENGE

A brilliant interpretation of the most visually stunning arcade game of all time. Superb high resolution 3D graphics with full perspective plus a host of new and exciting features make Rommel's Revenge the most spectacular game ever produced for your Spectrum!

ZX Spectrum 48K

£6.50

Written by Martin Horsley.



Please Supply:

Invasion of the Body Snatchas ☐  
Rommel's Revenge ☐ The Island ☐  
Halls of the Things ☐ The Dungeon Master ☐  
Catalogue (please enclose SAE 6in. x 9in.) ☐

I enclose cheque/PO for.....

NAME.....

ADDRESS.....

Please send SAE for our latest catalogue and details of our forthcoming software.

Catalogue FREE with every order. P&P included.

Please add £0.50 per item for overseas orders.

Please make cheques/PO's payable to:

CRYSTAL COMPUTING

2 ASHTON WAY

EAST HERRINGTON

SUNDERLAND SR3 3RX

DEALERS! For details of our excellent dealer discounts (including export) ring Chris Clarke on 061-205 6603.

PROGRAMMERS! Written any good software? send it to us for evaluation and details of our excellent royalty scheme.



## PCNProgramCards

### 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
760DEFFPROCJ: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
800DEFFPROC SMOK:EX=EX+1:IF EX>5 THEN EX
=1
810L%(EX)=XS%(T)-20:ML%(EX)=YS%(T):END
PROC
820DEFFPROC SM:FORI%=1 TO 7
830IF POINT(C%(I%)+16,CC%(I%)-10)=1MOV
EC%(I%),CC%(I%):GCOL0,0:VDU253
840NEXT:ENDPROC
850DEFFPROC LAND:K=1:CLG:COLOUR0: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
1050DEFFPROC L:K=0:READH,R$:GCOL0,C:FOR K
=K TO H:MOVEX,K*32+10:VDU253:NEXT
1060IF R$="O" 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.

## PCNProgramCards

### Falklands Raid Card 5 of 5

8337FM5/5

```

1090IF R$="B"MOVEX,(H+1)*32+10:GCOL0,2:
VDU253
1100ENDPROC
1110DATA C1,@,@,@,AC,@,SS,@,@,@,AC,@,@,
,S,@,@,SS,@,@,SS,@,@,20
1120DATA @,@,5,S,@,@,@,SS,@,@,8,S,
L,1,0,L,1,R,L,2,B,L,3,R,L,3,B,L,3,0,L,4,
R,L,7,R,L,5,0,L,5,B,L,5,0,L,5,R,L,5,B,L,
6,0
1130DATA L,4,0,L,3,B,L,2,R,L,1,R,S,@,SS,
@,@,@,SS,@,@,SS,@,@,SS,@,SS,@,SS,@,1,
R,@,S,L,1,R,L,1,B,L,2,B,L,1,0,@,L,0,B,L,
1,0,L,2,B,L,3,R,L,4,0,L,3,0,L,3,B,L,3,0,
L,3,B,L,3,0
1140DATA L,4,0,L,5,B,L,7,R,L,5,0,L,6,0,L,
4,B,L,4,0,L,6,R,L,3,0,L,1,R,S,SS,SS,@,@,
SS,@,@,@,SS,@,@,@,@,@,@,@,@,@,@,@,@,
@,@,@,@,@,@,@
1150DATA @,@,20,SS,@,@,@,SS,@,AC,@,@,SS,@,
,20
1160DATA @,@,50
1170DEFFPROC LANDED:D%=0:MX%=0:MY%=0:IF Z
%<20RZ%>5THEN1180ELSEX%=200:PROCBANG:PRO
CEND

```

```

1180MOVEX%,Y%+100:GCOL0,3:PRINT"LANDED"
:VDU4:FORFU%=FU% TO 500 STEP2:COLOUR0: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
1220DEFFPROC LIV:FU%=FU%-1:IF FU%<100 VDU
4:COLOUR0:SOUND1,-5,160,1:PRINTTAB(25,4)
"FUEL LOW":VDU19,3,12,0,0,0:VDU5
1230ENDPROC
1240DEFFPROC END: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.





# The Entertainers Software Suppliers

1/1 Main Street, Deans, Livingston

TEL: (0506) 410004

## ZX SPECTRUM

Game	Ram	Author	Price
Molar Maul	16/48	IM	5.50
Leapfrog	16	CD	5.95
3D Painter	16	CD	5.95
Bozo Boa	16	CD	5.95
Planet of Death	16/48	AR	6.95
Ship of Doom	16/48	AR	6.95
Invaders	16/48	AR	4.95
Micro Chess	16/48	AR	6.95
Cosmic Debris	48	AR	4.95
Chess Tutor	16/48	AR	9.45
Astroblast	16/48	QU	7.95
The Chess Player	48	QU	6.95
Time Gate	48	QU	8.95
Space Intruder	16/48	QU	4.95
Mined-Out	48	QU	7.95
Meteor Storm	16	QU	4.95
3D Strategy	16/48	QU	6.95
Velnors Lair	48	QU	6.95
Smugglers Cove	48	QU	6.95
Schizoids	16/48	IM	5.50
Ah Diddums	16/48	IM	5.50
Zip-Zap	48	IM	5.50
Jumping Jack	16/48	IM	5.50
Zoom	16/48	IM	5.50
Arctidia	16/48	IM	5.50
Invasion Force	16/48	AR	4.95
Centi-Bug	16/48	DK	4.95
Invaders	16/48	DK	4.95
Dictator	48	DK	4.95
3D-Tank	16/48	DK	4.95
Spawn of Evil	16/48	DK	4.95
Meteoroids	16/48	DK	4.95
Gold Mine	16/48	DK	4.95
Frenzy	16/48	OC	5.50
Kong	48	OC	5.50
Armageddon	16/48	OC	5.50
Monster Muncher	16/48	OC	5.50
Caterpillar	16/48	OC	5.50
Star Trek	16	IP	5.00
Spec Man	16	IP	5.00
3-D Maze	48	IP	5.00
The Quest	48	HE	7.95
Heathrow	48	HE	7.95
Night Flight	48	HE	5.95
Spectral Panic	48	HE	5.95
Specvaders	48	HE	5.95
Trader	48	PI	9.95
Gobble a Ghost	16	CD	5.95
Penetrator	48	ME	6.95
Terror Daktil	48	ME	6.95
Jet Pac	48	UL	5.50
Trans-Am	16/48	UL	5.50
Manic Miner	16/48	BB	5.95
Styx	16/48	BB	5.95

## VIC 20 software at discount prices — Send s.a.e. for a full list.

Game	Ram	Author	Price
Star Trek 3000	48	DK	4.95
Slicker Puzzle	16	DK	6.95
Trom	16	DK	5.95
Golf	16	DK	4.95
Diet	48	DK	6.95
Speed Duel	48	DK	5.95
Apple Jam	48	DK	5.95
Personal Finance	48	DK	6.95
Maziacs	48	DK	6.95
Hunchback	48	OC	5.90
Rescue	48	OC	5.90
Digger Dan	48	OC	5.90
Repusar	16-48	SK	5.95
Firebirds	16-48	SK	5.95
Lunar Jetman	48	UL	5.50
Atic Atac	48	UL	5.50
3D Spacewars	16-48	HE	5.95
Traxx	48	QS	6.95
Ant Attack	48	QS	6.95
Bugaboo	48	QS	6.95
Aquaplane	48	QS	6.95

## ZX 81

Game	Ram	Author	Price
Inca Curse	16	AR	5.95
Ship of Doom	16	AR	5.95
Krakit	16	AR	5.95
Galaxians	16	AR	5.95
IK Games Pack	16	AR	6.00
Asteroids	16	QU	3.95
Invaders	16	QU	3.95
Monchies	16	QU	3.95
Croaka Crawla	16	QU	3.95
Maze Death Race	16	PS	3.95
Alien	16	PS	3.95
Ghost Hunt	16	PS	3.95
Star Trek	16	PS	3.95
Krazy Kong	16	PS	3.95
Hopper	16	PS	3.95
Octopusy	16	PE	3.45
Tape 1 10 games	1	JK	3.95
Tape 2 Starfighter	16	JK	3.95
Tape 3 Catacomb	16	JK	4.95
Tape 4 3D Monster Maze	16	NG	4.95
Tape 5 3D Defender	16	NG	4.95
Puckman	16	HE	5.95
Pilot	16	HE	5.95

## EXTRA SPECIAL DISCOUNTS

- Orders up to £5.00 — 1 x 50p voucher.  
£5.01 to £10.00 — 2 x 50p vouchers.  
£10.01 to £15.00 — 4 x 50p vouchers.  
£15.01 to £20.00 — 5 x 50p vouchers.  
£20.01 to £25.00 — 7 x 50p vouchers.  
Redeemable against our ever increasing software list.  
We personally guarantee to honour our vouchers.
- Many special offers on the best games software around.
- Postage and packaging is free.
- Every numbered voucher entitles you to a chance to win our special software prize absolutely free.
- Only top quality original cassettes supplied.

The Entertainers Software Suppliers (PCN),  
1/1 Main Street, Deans, Livingston. Tel: 0506-410004.  
Please supply the following:—

1. ....  
2. ....  
3. ....  
4. ....  
5. ....  
Despatch to:—  
Name .....  
Address .....  
Computer ..... Ram .....  
Cheque No ..... for £ ..... enclosed.  
Please debit my credit card Access/Visa No. ....  
Signed .....

## SUPPLIERS KEY

SU — Sumlock; SO — Solar; PI — Pixel; IM — Imagine; AN — Anirog; UL — Ultimate; ME — Melbourne;  
HE — Hewson Consultants; IP — Impact; AR — Artic; QU — Quicksilver; DK — DK Ironics; OC — Ocean; PS — Pss;  
SK — Softek; PE — Peaksoft; JK — J. K. Greye; NG — New Generation; CD — CDS; TE — Terminal; BB — Bug-Bite.

# SHARP Special Offers

## MZ-700

High quality keyboard, Z80 A 3MHz  
64K RAM  
Full Colour  
Cassette Recorder  
£39.95 inc VAT  
Four colour printer  
£115.00 inc VAT

**£240**  
INC VAT

FREE CARRIAGE  
TO UK  
MAINLAND

## MZ-80A

The MZ-80A comes  
complete with  
48K RAM.  
The screen and  
cassette are  
built in, instead  
of expensive extras  
+ FREE SOFTWARE PACK



FREE CARRIAGE  
TO UK MAINLAND

## MZ-80B

Complete with 64K RAM  
Full electronic cassette  
mechanism  
High resolution dot  
addressable graphics  
40/80 col screen

**£750**  
INC VAT



FREE CARRIAGE  
TO UK MAINLAND

## FULL RANGE OF SOLO SOFTWARE STOCKED FOR THE 700

TOMBS OF KARNAK  
DRAGON CAVES  
ENCOUNTER  
FLAME QUEST  
ICE WARRIORS  
TRUCKER  
SCOOP  
COMMANDO PLAIN

GLOBAL WAR  
FIGHTER COMMAND  
NIGHTMARE PARK  
CHOC-A-BLOCK  
MOUNTAIN RESCUE  
BRICKY  
DATABASE FILER  
APOCALYPSE

# Computer 100 Limited

181 Oxford Road  
Reading  
Berkshire RG1 7UZ  
Tel: (0734) 591616



8337PY3/4

```

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 wrong
"
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 19,20; "en
ter"
1420 PAUSE 0
1430 PAPER 0: CLS
1440 PRINT INK 2; AT 21,14; "X"; I
NK 5; AT 21,16; "Steve Using"
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 U(
A),H(A); ""
1530 NEXT A
1540 RETURN
1600 REM Routine to delete playe
rs route & re-start-----
1610 FOR A=2 TO A-1
1620 PRINT OVER 1; PAPER 7; AT E(
A),D(A); ""
1630 BEEP .25,50
1640 NEXT A
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.

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 0; 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 adjoining,
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,
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 'S' to drop left; AT 6,2; "2
) pressing 'D' to drop down; AT
8,2; "3) pressing 'G' to drop rig
ht"
2045 PRINT INK 5; "also"; "----
"; INK 4; AT 15,2; "A' 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 18,3; "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
2099 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+15; "="
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
3000 BORDER 7: PAPER 7: INK 0: C
LS : STOP

```

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



# YOUR FREE CHRISTMAS GIFT

Dear Customer

Re: AT CONWAY-YOU GET MORE FOR LESS

All of us, here at Conway, would like to thank you for your continued support, and wish you a Merry Christmas and a very happy New Year.

To receive your gift all you have to do is order your requirements now, and claim your free Disk Ring Binder above, capable of storing up to 20 disks.

Looking forward to being of continuous service to you.

On behalf of  
CONWAY COMPUTER SERVICES LTD

\* See our adverts in PCW, PCN, Microdecision, Computers in Education. To order, simply follow the instructions in the advert below.

OFFER OPEN UP TO DEC. 31st, 1983

## THIS ATTRACTIVE DISK RING BINDER, WORTH £5.75, CAN BE YOURS!

### ORDER NOW!

Purchase items worth £50 or 20 Disks and over, and get your Christmas Gift free!



## At CONWAY you can order more for less!

At Conway Computer Services we can offer you the lowest prices for diskettes, ribbons, binders and lots more. Just look at our prices!

ALL PRICES INCLUSIVE OF 15% VAT

### PROTECT YOUR FLOPPY & MINI DISKS.

Lockable, secure, with dividers, anti-static in beautiful smoke & white colour



**F40**  
210 x 240 x 230 mm  
£23.00  
For 40 Disk



**F90**  
350 x 240 x 230 mm  
£34.50  
For 90 Disk



**M35**  
210 x 180 x 165 mm  
£16.10  
For 40 Disk



**M85**  
250 x 180 x 165 mm  
£21.85  
For 90 Disk

### RIBBONS

(Minimum quantity 12)

IBM 3262  
IBM 5211  
IBM 5225  
IBM 5256 - CARTRIDGE  
EPSON FX80/MX80/PX80  
EPSON FX100/MX100/RX100  
EPSON SPINWRITER 5500  
NEC MICROLINE 80/82A/83A  
OKI MICROLINE 80/82A/83A  
C.I.TOH 1550/8510

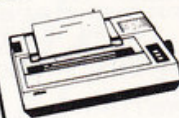
Prices Each

£6.85  
£4.55  
£19.85  
£4.25  
£4.60  
£11.45  
£6.90  
£2.40  
£4.85

ASK FOR OUR FULL LIST!

### RING BINDERS

New, very attractive Ring Binder, in black plastic finish, capable of storing up to 20 diskettes.  
Special Price of £5.75 £35p P & P each.  
Over 10 Binders £5.15 & £1.35p P & P.



MATRIX PRINTERS  
EPSON

FX80 - 160 CPS £465.00  
RX80 - 100 CPS £315.00

Add £8 for P & P and Insurance

### ANTI-GLARE SCREENS

Eliminate glare from your screen by using this special frame covered with precision woven nylon mesh. Designed to fit the front cover and glass face of V.D.U. terminals.

Standard sizes:

9" - £15.65  
12" - £16.25  
14" - £17.25

### QUICK-SHOT JOYSTICK!

Winning is the name of the game!

- \* CONTOUR HANDLE, RAPID FIRE BUTTON
- \* OPTIONAL LEFT HAND FIRE BUTTON \* JACK & LONG CORD
- \* SURE FOOT SUCTION CUPS

FOR USE ON THE:  
ATARI VCS, SEARS VIDEO ARCADE, VIC-20, ATARI 400 & 800, NEC PC-6001, SPECTRUM (Interface required)

AT THE VERY LOW PRICE OF £12.95!  
BUY TWO AND SAVE £22.95!



HOW TO ORDER  
You may purchase any of the items listed by MAIL ORDER ONLY.

All you have to do is list your requirements on a piece of paper, fill in the coupon below and post to us with your cheque or P.O. made payable to: CONWAY COMPUTER SERVICES LTD. Allow 7 or 14 days for delivery.

\* CASH WITH ORDER ON ALL FIRST ORDERS (Subsequent Company Orders - 30 days). \* DEALER ACCOUNTS WELCOME. \* SPECIAL DISCOUNTS TO EDUCATIONAL ESTABLISHMENTS

Please post to: Conway Computer Services Ltd  
39 Conway Rd. Harringay London N15 3BB

I enclose cheque/P.O. for £.....

NAME: .....

COMPANY: .....

ADDRESS: .....

TEL (DAY): ..... TEL (EVE): .....

CONWAY COMPUTER SERVICES LTD  
39 CONWAY ROAD · HARRINGAY · LONDON N15 3BB

MAIL ORDER ONLY

Tel: (01) 800 1796



# PCNProgramCards

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,C0$:IFC0$=""THEN200

```

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

# PCNProgramCards

Monitor 64

Card 2 of 8

8337MO2/8

```

205 IFC0$="↑"THEN6000
210 L$=LEFT$(C0$,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 IFC0$="R"THEN5000
310 IFC0$="X"THENPOKE53280,14:POKE53281,6:PRINT"X";: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>16-10RT<0THENER=1
640 NEXT
650 IFER=1THENER=0:H=-1
660 RETURN

```

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



# Computers by Post

All prices  
include VAT  
unless otherwise  
stated.

## Sinclair 48K Spectrum

FREE

2 Best-selling Games from  
IMAGINE, ZIP-ZAP AND  
ZOOM. WORTH £11

£129.95



## BBC Model B

Includes **FREE** Killer Gorilla  
(Program Power)  
Hunch Back  
(Superior Software)  
Worth  
£15.90

£399.95



## BBC Word Processing Package

BBC Model B  
Disk I/F  
Wordwise W/P ROM  
Cumana 100K Disk Drive  
Juki 6100 Daisy Wheel  
Printer + all cables

£1099.95

## Commodore 64 £189.95



**Commodore 1541  
Disk Drive £209.95**  
Including  
**£105 worth of  
Software FREE**

## The UK's Best Printer Prices

### DAISYWHEEL LETTER QUALITY

Smith Corona TPI (P or S)  
Juki 6100 (P)  
Brother HRI (P or S)  
Brother HRI5 (P)

330.39+VAT = £379.95  
339.09+VAT = £389.95  
539.09+VAT = £619.95  
382.57+VAT = £439.95

### PRINTER/TYPEWRITERS

Brother EP22 Dot Matrix (S)  
Remstar 201 Daisy Wheel (P)  
Silver Reed EX44 Daisy Wheel (S)

139.09+VAT = £159.95  
347.78+VAT = £399.95  
399.96+VAT = £459.95

### DOT MATRIX PRINTERS

EPSON RX80 (P)  
EPSON RX80 F T (P)  
EPSON FX80 (P)  
EPSON MX100 F T (P)  
EPSON FX100 F T (P)  
Seikosha GPOOA (P)  
Seikosha GPOOAS (S)  
Seikosha GPOOVC (CBM)  
Seikosha GP25OX (P + S)  
Seikosha Friction Feed Adaptor  
Seikosha GP700A colour (P)  
Star DPS10 + 2K Buffer (P)  
Star DPS15 + 2K Buffer (P)  
Shinwa CT80 (P)

243.40+VAT = £279.95  
269.50+VAT = £309.95  
365.17+VAT = £419.95  
399.96+VAT = £459.95  
469.52+VAT = £539.95  
165.17+VAT = £189.95  
182.57+VAT = £209.95  
182.57+VAT = £209.95  
217.35+VAT = £249.95  
26.04+VAT = £29.95  
356.48+VAT = £409.95  
234.74+VAT = £269.95  
304.30+VAT = £349.95  
243.44+VAT = £279.95

We supply a wide range of Cables and Interfaces Phone for Details.

(P)=Parallel-Centronics  
(S)=Serial RS232

## EPSON HX20 with case



**FREE**  
Micro Cassette Drive  
(Usual Price £80)  
**£399 + VAT  
= £458.85**

## VIC-20 Starter Pack

Inc Cassette Deck  
Intro to BASIC + 4 Games  
plus 10 EXTRA FREE GAMES  
**£135.95**

## VIC-20 21K Starter Pack

plus  
**FREE DATABASE PROGRAM  
£165.95**

### Commodore

VIC 16K RAM inc Database  
Cassette Program £29.95  
16K/3K Switchable RAM Pack £34.95

VIC-20 5K £98.95

VIC Package see box above

C2N Cassette £39.95

**Commodore 64 £189.95**

1541 Disk Drive see box above

1525 Tractor Printer £215.95

1526 Friction tractor  
Printer £319.95

1520 Colour Printer  
Plotter £149.95

1701 Colour Monitor £219.95

Simons Basic ROM £44.95

Easyscript W/P Disk £69.95

Petspeed Compiler Disk £44.95

**Atari**

400 16K inc BASIC £97.95

800 48K inc BASIC £269.95

600XL 16K £149.95

Other New Models phone for prices

**Dragon**

New Dragon 64 £219.95

Dragon 32 £159.95

Disk Drive inc Controller £259.95

### BBC

Model B See Box Above

Disk Interface Kit £81.95

Model B inc Disk I/F £459.95

Cumana 1x100K

Disk Drive £204.95

Cumana 1x200K

Disk Drive £259.95

Cumana 2x100K

Disk Drive £385.95

Cumana 2x200K

Disk Drive £495.95

Cumana 2x400K

Disk Drive £649.95

Disk Drive Cable, Manual

+ form. disk extra £25.00

Microvitec 14" RGB Monitor £235.95

Wordwise W/P ROM £39.95

Beeb-calc W/P ROM £35.95

Acorn Electron Phone!

**Sinclair**

Spectrum 16K £94.95

Spectrum 48K see box above

ZX Printer £37.95

Kempston Printer I/F £39.95

Kempston Joystick I/F £17.95

16K-48K Upgrade £22.95

**ORIC I**

48K £129.95

4 programs game pack £6.95

Colour Printer/Plotter £129.95

## Low Prices on Monitors

### Monochrome

Sanyo 12" med-res green 15 MHz  
Sanyo 12" hi-res green 18 MHz  
Phoenix 12" V. hi-res green 24 MHz  
Phoenix 12" V. hi-res amber 24 MHz

67.78+VAT = £77.95  
86.91+VAT = £99.95  
92.13+VAT = £105.95  
95.60+VAT = £109.95

### Colour

Microvitec 14" std-res RGB  
Microvitec 14" std-res RGB composite  
Microvitec 14" med-res RGB  
Microvitec 20" std-res RGB  
Sanyo 14" med-res RGB  
Commodore 14" 1701 Composite  
Sony Profeel 20" RGB composite  
Sony Profeel 27" RGB composite

205.17+VAT = £235.95  
234.74+VAT = £269.95  
304.30+VAT = £349.95  
286.91+VAT = £329.95  
208.65+VAT = £239.95  
191.26+VAT = £219.95  
405.17+VAT = £465.95  
573.87+VAT = £659.95



Delivery by Securicor-FREE Delivery and Packing.

Send off the coupon or order by phone quoting your  
Access Barclaycard No. Phone 01-681 8785. Immediate  
despatch on receipt of order or cheque clearance.

**GALASET LTD** 30 Bayford Rd, Littlehampton,  
West Sussex. Tel: 01-681 8785

These prices correct until superseded by next advertisement.

All the goods in this advertisement are available for EXPORT.

To: Galaset Ltd., 30 Bayford Road,  
Littlehampton, West Sussex.

Please supply

I enclose my cheque for £.

(FREE delivery and packing)

or charge my Access Barclaycard No.

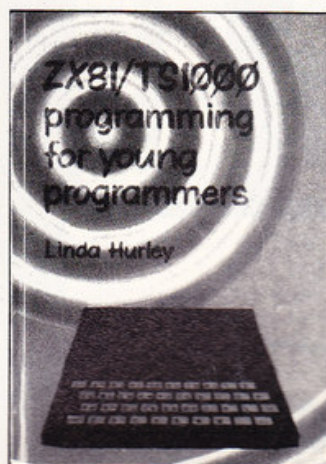
Name \_\_\_\_\_ Signature \_\_\_\_\_

Address \_\_\_\_\_

PCN 17/11



Which book would your micro want you to buy? PCN's review page helps you choose.



**'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 straight-away. 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 whiz-kids 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.

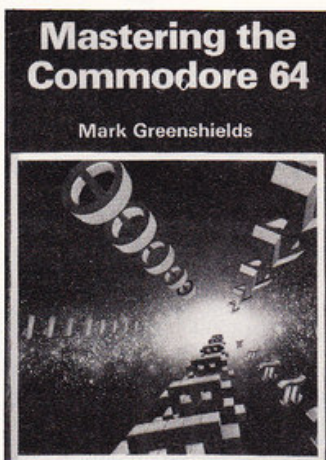
With just enough theory to make things clear, Mr Greenshields offers one of the most lucid introductions to machine code I've found and backs this up with some illustrative and useful programs, including chapters on using sound, colour, graphics and sprites in your machine code programs.

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

## Self-instruct BASIC a practical guide

Antony & James Clark

Featuring the BBC Micro & ZX Spectrum



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 deliberate 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**

## SOFTWARE 64 Practical programs for the Commodore 64

PHONE CALL COSTER TIPSTER  
SOUNDS INCREDIBLE SPRITE CAPTURING  
ACCOUNTANT GOTIT! PHONE COSTER  
THE SHAPE OF THE FUTURE NEXT  
STOCK TAKE SALES TREND  
COMPARE IT INFO FILE





# WANTED

## PROGRAMS

Top Quality Machine Code Games Programs  
for All The Home Micros, including:—

**ZX SPECTRUM**  
**COMMODORE 64**  
**ACORN ELECTRON**  
**BBC**  
**DRAGON**  
**VIC 20**  
**ORIC**  
etc



*We also require freelance M/C Programmers.*

We distribute throughout the U.K.,  
U.S.A. and Europe.

Write in confidence to:  
THE SOFTWARE DEVELOPMENT MANAGER

**NOW!**

**THOR** (Computer Software) Co. Ltd.

Erskine Industrial Estate  
Liverpool  
L6 1AP

OR TELEPHONE:  
051 - 256 7666

**HUGE**



# REWARD



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.

# 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



A young member receiving personal tuition.

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

**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 Wolfbridge 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.

**Worcester** Computer Club. Meets at Woodsprings 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.

**Chiltham** 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, 046 20F, 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 Nield. Tel: 021-459 8995.

### BUCKINGHAMSHIRE

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

**Chiltham** 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.

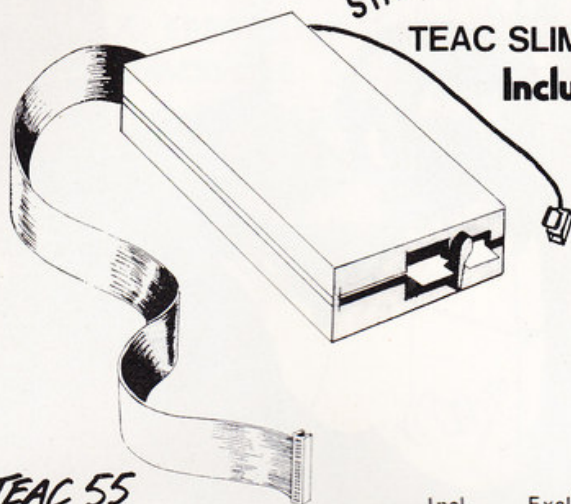


# YOU CAN ALSO DO IT IN 5 SECONDS!

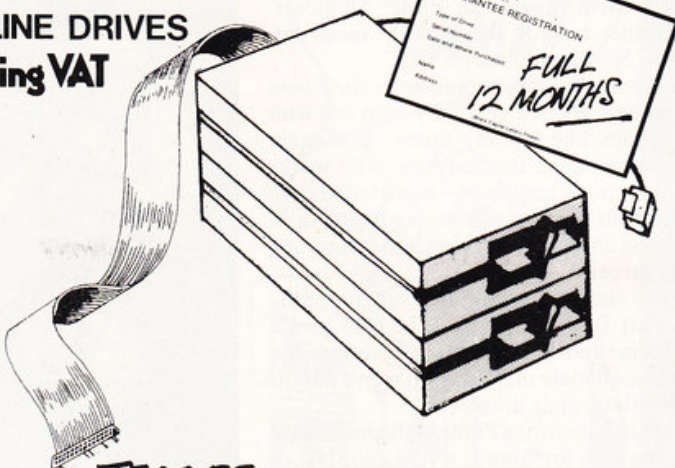
INVITATION TO MICRO USER SHOW  
Westminster Exhibition Centre  
Greycoat Street, London, SW1  
Dec 8, 9, 10, 11, 1983  
STAND Nos. 28-29-30

Replacing your Cassette with a Disk Drive, means DATA ACCESS in less than 5 seconds!

If you are looking for a guaranteed Disk Drive, fully BBC compatible, at a price that includes VAT, formatting disk, user manual, cases and leads, then just look at our all-inclusive prices!



TEAC SLIMLINE DRIVES  
Including VAT



## TEAC 55

### SINGLE DRIVES CASED

	Incl. VAT	Excl. VAT
40 TRACK 100K	£166	£144.35
40 TRACK 200K	£230	£200.00
40/80 TRACK SWITCHABLE 200K	£199	£173.05
40/80 TRACK SWITCHABLE 400K	£257	£223.48

## TEAC 55

### DUAL DRIVES CASED

	Incl. VAT	Excl. VAT
40 TRACK 200K	£320	£278.26
40/80 TRACK SWITCHABLE 400K	£402	£359.59
40/80 TRACK SWITCHABLE 800K	£520	£452.18
DFS KIT	£75	£65.22
P.S.U.	£32.20	£28

## MITSUBISHI DRIVES

	Excl. VAT	Incl. VAT
400K SINGLE DRIVE	£213.04	£245
800K DUAL	£379	£435.85
800K & POWER SUPPLY	£399	£458.85

\*These drives are fully compatible with other Computers and can be used should you change your computer.

\*Check our special terms for Educational Establishments and Government Departments

## DEALER ENQUIRIES WELCOME

**SPECIAL OFFER!**

FULL HEIGHT DRIVE  
**£145 inc. VAT**  
READY TO PLUG IN

**Viglen**  
COMPUTER SUPPLIES

ENQUIRE ABOUT OUR 24-HOUR  
GUARANTEED  
DELIVERY SERVICE!

UNIT 7 TRUMPERS WAY  
HANWELL W7 2QA  
Tel: (01) 843 9903



## HOW TO ORDER

### BY POST

To purchase any of the items simply fill in your requirements listed above, in the coupon. Enclose your cheque/P.O. or use your Access or Barclaycard. Please make cheque payable to: VIGLEN COMPUTER SUPPLIES and post to address below, allow 7 to 14 days for delivery & add £ 8-00 postage, package & insurance on all prices.

### BY TELEPHONE

-(01) 843 9903  
Credit Card holders (Access/Barclay Card only) can purchase by telephone. Please give Card No, Name, Address and the item required.

Post to: VIGLEN COMPUTER SUPPLIES UNIT 7  
TRUMPERS WAY HANWELL W7 2QA

Please send me the following items:

\_\_\_\_\_

I enclose Cheque/P.O. for £ \_\_\_\_\_

I prefer to pay Access/Barclaycard  
(Delete whichever not applicable)

CARD No \_\_\_\_\_

SIGNATURE \_\_\_\_\_

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Tel (Day) \_\_\_\_\_ Tel (Eve) \_\_\_\_\_



CREDIT CARDS VALID IF SIGNED BY CARD HOLDER.  
ADDRESS ABOVE MUST BE THE SAME AS CARD HOLDER.

PCN-2



**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, Penpew Road, fortnightly on Mondays at 7.30pm. N G Day, 2 Cilendale Close, St Austell.

## CUMBRIA

**Ambleside Computer Club**. Contact Jeremy Western, 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, Shepherd 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 Cousins, 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.

**Modern 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 Waking Road, Little Waking, 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 Microcomputer Club**. Meets 7.30pm alternate Fridays at Old Star Inn, High Street, Bridlington. Contact D Complean, 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, Walderslade Centre, Walderslade 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 Siddelle 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 Philipps, 61 Grainger 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, Alpertown, on the first Tuesday of month at 7.45pm. Graham Brain, 01-997 8966.

**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 NN12 7AG.

**Middlesex Micro Club**. Contact Pete Kanner, 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.



# BACK ISSUES

## Issue 1, March 11-18.

**Pro-Tests:** Apple's Lisa, Text 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 Baramah (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).

**Databases:** 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.

**Databases:** 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).

**Databases:** micros.

**Micropaedia:** Anatomy of the BBC, part 3.

## Issue 4, April 1-8.

**Pro-Tests:** Pled Piper Communicator, Olympia ESW3000 printer, Namal Supertalker, Commodore Calcsult, Spectrum Pascal, Cashbook (BBC).

**Gameplay:** Dark Crystal (Apple II), St George (Dragon), Wizard War (Dragon).

**ProgramCards:** Fruit Machine (C64), Tunesmith (Oric), Array Editor.

**Databases:** 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.

**Databases:** 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:** IBMPCDOS, BBC word processing, PC-1251.

**Gameplay:** Mined Out (Spectrum), Transylvanian Tower (Spectrum), Lunar Luper (Apple II), Evolution (Apple II).

**ProgramCards:** Wacky Racers (Oric), Mortgage Comparison

(Sharp MZ80K), Computer Set Up (BBC), Day of Week.

**Databases:** 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.

**Databases:** 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.

**Databases:** software.

## Issue 9, May 6-13.

**Pro-Tests:** Structured Basic on the Apple, Pixel Power on the Vic 20; Star DP510 printer, Dams and Interop 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).

**Databases:** hardware.

**Micropaedia:** Graphics, part 4.

## Issue 10, May 13-20.

**Pro-Tests:** Infomast on Commodore 64, Dragon Mace; MC202 and CMU800 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).

**Databases:** 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 MS.

**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).

**Databases:** Hardware.

**Clubnet:** clubs (Cambridge Micro-computer 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), Oix (Atari).

**ProgramCards:** Cupid (Oric), Alien (Dragon 32), Time Bomb (Atari).

**Databases:** peripherals.

## Issue 14, June 10-June 15.

**Pro-Tests:** Apple Accelerator II board, Modula-2 (Apple II), Oric-Basic, 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).

**Databases:** Software.

**Micropaedia:** Spectrum, Part 1.

## Issue 15, June 16-June 22.

**Pro-Tests:** Comx 35, Address Manager (BBC B), 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).

**Databases:** 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 Titrer (TI99/4A 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 Oric (BBC), Jet Pac (Spectrum), The Ring of Darkness (Dragon 32), Spectrum spectacle.

**ProgramCards:** Video Titrer (TI99/4A 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 daisy-wheel, 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, TI99/4A), 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, Zzoom (Spectrum), Spectrum roundup, Hover Bover, 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), Pharaoh'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.

## ORDER FORM

Any one issue is 75p, additional copies 55p, post & packing inclusive. Overseas readers please add £1 per copy airmail postage. Please allow up to 21 days delivery.

Name ..... Telephone (day) .....

Street .....

Town ..... Post Code .....

Please send me ..... issues of PCN, issue nos .....

I enclose my cheque/PO

made payable to Personal Computer News or please debit my credit card:

Visa/Access/Amex/Diners

Card no ..... Signature .....

Send to: PCN Back Issues Service, 53-55 Frith Street, London W1A 2HG.



**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. **Workshop** Computer Group. Mr Andrews, Workshop 487327.

#### NORFOLK

**Anglia** Computer User Group. Jan Rejzl, 128 Templemere, Sprowton Road, Norwich. 0603-29652.

**Brecklands** Computer Club. Contact Andrew Hlom, 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: 0493-600003.

**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 Hollywood 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 Tuesday 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 Dungleigh 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 Street, 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 Lochalsh** 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 Mary's 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

**Ashted** Computer Club meets on the last Thursday of month. Contact P Palmer, 8 Corfe Close, Ashted.

**Deaf** Microcomputer Users Group. Contact Chris Marsh, 3 Delaport Close, Epsom, Surrey KT17 4AF.

**Thames Valley** Amateur Computer Club meets at Griffon, Caversham, on the first Tuesday of month. Brian Quarm, 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, Waterlool 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, Compton 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 R06, 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** **Chippenhams and Calne**, proposed new club. Matthew Jones, Pinhills, Calne SN11 0LY.

**Chippenhams** Computer Club. Contact Peter Knaggs, 12 Seymore Road, Chippenhams or call Chippenhams 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 7PQ.

**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 CI 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, Conna'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 NP23 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 Prescili 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.

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

## Teenagers do it themselves

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 9630082

## 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, Failsforth, Manchester, 061-681 4962.

### Apple

**Ashted Apple User Group.** Meets first Monday of every month. Contact M Lawrence, 15 Petters Road, Ashted, 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 Flawhurst 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 Tydeman, 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, Middlesex. 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, Gourrock, Renfrewshire. Contact Robert Watt on Gourrock 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.

**Chelmsbug.** 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 Stadiwe, 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.



# CALLING ALL BBC MICRO USERS

## Question:

How can you be sure that your programs are doing what you want them to do, and that you are getting the best from your BBC Micro?

## Answer:

Rush out to your nearest computer store or bookshop and pick up a copy of

## ADVANCED PROGRAMMING TECHNIQUES FOR THE BBC MICRO

by Jim McGregor and Alan Watt

There are a lot of things you may not even have thought of that you and your BBC Micro can discover.

This is the book that helps you make them happen.

376 pages      0 201 14059 4      £7.95 paper



Addison-Wesley Publishers  
53 Bedford Square, London WC1B 3DZ  
Tel: 01-631 1636

# ORIC SOFTWARE

Dept PCN 118 Worcester Rd., Malvern, Worcs WR14 1SS

SPECIALIST SUPPLIERS OF ORIC SOFTWARE

## AMAZING XMAS OFFERS

PRICES VALID UNTIL DEC 20, 1983



ORIC 48K	£119.95 + £2 P&P
ORIC PRINTER	£109.95 + £2 P&P
COMPUTER CASSETTE	£39.95 + £1 P&P
COMPLETE SYSTEM FOR	£249.85 + £5 P&P



**FREE!!** Software catalogue with every purchase or £1 which is deducted from your first order

ORIC SOFTWARE, Dept WM, 118 WORCESTER RD., MALVERN

Mr/Mrs/Miss/Ms.....

Address.....

Postcode.....

Cheque enclosed.....

Please debit my Access/Visa/AMex/Dclub - with £.....

No.....

I have a 16K Oric    48K Oric    My Software interests are:

Home— Business— Games— Education—

Other (Please specify).....

SOFTWARE WRITERS:- Lump sums or royalty payments. Send tapes and details.  
(Tapes not returned unless return postage is included).

# THE COMPUTER JUNGLE~



# TAMED.



# THE GAME KEEPER



# The Way Out of the

## HARDWARE

## PERIPHERALS

### BBC

BBC B Computer

**£399.00**



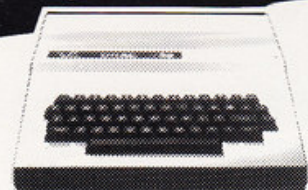
BBC B Computer  
with disc interface

**£470.00**

### DRAGON

Dragon 32 Computer

**£175.00**



### COMMODORE

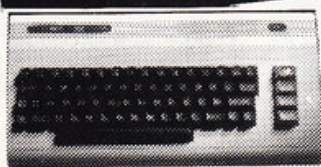
Commodore 64

**£199.00**



Commodore VIC 20 KIT

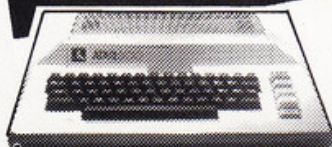
**£139.00**



### ATARI

Atari A800

**£299.99**



Atari AM400

**£149.99**

### SPECTRUM

Spectrum 16K & 48K

16K **£99.95**

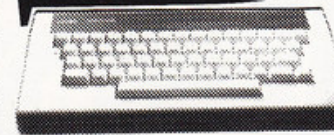
48K **£129.95**



### ACORN

Electron

**£199.00**



### ORIC

48K **£139.95**

**NEW! CGL M5**  
Best Value Home  
Computer RRP £149.99  
**OUR PRICE £134.99**  
Mail Order Only

### CGL SORD M5



R.R.P.

**£149.99**

Our Price

**£134.99**

Plus free graphics, software and  
literature package.

### BBC

BBC or LVL Single  
Disk Drive



**£265.00**

LVL Dual 100K  
Disk Drive



**£389.00**

LVL Dual 200K  
Disk Drive



**£573.00**

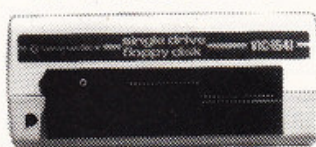
Also BBC 400K Dual  
Disk Drive **£803.00**  
Cabel Monitor **£217.00**

### DRAGON

Disk Drive **£275.00**  
Joystick **£19.97**

### COMMODORE

1541 Disk Drive



**£229.00**

### ATARI

A810 Disk Drive



**£299.00**

also A410 Recorder  
**£49.45**

### SPECTRUM

Intelligent  
Joystick **£27.50**  
Printer **£39.95**  
VTX 5000 **£99.95**

### SEIKOSHA

AP 100A



**£247.00**

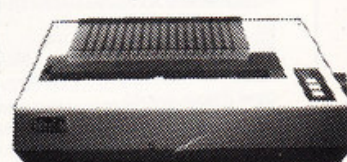
### EPSON

RX-80



**£342.70**

FX-80



**£503.70**



# Computer Jungle...

## SOFTWARE

### BBC TOP 20

	RRP	OUR PRICE
1. 747 Flight Simulator	£7.95	£7.16
2. Killer Gorilla	£7.95	£7.16
3. Cylon Attack	£7.00	£6.30
4. The Hobbit	£14.95	£13.46
5. Felix & the Fruit Monsters	£7.95	£7.16
6. Felix in the Factory	£7.95	£7.16
7. Sphinx Adventure	£9.95	£8.96
8. Danger UXB	£7.95	£7.16
9. 3D Bomb Alley	£7.95	£7.16
10. Snapper	£9.95	£8.96
11. Number Balance	£11.90	£10.71
12. Demon Decorator	£7.95	£7.16
13. Bandits at 3 o'clock	£7.95	£7.16
14. Philosopher's quest	£9.95	£8.96
15. Starship Command	£9.95	£8.96
16. Galactic Commander	£7.95	£7.16
17. Painter	£8.00	£7.20
18. Bug Byte Oblivion	£7.50	£6.75
19. Bug Byte Old Father Time	£7.50	£6.75
20. Forth	£14.65	£13.19

### DRAGON TOP 20

1. Everest	£7.95	£7.16
2. Defence	£8.00	£7.20
3. Katerpillar Attack	£8.00	£7.20
4. Morocco Grand Prix	£8.00	£7.20
5. The King	£8.00	£7.20
6. Wizard War	£7.95	£7.16
7. Samurai Warrior	£6.95	£6.26
8. Night Flite	£7.95	£7.16
9. Space Monopoly	£8.00	£7.20
10. Ultimate Adventure	£8.00	£7.20
11. Invader Revenge	£8.00	£7.20
12. Gridrunner	£8.75	£7.88
13. Dragbug	£12.95	£11.66
14. Don't Panic	£5.95	£5.36
15. Champions	£5.95	£5.36
16. Flipper	£8.00	£7.20
17. Golf	£7.95	£7.16
18. Escape	£8.00	£7.20
19. Dragon Invaders	£8.00	£7.20
20. Jungle Search	£7.00	£6.30

### COMMODORE 64 TOP 20

1. Hover Bower	£7.50	£6.75
2. Frogger 64	£7.00	£6.30
3. Laser Zone	£7.50	£6.75
4. Damsel In Distress	£7.95	£7.16
5. Gridrunner	£7.95	£7.16
6. Galaxions	£7.95	£7.16
7. Scramble 64	£7.00	£6.30
8. Hobbit	£14.95	£13.46
9. Simon's Basic	£50.00	£45.00
10. Token of Ghall	£6.95	£6.26
11. Motor Mania	£8.75	£7.88
12. Crazy Kong	£7.00	£6.30
13. Exterminator 64	£5.99	£5.40
14. Alien Panic 64	£3.99	£3.60
15. Introduction to Basic	£14.85	£13.37
16. Jumpman (import)	£33.10	£29.79
17. Trog (import)	£14.85	£13.37
18. Protector (import)	£36.70	£33.03
19. Repton (import)	£33.10	£29.79
20. Serpentine (import)	£33.35	£30.02

### COMMODORE VIC 20 TOP 20

1. Arcadia	£5.50	£4.95
2. Bewitched	£5.50	£4.95
3. Gridtrap	£7.95	£7.16
4. Astro Fighters	£6.95	£6.26
5. Gun Fighters	£6.95	£6.26
6. Chopper	£6.95	£6.26
7. Get Lost	£5.95	£5.36
8. Choplifter	£21.55	£19.40
9. Space Rescue	£6.95	£6.26
10. Shark Trap	£16.50	£14.85
11. Gridrunner	£33.35	£30.02
12. Lazer Zone	£29.00	£26.10
13. AE	£33.35	£30.02
14. Astro Patrol	£28.98	£26.08
15. Shadowfax	£7.95	£7.16
16. Fourth Encounter	£25.00	£22.50
17. Barrel Jumper	£8.95	£8.06
18. Conqueror	£15.95	£14.36
19. Alien	£9.99	£9.00
20. Omega Race	£9.99	£9.00

### ATARI TOP 20

1. Zepelin (import)	£28.95	£26.06
2. Planet Fall	£41.35	£37.22
3. Blue Max	£27.80	£25.02
4. Zaxxon	£25.95	£23.36
5. Necromancer	£24.95	£22.46
6. Choplifer	£29.95	£26.96
7. FT. Apocalypse	£29.95	£26.96
8. Soft Porn	£21.95	£19.76
9. Strip Poker	£21.95	£19.76
10. Sargon 2	£28.95	£26.06
11. Blade Blackpool	£33.10	£29.79
12. Gorf	£29.95	£26.96
13. Miner 2049ER	£21.95	£19.76
14. Wizard & the Princess	£24.95	£22.46
15. Wizard of War WR	£21.95	£19.76
16. Shamus	£21.95	£19.76
17. Drelbs	£28.95	£26.06
18. Preppie	£21.95	£19.76
19. Preppie 2	£25.49	£22.95
20. Frogger	£24.95	£22.46

### SPECTRUM TOP 20

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-Daktal 4D	£6.04	£5.44
12. Chucky Egg	£6.90	£6.21
13. 3D Combat Zone	£5.95	£5.36
14. Styx	£5.95	£5.36
15. Transam	£5.50	£4.95
16. Zip Zap	£5.50	£4.95
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

### ORIC TOP 10

1. Road Frog	£6.90	£6.21
2. Centerpede	£6.95	£6.26
3. Galaxians	£6.95	£6.26
4. Candy Floss + Hangman	£7.50	£6.75
5. Invaders	£7.50	£6.75
6. Light Cycle	£6.95	£6.26
7. Star Fighter	£6.95	£6.26
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

**FREE T-SHIRT**  
With all orders  
between £100 - £200

**FREE SWEATSHIRT**  
With all orders  
between £200-£300

**FREE TOUR JACKET**  
ALL ORDERS OVER £300



## RIGHT STOCKS RIGHT PRICES WRITE NOW

Please complete the coupon and post to:  
**THE GAME KEEPER, FREEPOST, BIRMINGHAM B23 5BR.**

All items in stock at time of going to press.  
Delivery within 14 days or your money back.  
All prices include V.A.T.

NAME

ADDRESS

PHONE

FOR GAMES PURCHASES PLEASE STATE MAKE OF HARDWARE

Please supply the following

<input type="text"/>	£	<input type="text"/>	£
<input type="text"/>	£	<input type="text"/>	£
<input type="text"/>	£	<input type="text"/>	£
<input type="text"/>	£	<input type="text"/>	£
<input type="text"/>	£	<input type="text"/>	£

I am entitled to receive my free T-Shirt/Sweat Shirt/Tour Jacket — size S M L

Cheques/P Orders payable to The Gamekeeper.



Orders under £10.00 please add 50p for postage + packaging.

TELEPHONE ORDERS — Please phone your order + card number for immediate despatch. 24 hour phone-in-line 021-384 6108.

**THE  
GAME  
KEEPER**





**Tyne & Wear BBC User Club.** Contact Ian Waugh, 13 Briardene Drive, Wardley, Tyne & Wear NE10 8AN.

**Wakefield BBC Micro User Group.** Meets at Holmfild 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 Loddells 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, Stvechale, 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 Duffield 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 Cocalis, 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, Weaving 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 IG23 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, Clwyd, 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 Nottley, 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, 0734 387725.

## 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



## Lynx

**National Independent User-Group.** Subs £9. Contact Robert Post, 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 Marlborough 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 Aweaway, 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 Benerley 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 L63 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 Rossmount 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, Etchingham, 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 Woodways 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 733938.

**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, Northwick 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.

**Hants.** 6502 User Group (Southern Region). Steve Cole, 70 Sydney Road, Gosport, Hants.



**Atari VCS** 7 cartridges, £120 ono. Tel: 01-205 2097.

**BBC 100K.** Disk drive, utilities disk, all leads included, £140, official Acorn BBC disk interface, £60. Tel: Richard on 021-783 8651 eves.

**Stack Expansion** board for VIC. 27K plus (Dams) Vicom Eprom, £95. Tel: 07744-52196.

**Mattel Intellivision**, £30, 12 cartridges including Look 'n' Chase, Star Strike, Boxing, Bowling, £7 each or £110 for the lot. Tel: 01-402 8570.

**Atari 800** 410 recorder, Basic, joysticks, manuals, various games, £300 ono. Tel: 01-527 2981.

**Printers NEC** 8023. Microline 82A. Both friction/pin feed. As new, £290 each. Pet arcades £15. ROM expansion board, £20. Eprom programmer, £45. Tel: 0432-275047.

**48K Lynx**, never used. Original packaging. All leads and manuals, two news letters and two cassettes. Only £180 ono. Tel: Melksham 0225 706630.

**VIC-20 32K** cassette super expander, loads of software + books. Basic parts 1 and 2. £170 the lot. Tel: West Drayton 444101 (Middlesex) after 6pm.

**Apple II 143K** disk drive, £195, vgc, Videx 80 column card incl. Inverse, as new, £140. DOS 3.3 controller, £35. Tel: Bristol 603252.

**ITT 2020**, single drive + controller in original packaging. Wordprocessing games software and magazines, £500 ono or will split. Tel: Graham on 01-573 2727.

**Atari software** to swop, Zaxxon protector, Caverns of Mars, Chess and others. To sell Astro Wars, £13. Tel: Michael Rooney on 022029-830 (West Wratting).

**48 Oric** + Ferguson B/WTV, with Chess, Castle, Death Satellite, Multigames, Xenon, Ultra, Zodiac, Harrier Attack, £200 the lot. Tel: East Harling (0953) 717942.

**Spectrum 48K**, tape recorder, software including Zzoom, Jetpac, Jumping Jack. 1 book, mags worth £240 new, sell for only £150. Tel: Tottington 5933.

**Jupiter Ace**, with 16K RAM pack, power supply, leads, manual, demo tap and Dotman £65. Leo Brodies starting Forth £8. J. Graynoth, Hope Hall, Exeter EX4 4PN.

**Lynx 48K** as new, still under guarantee. Boxed with manual, leads, demo tape and user magazines £150. Tel: Wickford (Essex) 68701.

**4040 Dual floppy** disc drive wanted. Details to: F. Richardson, 76 High Street, Mabelthorpe, Lincs. Tel: 05213-2231.

**Apple II**, screen, twin drives and printer. Also Commodore 8032, 8050 drives, 8026 printer. Best offers secure. Tel: 01-589 8084 after 6pm.

**Commodore 64** + cassette unit, joystick, software including Attack of the Mutant Camel, Gridrunner, Motor Mania etc, Programmers Guide, manual £250. Tel: Farnborough (Kent) 54195.

**Acorn Atom**, 12K+12K floating point, printer part. Lots of software + manuals + leads, £90. Tel: Uxbridge 34996.

**Atari 400/800** cartridges wanted: Atariwriter £35 offered, Pole-Position, Pengo, Joust, Tennis, Robotron, Donkey Kong Jr, £15 each offered. Originals only please. Tel: 01-341 0464.

**Vic 20**, tape recorder, 16K RAM pack, super expander, motherboard, joystick, games, books etc. Still under makers guarantee, worth £280, sell £180.

# PCN Billboard

**Epson MX-80 F/T** type III Centronics printer. Excellent condition £325 ono. Tel: 021-559 2686.

**Dragon Joysticks** brand new bargain £12. Tel: Robert on 01-954 4807.

**Spectrum 48K** (guaranteed) £200 ono + 50 games, includes Arcadia, Kong, Cooki, Tranz-Am, Jet-Pac, etc. Tel: Bedford 61069 after 6pm.

**Swop** £1,100 Technics open-reel tape deck RS-1700, 3 speed, auto-reverse, quartz + infra-red control, mint condition, boxed. Require BBC Micro B and accessories. Tel: 0980-46630.

**BBC mode A**, as new, with five BBC soft programs + soft cover + two books, £260. Tel: Blackburn 672603, after 6pm.

**Vic-20** motherboard, cassette 16K-RAM, 3K super expander, joystick, O'level maths, physics, chemistry, Mission Impossible, Superlander, Jelly Monsters, Alien, Blitz, £500 worth, £225 ono. Tel: Kings Langley 65457.

**Seikosha GP-250X** excellent order, recently bought, £190 ono owing to need for daisywheel. Tel: 09904 3414.

**Intellivision** guaranteed till April complete with Pitfall, Burgertime, Lock and Chase and Soccer. Still boxed, as new, £85 ono. Tel: 01-530 5219 after 6pm.

**T199/4A**, Minimemory (+assembly language programming books), Parsec, Invaders, Wumpus, Soccer, worth £280, asking £140. Will split. Tel: Simon: 091-4106393 after 6pm.

**Oric-1 48K**, Cassette recorder, joystick and interface, £50 software, printer voucher, worth £300, new and VGC for £200 ono (or will split). Tel: Melton Mowbray 60281.

**Lynx 48K** 6 months old with compatible tape recorder, 9 games tapes, associated books, newsletters and listings. Only £180. Write to 31 Irwell Place, Platt Bridge, Nr Wigan WN2 5EF.

**CBM 64 SOFTWARE** For sale. Simon's Basic cartridge £30, Macro Assembler disk £18. Both unwanted presents. Tel: 01-769 1401.

**ORIC-1** software for sale, the Ultra, Dinky Kong, Fantasy Guest, Oric Flight, Moria £4 each. Tel: Waltham Cross 27415 after 4pm.

**ATARI 400** 16K, 410 program recorder, joystick, and software including Gorf, Frogger, Airstrike. Still boxed, four months old, Christmas bargain, £150. Tel: 0324-562051.

**VIC-20 3K, 8K, & 16K** expansions, games cartridges, cassette Database, SimpliCalc, Money Manager, games cassettes including Krazy Kong, Scramble only £180 ono. Tel: 01-441 0465 eves/w. ends.

**VIC-20 SOFTWARE**, cassettes — Vi-Calc, Curse of the Werewolf +16K, Magic Mirror +16K, The Count adventure cartridge — all £7.00 each. Tel: Paul on 0455-637427.

**VIC-20** computer, cassette 16K RAM expander, joystick, Avenger cartridge plus £60 worth of games, excellent condition £145 ono. Gary Searle on Bristol 0272-612107 after 2pm.

**VICTOR 9000** and printer plus Vic-Writer and SuperCalc software, hardly used, (Similar to Sirius) £2000. Tel: 0704 (Southport) 30741.

**SINCLAIR ZX** printer with paper, as new, only two months old, £27 ono. Jim Cowie, The Manse, Portsoy Banff, Scotland. Tel: 0261-42272.

**Apple II** + two disk drives with controller, 80 column card, 16K language card, Pascal software, printer interface, software. £950 ono. Tel: 0482-53111 after 6pm.

**BBC Model B** with disc interface, word-wise, 1.2 ROM, immaculate £450 ono. Acorn Teletext adaptor brand new, £200. Acorn DFS chip (0.9A) £20. Tel: 0227-750600.

**Apple II 48K**, disk drive, monitor, joystick, Ap100a graphics printer. Over £1200 worth of software, Word Processor, games etc. Tel: Luke at 01-589 8801.

**BBC Tapes Logo II**, Lisp, Forth, Beyond Basic, To sell half price. Tel: 0273-14586 after 7pm.

**ATOM**, 12K + 12K, via and printer port, including £45 worth software, only £100 ono. Tel: Watford 30218 after 6.30pm.

**SHARP MZ80A** within guarantee, approx £300 software, five M/C games, four adventures, three versions of Basic, £400. Tel: Neil Staveley 0539-821013 after 5.30pm.

**Jen synthesiser** still under guarantee. Swop for BBC micro or Sharp MZ-80K or equivalent. Sell £170 o.n.o. Jonathan Tucker, 40 Fendoch Road, Grange-mouth, Stirlingshire.

**Back issues** of PCN, mint condition, issue 1 to 28 for sale, plus many other computer magazines, any offers welcome. Tel: 061-224 2661.

**Atari-400** Sale or swop with Vic-20, 16K, typewriter keyboard, cass.410, Basic course, manuals, and latest games. Everything 4 months old. £200. Tel: 01-549 5120 eve.

**TRS-80 L2 16K**, good condition, all leads, BW TV, CTR-80A tape recorder, loads of software and books. Price wanted only £310 ono. Tel: Watford 31421.

**ATARI 400**, cassette recorder, Basic and Pilot programming languages plus joystick and software, £200. Tel: 582-3975 after 5pm.

**Swop Vic-20**, cassette, some games etc + 48K Oric + cash for a BBC B. Both computers still under guarantee. Tel: 0632-665184.

**ITT 2020**, single drive plus controller in original packaging. Wordprocessing, games software and magazines, £500 ono or will split. Tel: Graham on 01-561 1606 eves only.

**Wanted BBC Model B**, must be issue 4 or later. Will pay up to £300 cash or part exchange Intellivision plus 8 games. Tel: 0734-303021.

**Mattel Intellivision** in box, plus 8 games, perfect condition, ideal Christmas present, £95. Tel: 0734-303021.

**CBM 4022** printer, home use only. Very good condition, includes Pet word processor and paser, sticky labels, £225. Tel: Willie Stott, Milton Keynes 0908-660459.

**Genie I**, LE18, hi-res graphics unit, 384x192 resolution, 256 user characters, leads, software, cost £98 still under guarantee, accept £48. Tel: Winsford (Ches.) 06065-4485.

**Spectrum 48K** and printer. Sound amplifier plus £400 of software, £250 ono. Tel: Camberley (0276) 35251.

**Exchange** Intellivision and 33 cartridges for BBC C and disk interface. Tel: Wolverhampton 756156.

**SPECTRUM 48K**, printer, paper, recorder, tons of software. All new worth approx £340, sell for £280 o.n.o. Paul MacDonald, 282A Long Lane, London N2.

**Vic 20 + 3K** + cartridge game + Programmers Reference Guide, £100 ono. Tel: 785 9414 after 7pm.

**BBC 800K**, dual disk drive, £575. Epson EX80 printer, £375. BBC Model B computer, £295 with software. Tel: 01-472 3507.

**APPLE SOFTWARE** — Wordstar, Mailmerge, dBase II, Cobol, Last One, Format 80, Applewriter II, Visi-Calc, Visi-Dex, many utilities plus over 100 games. J. Davey, 44 Hazelmere Road, Stevenage, Herts.

**Acetronic/Radofin** games unit. Cartridges including programmable cartridge, Invaders, Space-War, Circus. Mint condition and boxed, worth £250, accept £130 or swop. Tel: 02756-4153.

**Atari 810** disk drive wanted. Any offers below £100 please. Tel: 01-960 0932 evenings.

**SPECTRUM 48K** new (unwanted gift) £120, also Oric-1 48K 9 months old, plus £40 software, £110. Tel: Farnborough (0252) 545294.

**INTELLIVOICE** speech synthesiser, add-on for Intellivision games, unwanted gift, £35 ono. Never used. Tel: after 6pm 0734-787669.

**DRAGON 32**: Perfect condition, boxed as new, plus software and joystick. Sell £120 or swop for Lynx. Tel: Barnes 741-7824 (after 5pm).

**WANTED ZX Spectrum 48K** for around £80 or 16K around £60. Software and add-ons considered, quote price. Peter Carolan, 479 Oldpark Road, Belfast, BT14 6QT.

**DRAGON 32** with 3 manuals, tapes, RS232 modem interface, 2 joysticks, magazines etc. Good as new, worth over £230, going for £160. Tel: 01-777 8089 evenings.

**MICRO PROFESSOR M311 64K RAM**, original packing, six months old, very little used, £130 ono. Tel: after 6pm or weekends 01-574 7585.

**WANTED for Apple II+ 48K**: DOS 3.3 controller, manual and master diskette. Also Database, Forth, software, reasonable prices only. John 311-7681 after 4pm.

**WANTED Atari 810** disk drive and disk software, also Multicart and Happy Enhancement kit and Casdis. Tel: Gary, Dudley 238169 days, 53149 evenings.

**PRINCESS 1800** (1976), Goldseal reconditioned engine, gearbox, new exhaust. Swop for Atari-800 system, BBC-B, video recorder. Will sell £500. Tel: Ipswich 0473-51556.

**WANTED BBC Model B 1.2OS** plus extras, will pay reasonable price. Tel: 0773-811592 (Derbys) anytime.

**VIC-20** 16K RAM pack, C2N cassette + £50.00 software, cost £285, sell for £140. Tel: South Benfleet 58634. Software includes matrix, Galactic Abductor, Cyclons + Traxx.

**BBC Snapper**, Defender, £5 each; Forth £8, Tape copier £5, Security EPROM £10, 16K sideways RAM-pack. Michael Bright, 36, Freckleton Drive, Bury, Lancashire.

## Billboard Buy & Sell Form

To place your Billboard ad, fill in the form on the left, with one word per space, up to a maximum of 24 words. Send the completed form, together with a cheque or postal order for £1.50 made payable to VNU Business Publications, to:

**Billboard, Personal Computer News, 62 Oxford Street, London W1A 2HG.** Note that we cannot guarantee that your ad appears in any specific issue, and that we cannot accept ads from commercial organisations of any sort.

Your name: .....

Address: .....

Telephone: .....



# MICROSHOP

Rates: £10 per single column cm. Minimum size 3 cm. Series discount available. **Mechanical Data:** Column width, 1 column 57mm. 2 colours 118mm. 3 columns 179mm. **Copy Dates:** 10 days prior to publication.

**Contact:** Christian McCarthy on 01-323 3211.

## SOFTWARE

**ELKAN ELECTRONICS** **LOOK! LOOK!**

QUICK-SHOT deluxe self-centring joysticks — DRAGON/TANDY/COLOR ..... £14.95 (£1 p&p)

New! ELKAN TOP-SHOT self centring joystick with three firing buttons ..... £9.95 (+ £1 p&p)

for Dragon/Tandy/Commodore 64/VIC-20/Atari/Texas Spectrum (with Interface 2) Buy a pair — p&p is free

**NANOS "quick-reference" cards** — easier to use than the manuals!

DRAGON32 ..... £3.95

COMMODORE 64/VIC-20 ..... £3.95

6502 PROCESSOR ..... £2.95

others, e.g. Apple, Tandy, Sinclair available.

DRAGON'S EYE on/off indicator ..... £3.95

DRAGON'S TAIL joystick extender ..... £2.95

Send cash, cheque, credit card no. to:

**ELKAN ELECTRONICS, FREEPOST,**  
11 Bury New Road, Prestwich, Manchester  
M25 6LZ. Tel. 061-798 7613  
(s.a.e. for full lists catalogue)

**MICRO CHIP POSTER**  
40 x 50cm poster featuring Motorola MC68000 16-bit microprocessor chip in die form showing fine circuit details at a magnification of 150x.

**SATELLITE POSTERS**  
41 x 60cm Landsat poster showing whole of UK  
48 x 70cm Meteosat poster showing whole of earth  
All posters in full colour available now at just £1.75 each or £4.50 for any three inc VAT. Add 55p P&P per order. Send cheques/PO to:

**Climax Computer Systems Ltd**  
17a Broad Street South Molton  
Devon EX36 3AQ

### 64 BUSINESS USERS

Hardware including super Epson printers at low prices and lots of good software in stock. e.g. Calc Result, Accounts Packages, Visawrite and Spell, Codewriter, Assembler, Monitor, Programming Utilities and WAIT FOR IT — CENTRONICS INTERFACES.

**THE COMPUTER CENTRE**  
17 Bridge Street, Leighton Buzzard, Beds.  
Tel (0525 376622 & 382504)

### Programs Wanted

We require quality programs for most micros. We pay cash fees, royalties and distribute in the UK, USA and Europe.

Phone: Basingstoke (0256) 25107  
or write to:

**DREAM SOFTWARE**  
P.O. Box 64, Basingstoke, Hants. RG21 2LB  
(Please enclose return postage if you wish your cassette returned)

### MORGAN CAMERA

S/H Computers in stock, 9/11/83. Big stuff inc. Sord M23 inc. Twin 8 inch disc drives and colour monitor £999. N.E.C. 8001 B.E. inc. double disc and high-RES Monitor £795 N.D.C. Personal C.P.M. based, double disk and monitor inc. Word Star. Super calc £695, big centronics printer £250, Acom Atom 12K, 8K £70, New 3 brain A.D. £195, ZX Spectrum 48K £99, ZX81 and 16K £35, Vic 20 £65, Casio FX-702P £39, ITT 2020 £299, Vic disc drive £150, Pet printer £225, Centronics 739 £225, shuttle £110, the caverns of Mars £15, Shamus £15, Star Raiders £10, Defender £15, Atari assembler editor £25, all prices inc. VAT. **Morgan Camera Co.** 160 Tottenham Court Road, W1. 01-368 2562.

### SOFTWARE

Wide range for Apple, Atari, Commodore, Vic 20, IBM, Texas Instruments and TRS-80 — all available at new low prices — send s.a.e. for details.

**CSM Enterprises,**  
10 Queensgate,  
Chorley, Lancashire PR7 2PX.  
Tel: Chorley 72703



## SEASONAL GAMES BARGAINS



### COMMODORE 64

Arcadia	4.55
Frog Run	5.30
Hovver/Bovver	7.00
Scramble	7.00
Kong 64	7.00

### SPECTRUM

Ah Diddums	} 4.60 each
Jumping Jack	
Zip Zap	
Arcadia	
Pharaoh's Tomb	} 5.00 each
Greedy Gulch	
Jet Pac	
Lunar Jet Man	
Atic Atac	

Try the Forest a different type of game 8.65  
critically acclaimed in PCN

*"If satisfied tell your friends, if not tell us"*

CHEQUES & P.O.'s to

**LA MER SOFTWARE,**  
22 WEST STREET, WESTON-SUPER-MARE, AVON BS23 1SU



### POOLS PREDICTION

#### "POOLSWINNER"

The most sophisticated Pools Prediction Aid available. Gives probabilities of score draws, draws, homes or aways, based on two databases holding over 20,000 matches (included).

The databases are automatically updated as results are entered. This year's results are supplied with the package.

Can be used in simple mode, or with parameter adjustments to develop your own unique forecast method.

Fully documented, available now for Apple, Spectrum (48K), Dragon, ZX81 (16K), Commodore 64, BBC (B) (others — please enquire).

£15.00 (discs/tapes)

#### "POOLS DATA"

Complete record of all English Football League matches 1978-83. Team, scores and dates of 10,000 matches held in simple format, ready for your analysis.

Starter analysis programs and full documentation included. Available for Apple, Spectrum, ZX81, BBC, Dragon, Commodore series.

5 years Data £15.00 2 years Data £7.50

### SELEC SOFTWARE (PCN)



37 Councilor Lane,  
Cheddle, Cheshire  
061-428 7425



**48K SPECTRUM USERS**

**SPECIALISTS IN PROGRAMS FOR SECONDARY SCHOOL SUBJECTS**

**WITH TOP THE MICRO SWOT TO GET**

For details and an order form write, enclosing a STAMPED ADDRESSED ENVELOPE to:

**MICRO-SWOT, FREEPOST,**  
55 Nash Square,  
BIRMINGHAM B42 2EX.  
(no stamp required)

### LYNX SOFTWARE

LABYRINTH — 3D maze game	£4.75
REVERSALS — our version of traditional board game in fast machine code	£4.75
CHANCELLOR — run UK economy for 10 years	£4.75
SPACE TREK — Zap the Klingons	£4.75
THE WORM — our best yet, guide Wilberforce to the flowers, you will not want to stop	£5.95
DISASSEMBLER — examine machine code programs in standard Z80 mnemonics	£4.75

Cheque/PO to  
**QUAZAR COMPUTING**  
Dept PCN, 29 Western Road,  
Newick, Sussex.

Other programs also available, send for details

### Books

### SPECTRUM — COMMODORE 64 — B.B.C. MICRO BOOKS

Popular Micro Books are Great Gift Ideas. They are gifts that offer excellent value for money, are instructional and enjoyable. Is there someone you care enough about to help them really get into their micro?

<b>FOR THE NOVICE</b>	
The Working Spectrum	Sunshine £5.95
The Working Commodore 64	Sunshine £5.95
Let your B.B.C. Micro Teach you to Program	Interface £6.95
<b>INTERMEDIATE</b>	
Spectrum Machine Code Made Easy Vol. 1	Interface £5.95
Using Commodore 64 (Intermediately to serious)	Duckworth £9.95
	Interface £7.95
<b>ADVANCED</b>	
The B.B.C. Micro Revealed	
Spectrum Machine Code Made Easy Vol. II	Interface £5.95
Commodore 64 Machine Code Master	Sunshine £6.95
Functional Forth for the B.B.C.	Sunshine £5.95
P&P Free. Allow for cheque clearance and postage. All carry a no quibble, no nonsense guarantee. If dissatisfied return within 30 days and claim money back. Cheques, P.P.'s (Please print name and address) U.K. only P&P Free. Europe add £1.	

**JUST-ED**  
58 St. Mary's Road, Weybridge, Surrey KT13 9PZ  
p.s. 100's of other titles. Send for free list state machine type.



# · VALUE · APPLE · VALUE ·

## BASE UNITS



100%  
APPLE  
COMPATIBLE  
**£349.00**  
+ £52.35 VAT

BASE 64A compatible with Apple cards and software. RAM based system control program, 64K on board memory, expandable to 192K. MINI-WRITER on board in RAM. 24K system memory. Tiny assembler with assembly and disassembly function. Upper and lower case characters. Function commands on keyboard. Numerical and cursor keypad. Can load 140K diskette program to 192K user RAM. Staggering value!

**\*\*Phone for part exchange quote on your existing personal computer\*\***

## MONITORS



**£75.00** + £11.25 VAT

12" Green 18 Mhz monitor in elegant plastic case.

## APPLE DRIVE ADD-ONS

### DISK INTERFACE CPA 6

**£47.90** + £7.19 VAT

To connect Apple or compatible drive

### DISK DRIVE CPA 14

**£176.00** + £26.25 VAT

Top quality Japanese slimline drive with cable.

## APPLE CARD ADD-ONS

### 80 COLUMN CARD CPA 4

**£57.50** + £8.62 VAT

80 characters by 24 lines with true decoders. 7 x 9 character resolution compatible with BASIC, PASCAL and CP/M. Modem compatible.

### Z80 CARD CPA 3

**£47.99** + £7.19 VAT

Adds a Z80 processor to your Apple. Under CP/M, you can add COBOL, FORTRAN or BASIC compiler and assembly language to your II plus and run CP/M packages such as Wordstar and business software.

### 128K RAM CARD CPA 20

**£199.00** + £29.85 VAT

Enables user to load 142K program or use as a fast access disk.

### 16K RAM LANGUAGE CARD CPA1

**£57.50** + £8.62 VAT

Expands the internal memory of your II to 64K and memory capacity available to Z80 card users from 44K to 56K. Available to load integer BASIC under DOS 3.3.

### PAL CARD CPA 7

**£79.00** + £11.85 VAT

Display your II plus colour text and graphics on your home television

### PRINTER INTERFACE CARD CPA 9

**£38.32** + £5.75 VAT

Parallel printer interface.

### RS 232 CARD CPA 12

**£57.50** + £8.62 VAT

Permits basic control of high speed printers and plotters. Programs easily with switch selectable preset for speed, line length, auto line feed and carriage return delay. Handles half duplex communications from 75 to 19200 baud. EIA RS 232 C or 20 mA current loop.

## PRINTERS



**£229.00** + £34.35 VAT

CP80 Matrix Printer. 80 cps, bidirectional logic seeking 80 column. Friction and adjustable tractor feed. Hi-res and block graphics. True descenders. Switchable italic print. Auto underline.

## TURNKEY OFFER

Base 64 unit with monitor, two slim line disk drives and disk controller for

**£749.00** + £112.35 VAT

Base 64 unit with monitor, two slim line disk drives and controller, Z80 card and 80 column card, CP 80 printer and controller

**£1108.00** + £166.20 VAT

## TO ORDER:

Access and Barclaycard accepted  
Send exact amount including 15% VAT  
plus £7.00 carriage and insurance,  
quoting part numbers, to:

# · WOLFCROWN ·

Alphasoft Limited · 101 Jermyn Street · London SW1Y 6EE · Telephone: 01-930 1991

## ATARI-COMMODORE 64-B.B.C.-DRAGON-ORIC-TEXAS-VIC20-LYNX-SPECTRUM

WE HAVE THE SOFTWARE YOU WANT AT PRICES YOU CAN AFFORD

ATARI	MEDIA	MEMORY	PRICE
ADVENTURES 1-12	CASS	24/K	£13-99
PREPPIE	CASS/DISC	16/24K	£17-50
PREPPIE II	CASS/DISC	16/24K	£19-99
MINER 2049er	ROM	16/K	£25-95
CHOPFLIFTER	ROM	16/K	£25-95
THE GOLDEN BARON	CASS	16/K	£7-99
ARROW OF DEATH I	CASS	16/K	£7-99
ARROW OF DEATH II	CASS	16/K	£7-99
A.C.E.	CASS	4/K	£6-20
DIAMONDS	CASS/DISK	16/24K	£11-50
AIRSTRIKE II	ROM	16/K	£25-95
ZORK I, II, III	DISK	32/K	£24-99
DEADLINE	DISK	32/K	£31-99
FROGGER	CASS/DISK	16/24K	£21-99
WIZARD OF WOR	ROM	16K	£25-50
GOLF	ROM	16/K	£25-50
FORT APOCALYPSE	C/D/ROM	32/16K	£21-99 — £25-50
NECROMANCER	C/D/ROM	32/16K	£21-99 — £25-50
BLUE MAX	C/D/ROM	32/16K	£21-99 — £25-50
SUBMARINE COMM"	ROM	16K	£25-50

## AND MANY MANY MORE

B.B.C.	MEDIA	MEMORY	PRICE
HELL DRIVER	CASS	32K	£6-20
KILLER GORILLA	CASS	32K	£6-20
747 FLIGHT SIM"	CASS	32K	£6-20
TIME MACHINE	CASS	16/32K	£7-50
GALAXY WARS	CASS	32K	£6-20
COMMODORE "64	MEDIA	MEMORY	PRICE
SEAFOX	ROM	16K	£24-99
TEMPLE OF APASHAI	CASS/DISK	32/K	£24-50
CURSE OF RA	CASS/DISK	32K	£12-99
MOONSHUTTLE	CASS/DISK	16K	£19-99
SENTINEL	CASS/DISK	16K	£21-00

Renown Electronic Enterprises, 6 Station Parade, Southgate

Send large S.A.E. for 22 page catalogue

Please include all information on this sheet

# MASSIVE DISCOUNTS

(UP TO 60% !!)

ON SOFTWARE FOR ATARI, BBC, COMMODORE 64, DRAGON, SPECTRUM & VIC20

Send s.a.e. for free leaflet or call in at one of our shops now!

## Maplin Electronic Supplies Ltd.

All mail to P.O. Box 3,  
Rayleigh, Essex SS6 8LR.  
Tel: (0702) 552911

Shops at: 159-161 King Street, Hammersmith,  
London W6. Tel: 01-748-0926.  
8 Oxford Road, Manchester.  
Tel: 061-236-0281.

Lynton Square, Perry Barr,  
Birmingham. Tel: 021-356-7292.  
282-284 London Road, Westcliff-on-Sea,  
Essex. Tel: 0702 554000.  
46-48 Bevois Valley Road, Southampton.  
Tel: 0703 25831

All shops closed all day Monday.



# STELL SOFTWARE

— For top quality programs

## GIVE YOUR CHILDREN A Happy Christmas!

with these top quality educational games.

### MONEY

(Spectrum 48K)

— an introduction to coins and notes and their use in shopping. Many detailed sections with excellent graphics and sound. 4-10 years old.



### MATHS INVADERS

(Spectrum 16/48K, BBC B/Electron)

Load your gun with the right answer and shoot the questions before they land on you. Makes learning to add, subtract, multiply and divide, great fun. 4-12 years old.



Also, look out for: Identikit (48K Spectrum), Time (48K Spectrum, BBC B/Electron), Missing Words (48K Spectrum), Railroader (BBC B/Electron), Micros for Children — 1 (16/48K Spectrum).  
Spectrum programs only £6.95 BBC £7.95

All programs are attractively packaged in red boxes, with colourful pictures of each game.

Most titles will be available from larger branches of Boots, John Menzies and good computer shops, at the end of Nov., or available now, by return post from: Stell Software, 36 Limefield Ave, Whalley, Lancs BB6 9RJ.

## No 1 in EDUCATION

# TURBO CHARGE YOUR ZX 81!

with our  
**ZX 81 — FORTH ROM**  
with multi-tasking

Replaces your basic ROM to give you a totally new system. The unique screen editor allows you to edit programmes while other programmes are executing. Runs more than ten tasks at once. Schedule tasks to run from 50 times per second to once a year. Ideal for control purposes. Uses all ASCII characters and restores the keyboard to normal operation. It contains a real-time clock and a large number of 32-bit words. Supports the ZX printer. Allows machine code definitions and needs at least 2K of memory. Supports 16K, 32K, and 64K Ram-Pack. Three times faster than fig-FORTH, but fig compatible. Available as a "fit yourself EPROM", with an extensive manual for £25 + VAT. Some ready-Converted ZX81's available. Floating point extension. ROM — out soon!

### Coming Soon!

FORTH-I/O Cartridge for Spectrum £59 + VAT. Ask for details

### AND THE OLD FAVOURITES:

Nas-FORTH NASCOM £25 + VAT

Pet-FORTH for Pet from £25 + VAT

### DAVID HUSBAND

2 Gorleston Road  
BRANKSOME  
Poole BH12 1NW  
Tel: 0202-764724

## Accessories



# Lin Kup CONBLOCK

This miniature mains connector, 150 by 75.5 by 21.5mm, including plugs, gets rid of all the lead spaghetti usually found behind micro systems.

Approved to B.S.5733, it incorporates the latest technology:

Printed circuit distribution  
Individual cable strain relief  
Shuttered socket entry  
Neon power indication

Enabling four units to be safely and neatly powered from one 13 AMP socket.

Price inclusive of four plugs,  
VAT, p&p £7.50

Send cheque/P.O.s to:  
**Lin Kup, Transport House,  
Severn Square, Newtown,  
Powys SY16 2AF**

## COMPUTER CARRYING CASE

Suitable for Spectrum, Oric, Lynx, Sord, Vic 20, Commodore 64, or computers of similar size. The hard case is finished in black with twin lockable fasteners and carrying handle. Separate pockets hold computer/manual, leads, power pack, cassette player and five cassettes. Folds flat for storage.

£13.95 inc VAT +

Post and packing £2

Dust covers also available for any computer, printer etc.

Dealer enquiries welcome.

### SHERBORNE DESIGNS

Victory House, 8A The Rank,  
North Bradley, Trowbridge, Wilts.  
Tel: 02214 4425

# COMPUTER CONSUMABLES QUALITY DISKS AT COMPETITIVE PRICES

RHONE — POULENCE

Machine	Price per box 10
Commodore Pet	From £20.00
Tandy	From £20.00
Osborne I	£20.00
Apple II	£20.00
Apple III	£21.00
Olivetti M20	£25.00
IBM P.C.	Single sided £21.00
	Double sided £25.00
Sirius	Single sided £24.00
	Double sided £33.00

Prices are exclusive of V.A.T.

Postage & Packaging included in price.

**01-691 7120**

### LOOK — COMPUTER STATIONERY SMALL OR LARGE QUANTITIES AVAILABLE

Continuous listing paper — music rule or plain. 500, 1000, 2000 sheet.  
Continuous labels — large range of sizes in packages of 500-5000,  
larger quantities available.

Continuous envelopes. Cleaning kits

Store your work safely in one of our printout binders.

Catalogue on request. Speedy service.

**HCL COMPUTER SUPPLIES**

19 GREENLANDS ROAD, KEMSING,

SEVENOAKS, KENT.

TEL: OTFORD (09592) 2918

THE No 1 IN MAIL ORDER



## MICROSHOP

### Accessories

#### DELTA 14 HANDSETS FOR THE BBC

Used for years by DATABASE owners these high specification handsets have 14 pushbuttons to take the strain off of your keyboard. The DELTA 14 comes in two parts. One handset will plug into the A/d to give analogue spring return joystick plus three button functions. The second part is the DELTA 14B/1 adaptor box which connects the 15-way "D" to the user port. This gives 12 buttons on a 4 x 3 matrix. The eighth line selects a second joystick which can be plugged into the adaptor box.

**New, available now** — Program to convert keyboard-played games to run on the joystick and handset buttons.

**DELTA 14B JOYSTICK HANDSET FOR BBC £12.95**

**DELTA 14B/1 ADAPTOR BOX AND CABLE £13.95**

**CONVERSION PROGRAM CASSETTE £5.95**

**CONVERSION PROGRAM DISK £8.95**



#### DIRECT FROM OUR FACTORY



**IN KIT FORM:** kit contains 1 switched joystick assembly, 2 moulded case halves, fire button, 1.5m 5 core + screen cable, fixing screws ..... **£4.50 per KIT**  
**READY BUILT** with 9-way "D" socket — suit Atari or Vic20 ..... **£5.95 each**  
**SPECTRUM PROGRAMMABLE INTERFACE** — to enable above joystick to work on the SPECTRUM. Will convert any keys to joystick directions. Complete with program tape ..... **£24.00**

"D" connectors 9-way female plug or 15-way male plug complete with hoods ..... **£1.75**

Din plug 5-way 240 deg ..... **50p**

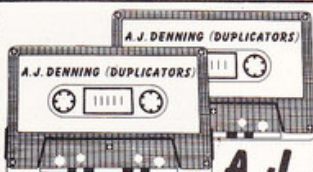
**AERIAL SPLITTER SWITCHES** ..... **£2.50**

(Saves unplugging T.V. aerial to connect computer)

Cheque or PO with order. Prices quoted INCLUDE VAT. 1st Class Post. 7 day money back

**VOLTMACE LTD., PARK DRIVE, BALDOCK, HERTS.**

Callers welcome Monday to Friday. Telephone: (0462) 894410



## A.J. DENNING (DUPLICATORS)

### QUALITY CONTROLLED CASSETTE DUPLICATING QUALITY & SERVICE AT COMPETITIVE RATES

**QUALITY** — Constant Stringent Checks Made Throughout Production.

**SERVICE** — Despatched Normally Within 10 Days From Receipt Of Master.

**PRICE** — C10 From 28p Including Case. C15 From 31p Including Case.

CONTACT US NOW FOR YOUR PERSONAL QUOTATION

**A. J. DENNING (DUPLICATORS)**

19 The Crescent, Henleaze, Bristol BS9 4HW

Tel: (0272) 623267

## CABLES & SWITCH BOXES

FREE ILLUSTRATED  
DESCRIPTIVE BROCHURE

Call

DENHAM (0895) 832375

24 HOUR SERVICE

**HOMESTEAD ELECTRONICS**

24 OXFORD ROAD,

DENHAM, UXBRIDGE,

MIDDLESEX

### Shops

## Computerama

**TORCH Z80 DISC PACK**  
inc £1,000 of software  
ONLY £835 Incl. VAT

**ADVANCED USER GUIDE  
FOR BBC**  
ONLY £12.95 + £2 carr

**BBC \* SPECTRUM \* COMMODORE \*  
& ALL LEADING MICRO'S**

59 FOREGATE ST.  
STAFFORD  
41899

STOKE-ON-TRENT  
MARKET SQUARE ARCADE  
HANLEY.  
268620

### Microshop

## ZX OWNERS BANISH LOADING PROBLEMS

Send S.A.E for Leaflet.  
STATE ZX81 or SPECTRUM.

**ELINCA PRODUCTS LTD.**  
Lyon Works, Capel Street,  
Sheffield 6. (tel 0742 339774)



for only

**£14.99**

Inc. VAT — Post FREE

## SINCLAIR OWNERS READ THIS FORM OCP

You've probably heard about MACHINE CODED PROGRAMS and thought "so what! How can they help me?"

Well now you can find out and taste the very real difference by purchasing our latest MACHINE CODED programs. These emulate features of the most modern professional computers (12 years writing machine coded programs for IBM, ICL, UNIVAC and Sinclair means we know what we're talking about).

### FINANCE MANAGER

is a powerful and flexible MENU DRIVEN program for practically all domestic and business accounting applications. MACHINE CODE has enabled us to produce the very latest in professional screen presentation and editing facilities.

Great care has been taken to make FINANCE MANAGER extremely easy to use yet the facilities are extensive and comparable to those of software packages for microcomputers costing many thousands of pounds.

FINANCE MANAGER'S main facilities include:

- **AUTOMATIC DOUBLE ENTRY** — for up to 255 separate accounts with running totals
  - **ANALYSIS** — by user-defined transaction descriptions and/or date
  - **STANDING ORDERS** — added, applied and removed by date or at regular intervals
  - **BALANCE** — all account balances can be listed at any specified date
  - **NEW TRANSACTION MARKER** — differentiates between old and new entries
  - **PAGE COMMAND** — scroll back and forth through all the accounts
  - **RECONCILIATION** — enables the user to check all items against statements
  - **FULL SCREEN PRESENTATION** — see it as it happens when you enter, amend or delete
  - **SPEED** — this program is very, very fast
- PLUS print screen or file, block move, TAB, delete and insert in line, automatic file dating, date change, etc. . . .
- APPLICATIONS: domestic and business accounts, specific and general ledgers, financial budgeting and planning.

### ADDRESS MANAGER . . .

Works on the 16K and 48K Spectrum, in 48K it will store, file, select and retrieve over 400 full addresses (over 1500 individual names); Dynamic Memory Management and compression techniques makes all this possible and there's a lot more:

- **FULL SCREEN INPUT and EDITING** — see it as a page as it happens with insert, delete and TAB Commands.
- **MULTIPLE INDEXING** — 3 way user-defined index enables you to define, catalogue, select and print entries as needed, (essential for the more sophisticated applications.)
- **INSTANT RESPONSE** — yes, this program is very very fast.
- **SUPER FRIENDLY** — crash-proof, extremely easy to use and efficient in a way that BASIC can never be.

#### MANY USES

- **AT HOME** — (storing addresses, printing out Xmas Card lists etc.)
- **AT WORK** — for mail-order work, internal telephone directory, sorting customers into types, areas, size . . . you choose.
- **CLUBS** — print-out members list, sort different categories etc.

## SPECTRUM CHESS Dare you face The Turk

The original Turk was an eighteenth century automaton, a life-size mechanical figure resplendent in Turkish costume and seated behind a wooden cabinet on which a chess board and pieces were placed.

OCP now offer you the twentieth century equivalent of that Turk — a chess-playing computer program.

The Turk challenges you to a game of chess!

#### MANY OPTIONS INCLUDE:

- 6 LEVELS OF DIFFICULTY
  - DEMONSTRATION MODE
  - BOARD EDITOR
  - GAMES PRINTOUT FACILITY
  - BLITZ CHESS AGAINST THE CLOCK
  - TWO PLAYER MODE
  - UNFINISHED GAMES CAN BE STORED
  - RECOMMENDED MOVE
- FULL INSTRUCTIONS PROVIDED**



Post order to: Oxford Computer Publishing, 4a High Street, Chalfont-St-Peter, Buckinghamshire

Please rush me: FINANCE MANAGER at £8.95 ☐ Spectrum only.

ADDRESS MANAGER at £8.95 each. ☐

Spectrum only.

CHESS THE TURK at £8.95 each. ☐

Spectrum only.

MACHINE CODE TEST TOOL at £9.95

each.

Send cheque, postal order or ACCESS No. to above address. Or telephone order with ACCESS No. to (0753) 888866

NAME .....

ADDRESS .....

.....POSTCODE ..... CA11

Available from selected branches of  
**BOOTS & W H SMITHS**





# Information Technology & Decision Support

The Information Technology Department of BICC Group Management Services is engaged in a variety of projects at Head Office in London and across the Group aimed at improving the information services to all levels of management, up to the board room.  
The projects include:—

- Electronic Mail ● Word Processing
- Information Retrieval ● Finance Systems
- Local Area Networks

The department is seeking to increase its staff to meet the increasing demands on its services. Applications are invited from well qualified staff of graduate level who can clearly demonstrate innovation, self motivation, and a commitment to the application of Information Technology in commercial, technical and manufacturing environments. Experience of dealing with Management at all levels would be distinct advantage.  
Initial appointments will be in the North West. However, relocation to London in respect of one of the vacancies may be necessary in the foreseeable future. A competitive salary is offered, together with a generous benefits in-keeping with one of the UK's leading companies.


**BICC**

Applications giving brief but concise details should be sent to:  
**Mr. L. Barker, Personnel Services Manager,**  
BICC plc, PO Box 1, Prescot, Merseyside. L34 5SZ

## Microshop

### SHORTAGES — WHAT SHORTAGES?

1541 COMMODORE DISK  
DRIVES  
C2N CASSETTE UNITS  
SIMONS BASIC  
64 PROG REF GUIDE  
BBC MODEL B ADVANCED  
USERS GUIDE

ALL IN STOCK AT LOGIC

### LOGIC SALES LTD.

19 The Broadway,  
The Bourne, Southgate N14  
Telephone 01-882 4942

## FOOTBALL POOLS

Professor Frank George's Football  
Pools Forecasting system is now  
available for the:

### COMMODORE 64

as well as: Apple II, Pet, Video  
Genie, TRS-80, Spectrum, ZX81,  
BBC 'B', NewBrain, Sharp MZ80K,  
Sharp MZ80A.

Also available: POOLPERM which  
calculates perms according to stake  
and number of matches covered.

Write to: Bureau of Information Science,  
Commerce House, High Street,  
Chalfont St. Giles, Bucks.

## Programming



### URGENTLY REQUIRE GAMES PROGRAMS

Ocean Publishing Limited, publishers for a major software house,  
urgently require machine code game programs for home micros.

### ZX SPECTRUM, COMMODORE 64, ORIC, DRAGON, VIC-20 and ACORN ELECTRON

Our national dealer network ensures maximum sales. Should your  
program be accepted we will pay top royalties or buy your copyright.

Write in confidence to the

### SOFTWARE DEVELOPMENT MANAGER

Ocean Publishing Limited, Ralli Buildings, Stanley Street, Manchester M3 5FD.  
OR TELEPHONE: 061-832 7049

## LYNX

Instant machine code for the price of a  
game.

MODER-80 is the easy way to examine and modify memory  
using assembly language rather than hexadecimal. Just type  
your new instruction or data into any disassembled line and  
see it instantly updated on the screen! You can also insert or  
delete lines just as easily. Other advanced features include:

- All standard Z80 mnemonics plus DEFB, DEFW and DEFM.
- ASCII, binary, decimals, hexadecimal and current  
address allowed in expressions.
- Disassembled listings to screen, printer and tape.
- 100% machine code — you can run BASIC programs  
which CALL your code without affecting MODER-80.

A "must" for anyone interested in machine code on the  
Lynx, beginner or not! Only £6.95 inclusive (mail order  
only) from:

### SEVEN STARS PUBLISHING

Dept N, 15 Gloucester Avenue, London NW1 7AU

## Insurance

### Insure your computer

Impact damage, fire, theft and transit cover for all your computer equipment.

£1 to £1500	Cover £8 p.a. with £10 excess
£1501 to £2500	Cover £16 p.a. with £15 excess
£2501 to £8000	Cover £16 p.a. with £25 excess
£8001 to £10000	Cover £20 p.a. with £25 excess

Write or telephone today for further details

**KGJ Insurance Brokers (Stourbridge) Limited**

6 Hagley Road Stourbridge  
West Midlands DY8 1QK  
Tel: Stourbridge (STD code 03843)  
5333/2545/77391

## Services

Dear reader, my name is Simon Stable. I specialise in direct data  
duplicating for the following cassette-based micros: BBC A/B, ZX Spectrum,  
Electron, Lynx, Oric 1 and Dragon 32. Disc copying for BBC 40/80 track. Dot  
matrix printed labels to order/blank. Blank cassettes.

**FAST  
TURNAROUND**

**0869 252831**

**COMPETITIVE  
PRICES**

I'm proud to be sole duplicator for Chalksoft Educational Programs whose  
new mail order address is: Freepost O.F., Chalksoft Ltd, 37 Willowslea  
Road, Northwick, Worcester. Yours Sincerely, Simon Stable.

For further information about real-time cassette copying write or phone:  
**FREPOST, 46 WEST END, LAUNTON, OXON OX60 612**

### DATA CASSETTE DUPLICATING

Swiss quality cassettes with high grade tape. C15  
length from fifty to 200 pcs delivered to your door  
for 66p each, for single side duplication.  
Less than a week delivery. No ATARI please.  
Send your cassette with a cheque to:

**DEDICATED MICROPROCESSORS LTD.,**  
UNIT B2, REGENERATION HOUSE,  
SCHOOL ROAD, NORTH ACTON, LONDON NW10 6TD.  
Tel. 01-965 2841





## 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.

## SIN TAX 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.

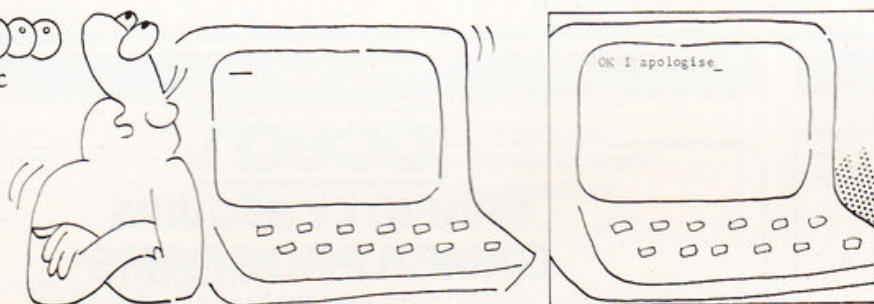
The program was written by Victor Serebriakoff, who is international president of MENSA — the society for people who can guess the next number in the series 2, 4, 19, 1, 45, 37...

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.

PAL2000  
by Mollusc



## PCN DATELINES

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

Organisers who would like details of coming events included in

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

## UK EVENTS

Event	Dates	Venue	Organisers
COMPEC	November 15-18	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



**EXCITING NEW GAMES FROM AN  
EXCITING NEW SOFTWARE HOUSE!!**



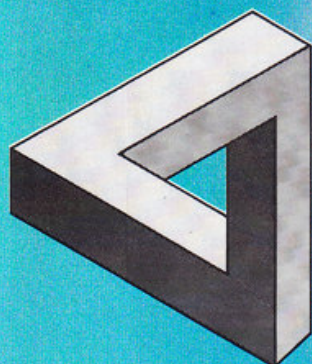
**FOR THE 16/48K SPECTRUM  
100% MACHINE CODE,  
FUN PACKED ARCADE ACTION**  
THRUSTA 48K SPECTRUM  
McKENZIE 48K SPECTRUM  
SPACE JOUST UNEXP. VIC 20  
**ALL AT £5.95**

**ALSO**  
**CRAZY BALLOON** CBM 64  
**£7.95**

**AVAILABLE AT SELECTED BRANCHES OF MENZIES AND HOUSE OF FRAZER**

**DISTRIBUTORS CONTACT:**  
**SOFTWARE PROJECTS,**  
**BEAR BRAND COMPLEX,**  
**ALLERTON ROAD,**  
**WOOLTON,**  
**LIVERPOOL L25 7SF**  
**051-428 7990**

**DEALER ENQUIRIES TO:**  
TIGER DISTRIBUTION,  
4 VICTORIA ROAD,  
WIDNES,  
CHESHIRE  
051-420 8888





# ocean

## TOP OF THE CHART

		GAME TITLE	PUBLISHER	MA
▲	1 (2)	Kong	Ocean	MA
▲	2 (6)	Manic Miner	Bug Byte	Spec
▲	3 (1)	Jet Pac	Ultimate	Spec
▲	4 (4)	Zoom	Imagine	Spec
▲	5 (8)	Hobbit	Melbourne	Spec
▲	6 (5)	Penetrator	Melbourne	Spec
▲	7 (10)	Harrier Attack	Martech/Durell	Spec

# ocean

## We've got a hunch you're going to like our latest best seller . . .

**Dealers:** The bells, the bells, the bells ringing from your till after you have stocked our best selling software range will make you deaf. But hear this, our dynamite selling range is available from all major distributors.  
Phone: 061-832 7049

Available now for the  
ZX Spectrum  
Commodore 64  
Oric 1  
and soon for  
Dragon 32, Atari 400/800  
and Acorn Electron.  
MORE FUN  
MORE CHALLENGE

Ocean Software is available from selected branches of **WOOLWORTH, W H SMITH, Boots, John Menzies, LASKYS,** major Department Stores and all good software dealers. For your nearest stockist  
Phone: 061-832 9143.

Ocean Software, Ralli Building, Stanley Street, Manchester M3 5FD.