

PERSONAL

COMPUTER

THE COMPLETE COMPUTING WEEKLY **NEWS** WEEK ENDING APRIL 8th 35p

HARDWARE

BIRTH OF A NEW MACHINE

We take the wraps off the Pied Piper in this UK exclusive

PERIPHERALS

VERBAL PRO-TEST

This versatile synthesiser gives micros the right of reply

PCN MICROPAEDIA

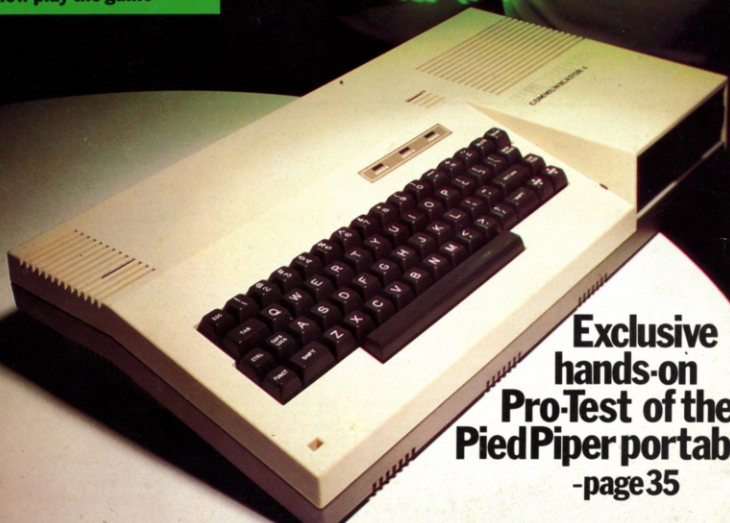
GO FORTH: PART 1

Add this new language to your library of microcomputing

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DARK CRYSTAL

You've seen the film, now play the game



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Assistant editor
Geof Wheelwright

Production editor

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News editor

Margaret Coffey

News writers

David Guest

Wendie Pearson

Software editor

Shirley Fawcett

Systems editor

Max Phillips

Hardware editor

Richard King

Peripherals editor

Ian Scales

Listings editor

Sandra Grandison

Editor's assistant

Harriet Arnold

Art director

Jim Dansie

Art editor

Jimmy Egerton

Art assistant

Dolores Fairman

Publishing manager

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Advertising

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Sales executives

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Bettina Williams

Simon Treasure

Ian Whorley

Sarah Barron

Production manager

Brian Humphrey

Microshop production

Eva Wroblewska

Advertisement assistant

Jenny Dunne

Subscription enquiries

Simon Maggs

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

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Buy, sell and swap through your free advertisements.

Cover photograph by Ian McKinnell

Micropaedia
Part 1
First of our two-part
Forth
Guide which gives you the facts about

Compilers: new move

Two new compilers on the way from Microsoft promise to turn existing ideas about portability on their head.

Microsoft has added C and 16-bit Basic to its range of languages. The C is a standard version and offers portability to and from other C systems such as Unix and CP/M-68K.

But the 16-bit Basic for MS/DOS 2 systems will allow you to move Basic programs from one machine to another without any changes.

The Business Basic is very much an attempt to match and surpass Digital Research's CBasic system. Digital Research announced a 16-bit version of the compiler in January.

Microsoft's compiler offers 14 digit BCD arithmetic, labelled lines, long strings, multi-line functions, dynamic arrays, and other new Basic functions. It is expected to cost £300.

The MS/DOS 2 version in particular will support a standardised set of terminal control

characters so that programs will be portable between machines running this operating system and compiler.

With the interchangeability of disks between MS/DOS 2 systems (excepting the Sirius, when the implementation of MS/DOS 2 is announced) the idea of portability that Microsoft is promoting has a broader range than anybody has hoped for before.

Microsoft's intention to out Digital Research is plain in one

particular aspect of the compiler. It includes an automatic translation utility that, coupled with the standard RD/CPM program, will take existing CBasic programs and compile them under MS/DOS.

The C implementation, besides offering compatibility with other C systems, compiles code in the standard MS/DOS relocatable format. This allows C programs to be linked into routines in Fortran, Basic and others.

On the dark side of the Spectrum

The original micro price-cutter looks likely to apply its inimitable touch to the opposite end of the market.

Muted whispers in the industry suggest the next Sinclair machine (or the one after next) will not be a still cheaper home computer, but a 16-bit system with multi-user possibilities.

Sinclair is understood to be having an operating system written in the C language, which implies compatibility with Unix and CP/M-68K.

The more prevalent rumour concerning Sinclair's plans involves the ZX-83, so-called because the company is expected to be consistent in its sequence of names.

The ZX-83 has so far been pictured as a meatier version of the Spectrum with various communications facilities.

Colour plotter suits Sinclair

Sinclair users can now get their hands on a colour printer for under £150 — even though it's actually a Tandy add-on.

All that's needed to link the four-colour printer-plotter to Spectrums or ZX81s is a £35 package of hardware and software from Hampshire-based Softest.

Tandy sells the CGP-115 mini printer-plotter for use with its TRS-80 systems. It is slightly wider than the Sinclair ZX printer, and uses ordinary paper on a roll 10cm wide. Plotting is done with black, blue, green and red pens.

Dr Chandra Fernando, who wrote the Softest package, said 'This is one of a very few colour printers within the price range of the home user.'

The printer-plotter is actually designed to work with systems based on the Mostek 6502 chip, such as the BBC micro. But Sinclair uses the Zilog Z80

chip, so Softest had to design software to let Sinclair machines emulate 6502 printer protocols.

The printer is semi-intelligent, and accepts character control codes in the standard ASCII format, so the Softest package simply supplies the ASCII equivalent of the 6502 printer control commands.

Softest's package comes as a hardware interface to cope with the handshake protocols between the micro and printer, and a set of machine code device drivers to control the movements of the pens.

The printer control commands are also included so that people can write their own special device driver programs.

'A typical program to draw pie charts, say, would take a day or so to write using our control codes', said Dr Fernando.



SHADES OF CHANGE — Not so identical twins! At the back the Research Machines' 480Z in its smart black metal case. In front, a Research Machines 480Z in its new white structural foam case. There will be a gradual metamorphosis from black to white over the next few weeks. The new case is intended to improve looks and reduce weight. At heart it's still the same old 32K, Z80-based micro. Research Machines is on 0865 249791.

Torch puts final gleam on its own 'Super-Econet'

It will be several months before you can get the Econet local area network running on your Torch computer — but Torch says it will be worth the wait.

Torch spokesman Ray Anderson said last week that his company has developed an advanced and more sophisticated version of Acorn's Econet system, but declined to give details of the system or a release date.

He said Torch has had its 'Super-Econet' running at its Cambridge offices for several months, but added that the company wants to release no further details until it is ready to launch the system and consid-

ers 'we've got it exactly right'.

Mr Anderson did say, however, that the Torch system allows two Torch machines to talk to one another as well as to BBC micros equipped with Econet interfaces. Unlike the Acorn system, Torch's file-serving network does not require dedicating one machine to running the file server program.

'At the moment we're just productifying the system so it's easy to use and provide support for', he said.

'We've built a very sophisticated set-up on top of that which allows you to share disks, printers and peripherals.'

Sharp 8¹/₂lb baby due

You should be able to buy a micro with plotter/printer for less than £400 in a few months.

If the hardware makes the trip from Japan unchanged, Sharp's MZ-700 (released there late last year) should be available in the UK in September.

It comprises a Z80-based CPU with 64K of RAM, plug-in screen, printer/plotter and cassette recorder.

The package weighs only 8¹/₂lbs including tape recorder and printer/plotter and comes with an attaché case at an extra £55.

The basic unit is around £225, based on current exchange

rates, with the recorder at £28 and the printer for £98.

Paul Streeter, MD of Sharp, said UK prices would be decided nearer the time and would take into account the effect of the falling pound.

The printer/plotter has four ballpoint colours — red, blue, green and black.

Sources in Japan say the unit itself has five user-definable function keys.

The screen's price remains a secret until launch date, when a comprehensive software range is also promised.

The MZ-700 will run on Sharp's own operating system and uses two versions of Basic.

One version makes it compatible with Sharp's existing products — the MZ-80 range — while the other, written by a Japanese software house, is said to be much more comprehensive.

There will be mass distribution through 400-500 outlets in the UK including selected branches of the Co-Op and Lasky's plus 100 general Sharp dealers.

Sharp has already written most of its own software and more is coming from six independent software houses. It includes games, business and education programs, some of which will come free with the machine.

A crock of new software

Even if you can't lay your hands on a DEC Rainbow yet (*PCN, March 25*) you can lay in a store of software to prepare for it.

Microcomputer Products International (MPI) of Barking is offering a range of software which it says is specifically tailored for the Rainbow's CP/M-80 and 86 formats.

The software comes from such illustrious names as Digital Research, Microfocus, Microsoft, Micropro, and MPI itself. The packages cover applications and utilities.

MPI says they are available off-the-shelf through Rainbow dealers or from MPI's own network of dealers. Contact MPI on 01-734 2907.

Fast FIG-Forth for Oric

Forth fever has infected the Oric.

You can now buy a cassette-based implementation of FIG-Forth from Tansoft, a specialist Oric software house.

According to Tansoft director Paul Kaufman, the package took a month to adapt from the version of the Forth Interest Group (FIG). Tansoft's offering comes with what it describes as a 'comprehensive' 69-page manual.

Kaufman claims that bench

tests have shown the Oric implementation to run 33 per cent faster than the Forth on the Jupiter Ace.

The program includes an editor and assembler, and Tansoft says it has built-in utilities to take advantage of the Oric's screen handling features. Some Basic type high resolution commands are an added bonus.

The package comes with a demonstration music program and costs £15. Tansoft is on Cambridge (0353) 2278.



DOWN THE TUBE — This is how a Cabel monitor looks when you have to do something really complicated like adjusting the vertical hold. Or the horizontal hold. In fact, if you have to adjust anything apart from the on/off switch and the brightness you have to take out six screws and remove the unit's cover. Cabel isn't the only manufacturer to go in for this kind of obstacle course; the usual reason given is that it prevents little fingers from altering the display — but think of the damage big fingers could do inside there.

PCN THREEBIES OFFER

It's Cash-In Week of the PCN Threebies Offer. It's time to collect your lovely, free one pound note. Simply cut out the PCN Threebies Offer Coupons from issues one, two and three of Personal Computer News, fill in your name and address on the coupon below and send them to: PCN Threebies Offer, Dept 101, 55 Frith Street, London, W1A 2HG.

Naturally, this offer is open to genuine readers only, and all claims must include the coupons cut from each of the first three issues of Personal Computer News (NO PHOTOCOPIES PLEASE). Send them to us today — a stamped addressed envelope ensures a speedy response.

No replies can be accepted from anyone who has any connection with the publishing, printing or distribution of this magazine.

Pass this completed coupon to your local newsagent.

Please send this order form with your remittance to Personal Computer News, Subscriptions Department, Freepost 38, London, W1E 6QZ. No stamp is needed on the envelope.

VIEW FROM AMERICA



California Faire remains micro mecca

by Guy Kewney

The invention of a computer that will only let you use it if you're human stood out from the crowd of new ideas at this year's West Coast Computer Faire in San Francisco.

The Faire has faded from its former glory as 'the' microcomputing mecca, even though the people who exhibit there are bigger and more important, and even though the number of visitors goes on breaking records.

But there are still enough really new ideas to make the trip to the Silicon Valley area worth the effort — and the Turing Test on the CommuniTree system is just one such.

Turing was the man who suggested that the true test of machine intelligence would have arrived when it became impossible to tell whether you were communicating with a human or a computer.

The Tree system has a 'Turing filter' built in, which causes it to ask questions that only a human can respond to sensibly.

The company that supplies the system charges \$250 for the software, which runs on the Apple II, and the only other thing you need to use it is a modem to get into the telephone network.

Humdinger

The Americans have started working on machines to beat the Sinclair Spectrum, and first out of the traps is a new company called Venture Micro Inc with a system called the Humdinger.

Billed as the 'World's lowest cost full feature personal colour computer', the Humdinger costs \$129.95 — at the current exchange rate about the same price as the Oric.

It isn't just an American curiosity; the maker insists it is working on a version to cope with British colour television, and which they will have ready by July. The history of US attempts to produce UK standard colour suggests that this estimate should be regarded as optimistic.

The Humdinger has more convincing sound abilities than the Oric, in that it can produce four simultaneous noises and transmit them through the TV loudspeaker. But the Oric has a superior keyboard — the Humdinger's is a squishy rubber one like the Spectrum's — and much more internal storage.

Plug-in packs for TI micro



Business and technical users of TI's new CC-40 will be able to plug in software packages on 128K ROMs.

Plug-in applications software is one of the lures Texas Instruments will use to draw you to its CC-40 personal computer, launched last week (see *PCN*, March 25).

TI is supplying software packages on 128K plug-in ROMs for the machine, which costs £169.95. At the moment they'll only be of interest if you're a business or technical user, but the range of applications is expected to grow as TI talks to third-party software suppliers.

The idea of plug-in applications will be familiar to computer games players, but Texas claims this is the first time it has been used for business software with this kind of capacity.

Much of the 128K is taken up by versions of the packages in different languages — German and French are there as well as

prompts for users in different countries, and this takes up quite a bit of the capacity.

'But we are going to continue to encourage third-party suppliers with large scale applications, and we'll encapsulate their software in the ROM for this to sell under their own name.'

TI has been issuing software in this form for five years, starting off in 1978 with applications packages of 5K each.

TI is treading in Commodore's footsteps by bringing out a cassette recorder for its range of home computers.

For £44.95 you will be able to buy the cassette recorder to use as a program and data storage system for the TI-99/4A and the new TI-99/2 micro.

The recorder will have an interface cable for the TI-99/4A, and for would-be TI-99/2 users the cable will come with the micro.

TI says the recorder will be available at the end of April. It will feature an automatic recording level control, a digital tape counter and a built-in condenser microphone to allow you to use it as an audio cassette recorder.

TI is on Bedford (0234) 67466.

ns terminal

display terminal can be switched from its everyday purpose to a personal computer running PC-DOS and processing local applications.

So far this option applies only in the United States, but the number of 3278s around the world should ensure that it is exported.

Peripheral price cut

by Sandra Grandison

A club set up to sell you software at discount prices now plans to slash prices for add-ons.

John Durrant, manager of the MicroComputer Software Club, said: 'We've had a lot of queries from our members having difficulty loading programs on their cassette recorders. So we are going to review peripherals for the BBC models, Spectrum, Dragon and ZX81 machines.'

Reviewing will be the first stage. The club then plans to test and buy selected peripherals.

'As with the software, we would try and get prices of add-ons reduced by using the bulk-buying power of the club,' said Mr Durrant.

You can join the club free, and there are no obligations to purchase once you've joined.

Each month you are sent a newsletter containing program reviews for the BBC, Spectrum, Dragon and ZX81 micros. The program of the month for each machine usually has 20 per cent discount, and other programs reviewed normally have ten per cent discount.

Mr Durrant said: 'The club's aim is to take the risk out of

software buying, by recommending only those programs we have tested ourselves.'

Software distributors have reacted cautiously to the discounts. IJK Software's Ian Sinclair said: 'The ideas behind the club seem quite good.'

'We sell software to the club at the same rates we sell to our dealers. And if it wants to sell software to its members at the same price the club bought it, well, it's up to them.'

Tony Baden of Bug-Byte felt

that the club's discounts were not too excessive and said: 'The ideas behind the club seem feasible. So far, they have ordered 200 cassettes over a two-month period.'

Mr Durrant boasts of a growing membership and says other plans in the pipeline include offering discount software for the Oric 1 and Commodore 64.

For further information contact the MicroComputer Software Club, PO Box 166, Oxford OX2 9BJ.

Computerland micro mart branches out

Computerland, famous in the US for its supermarket-type micro shops, plans to open 11 more stores here by autumn.

'We hope to have at least four more in the London area plus branches in Edinburgh, Glasgow, Leeds and Sheffield,' said

Chuck Hansen, managing director of Computerland's European head office in Luxembourg.

And there are also plans for stores in Liverpool and Manchester.

The existing UK Computerland stores, in Southampton and Marble Arch, stock the IBM PC, Digital, Apple IIe, Atari 400 and 800, Commodore Vic-20, Sirius and Hewlett Packard.

Take on your tax man

Any day now a brown envelope could drop through your letterbox and give you a taxing time. In which case you may find Microtax a sound investment.

This piece of software runs on the Sinclair Spectrum, Vic-20, Commodore 64, Pet 400 series, Dragon 32 and BBC Model B.

It will calculate your tax liability for the 1982/83 tax year and work out your allowances for 1983/4.

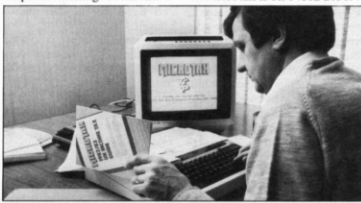
It costs £24.94 and not only takes you through your tax return step by step but also helps in making decisions —

such as whether to opt for a company car and whether a wife's earnings should be taxed separately.

The package will cover most people and their tax arrangements. But those running a business from home or in self employment will have to wait until later in the year when the complementary package becomes available.

The package is currently available only by mail order but Microtax is negotiating with two retail chains to make it available off the shelf.

Microtax is on 04862 20369.



Microtax gives you a step by step guide to tax returns.

PCN Charts

PCN Charts follows the rise and fall of the UK's best-selling micros. This fortnightly top-of-the-shops list tells you what's selling best over the counter; it does not take account of mail order and does not count deposit-only orders. This week's figures show the number of machines sold in the two-week period ending two weeks before publication date (in this case April 1), so these charts tell the story in high streets between March 4 and March 18.

Machine prices quoted are for the no-frills models and include VAT. Information for the PCN Charts is culled from retailers and dealers throughout the country and compiled by MRIB, London. They will be updated every alternate week... so watch for the arrows to follow the ups and downs of the best-sellers.

Top Twenty up to £1,000

	MODEL	PRICE	DISTRIBUTOR
→ 1	BBC Model B	£399	(AC)
→ 2	Sinclair ZX81	£50	(SI)
↑ 3	Sinclair Spectrum	£125	(SI)
↑ 4	Atari 400	£160	(AT)
↑ 5	Newbrain AD	£299	(GR)
↓ 6	Commodore Vic-20	£170	(CO)
↑ 7	Dragon 32	£200	(DR)
↑ 8	Jupiter Ace	£90	(MM)
↑ 9	Oric 1	£100	(OR)
↑ 10	Atari 800	£400	(AT)
↑ 11	Commodore 64	£345	(CO)
↓ 12	Acorn Atom	£174	(AC)
↓ 13	Apple II	£776	(AP)
↓ 14	Sharp PC1500	£170	(SH)
↓ 15	Texas TI99	£150	(TE)
↑ 16	Epson HX20	£472	(EP)
↑ 17	Lynx 48	£225	(CA)
↓ 18	Colour Genie	£224	(LO)
↓ 19	Tandy TRS	£240	(TA)
↓ 20	Colour Computer Commodore 4016	£632	(CO)

Top Ten over £1,000

→ 1	Sirius I	£2,754	(ACT)
↑ 2	Osborne I	£1,581	(OS)
↓ 3	Olivetti M20	£2,754	(OL)
↓ 4	HP 86A	£1,541	(HP)
↓ 5	Apple III	£2,780	(AP)
↓ 6	Commodore 8032	£1,029	(CO)
↑ 7	Sanyo MBC 1000	£1,195	(SA)
↑ 8	Micro-Mimi 803	£1,720	(BM)
↑ 9	Sharp PC3201	£2,300	(SH)
↓ 10	Xerox 820	£2,415	(RX)

AC — Acorn Computers. ACT — ACT Sirius. AP — Apple Computers. AT — Atari International. BM — British Micro. CA — Computers. CO — Commodore. DR — Dragon Data. EP — Epson. GR — Grundy Business. HP — Hewlett-Packard. IC — Icarus Computers. LO — Lowe Electronics. MM — Micro Marketing. OL — Olivetti. OR — Oric. OS — Osborne Computers Corporation. RX — Rank Xerox. SA — Sanyo Marubeni. SH — Sharp. SI — Sinclair. TA — Tandy. TE — Texas Instruments.

Pick a brick with Pinball

It was only a matter of time before somebody came up with an electronic version of Lego to run on your micro.

With the Pinball Construction Set you can make your own pinball games piece by piece.

For £27.95 you get not only the software but also a joystick. This is used to move a hand around the screen to pick up pieces from the parts box and place them where you want them. The hand can also use a paint brush to colour the final article.

And once you've made the machine you can use it to play the game.

The complete package, which has been designed to run on the Apple II, can be obtained from Pete & Pam Computers on 0706-227011.

Software pirate is scuppered by ACS

Anyone with ACS software that didn't come to them through the usual channels should contact ACS immediately.

ACS Software, which specialises in programming aids for Sinclair machines, has just shaken off a software pirate by the threat of legal action. But the pirate claims to have kept no sales records — so you could be left high and dry in possession of ripped-off software if you replied to his ads.

The software shouldn't be hard to spot — illegal copies are identical to the extent that ACS's logo is on them, and when LOADED the programs

put up the logo and the copyright clause of ACS. If you call ACS now it will provide any support you may need.

The programs in question are machine code assemblers and disassemblers for the Spectrum. They are normally — legally — available from ACS through a mail-order scheme and from some shops and software retailers.

Anthony Booth of ACS said that the piracy the company had stamped on was essentially a one-man operation. 'It's the first time we've been affected

by this kind of thing,' he said, 'and it leaves a nasty taste.' But he added: 'We'd have gone after him anyway — this has got to be stamped out.'

In this case the threat of legal action seems to have been enough, and ACS regards the matter as closed, although the company would appreciate hearing from users.

It has offered to give advice to anybody else suffering from piracy.

ACS can be contacted through Mr Booth on 0532 667440.

Non-violent software from Systematic

Three software packages and a new expression were coined last week.

Systematics International launched word processing, database and payroll packages for users of Apple, IBM, Sirius, NEC and Triumph Adler micros. And with a memorable turn of phrase it described its software as a response to the 'user-violent' offerings of some of its competitors.

The Systematics Word Processor costs £200 and aims to be simple to use. 'A secretary introduced to a microcomputer and the Systematics Word Pro-

cessor for the first time will be able to do a letter within half an hour of the introduction,' the company claims.

The Administrator also costs £200 and offers both database and addressing and mailing facilities.

The Systematics payroll package costs £400 and has been designed to cope with the latest legislation, including the Statutory Sick Pay Scheme.

In addition to its own software, Systematics announced that it is to market the Micro-finance financial modelling package which can also be integrated with its other software.

Systematics software should be available through your local micro dealer. In case of difficulty, Systematics is on 0440-61121.



SHOCK-STOPPER — a typical domestic scene; the young enthusiast, unsupervised, is learning to program a computer. But is it safe to leave him alone with all that electrical equipment? Yes, says B & R Electrical Products. It makes the white box in the top of the picture which turns out to be an H04 earth leakage circuit breaker. So if he was to accidentally pour his lemonade into the back of the TV set, the power would switch off in a fraction of a second leaving him safe from the danger of electrocution. The H04 costs £29.50, and B & R is on 0279-34561.

ACT launches Writer range for Sirius

The company behind the Sirius in the UK has launched a range of printers to go with it.

ACT's matching accessories start with the Writer 10 dot matrix printer. This prints at 120CPS and will set you back £395.

From there you can move up through the Writers 12, 14, 20 and 30.

The Writer 12 costs £695 and

is designated a business printer. It gives 120CPS, and has logic seeking and bit graphics capability.

The writer 14 costs £1,295 and does 150CPS. It acts as a heavy-duty printer for high-volume use, while the Writer 20 is the fastest with a claimed 180CPS in draft mode. It also has a slower letter-quality mode.

At the top end of the range the daisywheel Writer 30 costs £1,395 and produces 40CPS.

ACT is on 021-454 8585.

■ PCN will Pro-test the Writer 10 in issue seven.

Micro try-out

Try before you buy is the aim of a service set up in the North for micro beginners.

Based in Macclesfield, Cheshire, Microtime lets you test out a micro, and tries to give you a good idea of which one to buy.

This service for the undecided costs 95p for the first half hour's use of the machine plus 30p for every 15 minutes thereafter. The price includes basic technical help.

Machines provided are BBC 16K and 32K, Dragon, Tandy TRS 80, Oric and Sinclair's Spectrum.

Will Ablett, the proprietor of

Microtime, says he doesn't receive any commission from local dealers if his customers decide on a particular machine, and he owns all the micros himself.

Duncan Cummins, who used Microtime, said he was very pleased with the service. He tested a Spectrum and a Dragon, and preferred the Dragon because of its full-sized typewriter keyboard. It took him 1½ hours on each machine to reach a decision.

Microtime is open from 6.30-10pm Monday to Saturday, at Waterside, Macclesfield, telephone 0625-610793.

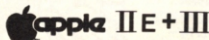
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Some of our other offers

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PCN 408

Micro consumer group dives into discounts

A microcomputer consumers' group has gone on to the attack and is in there pitching with the suppliers.

The Association of Micro-Computer Users (AMCU) promises you advice, problem solving and arbitration — all the usual things consumer organisations do. But in return for your membership fee of up to £39.50, it also promises discounts on software and hardware as an extra.

Paul Swerhun, principal of the group, described AMCU as the micro owner's equivalent of the AA. But he added: "We are

a body of consumers who have come together to take action on issues like lower prices and a guarantee on the supply of machines. We want to cut out the middleman."

The National Computing Centre, which also offers consumer advice, predicted that the middle-man might object to being cut out, but its spokesman said a national consumer group was probably overdue. The retailers already have the Computer Retailers Association, and UK manufacturers have the British Microcomputer Manufacturers Group.

AMCU membership costs £25 if you use a home computer, £37.50 if you're in business, and £39.50 if you are in education. Mr Swerhun claims 250 members, and presents the AMCU as a kind of exclusive club.

Benefits of AMCU membership, he says, include special prices — known only to members — on popular micros like the Vic-20, ZX81, Spectrum, Dragon 32, and BBC systems. Software prices are also under attack, he claims.

You can contact the ACMU through Mr Swerhun on Worcester (0905) 640400.

Dynacalc spreadsheet for 6809

For those of you in business with a 6809-based machine there is now another alternative spreadsheet to VisiCalc.

Software house Compuserve has launched Dynacalc which runs under Flex, Unixif or OS-9 on models such as Tandy TRS-80, Positron 900/9000 and Southwest Technical Products.

Dynacalc is available only on disk, and costs £140 for use on the Flex single user operating system. Multi-user versions for Unixif and OS-9 operating systems cost £340 and £220 respectively, exclusive of VAT.

The spreadsheet is available direct from Compuserve, or from SWTP's 12 UK distributors. A version for the Tandy colour 51 × 24 screen is due out within a month.

Also waiting in the wings is a Cobol compiler for the Flex operating system. This disk-based compiler is available for demonstration now, and is due in about two weeks.

Compuserve is on 01-882 0681/6936.

Mainframe meetings for Sirius

Victor Technologies and its UK distributor ACT are working on ways to increase the flexibility of the Sirius system.

Before the end of the year the Sirius will be able to talk to IBM, Burroughs and Honeywell mainframes, and its capacity as an office computer will grow with the addition of specialist software.

In the US, Victor Technologies is aiming to provide IBM 3270 SNA/SDLC emulation, a co-axial connection for IBM 3278 emulation, and support for Burroughs TD830 and Honeywell's VIP protocols. There should also be videotex and telex links this year.

ACT is working on word processing and electronic mail packages for the Sirius. It will give no release date and has not decided on a price, but a spokesman said they would be "keenly competitive". Packages in ACT's current range cost about £195.

The intention, said ACT, is not to turn the Sirius into an intelligent terminal, but to improve its position in a sector where it is already established.

Both Victor Technologies and ACT have been raising capital recently, and each has its own expansion plans. ACT's involve the production of its own micro, the Apricot (PCN, March 18).



CHESS HUTS — The Dutch are crazy about chess. Apparently about 2.5 million out of a population of 14 million describe themselves as chess players. Small wonder that Dutch-based multinational Philips should address itself to the computer chess market, and announce a chess module for the G7000 video games computer. The G7010 plugs into the games computer and the action takes place on screen. The system has six skill levels — the highest thinks six moves ahead. This involves the consideration of over seven billion possible positions, taking up to one hour. The system costs £69.95.

Hotel menu

Residential micro courses in plush hotels are catching on north of the border.

The Royal Hotel in North Berwick will be the site of weekend courses concentrating on the BBC Micro from the end of April.

Course organiser Ian Goodall promises four to six hours devoted to background skills, with what is left of 20 hours spent on programming.

Mr Goodall is on North Berwick (0620) 3184.

Starring software

Bristol Radio West engineers have broken new ground by broadcasting data on the airwaves — and the response has been 'incredible'.

Dozens of letters and programs are coming into the station as a result of Tim Lyons' and Edwin Tozer's programme Dataarama.

The programme needed special Home Office approval — but once on the air it found an eager audience.

Dataarama runs for half an hour from 7.30pm every Monday evening. It is a general interest programme on computing and sets the tone for the software broadcasts — these go out after the station closes at lam.

Radio West aims to put out data for a wide range of machines, said Tozer. Most of its output is small routines and utilities, but longer programs can be broadcast during the

night when, every 15 minutes, data is added to an automatically broadcast message.

If you live in the Radio West catchment area tune in on 238 metres medium wave or 96.3 VHF.

And deprived insomniacs in the rest of the country can take heart — Tozer and Lyons plan to offer their programme to the independent radio networks so data on the airwaves could soon be coming your way.

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Enter Key	No	Yes	Speed	3" Sec	6" Sec
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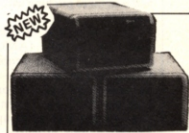
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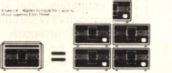
Rana has an advanced write protect feature which makes it impossible to lose your information. A simple touch on the front panel's membrane switch gives you fail-safe control. Apple of course only has a notch or tabs, which gives you only minimal protection.

With the superior Elite controller card, you can control up to four floppy disks using only 256 bits. With Apple's you can only use two. Of course, you can still plug into Apple's controller card, but down the line you'll want to switch to Rana's and save yourself a slot.

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Be careful of the Context

I received a copy of your launch issue in which you publicised a photograph of the CWP Context microcomputer. You describe it as an 8-bit system with about the same capability as the Osborne.

This bald announcement hardly does justice to a twin processor, pixel-mapped machine, with very high resolution, a full 80 column screen (did you know Osborne has 52?), 104K of RAM, and a no-wait state Z80A processor which is so efficient that it comes out above the Apple II, Apple III, Osborne, Sirius and IBM in the *Personal Computer World* benchmarks.

And, incidentally, it also has half-height double density Schugart floppy drives, the Keytronics keyboard used on the IBM PC and the option of 8-in and Winchester disks. All this for £1,495.

*T A Margerison,
Chairman,
CWP Computers*

Enterprising Oric owner

I read with special interest your article Oric Enterprise (*PCN, March 18*) because, while I have been interested in micros for some years, and used a mini at work, I have only recently purchased my own — a 48K Oric.

The program is well laid out and easy to understand, and is a good demonstration of some of the Oric's facilities. My only minor criticism is that the GOSUBs branch to REM statements — not recommended.

My other modification has been to put KS = KEYS before requesting input which removes anything in the keyboard buffer from the previous section.

*Alan Northcott,
Wokingham, Berkshire.*

Speaking up for micro owners

Re Mr Parsons' letter in your first issue. The poor man shows himself to know next to nothing about home computers and the people who operate them.

He is, unfortunately, obviously prone to making sweeping general statements to help prop up his extremely weak arguments.

Mr Parsons seems to have his own, rather strong, opinions on Space Invader and Pac-Man type games, to which, of course, he is perfectly entitled. But there are many thousands of other people who disagree with his description of the games as 'rubbish'. He ought to remember that these games give a tremendous amount of enjoyment to a lot of people and they provide employment and income for the people who manufacture them.

Mr Parsons says computers are 'evaluated entirely on their graphics capability'. Isn't it funny then that in the advertisement for the Sinclair Spectrum, graphics get only a passing mention, and the Commodore 64 advert carried by your magazines makes no mention of them at all?

Certainly most games need graphics, but so do business and 'home use' programs.

And it is nothing short of ludicrous to suggest that many 'youngsters' have not heard of games such as Ludo and Snakes and Ladders.

Mr Parsons really should come out of his shell.

*Alan Gunnell,
Hookend, nr Brentwood,
Essex.*

In defence of the game players

I have just read the letter from RJ Parsons (*PCN, March 18*) and I am appalled at some of his ideas. As a 13-year-old owner of a small micro I had to write to defend all the young users.

We do not spend all our time playing arcade games as the gentleman seems to think. We own our micros to write programs, as well as playing games.

In my view, the computer is a highly advanced teaching tool which is fun to use and remarkable in the hands of a skilled user.

As for his idea that none of us has heard of Snakes and Lad-

ders or Ludo, many computer games, especially of the adventure/fantasy type, involve a lot more skill than the throw of a dice.

Space Invaders requires more skill than that.

*JR Mortelman,
South Woodford, London E18*

More to life than invaders

W. Bisiker (*PCN, March 25*) protests inaccurately at RJ Parsons' opinion that far too much effort is being channelled into producing personal computer games.

Parsons neither said that the games require little skill, nor drew comparisons with watching TV.

If Bisiker does indeed 'spend hours calculating complex mathematics to land a spaceship on the moon' he proves Parsons' point to the hilt — that the micro's potential (to say nothing of his own!) is being squandered.

In a recent article 'Home Computers — good or bad?' (*Personal Computer World*, February) Martin Banks writes:

'I always feel that there must be much more than can be done with all this technology than pretend to fire pretend rockets at pretend invaders from pretend space . . . Couldn't all that power be put to much better use?'

'If the industry is to survive, it must have products that have a long-term future . . . (which) means software products that . . . are of some tangible benefit to (their users).'

In this argument I'm happy to stand alongside Parsons and Banks.

*D T Hartley,
Wilmslow, Cheshire*

Key to computer enjoyment

I am buying my first micro, after much deliberation over which one. I narrowed myself down to two which are suitable for my purposes: the Spectrum 48k and the Dragon 32K.

On paper the Spectrum would win hands down. However, I decided to test drive both and contacted Microtime, of Macclesfield.

I spent my first hour on the Spectrum and noted the following:

Keys close together and soft

touch — this means that the time saved using key words is wasted checking that you have actually pressed a key.

The multifunction keys were confusing, to say the least.

On trying a program from the ZX printer handbook I came across the command 'UNPLOT'. As Spectrum does not define a keyword and it wouldn't accept the word being typed in I had to abandon the program.

My next hour was a lot happier. Within ten minutes I was running my first program successfully, enjoying the full, positive keyboard of the Dragon.

So, my choice is for Dragon, and yet, every popular computer magazine provides listings for the Spectrum, but none I've seen so far have any for the Dragon.

How about PCN doing me a favour in the near future?

*Duncan Cummins,
Stockport, Cheshire*

Following the guide to the stars

I feel that although your magazine appears to be very good in general, the section on the anatomy of the BBC micro contains some unforgivable errors.

If anyone had bothered to read the BBC User Guide they would have found that: *FX0; *FX16.0; *FX4.1; *FX4.0; and *FX4.2 are all correctly and well explained.

Forth and Lisp do not cost £7.50 each. Those are the prices of the manuals (which are unavailable). The languages cost £16, or £25 if you include the book as well.

Possibly the worst error is the printing of a picture of ovals upside down with ESCAPE AT LINE 90 written across it.

*J Vernon
Muswell Hill, London N10*

*You're right on one count, Mr Vernon. The *FX commands are in the User Guide (though hard to find). But we're not entirely wrong either. The Forth and Lisp manuals are available from Acorn, and the price we quoted did, as stated, include only the manual. But we could have been clearer — sorry. And we blame gremlins for the upside-down picture — Ed.*

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RANDOM ACCESS

A fumble amid the maths keys

How can anyone who reviews a calculator/computer do so when he lacks a knowledge of basic mathematics.

John Wadkin can, it seems. And he did indeed fumble with the Casio PB100.

For his information and anyone who was misled—SIN⁻¹x=ASNx (ie the angle whose sine is X). Similarly for COS⁻¹ and TAN⁻¹. PS The ProgramCards are an excellent idea, as is the magazine as a whole.
David Flack,
Neasden, London NW10.

See next letter Mr Flack — Ed.

A lesson in trigonometry

I couldn't believe my eyes when I read John Wadkin's review of the Casio PB100 (PCN, March 25).

He obviously uses a different trigonometry to that which I used through school and college. I feel it my duty to inform Mr Wadkin that in the more common trigonometry:

$$\text{COSEC} = 1/\text{SIN}$$

$$\text{SEC} = 1/\text{COS}$$

$$\text{COT} = 1/\text{TAN}$$

F⁻¹ means inverse of the function F, so COS⁻¹ means inverse of COS, or ARCCOS, hence ACS. Similarly ARCSIN becomes ASN and ARCTAN becomes ATN.

Andrew Crouch,
Andover, Hants.

An apologetic Mr Wadkin says what he meant to write was that abbreviations ATN, ASN and ACS are not as indicative or as common as TAN⁻¹ etc. He should have continued with a note to say that SEC, COSEC and COT are totally omitted from the PB100 — Ed.

A helpful word from the wise

I take exception to a statement that was made regarding the Wordwise word processing chip for the BBC.

In the article contained in the pullout section it is stated that the inability to edit Basic programs eliminates the system from being much practical use to programmers. On the contrary, the facilities of Wordwise make up for some of the few

failings of BBC Basic, ie, the lack of simple merge facilities and the inability to renumber a program in sections.

I use Wordwise to write my procedures and functions thus:
1. Write the procedure or function without, as far as possible, using GOTO's and other statements requiring line numbers.
2. Insert an AUTO statement at the beginning of the file. Your file should look like this:

```
AUTO  
DEFPROC Thisone  
.....  
.....Program statements  
.....  
ENDPROC
```

3. Store this on your filing system.

4. When finally putting the completed program together, decide where the procedure or function is going to be placed within your program, and insert the appropriate starting line number in the AUTO statement in the file, and again store the file.

So if you had decided that PROC Thisone was to start at line 2000, you would edit your file to say:

```
AUTO 2000,10  
DEFPROC Thisone
```

5. Return to Basic and use the "EXEC filename. The machine will insert the line numbers as it reads in the file.

When the file has been read press ESC to switch the AUTO-numbering and then the file can be saved as a normal Basic program.

This technique has numerous advantages as it allows you to make use of the full editing facilities of Wordwise when writing programs and it also allows the programmer to build up a library of procedures and functions to carry out specific tasks and then insert them in his programs at the desired point just by altering the AUTO statement in the Wordwise file. These measures will greatly speed program production.

Kennedy Fraser
Stewarton, Ayrshire.

A jewel among the rubbish

I used to think my Dragon 32 was the best computer around. I am still happy with my micro, but with one complaint: the lack of software support.

It is true that more games are coming onto the market, but not all are of good quality.

A few weeks ago I ordered

RANDOM ACCESS

the games pack offered by Active Software, of Birmingham, and to my surprise it was outstanding value for money.

For only £5.75 I received a good quality cassette containing eight games with adequate to excellent instructions.

On the subject of software I would like to tell other Dragon owners that some Tandy Colour Computer games software will work on the Dragon, especially the ROM packs.

Those which I know work are Dyno Wars, Maths Bingo, Space Assault, Chess and Quasar Commander.

Philip Kirtlan,
Harrogate, N Yorks.

Express Oric bucks the trend

Having read numerous articles and letters on the subject of delays and difficulties in obtaining the Oric I feel it only fair to inform you and other potential buyers that all is not gloom and doom on the Oric front.

I ordered my Oric 1 from a mail order firm on January 15 this year and it was at my door on January 31.

May I say here and now what a delightful little machine it is. *T A le Cocq,*
Braunton, N Devon.

Can a micro throw the match?

Many years ago, when I played chess with David Levy, the only strategy that avoided my humiliating defeat was to tip the board over while he wasn't looking.

Could a computer surpass human ingenuity by doing that — or duplicate the spectacular consequences that inevitably followed?

Sometimes I think I ought to issue a challenge — but then I change my mind.

Best wishes with a very good publication.
Monty Trent,
Welwyn Garden City, Herts.

It's cheaper by the mile

'Why are the prices so high?' (*PCN, March 25*) prompted me to relate the following experience.

In 1977 I attended an exhibition in New York, and saw Commodore N.60 Flying Calculators in many outlets for £28.

I purchased one, since at the time in the UK they were anything up to £72.

On opening it, I found they were made in England.

In 1980 a friend purchased a Simon game for the equivalent of £9 in California, at a time when they were anything from £22 to £35 in the UK.

There would seem to be a new Sod's Law. The further you are away from the product, the cheaper it becomes.

Dennis Hemmings,
Okehampton, Devon

Stretching across the Atlantic

In *Microwaves (PCN, March 25)* Peggy Keenan asks why the difference between American and British TV signals causes the display to stretch.

The main difference between the two systems is that in Britain the picture is composed of 625 lines vertically, while in America there are only 575 lines. (This is not exactly true as about 50 lines in each case are not displayed.)

Because there are 50 lines less on the American picture, the vertical spacing between the lines is greater than on the British screen, giving the impression of elongation.

In fact the oval on the Oric is probably due to a design fault which fails to compensate for the difference.

If anyone requires further explanation I refer them to a book, *Beginner's Guide to Television*, by GJ King, published by Newnes.
L J Dundon,
Tidworth, Hants.

Faulty EARing

On reading in routine inquiries about problems with LOADING the Spectrum I thought you might wish to know of a possible reason for the failure.

A friend of mine who experienced similar problems asked me to investigate. I did so and found the sockets marked EAR and MIC on the back of the computer had been connected the wrong way round.

The poor machine was vainly waiting for a signal which was being sent into the MIC socket. I wonder how many other machines were connected in this fashion?

P E Watson,
Nelson, Lancs.



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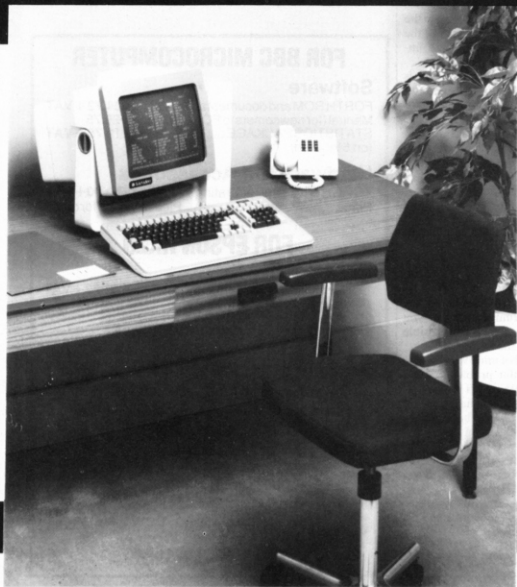
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- 64K RAM
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- Supports up to 6 users

TS 816/40

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- Supports up to 16 users

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ROM programs for the Newbrain

Can you tell me whether there
are any programs available in
ROM for the Newbrain? I ask
this with particular reference to
the Comal and Pascal that
David mentions in its leaflets.

Grundy Scott
Glenrothes, Fife
Neither is currently available.
Comal has been demonstrated
in Scandinavia, and as you
probably missed that, it will be
available here in August. Pascal
will be available 'in the
autumn'.

The problem is that any
ROM packages need the New-
brain memory expansion mod-
ule. Something else you'll
already be good at waiting for.

Vic-20 vs Spectrum

I am trying to decide between
buying a Commodore Vic-20
and the Sinclair Spectrum. I am
more in favour of the Spectrum
since it appears to be a good
economical buy and easy to use.

Could you tell me which of the
two models would be most
suitable for a beginner, and
suggest literature that might
help?

David Baldwin,
Glenburn, Paisley

Most cheap computers are
suitable for beginners, and there's
little to choose between the two
machines you're considering.
Both are well-established prod-
ucts with lots of software and
add-ons to play with. The
Spectrum has a useful 9K of
memory free for Basic com-
pared to the Vic's rather miser-
ly 3.5K, but the Vic has a proper
keyboard compared to the
Spectrum's clammy rubber
keypad.

If anything, the Spectrum has
the edge on user friendliness.
Spectrum Basic has commands
for graphics and sound while
Commodore still expects you
to learn POKE commands for
anything but the standard bits
of Basic. So if you wanted to
write in red on a white back-
ground with a blue border on
the Spectrum, you could use
INK 2: PAPER 7: BORDER 1.

On the Vic you would use the

Wait for the Oric expansion

Is the 16K Oric I expandable to
48K? And is it possible to use the
communications modem and
Forth cassette with the smaller
memory size?

N Smith,
Worthing, Sussex

All it takes to change a 16K Oric
into a 48K Oric is a new set of
RAM chips. So you'll have to
send your machine back to Oric
for the modification, and Oric is
not yet ready to offer the
service. It's a bit academic at
the moment since at the last
count, Oric was delivering 48K
machines on loan to those who
had ordered 16K versions.

The communications mod-
em costs £80 and will work with
16K machines when it's ready.

Lastly, the Forth interpreter
does need a 48K machine.
Forths are usually quite small,
but this one has high resolution
graphics support built in. And it
is actually ready now.

Start off with colour and sound

I am 13 and am thinking of
getting a personal computer. I
would like to know what I
should start with to suit my age,
something priced £50 to £125?

Gary Moore,
Speke, Liverpool

Take your pick. If you can
afford it, you're probably bet-
ter off with a machine with
colour and sound, like the ZX
Spectrum or Oric 1. There are
lots of new machines being
launched in this price-range but
it's sensible to go for a machine
which you know is being deliv-
ered and has lots of software.
That does suggest the Spec-
trum.

If you can't afford that, you
may decide to go for a ZX81.
Do try and buy a 16K RAM
pack as well, as the £50 ZX81
comes with only 1K. It works,
but it's not enough to run most
programs on the market, or to
learn programming.



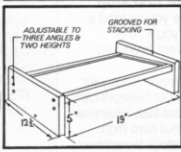
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ROUTINE INQUIRIES

somewhat less meaningful
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"[RED]".

The Spectrum also has the edge on price. You may already have a cassette recorder you can use with the Spectrum, while the Vic needs a special £45 cassette recorder.

As regards literature, both machines have suitable manuals available. One comes with the Spectrum, though for the Vic you do need to spend £10 on *The Vic-20 programmer's Reference Guide*. The best information comes from user groups, newsletters and specialist magazines rather than the latest 'Master the Vic/Spectrum/Oric/BBC/Dragon etc in ten minutes' book.

You might also find it helpful to take some traditional books such as David Ahl's 101 Basic Computer Games and adapt some of the programs to work on your machine. You learn by doing, not reading about it.

So don't worry too much about choice. Try a Vic and a Spectrum, see some programs going on them and then buy whichever you feel happier with.

IBM PC deduces disk types

I have read that the new IBM PC XT has an extra 20K of floppy disk storage. Does this mean that it can't read existing IBM disks? The XT also uses a new version of PC/DOS so it can control its hard disk. Why is this?

Sid Robson, Consett, County Durham
MS/DOS uses a system that automatically recognises and adapts to any different disk formats in use. Just like a double-sided (320K) system can invisibly switch to a single sided (160K) format, the new PC/DOS switches between 180K and 160K without you even noticing it.

The XT didn't really need PC/DOS 2 to control its hard disk. The problem is that a ten megabyte hard disk stores so many files that it's difficult to 'keep house' with a simple directory system like the one used in release 1 of PC/DOS. The new system allows you to organise directories into tree-structures, with the main directories actually holding other directories, which in turn hold others, and so on. It really makes the system nicer to use.

The meaning of multiple micros

Can you explain the difference between a multi-user and a multi-tasking computer? Everybody seems to be talking about networks but there are several multi-user micro-computers available. What are the pros and cons?

Mark Holmes, Cambridge

A multi-user system is a computer that allows more than one user to use it at the same time. A multi-tasking computer may have only one user, but it can do more than one thing at once. So you could have it printing out one lot of results while it calculated the next.

Multi-tasking is really a function of software and an operating system such as Concurrent CP/M86 turns an IBM into a multi-tasking system. In contrast, multi-user systems tend to require hardware that has to be designed specially.

This is part of the reason why multi-user micros are expensive. Networks connect computers together — even cheap ones like the Atom, Nascom or RML480Z — and allow them to share expensive gear such as printers and hard disks.

Networks score because they give you all the benefits of communication and shared access to the same information, while leaving you the privacy and performance of your own personal computer. Networks are also safe, in that failure of one machine doesn't jam up the whole system.

Some multi-user micros, especially the older designs, are somewhat overloaded by the tasks being demanded of them and suffer from software that doesn't protect each user's data adequately from accidental damage or sabotage.

It's the same with early networks, or with any new technology . . . there are unforeseen problems. But now that networks and multi-user systems are being based on improved hardware and software, more efficient and valuable products should appear.

At the moment, low cost networks and multi-user systems are challenging the rationale of buying a number of identical machines and swapping disks and information between them. It looks like most effort is being put into networking, but don't rule out multi-user systems.

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Cut back on brackets

On the BBC micro the error message "Missing" can sometimes be caused by having too many brackets, rather than one missing, as in the following, which uses numbers stored in arrays as graphics coordinates:—

```
4070 FOR count=1 TO 100
4080 MOVE (Xpoint (count),
Ypoint (count))
4090 VDU 18,0,0,227
4100 NEXT count
```

This will cause the error message "Missing" at line 4080", when in fact the line should be:—

```
4080 MOVE Xpoint (count),
Ypoint (count)
```

This slip is easily made as, if one were using text coordinates, an equivalent line would be:—

```
4080 PRINT TAB (Xpoint
(count), Ypoint (count))
CHR$227;
```

This does not occur when using brackets in calculations, for example:—

```
10 X=S:Y=4
20 PRINT X+Y
30 PRINT (X+Y)
40 PRINT ((X+Y))
50 PRINT ((X)+(Y))
RUN
```

John Penfold,
Benfleet, Essex

Capitalise on your BBC micro

Here are some tips and routines for BBC users, starting with two functions which take a string and return it with all its characters in upper case.

The first is straightforward

and requires no setting up. The second executes much faster but requires that DIM Z%255 has been executed at the start of a program:—

```
10 DEF FNUPRC (A$): IF
A$=""=""=""
20 LOCAL A%, B%: FOR
A%=1 TO LEN
A$:B%=""=""=""
AS:B%=""=""=""
(A$,
A%, 1)
30 IF B%>96 AND B%<123
AS=""=""=""
LEFT$ (AS, A%-
1)+CHR$( B%-32)+MID$
(A$,A%+1)
40 NEXT:=""=""=""
A$
```

Alternatively, after DIM Z%255 you could use:—

```
10 DEF FNUPRC (A$): IF
A$=""=""=""
20 LOCAL A%, B%:
Z%=""=""=""
AS=""=""=""
FOR A%=0 TO
LEN A$-1: B%=""=""=""
Z%=""=""=""
A%:
B%=""=""=""
B%+32*=""=""=""
Z%=""=""=""
96 AND
B%<123):=""=""=""
Z%=""=""=""
A%=""=""=""
B%=""=""=""
NEXT:=""=""=""
Z%=""=""=""
A$
```

I use these functions most often like this:—

```
KEYS=""=""=""
FNUPRC (GETS) OR
INPUT AS:=""=""=""
FNUPRC
(A$). All program lines beginning
DEF are ignored by the computer.
```

This means that you can give one procedure different names, different entry points or even use it as both a procedure and a function:—

```
1000 DEF PROCYIPPEE
(A$,WAH00%) LOCAL
F%:=""=""=""
F%=""=""=""
TRUE
1010 DEF FNYIPPEE
(A$,WAH00%) LOCAL
F%:=""=""=""
F%=""=""=""
FALSE
```

```
1050 IF F% ENDPROC
ELSE=""=""=""
A$
```

This procedure can be used as a procedure with PROCYIPPEE ("TEXT", 4) or as a function with A\$=""=""=""
FNYIPPEE ("TEXT", 4).

You could use this to let the user use procedure calls, for example:—

```
100 ON ERROR PRINT ""Bad
procedure call""
110 INPUT AS:=""=""=""
A=""=""=""
EVAL
("FN"+AS)
120 ON ERROR OFF
```

One last quirk is that the BBC's ON ERROR routine allows such statements as LIST, RENUMBER and so on if they follow immediately, while "forgetting" about the procedure or function it might be in. So it's only useful for error trapping in the main program.

J Parsons,
Bury St Edmunds, Suffolk

More help with hex conversion

Some of us are not fortunate enough to have the EVAL function, or an alternative to convert decimal into hexadecimal.

The following, written in Newbrain ANSI Basic, accepts Hex in string form and, by stepping through the number one digit at a time, converts any length Hex number into decimal.

```
1000 REM *** HEX-DECIMAL CONVERSION
1010 INPUT "ENTER HEX DIGITS":=""=""=""
HEX
1020 L=LEN(HEX):=""=""=""
H=0
1030 FOR N=1 TO L STEP-1
1040 IF MID(HEX,N,1)=""=""=""
"0"=""=""=""
"9"=""=""=""
1050 H=H*=""=""=""
16+=""=""=""
VAL (MID (HEX, N, 1))-=""=""=""
"0"=""=""=""
1060 NEXT N
1070 PRINT H:=""=""=""
END
```

S Ericsson Zenith,
Hayle, Cornwall.

Mr Parsons' suggestion for inputting hexadecimal numbers is a generalised method which accepts both decimal and hex. If a large number of hex values are to be entered we can avoid having to type '&' before each entry by concatenating the '&' with the input string:—

```
10 INPUT "Hex number="=""=""=""
a$
20 PRINT FNhex (a$)
30 GOTO 10
40 END
50
```

```
60 DEF FNhex (h$)
70=""=""=""
EVAL ("&"+"h$)
K Wolstenholme,
```

Deansgate, Manchester

Lynx's commanding presence

As G Carter (PCN March 25) found out, the Lynx has two other working commands/functions that are not mentioned in the manual — STR\$ and TEXT. I also discovered their existence when I started disassembling the ROM.

TEXT is a strange command, as I expected it to just clear the text window as defined by the WINDOW command. In fact, when executed, it first enables all the colour banks, sets the INK colour location (25179) to green and the PAPER colour (25180) to black. Next it clears

the screen and PROTECTS (25195) Magenta.

Protecting colour banks speeds up the screen driver (address held at 251978), for the computer does not need to update protected banks. In the case of TEXT, screen handling is speeded up by a factor of three.

The @ key shifted is in fact £ and not \. In fact to find \ and— you will have to go into the graphics set (SHIFT, and SHIFT/respectively).

Clive Newton,
Cwmbran, Gwent

Clean up your cassette

Tape loading problems are a common hassle for micro users. One simple cure I have never seen in print is to try cleaning your recorder.

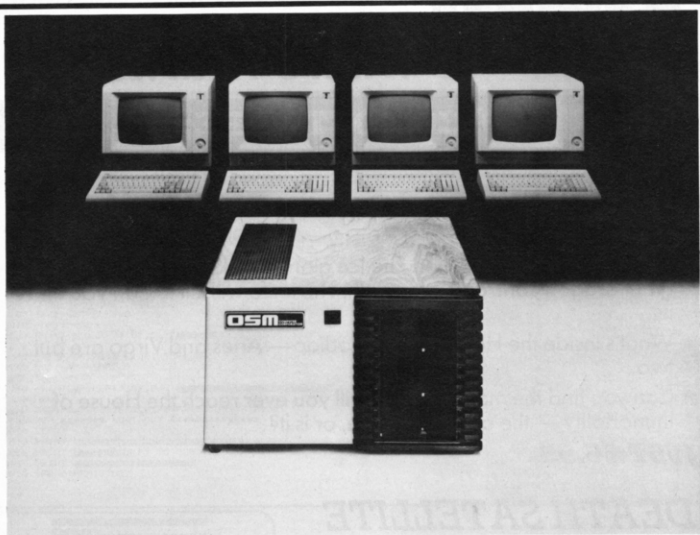
You can buy fancy 'cleaning kits' but the essential materials are a bottle of head cleaning fluid and some cotton buds.

Remove the cassette from the recorder and with the lid open switch to 'play'. You should be able to see the two heads move forwards. Put one or two drops (no more) of fluid on a cotton bud and give one head a good polish, then dry with the other end of the cotton bud. You will probably be surprised how much black gunge has been removed. Clean the other head with a new cotton bud—spreading the dirt around isn't the object of the exercise.

Finally, give the drive capstan and pinch wheel a good polish — they are usually the filthiest of all. With luck your loading problems will have gone away — if they come back after a few weeks, it's time to clean again.

One very important warning — never touch a tape head with anything made of metal. The smallest scratch could wreck it for ever. Be careful not to get cotton tangled up in the works when you are cleaning the drive mechanism — note which way it goes round and avoid getting the cotton sucked in between the wheels.

If you write your own programs it might be worth re-saving them after cleaning — though recording seems more tolerant of dirt than playback in general. R W Tuley,
Ockbrook,
Derby



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'The Vic-20 for Children', by Tony Noble, published by Sigma Technical Press (paperback, 154 pages)

There has been a recent boom in books for the Vic-20 but Tony Noble breaks new ground here. Mr Noble is a headmaster and his theme is making computing educational, and making education fun.

With one or two minor quibbles, he succeeds. Criticisms first: Mr Noble can't seem to make up his mind whether he is writing for the children in his title, or for their parents — and while the book can and does work on two levels, a clearer demarcation would help.

Second, it is to be hoped that Mr Noble does not pass on his writing style to his pupils. There were too many 'classroom situations' and 'learning environment situations'.

That aside, there is much to commend *The Vic-20 for Children*. It offers a clear step-by-step guide to get the beginner through the early stages of programming; a number of well thought out programs designed to be informative and fun; and two adventure-style simulations which could form the basis for a work project.

One is called *Smugglers*, and is intended to help develop logical thinking and thought processes. Your task is to find smuggled goods using coordinates on a grid, and each set of coordinates narrows the area in which you will find the treasure.

Saurus Island is a survival game, where the shipwreck idea is combined with 'horrendous, strange and gigantic creatures lurking in... swamps and forests.' To get off the island you have to use the available equipment, and your initiative.

These listings are one of the best features of the book and should be held up to every publisher of computer books as an example.

Straight from the printer,

reproduced full size, they are a marvel of clarity even down to the notoriously difficult Vic control characters.

The purchase of a computer 'to help the kids' is one of the most common reasons given. This book will actually help you to achieve that. **PW**

'Load And Go With Your Dragon' by John Phipps and Trevor Toms, published by Phipps Associates at £5.50 (paperback, 178 pages)



It's only recently that packages have been trickling from software houses for the Dragon 32, so *Load And Go With Your Dragon*, is particularly welcome. It is just what you need if you want to get stuck straight in to your machine.

Although it's pricey at £5.50, John Phipps and Trevor Toms have mapped out a fun way to learn about the Dragon.

After reading the introduction, you can start tapping in the games programs it lists.

Most are about 50 lines long — so are fairly easy to run. If you hit trouble the section on debugging programs might help. The book also contains details about Dragon graphics, and hints and tips.

For instance what can be more annoying to a user than spending hours typing in a long program, saving it on cassette, trying to run it only to find it won't appear on the screen?

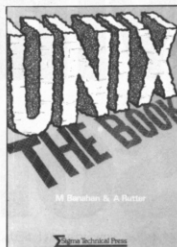
Load And Go With Your Dragon gives some sensible advice here. First you should type a couple of lines, save it on cassette, then try and run it. At least you won't feel too bad if a few lines are lost.

And to make humdrum tasks more enjoyable, this book has a Vocabulary Tester and Sums Galore.

The ideas of this book are well executed. Playing Hangman, Pairs or Computermind (a version of Mastermind) is certainly an enjoyable way to get

acquainted with the Dragon.

But for the more adventurous, some programs in this book could be tedious. **SG**



'Unix - The Book', by M Branahan & A Rutter, published by Sigma Technical Press at £6.50 (paperback 266 pages)

Unix - The Book is a marvelous introductory manual to the basic principles and techniques used to make Unix do what you want. It covers some pretty deep ground as well, and in itself that is sufficient reason for buying this book.

The detailed explanation of the most-used features of the common Unix utilities is excellent for reference. And the less-used (and possibly more useful) stuff is far easier to read than the regular manuals.

But the book really takes off when the most complex features of the Unix system are revealed. The authors give due warning at the beginning of chapter eight, commenting: 'Here's where you grow up; from now on the gloves are off.' They mean it.

This section isn't for beginners. Subjects covered include logging in a new user, controlling and activating timed processes, conditional compilation and even shutting Unix down and restarting it.

To the user of today's micro, who stops his machine simply to halt a program, this may sound an odd thing to get excited about: after all, only mainframes have problems like that, don't they?

But the machine of tomorrow (meaning about ten minutes from now) will be a very different beast. For example, it may not have an on/off switch... it'll stay on all the time. Make it as powerful as suggested, and you have to think about such things.

Mike Banahan and Andy Rutter's new book gives a

highly readable guide to the methods used by real programmers solving real problems with Unix, and gives the micro owner of today a forest of the ideas that will soon be here.

Not only is *Unix - The Book* useful — it's fun to read too, and this is a rare thing in a technical book of any kind. For example, did you know that Unix consists of ordnance and depends on suicidal children — victims of parental neglect — plumbing and forks?

In Unix, 'children' are a process created by 'parents', and they (the children) can call, use or be 'pipes' or 'filters'. The whole process is controlled by 'forks'.

I'm sure you'll find this all perfectly clear, but if not, it will give you the opportunity to look it up in a book that is well worth reading. **RK**



'The Sinclair Spectrum in focus' by Mark Harrison, published by Sigma Technical Press, £6.25 (paperback, 186 pages)

This covers the well-trodden 'introductory guide to the Sinclair Spectrum and Basic' ground, taking the computer newcomer on a programming course up to the level of do-it-yourself programming projects.

It's a meaty book. After preliminary pages which go back to grassroots ('micro-circuits are known as silicon chips... and so on) it gets down to business with diagrams and technical details.

It has the added bonus of about 50 program listings for the Spectrum covering a range of applications, such as word processing, stock control and three-dimensional plotting.

If you want to use your Spectrum as an introduction to programming, this would be a useful addition to your library. **IS**

In a flat spin with disks? Ian Birnbaum banishes all your confusion about the BBC micro's DOS.

Driving lessons

The BBC micro uses disk drives well, but the DOS (Disk Operating System) does have a few idiosyncrasies. If you want to get the best out of your system, then there are a few tricks you should know.

The BBC micro's DOS is supplied in ROM (or EPROM) and makes use of the paged ROM system that the resident MOS (Machine Operating System) supports. Thus, it is placed permanently in a spare ROM socket, and the current language ROM—usually Basic—transfers control to it whenever disk transactions are required.

There are advantages in having DOS in ROM, but it causes problems when you want to make your disk software uncopyable. Normally it's easy to configure a disk so that it requires a specially amended DOS, also on that disk, to read most of it. But this is not so easy with a ROM-based DOS, especially when the BBC DOS has

gone to great lengths to let you copy a disk using *BACKUP.

Because expensive software may be supplied in ROM, or part-ROM, rather than entirely on disk, the alternative will be able to use patching via the indirection vectors. But this is relatively easy to crack.

All disks have to be formatted, and therefore the formatter is supplied on the disk. There is a choice of 100K 40-track or 200K 80-track per side, and with many of the drives this tends to be under capacity.

Acorn used to be criticised for only supplying the formatting disk and the user manual with the DOS version of the BBC Micro. You had to buy an Acorn drive to get them, and Acorn drives are more expensive than the competition.

However, Acorn has now relented, and you can purchase the formatter and manual on their own. The formatter is clearly essential, and the manual is also very helpful.

```
*COPY 01
Copying from drive 0 to drive 1

Syntax: COPY <src drv> <dest drv> <afsp>
```

Table 1

Abbreviations used in command syntax messages

fsp	file specification*
afsp	ambiguous file specification* (i.e. wildcards are allowed)
src	source
det	destination
drv	drive
dir	directory

* A complete file specification consists of :drv.dir.filename, but the drive and directory are optional, and can be changed if desired by using instead * DRIVE and * DIR respectively.

You're in for some pleasant surprises if you've come to the BBC Micro DOS from CP/M. Any software writer will tell you that the error case is the normal case. The designers of the BBC DOS have clearly taken this to heart, and the error messages are of high quality.

Suppose you type *COPY 01, erroneously thinking this will copy all files from drive 0 to drive 1. Figure 1 shows you what happens, and to find out what to do look at the abbreviations shown in Table 1.

And even if you forget what facilities are available, *HELP DFS or *HELP UTILS will give you a list. *HELP actually belongs to the standard MOS and not to DOS, but it is still highly effective. Table 2 lists and describes all DOS and associated MOS keywords, and one at least will be familiar to CP/M users.

The abbreviation <afsp> in that table indicates that wildcards are available with that keyword. BBC DOS uses the same asterisk (*) wildcard as CP/M to represent any group of characters in a file name, and so *COPY 01.* will copy all files from drive 0 to drive 1. There is also a single character wildcard, #, but like CP/M's ? this is much less useful.

Warning

The C in brackets in Table 2 is a warning — it indicates that using the keyword will corrupt memory in the BBC computer. For example, using *COMPACT 2 to compact a disk in drive 2 will overwrite memory.

It's tempting to do this when you're trying to save a program on disk and getting the 'disk full' error message. You may well make space by compacting the disk, but you will destroy the program you're trying to SAVE.

Despite the disadvantages, compaction is necessary, as DOS will not automatically close up gaps on the disk caused by erasure. And the way it's done, with all its faults, produces fast results.

Unusual features

Let us now look at some of the more unusual features of the DOS referring to Table 2 as necessary:—

■ Pressing SHIFT and BREAK together 'boots' up a user-created file called !BOOT (if it exists). There are three ways it can be booted, *LOAD, *RUN and *EXEC. Which one depends on the setting of *OPT4. *RUN is used to run a machine code program, and *EXEC to execute some ASCII code, usually CHAIN "PROG", where PROG is the program one wishes to auto RUN. In this case the ASCII text would be constructed using *BUILD.

■ *TYPE can be used for printing out on the screen text which has either been constructed using *BUILD or copied from the output device (usually the screen) using *SPOOL. This facility, as CP/M users will know, is exceptionally useful in displaying instructions and information directly from disk.

*SPOOL is useful for appending programs, but comes into its own when used to

spool text to disk for later output to a printer.

■ Typing * followed by a file name will automatically find and RUN a machine code program of that name, so long as it is in the current drive and directory or in drive zero, directory \$(the default library). It can be altered before the next press of BREAK by using *LIB. A directory can be any single character (except #, ., and *), although upper and lower case are not distinguished.

Clearly, this facility is very useful for running utility programs.

The DOS also allows a formulation like *STRIP FILE, where FILE is another file (probably in the current drive and directory).

You can recover the text following *STRIP using an MOS call, and then access the file with that name.

Common problems

Finally, there are four common problems people find when using this DOS. The first three are quite easily solved, but the fourth is more difficult.

■ In a Basic program, it may be required to delete a file whose name is user defined. You may think that you should write *DELETE A\$ — but this won't work. A\$ will be interpreted as the file whose name is the two characters A and \$.

You cannot mix MOS or DOS commands and Basic variables like this.

There is, however, a simple way round this.

You should use the MOS facility CLI (located at &FFF7), which passes a string to the MOS line interpreter. The coding is as follows:—
\$&CEO="DEL:"+A\$:X%=&EO:Y%=&C:CALL&FFF7

Before you execute this code you'll need to set a suitable ON . . . ERROR statement. This traps the error that results if an attempt is made to delete a non-existent file.

■ There seems to be no true random access facility in Basic, since OPENOUT will delete the file with the attached name.

OPENIN is not documented, but it allows output to the file by using PRINT#, as well as input using INPUT#. Appropriate use of PTR# will, therefore, allow two-way random access.

■ When using serial access file management, it is often necessary to reSAVE a file under the same name. However, this can lead to 'Can't extend' errors, as the new file will be reSAVED to the same physical space occupied by the old file.

The answer to this is easy — delete the old file before you reSAVE the new. Now, 60 sectors will be reserved for the new file.

■ The directory will allow only 31 files. If you want lots of short programs on a disk, you'll find you'll run out of directory space long before you run out of disk space. Unfortunately, the only way round this problem seems to be patching the DOS itself.

Table 2

DOS and relevant MOS commands

(NB Items in brackets in the keyword syntax are optional)

(a) DOS

COMMAND	FORMAT	
*ACCESS	<afsp> (L)	Locks (with L) or unlocks a file. When locked, a file cannot be deleted except when using *BACKUP.
*BACKUP	<src drv><dest drv>	Produces an identical copy of a disk. Will overwrite any disk unless write-protected. (C)
*BUILD	<fsp>	Creates an ASCII file directly from the keyboard.
*COMPACT	(<drv>)	Removes 'gaps' on a disk. (C)
*COPY	<src drv><dest drv> <afsp>	Copies file(s) from one drive to another (or one drive to itself). (C)
*DELETE	<fsp>	Deletes a single file from a disk.
*DESTROY	<afsp>	Deletes a group of files from a disk.
*DIR	(<dir>)	Changes current directory (to \$ if none specified).
*DRIVE	<drv>	Selects which drive is currently in use.
*DUMP	<fsp>	Outputs a hexadecimal listing of a file.
*ENABLE		Must be used immediately prior to the use of *BACKUP or *DESTROY. Acts as a safety command.
*INFO	<afsp>	Displays information on length etc. of a file or files.
*LIB	(:DRV:)(DIR)	Sets the library to a specified directory and/or drive.
*LIST	<fsp>	Displays an ASCII file with line numbers.
*OPT 4	<n>	Changes the auto-start option for the current drive (n=0 to 3).
*RENAME	<old fsp><new fsp>	Changes the name of a file.
*TITLE	<name>	Changes the disk title.
*TYPE	<fsp>	Displays an ASCII file on the screen without line numbers.
*WIPE	<afsp>	Removes specified files. Confirmation is requested for each one.

(b) MOS

*CAT	(<drv>)	Displays a catalogue of a disk.
*EXEC	<fsp>	Treats any file as if it is being typed into the keyboard, each byte being one character.
*HELP	(<DFS> or <UTILS>)	Displays syntax information about DOS keywords.
*LOAD	<fsp> (<address>)	Reads a file into memory at a given address.
*OPT 1	<n>	n=1 enables the file message system n=0 disables the file message system.
*RUN	<fsp>	Runs a machine code program.
*SAVE	<fsp><start address> <finish address> (<execute address>) (<reload address>)	Saves a specified portion of memory on disk.
*SPOOL	(<fsp>)	Creates a file of all text subsequently output.

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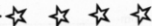
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Are computer adventures just electronic puzzles? Karl Dallas puts the dudgeon into dragons.

Lust for GORY



The three authors of the definitive guide to such games, *What is Dungeons and Dragons?* (Penguin, 1982), say of electronic adventures: "These games tend to be mere problem-solving exercises, interesting enough for hardcore computer freaks, but leaving us ex-wargamers longing for a bit of cold steel and some random violence."

What are adventure games, and why do they fail to measure up to the standards of the enthusiasts who made them a cult in the US? The acknowledged father of the adventure game was one Gary Gyrax, a guy from Wisconsin who took off from the plateau created by the boom in the works of J.R.R. Tolkien. Gyrax published a book of such games under the title of *Chainmail*.

What he did was apply the technique of the wargame, in which history fanatics would re-fight everything from Thermopylae to El Alamein on table-top representations of the old battlegrounds — or, more ominously, cold warriors would attempt to predict the likely outcome of World War III — to the worlds of fantasy created by Tolkien, H.P. Lovecraft and Ann McCaffery.

This unlikely liaison began to bear fruit in 1974, when the first printing of his *Dungeons and Dragons* completely sold out. The very name is now the jealously guarded copyright of Gyrax's corporation, TSR Hobbies Inc — the letters stand for Tactical Studies Rules.

In a 'live' adventure game, a group of players assemble and map out the para-

meters of the fantasy world in which the game is to take place. One plays the 'dungeon master', who creates the world and its characters, and acts as a sort of referee, and at their first session it is his task (his, because most games players tend to be men) to explain the ground rules to his co-players. This can take as long as three hours.

Decisions, like whether Gaarhtd can win this battle with the sgnuurd, are taken by throwing dice. These may have from four to 20 sides, and can have a probability factor added into the resulting sum by the dungeon master.

As the game progresses, the factors the dungeon master has to keep in mind get more and more complex, and obviously, it would be useful if he had a computer with quite a large memory to keep track of them.

So the ground rules of a true adventure game are: a strict but basically fair adjudicator to whom appeals may be made; a very complex situation and characters, and an element of chance.

When you start playing an actual adventure game on cassette or cartridge, how does it compare?

Commodore's *Pirate Cove* plugs into the RAM expansion socket and is one of five games cartridges designed by one Scott Adams. It seems to be fairly typical. You have to type in SYS 32592 to activate the game, at which time the associated documentation has given you very little guidance to the particular game you are about to play. It has, however, provided some valuable general rules, like building up a map of the various 'rooms' in the game, which may be a clearing in a forest or the top of a tree, for example.

After typing the SYS command, the usual copyright blah appears, plus the question 'Want to restore previously saved game?' This is because a game may last for hours, and it would be impossible if, having got yourself to the Treasure Island, you then had to go back to square one the next time you started to play. So you can save the game to cassette and take up next time where you left off previously.

Answering 'n' clears the screen, and displays the following message (the wording is straight from the screen): —

I'm in a Flat in London.

Flight of stairs. Sign says: "Bring

"TREASURES" here, say:

SCORE". Bottle of rum.

Rug. Safety sneakers.

Sack of crackers.

"Welcome to Adventure number 2: "pirate adventure" by Alexis & Scott Adams, dedicated: Ted Heeren & Paul Sharland Remember you can always ask for "help". What shall I do now?"

For the best hardware, the best software.

The BBC Microcomputer system is generally regarded to be the best micro in its price range you can lay your hands on. So, if you're thinking of buying one or already own one, you'll want to know about the software that's been specially designed for it.

Not surprisingly, it's made by Acornsoft, the software division of Acorn Computers Ltd., who designed and built the BBC Microcomputer. So naturally you can expect the highest quality software with the built-in ingenuity to fully exploit the BBC Micro's potential.

Further education for everyone.

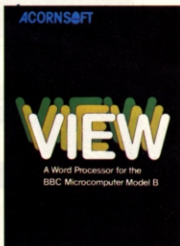
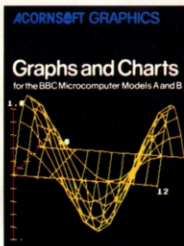
Tree of Knowledge (£9.95) is an interactive program for children of all ages teaching categorisation. It illustrates some of the more practical aspects of computing in that the pupil first educates the computer, building up a database by answering the computer's questions, and the database is then used to play games of deduction and logic.

Word Hunt (£11.90) is a set of four programs, each containing a list of nine words. The object of the exercise is to select one word and then try to create as many smaller words as

possible from the selected word.

Increase your business acumen.

Graphs and Charts (price £17.45) which includes the book 'Graphs and Charts on the BBC Microcomputer' contains a set of programs

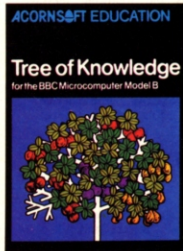


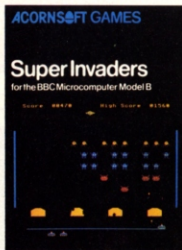
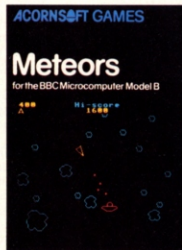
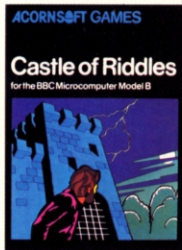
to present data graphically in a wide range of applications. The graphs include automatic scaling, labelling of axes and use of colours.

And VIEW (price £59.80) a program that enables your machine, together with a printer, to operate as a fully operational word processor. For convenience the program is in ROM so that it can become a permanent feature of your machine. (It can easily be fitted by your local dealer). You'll find out more by going to your dealer or by sending for the free catalogue.

Mind-boggling games.

Castle of Riddles (price £9.95) is a magical adventure, with wizardry and hocus pocus of all kinds; booby traps and fiendish riddles to be unravelled along the tortuous route to the Magic Ring of Power. Your reward is to keep the





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treasure you find along the way.

Meteors (price £9.95) is a game where you have to manoeuvre your laser-ship through a hail of meteors, smashing them with your laser bolts as they hurtle towards you on all sides. Complete with sound effects and table of Hi-Scores.

Super Invaders (price £9.95) is a fight against invading aliens. The only way to resist and avoid subsequent annihilation is to destroy the aliens before they land. You have three mobile launchers whose hyper-velocity missiles will instantly vaporise their target on impact. This game includes high-score, and is fully compatible with either keyboard or joysticks.

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Peeko-Computer (price £9.95) simulates the operation of a simplified microcomputer in order to teach the fundamentals of machine-code programming. It comes complete with a 16 page instruction manual including exercises and examples, and the cassette features five demonstration Peeko-Computer programs.



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ADVENTURE GAMES

427

Since we're tyro's at the game as yet, let's start as we mean to finish, by asking for help. On typing it in, we get the answer:—

Climb stairs . . .
What shall I do now?

adventure games depend mostly on tactics and logic, this is more to do with the sort of digital skill required in arcade games.

After **LOADing**, a three-colour land-

the risk of being broiled alive is greater).

The games are fairly easy, and are within the capability of a moderately bright and dexterous child. But children might be put off by the lack of clues, lack of graphics and unimaginative typography — not to mention the idiosyncratic English — of the supposedly more sophisticated cartridge game.

I could imagine *Pirate Cove* (or *Pirate Adventure*, depending on whether you believe the box or the screen title), becoming addictive once you have begun to build up a vocabulary of the permitted commands — and providing you have nothing better to do. But an adventure game, properly, it ain't.

To the purist, even the well-regarded *Datestones of Ryn* (not so far as I know available for anything with the VIC's modest memory) isn't a *real* adventure game, and the true role of computers in this field might well be to allow the dungeon master to input his scenario, the characters, their levels of heroism or villainy, the landscape and so on, and defer to its random number generator in decision making.

What has to be remembered is that on these journeys, it is more important to travel than to arrive, to meet the challenges rather than to win.

As the authors of *What is Dungeons and Dragons?* put it:—

In role-playing games there is no winning or losing as such, unless the character is killed, only constant progress in terms of experience levels. . . . Hence there is no logical point at which the game may be concluded and a winner declared.

Or as the founder of modern Olympics had it:—

The important thing in the Olympic Games is not to win but to take part. The important thing in life is not the triumph but the struggle. The essential thing is not to have conquered but to have fought well.

Wizards and Princess: simple, effective graphics

Let's try something silly, to see what the response is:—

jump
OK
Nothing happens
What shall I do now?
climb stairs
I'm in an alcove.
Open window. Books in
a bookcase.
Down
What shall I do now?
leave alcove
Don't know what
"ALCOVE" is.
What shall I do now?
read book
Sorry I can't
I don't have it
What shall I do now?
take book
There's a strange sound
What shall I do now?

And on it goes in this vein. Not only does the game fail to tell you what its basic vocabulary of commands is, or even who 'I' is (a pirate, Jim Lad, the parrot?), but it can't recognise a word it has used itself when it encounters it a moment later.

So I tried the *Wizards and Princess* cassette, which is for unexpanded Vic. This isn't an adventure game at all, but a suite of five different games. Some of them are fairly familiar; for example you must get into the castle, slay the evil dragon, find your way through the labyrinth, find the princess and rescue her, and finally escape from the castle.

Each of the games is presented as a 'chapter' in the overall story, and while

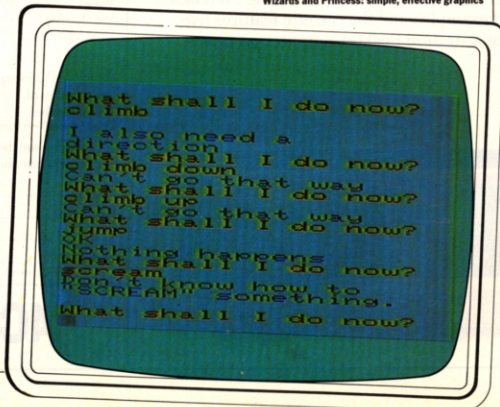
scape presents itself, with no words. The cassette slip has full explanations of what's going on, and of the movement commands it requires, which are L, R, and F and so on.

It's fairly easy to get into the castle, but you must avoid falling rocks — which appear if you turn the wrong way — and get under the portullis.

Chapter two, *Slaying the evil dragon*, has some nice sound effects, simple but effective graphics, and actually an element of logic in it, since the player has to find the exact spot to kill it. (The solution is to cut through the neck close to the head, where



Questions and answers in Pirate's Cove



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Word process-or bust

I could write a book if I strung together all the words I've lost to computer mistakes on my Apple word-processors.

Beware the idea that a word-processing package will turn your Apple into a super-wonderful typewriter at the flick of a switch. Take it from someone who bears the scars of late-night retyping that you cannot 'recover from any crash' on most word-processors.

After these nightmarish problems, I often have a dream in which I go back in time and tell myself what to do at the point that I was about to buy a word-processing package. It goes something like this:

'I hear you're considering a word-processing package for the Apple II you're about to buy. Well, at least you have the sense to look at the software before buying the machine,' I say when I see my younger self.

The youthful Wheelwright replies: 'Well, this little 40-column package for about £75 seems to hit the spot. It doesn't have upper and lower case, you can't edit Basic programs, but I like it. I think it will do everything I want it to.'

'Oh, really,' replies Wiseacre Wheelwright from the frustrated future. 'You won't be satisfied with that package and you'll end up spending more money on a lower-case adaptor, then a package that gives a high-resolution graphics 70-column screen, and finally a full 80-column screen.'

'I also predict that you'll spend some time toying with a 40-column scroll-across-to-80-column package like Magic Window before you find the scroll across so annoying that you chuck it.'

'If you spend £75 now in the inferior package, countless hours trying to figure out how something is going to look on the printer because you don't have a proper 80-column screen format, and you still end up plonking along in Basic without a decent editor, you may as well get a good typewriter and a jar of Tipp-Ex,' I continue in the self-assured manner that characterises my dream-self.

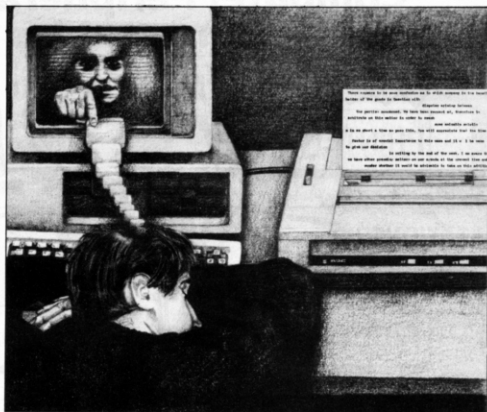
'Start by thinking about what you want to do with the package, what you're likely to want to do in the future and what hardware upgrades you'll need to support the software, then see if your little 40-column job with no lower case still fits the bill.'

At this point I wake up.

Disk file chaos

If I'd taken the advice of Wiseacre Wheelwright I would still have to be more organised when I got the package.

The first thing I'd change is the way I go about organising my disk files. The first package I bought was SuperText from MUSE at about £75, which had no lower case (unless I forked out for a Videx



Martin Ingley

adaptor) and no true shift key (I had to use Escape). Once I'd overcome these idiosyncracies, I went about the business of doing lots of writing on the package.

I soon found that I had all kinds of files on all kinds of disks and it was getting difficult to find out which files were on what disk. I tried listing the catalog on my SuperText data disks, but soon found that I couldn't list them fast enough to keep up the amount I was writing.

The disks were soon in disarray and I ended up cataloguing several every time I wanted to find out where a particular text file was.

Little black book

Now I think I've found the answer. When you start accumulating text files on more than one disk, start numbering or labelling the disks (eg, Correspondence, Business Reports, Recipes, etc) and then get a piece of old technology — a simple lined hardcover book — and make a table on each page for every disk you're using.

Allocate categories for the name of your text file, what's on it, when it was created and — if your word-processor allows — the amount of space it takes up. This reference book enables you to keep track of what you have on each disk and facilitates back-up.

Don't be an optimist. I've been at a loss for words many times, whether it was a 'glitch' in the power line, a foot pulling out the power cable or an intermittent chip that decided to 'hang' on deadline. Whenever

the power goes and your file isn't saved, it's gone forever.

Every time you leave your word processor (even if it's just a trip to the loo), save your file to disk AND write the pertinent details about that file in your book. If the work is important (and most work is), it's a good idea to make two copies of the file — on separate disks.

With all these files and back-ups you could end up spending a fortune on disks unless you 'clean' your files — and not just every spring. Every week or so, depending on how much writing you do, go through your book and see which files you have printed out and need no permanent record of, then delete the appropriate disks.

There are a lot of word-processors for the Apple, particularly if you buy CP/M, 80-column or integer language card. But for the standard 40-column Apple you have to look more carefully.

There's a new version of SuperText, which offers both a 40-column and 70-column (high-resolution graphics generated) screen, as well as many new spooling and formatting features. It has been released in the US at about \$200 and should be on sale here soon.

Word-handler is another low-priced word-processor worth looking at. Selling at £109, it is well-documented and relatively easy to use, offering a 66-character screen and mailing list facilities. **GW**

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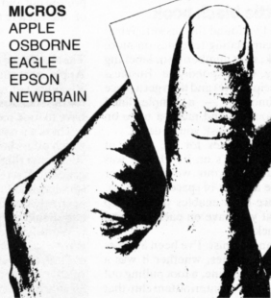
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Mike Whitney picks up the Communicator I. Nice keyboard, and an LCD that aids portability.

Who'll follow the Pied Piper?

A new contender in the portables market pioneered by the Osborne is the melodiously named Pied Piper Communicator I from Canada. PCN managed to lay its hands on a pre-production version, together with a pre-release version of some of the software to be included in the package.

Presentation

The machine arrived in a single medium-sized box, securely held in the usual styrofoam blocks, complete with the mains and monitor connecting leads, a small user's manual and the manuals for the additional basic software. Setting-up requires only connection to a power-point and to the monitor — via the usual phone plug — and should present no difficulty to an inexperienced user.

Documentation

The user's manual was a conveniently small ring-bound job of about 70 pages. It has apparently since been extended to include more illustrations, but the new version is still at the printers, so I was supplied with a pre-release copy. I liked this version — it is clear, informative, and written in a style nicely balanced between the usual gushing transatlantic offerings and the more austere English variety. I hope this is carried over into the extended edition.

Information content is rather sparse. The manual is clearly intended for the first-time user, covering only unpacking, setting-up, keyboard use, and basic disk-file manipulation from the keyboard; there is no technical description of the equipment. No other operating system documentation was supplied.

The remaining documentation was in three fat paperback volumes. No shortage of information here! They covered the user packages which apparently will be supplied as standard with the Communicator.

These consist of a rudimentary database package, a word-processing package and a spread-sheet processor, VisiCalc style. The packages are modestly entitled Perfect Filer, Perfect Writer (with Perfect Speller), and Perfect Calc.

I'm getting used to the self-congratulatory style adopted by many microcomputer technical manual writers, but the 'Perfect' software manuals reach a new nadir.

Construction

The Communicator I is a creamy coloured plastic box, about 20 x 11 x 4in. The right-hand 6in or so is occupied by the built in diskette drive, and most of the rest of the upper surface is occupied by the keyboard. There is a pull-out handle at the back, which makes the machine very easy to carry around and justifies the 'portable'

tag. The weight is very reasonable — no more than a small suitcase — and should give no difficulty even to a seven-stone weakling.

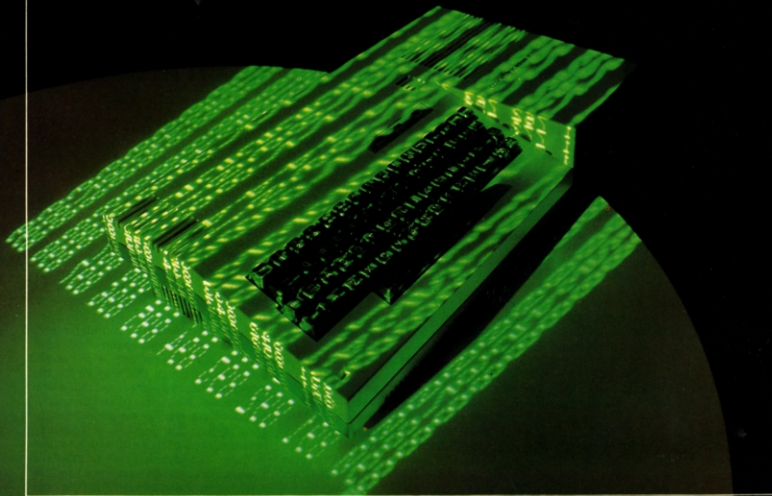
A clip-on cover is supplied to protect the keyboard in transit, and a card-insert for the diskette drive. There is only one problem: the diskette drive is of an unusual design, and has a fragile locking lever which projects about half an inch from the front of the case; this could be damaged if you put the Communicator I down on its front face.

A carrying-case is said to be available, which solves this problem — get one if you intend to carry the machine about a lot.

At first, I thought the case seemed a little flimsy — rather on the lines of the BBC micro — but it is in fact well supported internally, and should be proof against normal handling. There is not much room on the top of the case, and no monitor that I have yet seen would fit there. There is a grille over the back portion of the disk-drive, but this leaves just enough room to put a diskette on top without it getting all nasty and curled up with heat.

I resisted the temptation to take the lid off and peer inside, so I can't offer any opinion on the electronic side of the construction. But the Communicator I is a neat little machine and gave no mechanical or electrical trouble during the time I was using it.

36▶



Keyboard

The keyboard is a pretty standard typewriter-style job with the usual microcomputer additions — including two cursor-control keys and a sterling sign (albeit in the wrong place).

The keys repeat automatically if held down for slightly longer than usual. I was unable to find out whether it is buffered, but, if it is, this didn't create the usual problems associated with this benighted technique.

The keyboard has a slightly heavy action — particularly the space-bar — but this is all to the good, as it protects you against those slight miskeyings which on feather-light keyboards can give no end of trouble.

There isn't a plethora of extraneous keys — numeric pads, function keys and so on — as found on some of the more overblown of recent micros. This is good; anyone using keyboards on the intermittent basis of most keyboard users will tell you that these extra keys are nothing but a nuisance.

The reset button is on the back panel, safely out of the way of careless fingers, but easily accessible if needed.

I did notice that the shifted sterling symbol — which is supposed to produce a tilde — didn't; not a terrible problem for most people, but if it's on the keyboard it should work. But it's a good keyboard which most people will find quite satisfactory.

Screen

The Communicator I, in its basic form, drives a standard monochrome monitor, which must have a bandwidth capable of coping with an 80-column line-length.

The standard format is 80-columns by 24 lines. In this form, however, I had trouble with my little 9-inch Hitachi monitor: the first five characters of each line were invisible, despite the fact that I have used this monitor with a number of other machines without problems.

I rang Canada to see what could be done, and the makers supplied a system patch, but I could not load it into the machine because the software I had been given lacked the necessary utility program.

The distributor, STM, seemed to think that the problem was easily cured and I hope they will have it sorted out before deliveries start.

I also noticed a slight wobbling and flickering on the screen — presumably 50Hz frame-rate competing with 50Hz mains — but this was not too distracting.

The font — which includes upper and lower case and can be displayed highlighted (but not, as far as I could find out, inverse or flashing) — looked a trifle dated. The lower-case descenders are only one-dot, making the letters look like those on some early dot-matrix printers, with squashed-up g's and q's. It was, however, perfectly legible.

No mention is made in the manual of either monochrome graphics or colour, and it appears that the machine lacks these capabilities.

With a modulator, the Communicator I

can be used with a TV set, in which case the display format is reset to a width of 40 columns. This also works with a monitor, and was the way I eventually overcame the problem of fadeout at the beginning of each line. In this mode, the screen acts as a 40-column window into an 80-column screen, the whole screen scrolling left or right to accommodate the current position of the cursor.

This proved unsatisfactory in practice. In particular, when the prompt comes up in a formatted screen, the cursor is usually about six columns in from the left, making most of the prompt invisible. The more usual — and better — arrangement is for the cursor to come up to the right of the screen, leaving the prompt as fully visible as possible.

There are keystrokes to allow you to shift the display left or right as needed, but it is a nuisance to have to do this every time you are asked for input to a formatted screen, such as that used for the Perfect Filter.

Storage

The basic machine comes with 64K RAM memory, allowing it to run the full version of CP/M, the standard operating system provided. External storage supplied as standard is a double-sided, double density 5in floppy diskette drive, built into the case.

The diskette loading mechanism is slightly unusual in that in place of the normal door there are two hinged levers — one to lock the diskette in place and one to release the lock. The lock is — typically for first-generation microcomputers — not controllable by the computer. This means that an unwary user can take out a diskette while it is being written to, so destroying the data on the diskette.

The capacity of the diskette is large — about 800K — but even so, running with only a single drive under CP/M, while possible, is a bore, and you would probably be thinking of a second drive pretty soon. There is no indication in the documentation of what format the diskettes are in, or whether they are compatible with any other machine.

There is no provision for cassette recorder.

Expansion

On the example reviewed, the Communicator had — apart from the monitor and TV connections — only a single 15-hole IEEE connector, for a parallel printer. However, there was an interesting blanking-plate just above this, which may well eventually be replaced by some other connecting sockets.

The user manual mentions an optional extra floppy-disk drive, a hard-disk drive of unspecified capacity, an RS232C serial port and a telephone modem — although this is unlikely to be suitable in the UK.

A two-line 80-column liquid-crystal display is available for when you have to take the Communicator away and don't want to lug the monitor or TV with you. This makes the portability of the Communicator I a



Above: Pied Piper justifies its portable tag despite adequate construction and a full keyboard. Far right: the double-sided, double density 5in diskette drive. Right: connection options include monitor and TV 15-hole IEEE for printer. The blanking plate could hide other possibilities.

reality. But what the diskette directory, or word-processing screen, looks like on a two-line display I shall be interested to see.

Software

Operating software provided with the Communicator I is CP/M version 2.2, a regime for which there is a very wide range of software available. It is a disadvantage, though, in that CP/M is probably the first and worst of the operating systems widely available on micros. It was written for programmers, and even they curse it roundly. It's a pig.

But 'commercial considerations', together with the bandwagon effect, have dictated CP/M's present wide usage, unfortunate though that may be for the newcomer to computers — and that is who this machine is aimed at (aren't they all?).

Manufacturers of new machines are in a quandary on the question of operating systems. The big fellows often provide one of their own and, unless they are Apple or Commodore, usually feel forced to give CP/M as an option as well. The little ones



What about the 'Perfect' packages to be included in the system? In a nutshell, Perfect Writer and Perfect Calc have been built on the principle that most is best. The designers of these packages appear to have looked at every other comparable program on the market and incorporated every feature of every one of them — with the notable exception of a 'Help' command.

The result is a nightmare of incomprehensible control-key commands, meta-commands, embedded '@' commands and the like.

Let's be fair. The word-processor would be a help to the technical-manual writer who has to write and constantly update huge manuals, likes to number his paragraphs on the lines of '3.1.1.7', and has to keep all the indexes up to date.

For correspondence, articles, fiction and the like, forget Perfect Writer; while you have been finding out how to set it to do what you want, you could have written the letter or article five times over on a simpler and more practical program — and there are many such on the market to run under CP/M. Similar remarks apply to Perfect Calc.

If STM is aiming this machine at the newcomer, it should consider dropping these programs or finding easier-to-use alternatives. Otherwise it runs the risk of limiting its market to a tiny minority of professionals.



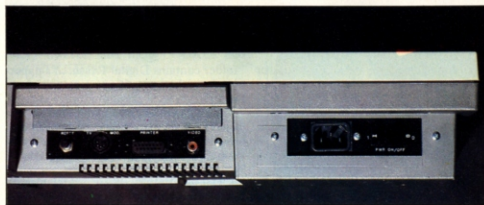
Support

STM plans to set up a marketing organisation for its products on this side of the Atlantic. How this will work in practice, and what level of support will be provided, no-one yet knows.

Verdict

With no price yet announced, it is not possible to talk about 'value-for-money', but, from the hardware point of view this is a very attractive and practical little machine.

With the liquid-crystal display, or using a handy TV set, it will provide genuine portable computing power, although with only a single built-in diskette drive, it is not quite up to the standards of, say, the Osborne. The operating system, CP/M with all its failings, will give the user access to a huge library of programs. The choice of included software is, however, unfortunate, and I hope this will be looked at seriously again.



don't want to spend time and money on creating an operating system with no software base, and usually take the easy alternative CP/M.

It's all rather sad, and not in the long-term interests of the computer-user. There is no indication that the Communicator will be provided with any alternative.

SPECIFICATION:

Price:	£1,000
Processor:	Z80A
RAM memory:	64K plus 2K screen memory
ROM memory:	2K bootstrap, plus 2K character generator
Text screen:	80x24 or 40x24
Graphics screen:	None
Keyboard:	62 moving keys, full size
Interfaces:	STO bus and Centronics
Storage:	820K disk
Operating system/Language:	CP/M
Distributor:	Semi Tech Electronics (Europe), tel: Guildford (0483) 31646.

Gary Herman slips a disk with the new heavyweight at the top of the Comart CP1000 range.

Comart's
hybrid
workhorse



Comart's CP1522 is the flagship of the company's CP1000 range, and is an excellent example of a working business system. It is robust and versatile, and while it doesn't really break any new ground it should be able to handle any job you can throw at it at a range of levels.

Presentation

The system I tested consisted of a Comart Communicator CP1522 with a Wyse WY-100 display terminal. The processor alone is 18.5 x 36.5 x 52.5cms, and is so heavy it really takes two to carry. The terminal is lighter, but even bulkier, and also requires careful handling. Nevertheless, the packaging seems to be adequate for the job.

The processor and the terminal are manufactured by different companies (the terminal is American while the processor is British) and, although the colours roughly co-ordinate, other aspects of each item's external appearance are at odds.

The processor's casing is made of tough moulded plastic (with black metal facia and back-panel) while the VDU and keyboard unit are both housed in metal.

All items seemed able to take a knock or two, although the metal of the terminal was more susceptible to scratching. Luckily, two keys to the processor were included since one arrived bent almost to the point of breaking.

All the necessary leads were included in the packaging, along with comprehensive documentation of software and hardware. There were screw holes for locking the connecting lead between the VDU and the processor, but as no screws were included, the plugs had an unfortunate tendency to slip out.

Documentation

Details of the terminal's characteristics and operations are given in one slim volume, in a rather telegraphic form. There is very little information on the internal workings of the machine, but apart from this everything you'd want to know seems to be there. However, the novice might find the presentation too brief, and therefore might not be able to get the best out of the system at first.

The processor's documentation errs, if anything, in the other direction. One

folder contains Digital Research's paperwork on the operating system, CP/M-86, including a user manual, a programmer's manual and a system manual. There is also a technical manual covering the floppy disk drive, Digital Research's CP/M-86 command summary, and some technical documentation.

This latter covers things such as the mini Winchester hard disk drive, which is standard on the CP1522; the bootstrap loader program, the Basic Input/Output System program (BIOS) and the Basic Disk Operating System (BDOS).

The CP1000 Series System Manual comes separate with the introductory software manual, and is what you actually use to set the system up. I found this fairly simple, and could then go on to the 'configuration' stage.

This is one of the most interesting aspects of the CP1000 range, and deserves better treatment than it receives in the manuals. The Configure program comes on a 5in floppy — which also comes in the folder — and organises mass storage devices and RAM so the building block system can be customised for the user.

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The point of Configure is that it allows you to play a trick on the machine. The CP1522, for example, comes with one floppy drive and one two megabyte mini Winchester as standard. But the micro-processor — a pseudo 16-bit Intel 8086 — can handle at most only eight megabytes on any one disk.

Configure overcomes this by dividing one 'physical' disk drive into a number of 'logical' disk drives. The 8086 is fooled into thinking its working with a number of disks when in fact there's only one.

The Comart machines can handle up to 16 logical disks, using up to six mini Winchesters and up to two 8in Winchesters. The maximum capacity is just over 100 megabytes.

The configuration program also sets up floppy drives, checks their parameters and does interesting things with RAM. It can create a 'silicon disc', which is a minimum of 128k of RAM acting as though it were a disk. The silicon disk will lose its contents when the power is turned off, but gives the system extra flexibility.

Further flexibility is given by two utilities which appear in Comart's version of CP/M-86.

Format, as its name suggests, formats floppy disks, while logen changes the input/output parameters to fit a variety of printers and telewriters. logen can also create turn-key systems.

On the minus side, all this is badly documented — the information is there, but is strewn all over the place. Error messages are not fully documented, and the examples of RUNning Configure, Format and logen are inadequate. Overall, the system would benefit from the provision of a step by step explanation of just what new owners should do to get it running.

Construction

I tested a system consisting of a processor, a VDU, a low-profile foot for the VDU and a detached keyboard. The keyboard has 105 full-travel sculpted keys, including cursor

keys, a numeric keypad and eight programmable keys giving 16 functions.

The FUNCT key, says the manual, can be used with alphanumeric keys to provide more programmable functions, but how you do this is not adequately explained. The control key lets you generate up to 32 control codes, and the escape key allows 75 basic escape sequences, in addition to various multiple escape codes used for screen display, attributes and graphics.

The keyboard is versatile and pleasant to use, but the variety of keys is bewildering, and I sometimes had difficulty getting them to work as the manual says they should.

'Configure allows you to play a trick on the machine. The 8086 thinks it's working with a number of disks when there's only one'

The screen can be tilted or swivelled, and has a standard display 80 characters long by 24 deep, with two extra rows at top and bottom giving information on the attributes of the display, the communications interface with the host computer and the status of the function keys.

Stability was good but not perfect, the characters were very readable (with true descenders) and the screen attributes could be combined at will so that graphics, DIMmed characters and underscoreing (say) could all be used at any point of one display. The only major problem was that

scrolling speed was too fast and I found it impossible to stop a scroll from the keyboard except by the use of a rather unreliable break key.

Storage handling

Mass storage is a major feature of the CP1000 series, and all models include some built-in disk facility. The CP1522's 5in floppy plus mini Winchester give a total of well over 20 megabytes.

Additional disk units and a 13.4 megabyte tape cartridge unit can be patched on to any machine, and all units are housed in the same type of stackable casing. My first machine developed a fault in the mini Winchester drive, but the replacement machine Comart supplied ran perfectly.

The mini Winchesters themselves contain alternate sectors, so data need not be lost in the event of an error. The system also provides a number of diagnostic utilities which are usually enough to clear up any problems with hard or floppy disks.

Expansion

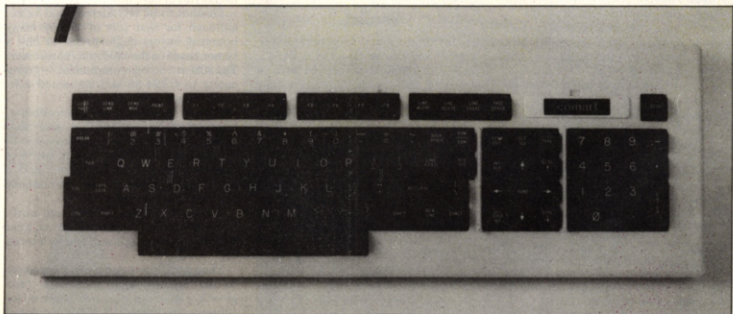
All Comart machines have an S-100 bus fitted as standard, and this ensures a high degree of expandability. The CP1522 uses four of the ten slots in the motherboard — for the processor card, the 128/256K RAM card, the floppy controller card and the mini Winchester controller card. This last is not included in the basic CP1100.

Three more cards can be fitted to provide up to one megabyte of RAM, and further disk controllers and serial interface cards can also be added.

The processor's back plate has 12 D sockets. Three of these are used for the terminal, Centronics compatible printer and RS232-C compatible serial output. The spare sockets may presumably be used for other S-100 cards, so there is plenty of scope for users to experiment with hardware add-ons.

Operation

The CP1000 series operating system is a slightly revised CP/M-86. Copydisk is



The keyboard of the standard terminal as supplied with the computer is liberally endowed with control and special function keys.

replaced by Comart's own Copy utility, which serves much the same purpose, and besides Iogen and Format, other utilities provided by Comart include Diskdiag, Memtest and Recover.

These are, respectively, programs for the testing of errors in floppy disks, RAM and hard disks. Sysgen has been specially rewritten and is used to transfer the operating system from one disk to another.

Any high level language operating under CP/M-86 or MS-DOS can be used on the CP1522, along with the other Comart machines. None is supplied as standard, but potential users are more likely to require functional software packages than programming languages.

CP/M operating systems now come under a great deal of criticism from users of pseudo 16-bit machines, but Comart's utilities for the CP1000 series do a great deal to counter this. In general error messages are no better than on other machines running CP/M, but the diagnostic utilities are sufficient to overcome the problems.

The resident operating system, CROSS (Comart Resident Operating System and Supervisor), also contains a useful diagnostic monitor with a number of machine code programming provisions.

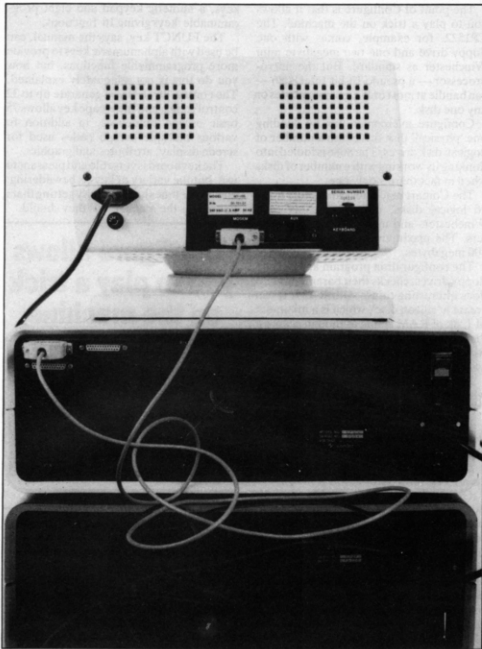
As the manual advises users to note down all hard disk errors and their circumstances, because 'it may be helpful for service personnel in diagnosing what caused the error', Comart clearly considers recourse to service personnel as a realistic possibility. My experience with the first machine certainly confirmed this, but unlike most companies, Comart was helpful, efficient and polite.

The provisions for writing files under CP/M-86 are standard, but once written, the Comart systems should give the programmer considerable scope for error-checking, debugging and error-recovery. Major problems seem most likely to be found in the mini Winchester system.

Support

CP/M-86 software is still fairly scarce and untried. But the amount available is growing, and a comprehensive range will eventually appear. With this in mind, a piece of hardware at this price has to be considered an investment for the future.

What software there is currently can be



The back of the machine has a large fan in the centre power input on the right, and a vast selection of I/O sockets available on the left.

had through Comart's dealer network. The Byte Shops in particular offer good supplies and back-up.

Verdict

The CP1522 is Comart's top of the range machine, and can be bought for £4,545. The WY100 terminal will set you back an extra £675, and for that you get a fully

operational system including 256K bytes of RAM, 790K bytes of floppy storage and 20 megabytes of hard disk storage.

This has to be considered good value, although for that sort of money many potential buyers might prefer to buy a system based on the 68000 microprocessor. The 8086 is a bit of a compromise — giving access to CP/M-86 and associated software, but it is not much of one.

Comart has achieved compatibility, upgradability, expandability and uniformity of design at the expense of portability and, to some extent, speed of operation (the maximum data transfer rate is 9600 baud). On the whole, the trade-off has been wisely undertaken.

The machines may look like old workhorses but that is, generally speaking, what they are: reliable, efficient and well cared for.

They particularly commend themselves to the business user with large (and growing) amounts of data to access or for software developers requiring a number of separate disk-based development areas.

SPECIFICATION

Price:	£4,545 (CPU)
Processor:	8086 at 6MHz
RAM memory:	256K — 1Mb
ROM memory:	2K — boot, self-test and monitor
Text screen:	Depends on VDU
Graphics screen:	Depends on VDU
Keyboard:	Depends on VDU
Interfaces:	2 × RS232C (1 full modem, 13-line), Centronics, 6 × S-100 slots (IEEE) spare
Storage:	5Mb Winchester 5 $\frac{1}{4}$ in, 790K 5 $\frac{1}{4}$ in floppy
OS/Language:	CP/M-86
Other languages:	None
Distributor:	Comart
Software supplied:	None

Z-80 and RAM on Floppy Controller gives track-buffering without main RAM usage. Silicon disk available.



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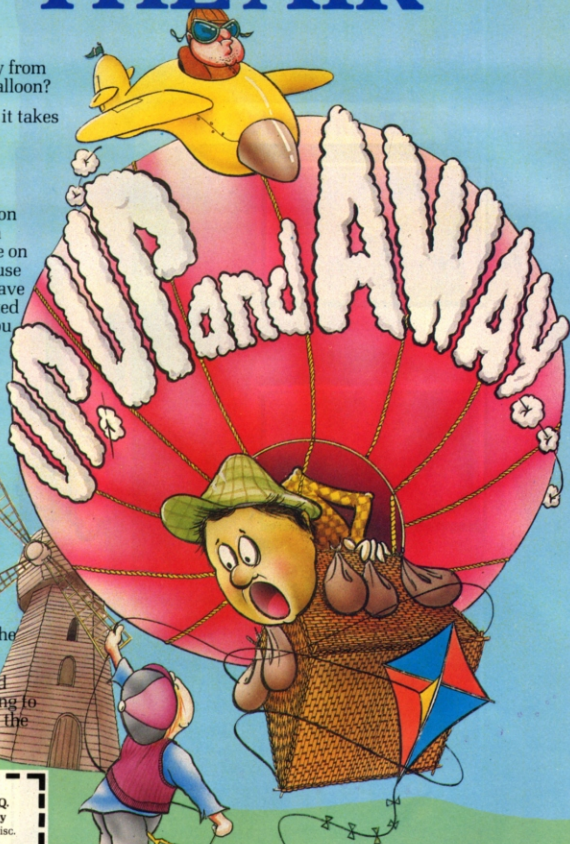
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PC&S 3/82

The Olympia ESW3000 is a high-quality daisywheel printer. Karl Dallas leaves his dabs on it.

Not every micro user needs a good quality printer, but if you use your computer primarily as a word processor, quality may be important to you. How important it is will dictate what kind of printer you buy, and how much you'll be willing to pay.

The new ESW3000 is right at the top of the Olympia daisywheel range, and costs a cool £1,300. But it's a state of the art machine, and if you want sophistication combined with a good finish, it could be a logical upgrade for you.

The ESW3000 gives the high quality print normally associated with daisywheel printers. While it's fast for a daisywheel it can't reproduce graphics but has a sophisticated control over the location of the typewheel on the page. This allows the reproduction of reasonably curved graphs using dots or asterisks.

One 100-character typewheel is supplied with the printer while six others are available at extra cost. It uses quality multi-strike and fabric ribbons. Tractor feed requires a further £172.50 while a sheet feeder demands £457.70, so unless you're processing trees worth of paper per day you are probably likely to settle for tractor or friction.

Interfaces are available as standard on an either/or basis covering parallel, serial or IEEE.

Physically, the ESW3000 is a remarkably solid rectangular box. Recessed in the front fascia are eight switches and three warning lights: switched paper-out warning, impression control, on/off line, up feed, down feed, form feed (the latter three can be operated on-line as well as off), test (which generates all the characters on the typewheel fitted) and reset.

OLYMPIA'S printing peak

Specifications are one thing, what a printer actually does when it's tied up to your computer is another thing again. Here Karl Dallas reviews a printer, while in 'Wheels within wheels' opposite, he outlines some of the problems he encountered with the same printer — the Olympia ESW3000.

There are also lights for cover off, paper on and ribbon out.

Baud rate, parity/no parity, no/2/1 stop bits, 7/8 bits per character and RC-TX/TTY operation is selectable by a ten-setting switch under the back cover.

Mode selection, including line-feed, 0/2/4K buffer, logic seeking (described as auto short travel), and bus format are on a rather fiddly eight-setting switch, which requires the hooking of wires under the appropriate catches. These are also inside the back.

I found that the appropriate board could be lifted up (but not out) to do this, but only after I had finished making the necessary adjustments.

Up and running

The printer has a claimed speed of 50CPS but I got about 30CPS from it, printing two lines of 80 full stops each in five seconds. Because I purchased the Olympia to help

speed-up my work-flow (producing this article, for instance) I also bought the tractor feed.

The tractor mechanism is easier than many to fit and feed paper into, but it still tends to be a rather frustrating operation — one wonders when some clever person is going to invent a self-loading tractor feed.

The tractors themselves are actually flimsy red plastic knobs, protruding through loops of transparent plastic. I lost two knobs before the end of the first week's use, but the printer continued to work adequately until a replacement was supplied.

Once you are actually up and printing the machine will stop and display an appropriate warning if the cover is off or the ribbon or paper is out.

If I left my previous printer to finish a long document while I went off to have a cup of coffee I usually found it had run out of either paper or ribbon half-way through.



12 pitch ref: 408
(10/12 pitch
typewheel)

ABCDEFGHIJKLMNPOQRSTUVWXYZ
WXYZ

abcdefghijklmnpqrstuv
WXYZ

1234567890-[:;@],./
!"£\$%&'()*+<=>?`{|}~

I was therefore very impressed by the Olympia's warnings. I was even more impressed when I changed ribbon and it remembered exactly where it had got to, resuming printing in mid-line.

The ESW3000 has a 4K buffer, which is fine except when you take it off-line to deal with some sort of error. When you put it back on line it immediately carries on with anything it's got left in the buffer. This happens even if you've aborted the relevant computer program. Turning the power on and off clears the buffer, but the reset switch doesn't appear to do so.

Verdict

Although the Olympia ESW3000 could never be described as a low-cost solution for someone requiring letter-quality output, its reliability and features put it in the running for someone who's prepared to pay for a reliable, efficient work-horse.

The only blot on the Olympia name with this product concerns its documentation. Although it was possible to make sense of the manual, the fact that it is likely to be referred to by non-specialists is unfortunate as it is too opaque, literally, for words.

For instance, though the printer manual has several pages devoted to special instructions, there is no reference anywhere to pitch changes. In order to change pitch, I found it necessary to refer to the section 'fixing and changing of print parameters', where I found the following table:

If you can work that out this printer is definitely for you. If you can't then I would suggest insisting on a good run-through with the salesman before buying.

Machine Olympia ESW3000 daisywheel printer
Price £1,306.40 **Speed** 30CPS **Interfaces**
parallel, serial, IEEE **Contact** Olympia
Business Machines (01) 262 6788

Wheels within wheels

Newcomers to computing soon run into three kinds of upgrade problem. They need more money, better data and program storage, and an improved printer.

The printer is probably the one that brings most problems in its wake, as you are confronted by various interfaces, baud rates and sending protocols.

For me the upgrade should have been easy, since I had used an Olympia for around two years, and had another, the ESW3000 in mind.

The first problem I confronted is common to all upgrades. The equipment I was replacing was virtually worthless as far as the market was concerned. No dealer was interested in a trade-in, and though I found one who was prepared to give me £150—it had cost me over £1,000 two years ago—he told me 'and you can keep it'. In other words, he wasn't really offering me a trade-in, he was giving me a better price on the machine I was buying.

I ordered a version with an RS232 interface, rather than IEEE. The IEEE would have plugged direct into my Commodore system, but I also use a Microwriter portable word processor, which outputs RS232. The Small Systems Engineering interface I'd used before could be used with the new printer, but the new, more demanding printer highlighted a minor fault I'd been struggling with in the interface ever since I first got it. I now had a major fault that needed fixing, which SSE did at its Finchley Road works while I waited.

But immediately I started working with the new printer, a strange bug developed. It mystified everyone, and the solution mystified them even more.

The ESW3000 is a bi-directional printer, and it printed in both directions quite happily when connected with the Microwriter. But when printing output from the Commodore system, it printed in one

direction only—this not only slowed it down considerably, but also caused me to fear for the survival of my work desk, as the power of each carriage return 'clunk' shook everything from top to bottom.

Both printer and interface have switchable baud rates, the printer from 50 to 19200, so we tried faster transmission of data, and slower, with no bi-directional printing resulting. It was looking as if I would have to live with uni-directional printing, and get a stronger desk. But then my dealer suggested that the problem might lie in the fact that the computer was sending a linefeed to the printer, and the printer-generated linefeed was turned off.

Apparently, this problem had occurred with Commodore equipment before.

I tried turning off the computer generated linefeed, which I could do with a small software modification, turned on the printer's linefeed switch, and I had bi-directional printing.

But then I had a new problem with the Microwriter. If I turned off its linefeed function, it would give me single-line spacing even though it was set for double-lined spaced output. With the linefeed output turned back on, it gave me triple-line spacing when set for double-line. The solution: I fooled it by putting the linefeed send on, set for single-line spacing, and I got double-line spacing.

The biggest problem, however, came when I tried to check out all the new printer's more advanced features.

With the WordPro WP program I use, the only special printing instructions my old Olympia had recognised were underlining, as well as formatting instructions like right alignment, centring, justification etc. The program contains instructions for pitch selection, bold (double-strike) printing, sub- and superscripts, and so on, but the printer had totally ignored these. So did the ESW3000.

This hadn't mattered with the old printer, since the only one I really cared about, pitch, was hardware switch-selectable, but with the ESW3000 it had to be software generated.

The instructions themselves, in 'Fixing and changing print parameters', were almost incomprehensible. They required much straining of the brain cells to effect any useful changes. For instance, the manual expects the user to work out how many 1/60ths of an inch will produce 12 pitch type, instead of just saying 'for 12 pitch, type ESC followed by such-and-such keys'.

↙ This pie chart is designed to be a rough guide to the printer's trade-off between capabilities and price as determined in the Pro-Test.

It's based on the premise that a high capability in one direction will normally cause a low capability elsewhere, or a higher price. Note that 'economy' is essentially a negative way of representing price—the more a printer costs the

smaller its 'economy' segment on the pie.

The missing slice in the pie represents what we consider to be its shortfall in matching capabilities against price. Ideally, less capabilities should result in greater economy, closing the gap, while extra good capabilities and a high price could also close the gap. A large gap indicates bad value for money. A 15 degree gap will denote good value.



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Len Warner puts words into the mouths of a number of micros with the Supertalker from Namal

The Namal Supertalker is a very versatile speech unit on three counts. Phoneme synthesis gives it a flexible vocabulary. It has an extensive built-in dictionary ROM/RAM, and carries a standard RS232 interface. Currently it seems to be the only product in the lower price range which is not limited either by fixed vocabulary or to a single model of micro.

The Supertalker uses an internal Z80 microprocessor to accept simple commands through the RS232 interface. This makes it easy to use, and allows it to be connected to most computers as if it were a serial printer. Two cheaper models for Sinclair ZX users have most of the features of the RS232 version.

The sound comes from a small internal speaker driven by a 500 mW amplifier, giving ample volume for most purposes, while a jack lets you use an external speaker or amplifier for better quality sound or more volume.

The Supertalker is designed around the Votrax SC-01A phoneme speech synthesiser chip, which is effectively an electronic model of the human vocal tract. Words are pronounced by supplying the chip with a sequence of codes for the component sounds.

For example, 'call' would be represented by the phonemes 'K-AW-L', or 'judge' by 'D-J-UH3-UH1-D-J'.

The 23-page instruction book includes a seven-page article on the phonetic principles involved. It is the job of the Votrax chip to make the corresponding sounds and to blend together the word components smoothly, simulating the changes caused by muscular movements of the vocal tract. Vowel sounds glide between the consonants before and after them.

This method has the advantage that any word can be spelled out in sounds, though it often requires a great deal of tinkering with different vowel sounds.

At this point other low-cost phoneme synthesisers abandon the user to his own experiments. As you might imagine from the examples above, you can go bananas trying to teach your baby micro its first words.

The Namal unit scores heavily here by having a vocabulary of about 550 useful words in a dictionary ROM. Each word can be spoken by giving its dictionary entry number.

Word numbers can be strung together with phoneme codes to add endings to existing words, and there is space for 200-250 new words to be downloaded into the Supertalker RAM. This gently eases the user into coding new words.

In use, it also keeps messages compact by storing them as sequences of dictionary numbers and provides for the unit to be set up for many different tasks.

One other advantage is through the choice of the Votrax chip, rather than the more common and cheaper GIM SP0256. This allows the Supertalker a small range of voice tone inflection, and helps make messages more natural.



Sounds like cheap and cheerful chat

The RS232 interface is designed for easy use. The connector is the readily-available 5-pin 180 degree DIN socket. An internal switch gives selection from 13 standard data rates between 50 and 9600 Baud, and choice of odd, even or no parity and one or two stop bits.

Commands and messages are sent as standard ASCII characters. Handshaking can be either character 'A' returned to acknowledge data accepted, or the RS232 signal DTR held low when the buffer is full. This makes it compatible with a wide range of computer equipment, not just home micros.

The Sinclair ZX81 and Spectrum versions are both memory-mapped and do not include their own Z80 processor. Instead, the Supertalker ROM contains a speech driver routine which is called by USR, and picks up a dictionary number previously POKED into RAM.

ZX81 Basic needs to be in Fast mode, or it causes unnaturally long pauses between words. ZX machine code programmers should have no problems, and lots of fun. New RAM dictionary entries can be built with a Basic program from the instruction manual, and PEEKing the ROM will provide lots of word coding examples.

The Namal Supertalker clearly has a future with the discerning home computer user. Though the phoneme technique is not capable of Kenneth Kendall speech quality, it's often better than having to chop sections from a digitised speech ROM, with the jarring lapse in phrasing which results.

It must also be attractive to those with serious computer voice response projects in hand, but where cost is an important constraint. An example might be an aid for the blind or physically handicapped, where the Supertalker can speak a measurement, or verify a keyboard operation verbally.

Instead of the available peripherals forcing your choice of computer, the Namal system leaves your options open. Schools and colleges often have a mix of computers, so they should find the flexibility of the RS232 interface helpful.

A talking computer is also a great stimulus to student interest, especially when they can create new vocabulary.

Name Namal Supertalker **Manufacturer** Namal Associates, Cambridge (0223) 355404 **Available** Mail order, or from the Namal shop **Price** RS232 £89.95, Spectrum £69.95, ZX81 £49.95

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Karl Dallas had counted Visicalc a true friend, but will he fall for a seductive look-alike?

It's sometimes better to be second on the scene — you can take advantage of the market created for an existing product and improve it or remedy some of its faults (if any). Calc Result is a Swedish-written Visicalc look-alike which even shares many of the command keystrokes. Despite its apparent similarity, it is quite different, being written in Forth, though the difference is not apparent to the user.

Calc Result includes a number of commands that Visicalc doesn't have; it will also LOAD Visicalc files onto the Calc Result screen, and allow you to incorporate the extra commands before reSAVING as a Calc Result file. Clearly, it could be a useful software upgrade for users familiar with Visicalc. The program allows the use of 12800 co-ordinates (entry cells) when used on the Commodore CBM 8096, and roughly half that number with the 8032.

Features

Among the features Calc Result adds to standard Visicalc are:-

- Up to 32 different pages can be created, and can be called at will without erasing the page currently being worked on.
- The screen can be split into three areas, allowing you to display up to three pages together.
- Title columns can be wider than other columns.
- All column widths can be varied on hard copy print out.
- You can perform functions on column/row combinations rather than just rows or columns.

There are also several very powerful additional commands, including IF THEN ELSE and AND, OR, and NOT.

It has a RND function and COUNT, which will keep a tally of numeric items in a column, for instance. @AVERAGE is there, but misnamed @MEAN. It does not, however, have the @LOOKUP and @CHOOSE functions.

Formulae can be made to refer to themselves. For example, if the formula A1+1 is typed in at the A1 co-ordinate, the number increments each time there is an entry when you're in auto recalculation mode, or when the appropriate character (the up arrow) is pressed in the manual recalculation mode. But it's worth remembering that it will always be one more than the figure you want unless you start with -1.

Formulae are also write-protected, so they can't be changed without either blanking or editing. You edit by pressing SHIFT/CONTROL, and this displays whatever is at the co-ordinate on the edit line.

In addition to representing integer values graphically, using asterisks, Calc Result also permits the display (and, with the appropriate printer, hard copy) of bar charts. The Commodore 64 version also supplies the option of pie-charts in colour.

Presentation

Calc Result comes with a manual in a two-ring binder, plus a program disk and a

security chip which plug into UD11. All are packed in a light but sturdy box case.

The manual is clearly and concisely written. It has no alphabetical index, but the contents pages are clear and there is a whole section with its own contents page, which summarises the commands and functions.

The error messages section is very helpful, but it refers disk errors to the



**Calc
clone
with a
plus**



separate disk manual, and this does tend to slow you up. Most of the commands are the same as Visicalc's, so any confusion can usually be cleared up by reference to a good Visicalc guide.

In use

The manual recommends that you make a BACK-UP copy to drive 1 the first time you use Calc Result. You use this as the program disk. After initialising the disks, CONTROL-D-U puts you in the user register. This lets you choose German, English, French or a fourth option for the language used by the HELP screen. You also set the type of printer, the printer and

disk device numbers, the numbers of rows per page, characters per line, and left margin setting.

This configuration is SAVED and LOADED automatically with the program, but can be changed at any time by keying the user register sequence again.

On power-down, the work area in use is SAVED, and is LOADED back the next time the program is RUN. The cursor reappears in exactly the same place, unless it has been specifically erased from the program disk.

The HELP screen is particularly useful. A detailed HELP screen can be displayed without damaging anything it replaces on the working screen, and is appropriate to whichever mode is engaged (eg EDIT, DISK, FORMAT, GLOBAL).

Performance

Automatic recalculation means that almost every co-ordinate entry affects everything else on all the pages, so operation can often be speeded up by putting the program into manual recalculation mode while inputting data, changing to auto recalc at the end, or by just hitting the up arrow, which is the recalc key. Even so, Spreadsheets are not the speediest of programs to use, at the best of times.

Reliability

The key commands in danger areas — like scratching and erasing are slightly more long-winded than with Visicalc. Frequent use of the 'ARE YOU SURE (Y/N)?' prompt prevents much tearing of hair. These safeguards are invaluable to the beginner, but can easily be circumvented — sometimes with the very consequences they were designed to avoid — by users who are familiar enough to be able to key in the whole sequence, using the CBM keyboard buffer to queue the keystrokes.

Verdict

Having found Visicalc indispensable in my life so far for everything from invoices to keeping track of the red print in my bank statements, I could imagine Calc Result easily taking its place in my affections. Anyone familiar with Visicalc would find it a worthwhile upgrade, though most of its extra features are available within the original program, though rather more clumsily.

RATING

Features — **★★★★**
 Presentation — **★★★★**
 Performance — **★★★★**
 User interface — **★★★★**
 Reliability — **★★★★**
 Overall Value — **★★★★**

Name Calc Result **Application** Spreadsheet
System Commodore CBM 8032 or 8096 **Price**
 £171.35 **Publisher** Handic Software AB **Format**
 disk **Language** Forth **Other versions** Commodore
 64 **Outlets** Kobra Micro Marketing,
 Henley-on-Thames (04912) 2512

Although the NewBrain is conceived as a total system, the unexpanded Processor itself has a great deal to offer. It is available in two forms: Model AD, shown below, with a built-in line display; and Model A, without the line display. Both models can operate with a monitor or a television set.

MEMORY

- 24K bytes of ROM;
- 32 bytes of RAM, at least 28K of which is available to the user.

THE SCREEN DISPLAY

- 40 or 80 characters to the line - without affecting the 28K bytes of RAM at your disposal;
- 24 or 30 lines to the screen;
- well-formed characters, with true descenders;
- a full European character set;
- normal or reverse video, high resolution graphics on screen of controllable size, 256, 320, 512 or 640 horizontal resolution by 250 vertical lines;
- a facility to set up a "page" of up to 255 lines, with the screen acting as a "window" to display it;
- ability to maintain several such pages simultaneously, and to switch rapidly between them;
- text may be used on graphics screen as well as on parts of the video screen not used by graphics.

CHARACTER SET

- 512 characters, including the full ASCII set, all European accented characters, Greek and graphics symbols.

GRAPHICS

- 20 powerful graphics commands;
- all text characters usable on the graphics screen;
- variable-sized graphics screen, with the rest of the screen available for text - for versatility and to save memory.

SOFTWARE

Enhanced ANSI BASIC; screen editor (32 commands); mathematics package (10 significant figures); graphics commands.

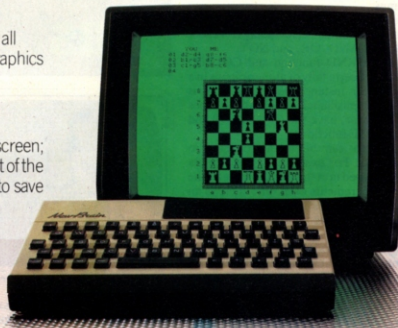
- a very friendly screen editor - a delight to use and readily adapted to text processing;
- arithmetic to 10 significant figures;
- very controllable output formatting of numbers - invaluable for accounting, statistics, and scientific applications;
- a powerful, much enhanced BASIC;
- a very flexible operating system, which allows any data stream to be opened to any device.

INTERFACES

- two tape cassette ports built into the processor unit;
- a built-in printer interface;
- a built-in communications interface (V24/RS232);
- a video monitor interface;
- a TV interface;
- an expansion interface for NewBrain system expansion modules.

KEYBOARD

- standard typewriter pitch, action, layout and size, with editing control and graphics keys.



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At £269 it starts off with twice as much memory as most of its competitors and can expand to over thirty times that amount. So there's no chance of being left behind in the micro race.

It comes with a very powerful language (enhanced ANSI BASIC) and it'll take CP/M; so it'll work on the same system as similar big business micros, giving you the capacity to use an almost limitless variety of tried and tested software.

But most of all NewBrain is a machine that can expand.

It's designed to take disks, printers and memory expansion modules (up to 2M bytes) plus anything else you'd expect a professional business micro to handle.

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WARNING: Unfiltered power can damage your computer's health.

David Janda looks at a Pascal compiler that brings structured programming to the Spectrum.

Compile with me...

Hisoft's Pascal 4T compiler is both a Pascal compiler and a screen editor for the 48K Sinclair Spectrum. The advertising blurb for it says, 'now you and your children can learn to program in an efficient and structured way by using Pascal...'

Of course, there's more to structured programming than just using a structured language, but Spectrum owners who realise the limitations of Sinclair Basic should still welcome the chance to program in a modular fashion.

It's a chance to switch to a compiled language which is really very different from Basic. This short but typical Pascal program illustrates this.

```
PROGRAM DEMO;
VAR I: INTEGER;
BEGIN
FOR I := 1 TO 10 DO
WRITELN('Personal Computer
News.');
```

END.

The HP4T package contains a screen editor for the Spectrum. This editor is not a separate file; it is part and parcel of the compiler. Its purpose is to allow you to enter and correct source code before compiling it.

The editor is line-oriented, so each line of Pascal must be preceded by a line number — numbers are either generated for you, or you may type them in.

When HP4T is loaded from tape, the editor is entered automatically. You have 16 commands including those allowing you to enter text, display, SAVE, and LOAD it. More commands allow you to RUN your compiled program or alter a line of text.

You can SAVE the object code on cassette and then RUN the program later without needing to have the compiler present in the Spectrum. This is done by the compiler SAVEing the run-time system just before the program itself, which is SAVED in a special tape format.

You can also SAVE the Pascal source code onto tape, and this will allow you to build up a large program over a period of time.

The Pascal itself is a subset of the original Jensen and Wirth-defined language, with a number of extensions. Original Pascal has no commands like PEEK and POKE to access the system's memory, but they are included in HP4T. There is also INCH, which causes the keyboard to be scanned, and ENTER, which is similar to Basic's INT function. And the compiler will support the Sinclair ZX printer.

HP4T does have some limitations. Files cannot be supported, since file handling is difficult on cassette. This could, however, be remedied when the Sinclair microdrive arrives. Passing FUNCTIONS and PROCEDURES as parameters is also not

allowed, and many Pascal programmers will miss this sorely.

Presentation

The 60-page manual that comes with the package is quite comprehensive. Notes in the front detail the implementation-dependent features of this package, then the main section describes Pascal language features such as syntax, functions and procedures. I found it a little vague in places.

In use

The compiler executes automatically as soon as you LOAD it. It then asks you: 'Top of RAM?', 'top of RAM for 'T'?', and 'Table size?'.

These questions are a little daunting at first, but the manual does warn you about them. If you simply hit the return key to answer each one, the compiler sets default values.

The editor is now automatically invoked. I found it quite good, and any illegal commands I tried to enter result in a message of 'Pardon?' You can use the editor to enter your program, then enter a command to compile it.

If your source code contains any errors, the compiler stops and displays "ERROR", followed by an upwards arrow pointing at the offending piece of code. There are no messages describing what type of error you have made, but an error number allows you to look it up in the manual. Error messages will appear during RUNNING if, for example, you don't have enough memory.

The package itself is very flexible. If you don't like the text editor, you can always use your own to create and alter source code. You can reset the top of RAM to allow you to add extensions to the compiler, or to store machine code programs to be RUN from Pascal.

It is also very fast, and this will be one of the main attractions as far as many people

are concerned. I did a test count from 1 to 10000, and this was completed in less than a second. This is a lot faster than Sinclair Basic.

Reliability

The compiler turned out to be very robust indeed. My first attempt to crash the system while LOADING the compiler failed miserably. So did attempts to enter bad data to editing commands.

The documentation gives details of how to re-enter the compiler should you accidentally enter to Basic. Nevertheless, two problems did creep up occasionally.

When listing the source-code the machine would sometimes 'hang up' resulting in me having to reset the machine. And although you should have the option to carry on compiling when the compiler comes across an error, this option didn't always work and resulted in a reset.

I also found that some programs I SAVED to tape failed to LOAD, despite my changing tape recorders. I think this is due to the format in which the compiler SAVES object-code programs.

Verdict

HP4T Pascal provides the Spectrum user with the ability to program in another language besides Basic — that must be good. This version is faithful to the original and you will therefore have few problems moving on to another Pascal system. However, the price does seem a little high.

RATING

Features — 
Presentation — 
Performance — 
User interface — 
Reliability — 
Overall value — 

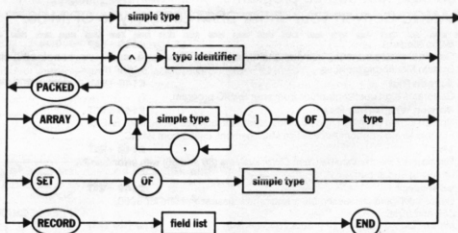
Name HiSoft Pascal 4T Compiler Application

Pascal programming System Spectrum 48K

Price £25 Publisher HiSoft Format cassette

Language Z80 m/c (source) Other versions none

Outlets HiSoft, Swindon (0793) 26616



A typical Pascal syntax diagram — this one maps out the ways in which you can use Pascal's wide range of data types.

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Will Cashbook — at £95 — straighten out the books of BBC users? Mel Pullen takes stock.

Bring your cash to book

If Cashbook lives up to the promise of its publisher it will put a few chartered accountants out of work. It is a set of programs designed by two chartered accountants to allow small businesses to keep their accounts computerised. Gemini Marketing's claim is that it will 'replace your manual cash and bank records'.

All you need is a BBC model A, a tape recorder and a printer. I tested it out on a model B with disk drive. At the moment, this is about the only package of its type for the BBC, so it has the field to itself.

I LOADED up my company's own accounts and put Cashbook through its paces.

Features

The program guides you through the entry of business transactions, and makes sure all the money is accounted for. The system simply prints out your transactions in a form suitable for filing, and stores the cumulative totals in a file on tape or disk.

It sorts your income and expenditure into more than 80 nominal accounts. These conform to standard accounting categories, and each has a standard code number. An accountant can therefore look at these figures and understand them.

The system also uses double-entry book keeping to ensure that all debits and credits balance. It also checks up for incorrect entries.

Cashbook sums up VAT information ready for VAT returns, and produces any number of separate 'cash books', or sets of accounts, each with any number of entries. You can print out an audit trail, keep track of cash in hand and two bank accounts, and

produce a set of final accounts formatted ready for the Inland Revenue.

Presentation

The manual is 13 A4 pages long, and comes in a plastic loose-leaf binder.

I found it too brief. No mention is made of backups of either the program or the data files, and my review disk wasn't write protected. The directory wasn't titled, and none of the programs was listed.

This means, in effect, that novices will be left to learn by bitter experience.

The manual itself is far too short for a suitable description of what things are done the way they are in accounting practice. It is also skimpy on information on what you should do each day. 'Organise your data into manageable batches', it says — but then it simply tells you what details to include in a batch and gives no examples.

I didn't understand many of the terms used, and I've been self-employed for years. You need accounting knowledge to use it. There is no tutorial.

Getting started

Starting up is easy. Whether you're using tape or disk, you just follow the instructions. But you do have to say what code your printer needs to print the pound symbol every time you start the program. Surely it would have made more sense to have variables dependent on the user's particular setup incorporated into the program when a backup is made.

In use

The menu-driven system is simple to use, though this approach could become tedious — there is no way of circumventing the menus.

However this does mean that almost anyone could use this system once they've mastered a few basic procedures. In operation you needn't worry about the tape or disk at all, as the file storage mechanism is used simply to store all the cumulative totals of your accounts.

The program itself stays in memory with all the details for the accounts, but as the memory of a BBC is limited, not many transactions can be carried out before you are forced to print out the details for your audit trail and SAVE the numeric totals. This makes the system carry out the totalling and check that the figures all balance.

After printing the transactions entered and SAVEing the results, you can carry on with the next batch of transactions. This approach means the system is ideally suited to the way normal offices run. Work is carried out in little chunks, and allows you frequent breaks for cups of tea. Even so, I think this system could keep up with all but the fastest and most competent book-keeper.

There are shortcomings. You can use references with your entries, but you have only eight characters at your disposal — enough to handle most UK cheque numbers, but not some foreign ones. Gemini says you'd normally make up your own reference, but I didn't spot this in the manual.

I managed to produce a total of 0 in the credits column of my end-of-day printout. Gemini says this can't happen if you use the system correctly but inexperienced users will make mistakes.

Reliability

The system has been designed with the fallibility of BBC micros as well as humans in mind, but reliability is still a weak point. The escape key is trapped and returns the user to the outer level, but the break or reset doesn't. It plunks you down in BBC and all your data is lost.

Gemini says that it's 'virtually guaranteed that all that will be lost if escape is hit accidentally is the information currently being entered; and this is likely to mean the current batch, so you could lose up to 25 transaction details. But what happens if you hit reset or you get a power failure — quite common with the Beeb?

Similarly, because of the lack of house-keeping procedures, there is no description of recovery from old cumulative files if you cannot read back the last tape or disk.

Verdict

This package is an excellent starting point for a trained book-keeper in a business that wishes to move over to a micro. Gemini has crammed a lot of good code into the little model A system. It produces plenty of nice neat paperwork, and this can be inspected and checked at any time. It may also be useful for the chartered accountant who looks after the books of say, 50 clients, and who needs to prepare the final accounts simply.

But with the current level of documentation, this program is not for the small shop proprietor or the one-man business.

Gemini is prepared to offer technical back-up — the qualified accountants who have devised this system are Gemini directors. But it costs about three times what I think it should.

Name Cashbook Application Accounting System
BBC A and B Price £95 **Publisher** Gemini Marketing, 03952-5832/5165 **Format** cassette or disk **Language** Basic **Other versions** none **Outlets** Mail order, various dealers

RATING

Features — ■■■■
Documentation — ■■■■
Performance — ■■■■
Usability — ■■■■
Reliability — ■■■■
Overall value — ■■■■

BATCH 1 - WITHDRAWAL OF CASH FROM BANK		
BATCH TOTAL =	£50.00	
BANK ACCOUNT 1		
AMOUNTS	£ 50.00	
BATCH 2 - CASH RECEIPTS		
BATCH TOTAL =	£50.00	
ACCOUNT/CAPITAL INTRD (1)		
AMOUNTS	£ 50.00	
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ACCOUNT/STANDY INCOME	AMOUNTS	5.50
TRANSACTION NO. 5	AMOUNTS	
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ACCOUNT/STANDY STOCK & WIP	AMOUNTS	
JOURNAL ACTIVITY	AMOUNTS	
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Cashbook's end-of-day report — but why the zero total?

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Two excellent new machines have just been added to our coverage – the Commodore 64 and the Oric. Software for these machines will be in our next Newsletter. Remember, membership is completely free of charge and you are under no obligation to buy anything from the Club unless you really want to. If you use a ZX81 (16k), Spectrum (16k or 48k), BBC (A or B), Dragon 32, Vic (expanded or unexpanded), Commodore 64 or Oric, you should join THE CLUB.

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ADVENTURE

APPLE II

Bats meanz Garthim

Name The Dark Crystal Application
Graphic adventure game system Apple II
Publisher Sierra-Online
Format Disk Language Machine code
Outlets Apple dealers

Now you must find the shard, heal the crystal and defeat the Skeksis, before the planet's three suns can reach conjunction.

First impressions

The game comes in a shrink-wrapped package with a flimsy cardboard backing. The program is on two disks with a covering storybook-cum-manual.

experienced player.

Perhaps it's familiarity with the principles of adventures, or maybe it shows just how susceptible I am to the ad-man's hype, but frankly I found it more frustrating than its fore-runners. It also seemed arbitrary to the point of farce at times.

One classic example is the time I was spotted by a bat with a crystal eye. It took only one bat-sighting followed a few turns later by the appearance of one of the Garthim (Invincible Nasties) to hammer home the point that Bats Meanz Garthim.

I got killed that time, needless to say.

Anyway, after rebooting and retracing my steps from the map I had drawn so carefully, I was spotted by a bat. I was only two moves away from the hill where the Landstriders grazed, so I headed for it and arrived just in time.

The picture of the Landstriders appeared, so I knew I'd got there, and then, sure enough, up came a singular Garthim. (What's the singular of Garthim... Garth?)

To my intense displeasure, I then discovered that actually being in the presence of a whole

problem.

In the case of The Dark Crystal, the need to load each picture-file from disk means you could confuse disks, causing a 'file not found' error. The same problem could occur when you move from one disk to another.

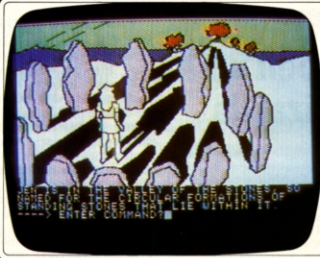
In both cases, and presumably in other situations, the program gives polite and clear comments which explain what the machine thinks might be happening. Even if not dead accurate, these messages are close enough to give you an idea of where to look for the problem.

It certainly never crashed, no matter what I did.

Verdict

I haven't seen the film yet, but I hoped the game would give at least a faint flavour of it. I don't believe the film is as dull as this game rapidly becomes.

My main objection after a few hours' playing is that the situations presented are far too inflexible, and the responses of the other actors are too limited. There's more than one way to skin a cat but in this game there seems to be only one way to



After all the ballyhoo about *Dark Crystal*, I was expecting something pretty amazing from a game of the same name. This is the latest release from Sierra-Online.

I tested the version for the Apple II, and since it is a 'Hires Adventure', meaning you get pickies as well as words, it's best if you can play it on the colour-telly. In monochrome it loses most of its appeal, although since it's American the colours are all funny. And in a game based so closely on the original that it uses the film's promo-shots, this is poor.

It is an adventure game in the great tradition, since apart from the pictures it functions in the same way as the first adventure. That was written in Fortran on an IBM mainframe in about 1960 and the *Dark Crystal* is quite faithful to the original.

Objectives

You are Jen, last of the Gelfing race, which was exterminated by the evil Skeksis. They control the land with the aid of the powerful *Dark Crystal*, damaged centuries ago when a shard broke off and was lost.

Also included is a poster from the film.

The protection given the disks isn't enough — a sharp-ended accident wouldn't do them any good. There's no pocket in the book for storing the disks, and as you're instructed to copy the play-disks so the masters just sit around and get dirty.

The most visible feature of this game is the pictures — the earlier games in the series included some pretty effective scenes but these are really good. Perspective is well-handled, and the figures look real.

In play

Getting the game up and running couldn't be simpler... you shove it in the drive (gently) and boot.

The first picture on screen shows Jen sitting on a rock playing his pipes. From then on it's up to you.

The game is the sixth in the Sierra-Online Hires Adventure series, and uses the same code as the previous ones. Normally this would be an advantage, since the principles of the game would be understood by an



bunch of Landstriders — who get their kicks in life by kicking the life out of Garthim, makes not one blind bit of difference. You wind up just as dead.

I won't give away any other hints, mostly because I can't think of any. The strategies for dealing with adventures are fairly well documented, and in most respects this one differs little from the rest.

In an adventure game there are very few situations in which an operator error can cause a

tackle any given situation that arises.

The marketing given this program leads you to expect that you'll be almost living the story when playing it. But sadly, only the words and the pictures are similar to the big screen version.

Richard King

RATING

Lasting appeal — (3)

Playability — (3)

Use of machine — (3)

Overall value — (3)

DRAGON MAGIC

DRAGON 32

Joystick slayer

Name St George and the Dragon
System Dragon 32 (joystick needed) **Price** £6.95 **Publisher** Computer Rentals, 01-247 9004
Format Cassette **Language** Basic
Outlets Mail order and John Menzies

The world of enchanted castles and magic stones usually means a text-only adventure, but St George and the Dragon is a high-resolution graphics confrontation between George and a fire-breathing red dragon. The latter's sole aim in life is to turn the saint into the medieval equivalent of a Big Mac.

Objectives

You play St George, and your aim is to free the maidens from the castle — feminists will have to write their own version. You do this by smiting the magic red stone with your sword.

Your path is blocked by a river (guess what happens to a saint in full armour in there),

levels to choose from. The instructions are clear and simple, and the game is well presented.

In play

After a rather wordy preamble the game starts, and the dragon is heading towards you. It's difficult to stab him at just the right moment, but if you do he bleeds messily from the part you hit.

Once free of the dragon you have time to manoeuvre carefully over the bridge and hit the stone. The movements are fairly smooth for Basic, and your positioning must be exact.

Verdict

The graphics are impressive, there's no doubt about that, but the problem is that killing the dragon is the highlight of the game, and the rest is anticlimax. When you hit the stone you only get another game and a point scored. The game speeds up slightly, but your only reward when your lives have gone is a score and a remark like 'My old gran could do better'. Not so much as a flash of ankle from the wretched maidens.

The game takes up only about 8K of memory, so there's actually plenty of room for a



DRAGON 32

Spell with wizards

Name Wizard War. **System** Dragon 32 (two joysticks needed). **Price** £7.95. **Publisher** Salamander Software, 0273-771942. **Format** Cassette. **Language** Basic. **Other versions** Tandy (shortly). **Outlets** Mail order, Spectrum shops and other dealers.

Death-struggles between wizards aren't normally my cup of tea, but Salamander has had the clever idea of upgrading the old paper-scissors-stone game. In Wizard War, as well as making your own choice you have to guess your opponent's.

Objectives

The number of players can vary from two to nine, but if there are more than two they are grouped into red, green and yellow teams. You can choose your own teams, or let the computer do it.

Two players then confront each other in battle, each choosing one spell from the four on offer, which in turn are randomly chosen from 24. The players can elect to know or not to know each other's spells, which include lightning bolts, thunderstorms and vampires.

Some spells are purely defensive, like the force bubble, which will keep out anything but a demon, while others are more offensive but use up more of the 500 units of manna with which you start the game.

When you run out of units you lose — or, in other words, the most manna'd wizard wins the game.

First impressions

My first reaction was panic — how can I ever learn to play this game, I thought. The 16-page spell book that comes with the tape lists the various spells and the damage they do, as well as the manna they use up, their duration, how much joystick control they offer, and — if you're ready for another complication — their colour.

A red spell will be most effective when used by a red magician, particularly — you are following all this — if there's a red sun in the sky.

In play

The game is slow at first, as you must refer to the book constantly, but once the tactics are mastered the fun begins.

The wizards face each other on hillsides, and launch their spells. A dragon, for instance, might be guided across the sky to burn your opponent to death — provided his fireball hasn't reached you first, of course.

A plague of frogs can descend from on high, or an earthquake be guided upwards till your opponent takes a realistic tumble into it when it reaches him.

My own favourite was the demon, who remains invisible for a long time then suddenly appears to lunge at your opponent. Unless he's decided to attack you instead.

Verdict

This is an excellent and original game, and shows that the Dragon's high-resolution graphics can be used to good effect. It should give you hours of fun.

Mike Gerrard

RATING

Lasting appeal — () () () ()
Playability — () () () () ()
Use of machine — () () () () () ()
Overall value — () () () () ()



and the aforementioned dragon, which homes in on you. The fire button activates the sword, and if you can get at the beast in between its fiery breaths you'll have a dead dragon on your hands.

With the dragon dispatched you can cross the river by the slippery bridge, smite the stone and notch up a point. You keep going till your five lives are used up, and there are four skill

further adventure inside the castle as an incentive for passing a certain score. The game is a good attempt at something different, and not bad at the price, but overall I feel it is a wasted chance.

Mike Gerrard

RATING

Lasting appeal — () () () ()
Playability — () () () () ()
Use of machine — () () () () () ()
Overall value — () () () () ()

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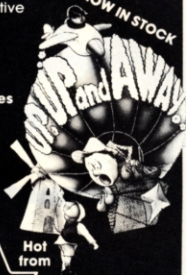
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As well as complete programs, a subroutine with an example of its use will be printed each week from the PCN library.

This week

We introduce the first of our serialised programs, a fruit machine simulation for the Commodore 64 from Barry Walsh of Coventry. The first five cards in a suit of nine are printed here and the other four will appear in next week's issue.

The program itself occupies 10K of memory and is quite impressive.

Thirteen-year-old Oliver Dungey from Tilehurst, Reading, sent in his small Oric 1 organ program. During testing Gary Mills, a member of the PCN refereeing panel, suggested some enhancements which have since been included.

These allow a tune to be typed in, then played upon completion.

Within the subroutine section this week we have a simple yet powerful array editor which, in fact, could be incorporated into the aforementioned Oric 1 program so that tunes could be amended.

The example program is an easy line editor using the subroutine and shows the techniques required to develop and implement a full text editor.

The package will allow you to insert new elements into an array, delete and search for particular elements. It should prove easy to translate from Microsoft Basic into other dialects and could be defined as a set of BBC procedures.

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PCN ProgramCards

Fruit Machine Card 1 of 9

8304FM19

A 10K program to emulate the operation of a fruit machine including the hold feature.

```
1 POKE53280,0:POKE53281,0
7 PRINT "***** YOU REQUEST INSTRUCTIONS?*"
8 GET# : IFR#="" THEN#
9 IFR#="Y" THEN#GOSUB25000
11 GOSUB1950 : GOSUB1510:GOTO170

15 PRINT "***** GOLD SOVEREIGN SLOT MACHINE. "
19 POKE53280,0:POKE53281,0
20 PRINT "***** WIN LINES. "
30 PRINT "***** CHERRY ANY ANY =002"
40 PRINT "***** CHERRY CHERRY ANY =004"
50 PRINT "***** CHERRY CHERRY CHERRY =008"
60 PRINT "***** BELL BELL BAR =010"
70 PRINT "***** PLUM PLUM ANY =010"
80 PRINT "***** ORANGE ORANGE ANY =010"
90 PRINT "***** BELL BELL BELL =012"
100 PRINT "***** PLUM PLUM BAR =015"
110 PRINT "***** PLUM PLUM PLUM =015"
120 PRINT "***** ORANGE ORANGE ORANGE =020"
130 PRINT "***** ORANGE ORANGE BAR =025"
140 PRINT "***** BAR BAR ANY =030"
150 PRINT "***** BAR BAR BAR =050"
160 PRINT "***** GOLD GOLD =100"
161 IFR# THEN#169
162 GET# : IFR#="" THEN#162
164 POKE53280,9:POKE53281,6 : GOSUB1090

169 RETURN
170 DIM#*(59,2)

176 FOR I=0 TO 59
180 READ#*(I,0)
190 NEXT I
200 FOR I=0 TO 59
210 READ#*(I,1)
220 NEXT I
```

Commodore 64 Commodore Basic

Application: game

- | | |
|---------|--|
| 1 | Set border and background colours to black |
| 8 | Blank entry not allowed. "Y" — perform instructions. All others skip |
| 11 | Perform sound characteristic settings, win line display, skip ahead |
| 15 | Win line display section |
| 19 | Border and background to black |
| 20-160 | Appropriate win lines |
| 161 | If start of program return to mainline |
| 162 | Accept single key input |
| 164 | Set border and background colours, perform reset of screen |
| 169 | Return to mainline |
| 170 | Program start. Array W\$(wheels), 60 tokens by 3 wheels |
| 176-190 | Read data into wheel 1 (W\$(*,0)) |
| 200-220 | Read data into wheel 2 (W\$(*,1)) |

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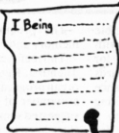
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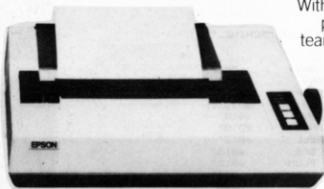
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Fruit Machine Card 2 of 9

8304FM2/9

```

236 FOR I=0 TO 59
240 REPR=INT(1,2)
250 NEXT I
260 PRINT "***** PRESS SPACE TO CONTINUE *****"
270 GETC:IF C=" " THEN GOTO 290
290 POKE 53280,9:POKE 53281,6

360 F0=(INT(RND(1)*9))*6
365 D=0
400 F1=(INT(RND(1)*9))*6
410 F2=(INT(RND(1)*9))*6
420 GOTO 1090

421 REM ***** SPIN DRUM *****
497 :
499 IF H1=1 AND H2=1 AND H3=1 THEN H1=0:H2=0:H3=0:GOSUB 12000:RETURN

499 IF H1=1 THEN H#(1)="*****" :GOTO 510
500 T0=(INT(RND(9)*6)+1)*6
510 FOR I=0 TO 15:POKE 54276,17
511 D=0
512 FOR K=0 TO 5
513 PRINT "M";LEFT$(D#,D);"*****";H#(1);"M";H#(2);"M";H#(3)
515 D=D+1:
520 NEXT J
525 D=0
530 FOR K=0 TO 5
540 PRINT "M";LEFT$(D#,D);"*****";H#(1);"M";H#(2);"M";H#(3)
545 D=D+1:POKE 54276,0
550 NEXT K
560 NEXT I
565 IF H1=1 THEN S0=0
570 F0=(F0+T0)/10*6
575 F0=(INT(F0/6))*6
580 D=0
585 H1=0:H#(1)=" "
590 FOR I=0 TO 5
595 IF F0>5 THEN F0=0
600 PRINT "M";LEFT$(D#,D);"*****";H#(F0,0)
605 IF F0=5 THEN F0=0
610 D=D+1:F0=F0+1
620 NEXT I
621 F0=F0-6:IF F0<0 THEN F0=53
625 IF H2=1 THEN H#(2)="*****" :GOTO 640
630 T1=(INT(RND(9)*6)+1)*6
640 FOR I=0 TO 15:POKE 54276,17
650 D=0

```

```

230 Load tokens to wheel 3
260 Are you ready? Space = YES
280 Set border/background to new colours
360-410 Select wheel token values for possible display
420 Skip ahead to display "machine" info
421 Wheel movement routine
498 If all wheels held check win, return to mainline
499 Wheel 1 held
500 Wheel 1 adjustment factor
510-621 Wheel 1 movement and display

625 Wheel 2 held
630 Wheel 2 adjustment factor
640 Start of wheel 2 movement and display

```

Fruit Machine Card 3 of 9

8304FM3/9

```

660 FOR J=0 TO 5
670 PRINT "M";LEFT$(D#,D);"*****";H#(2);"M";H#(3)
680 D=D+1
690 NEXT J
700 D=0
710 FOR K=0 TO 5
720 PRINT "M";LEFT$(D#,D);"*****";H#(2);"M";H#(3)
730 D=D+1:POKE 54276,0
740 NEXT K
750 NEXT I
755 IF H2=1 THEN T0=0
760 F1=(F1+T1)/10*6
770 F1=(INT(F1/6))*6
780 D=0
785 H2=0:H#(2)=" "
790 FOR I=0 TO 5
795 IF F1>5 THEN F1=0
800 PRINT "M";LEFT$(D#,D);"*****";H#(F1,1)
805 IF F1=5 THEN F1=0
810 D=D+1:F1=F1+1
820 NEXT I
821 F1=F1-6:IF F1<0 THEN F1=53
825 IF H3=1 THEN H#(3)="*****" :GOTO 840
830 T2=(INT(RND(9)*6)+1)*6
840 FOR I=0 TO 15:POKE 54276,17
850 D=0
860 FOR J=0 TO 5
870 PRINT "M";LEFT$(D#,D);"*****";H#(3)
880 D=D+1:POKE 54276,0
890 NEXT J
900 D=0
910 FOR K=0 TO 5
920 PRINT "M";LEFT$(D#,D);"*****";H#(3)
930 D=D+1
940 NEXT K:
950 NEXT I
955 IF H3=1 THEN T0=0
960 F2=(F2+T2)/10*6
970 F2=(INT(F2/6))*6
980 D=0
985 H3=0:H#(3)=" "

```

```

660-821 Continuation of wheel 2 movement and display

825 Wheel 3 held
830 Wheel 3 adjustment factor
840-985 Wheel 3 movement and display

```

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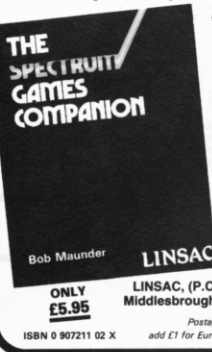
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Bob Maunder is co-author of 'The ZX80 Companion' and author of 'The ZX81 Companion'. He is a Senior Lecturer in Computer Science at Teesside Polytechnic, holds an MSc degree in Computer Science, and is a Member of the British Computer Society.

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Tunsmith Card 1 of 2

8304T1/2

This short program allows the user to type in a tune using 0-9,-,= to represent notes C to B including sharps, and also use the special sound functions so that it can be played back after octave selection.

```

4000 REM *****
4010 REM ** ORIC ORGAN **
4020 REM *****
4030 DIM N(99)
4040 DP$ = "C CED DEE F FEG GEÄ AEB ZABAPISH  "
4050 INK 7: PAPER 4
4060 CLS
4070 PLOT 11,1,"ORIC ORGAN"
4080 PLOT 14,3,"AND"
4090 PLOT 11,5,"TUNESMITH"
4100 PLOT 6,7,"ALL YOU HAVE TO DO IS"
4110 PLOT 6,8,"TYPE IN YOUR TUNE USING : "
4120 PLOT 1,11,"1:C 2:CE 3:D 4:DE 5:E 6:F"
4130 PLOT 1,13,"7:FE 8:G 9:GE 0:A -:AE :=:B"
4140 PLOT 1,15,"SPACE: BREATH. "
4150 PLOT 1,17,"EACH NOTE/BREATH IS 1 QUAVER IN LENGTH"
4160 PLOT 1,19,"THUS CROTCHET IS 2 NOTES, MINIM IS 4, "
4170 PLOT 1,21,"SEMI-BRIEVE IS 8. SPECIAL SOUNDS Z:ZAP"
4180 PLOT 1,23,"B:BANG P:PING S:SHOT. E:END OF INPUT"
4190 PLOT 1,25,"PRESS SPACE TO START, E TO END PROGRAM"
4200 GET A$: CLS: IF A$ = "E" THEN END
4205 IF A$ <> " " THEN GOTO 4060
4210 FOR C = 0 TO 99: N(C) = 0: NEXT C

```

Oric 1
Oric Basic

Requires: 16K
Game/general/music

Where £ is printed you should
type # (shifted 3)

```

4030 Note array — up to 100 notes
4040 String used to print individual notes
4050 White on blue
4060 Clear screen
4070-4190 Introduction/instructions

```

```

4200 Accept single key response.
      Space bar runs program, E ends
      program, any other redispays intro
4210 Set note array to zero

```

Tunsmith Card 2 of 2

8304T2/2

```

4220 C = 0: PRINT "TUNE IS : "
4230 GET A$: A = VAL(A$)-1
4240 IF A$ = "0" THEN A = 9
4250 IF A$ = "-" THEN A = 10
4260 IF A$ = "=" THEN A = 11
4270 IF A$ = " " THEN A = 16
4280 IF A$ = "Z" THEN A = 12
4290 IF A$ = "B" THEN A = 13
4300 IF A$ = "P" THEN A = 14
4310 IF A$ = "S" THEN A = 15
4320 IF A$ = "E" THEN N(C) = 99: GOTO 5000
4330 IF A<0 OR A>16 THEN GOTO 4230
4340 IX = A*2+1: PRINT MID$(DP$,IX,2): " "
4350 N(C) = A: C = C + 1
4360 IF C = 100 THEN GOTO 5000
4370 GOTO 4230
5000 CLS: PRINT "SELECT OCTAVE (1 TO 7): "
5010 GET A$: B=VAL(A$)-1: IF A$ = "E" THEN GOTO 4060
5020 IF B<0 OR B>6 THEN GOTO 5000
5030 PLOT 25,0,A$
5040 PRINT: PRINT "HERE WE GO!"
5050 DA = 16
5060 FOR C = 0 TO 99
5070 IF N(C) = 99 THEN PLAY 0,0,0,0: C = 99: GOTO 5160
5080 IX = N(C)*2+1: PRINT MID$(DP$,IX,2): " "
5085 IF N(C) <> DA THEN DA = N(C): PRINT "":
5090 IF N(C) = 16 THEN GOTO 5160
5100 IF N(C) = 12 THEN ZAP: GOTO 5160
5110 IF N(C) = 13 THEN EXPLODE: GOTO 5160
5120 IF N(C) = 14 THEN PING: GOTO 5160
5130 IF N(C) = 15 THEN SHOOT: GOTO 5160
5150 MUSIC 1,B,N(C)+1,5
5160 WAIT 15
5170 NEXT C
5180 PRINT: PRINT "ANY KEY TO RERUN": GET A$: GOTO 5000

```

```

4220 C is note array index
4230-4310 Single key response converted to
      numeric sound value

```

```

4320 If "E" entered then input complete
      so play tune
4330 Invalid entry — re-enter
4340 Print the note
4350 Store in array. Increase index by 1
4360 Limit at 100 elements
4370 Next note
5000 Clear screen. Print prompt
5010 Single key response. B is adjusted
      octave no. "E" returns to intro
      Must be valid otherwise re-enter
5020 Print response in correct place
5030
5050 OA represents last note played
5060 Playback loop
5070 If note is 99 then end tune
5080 Print the note
5086 If not continued note then
      separate by " "
5090 Breath
5100-5130 Special sounds — include long
      breath after each

```

```

5150 Play the note
5160 3/20 sec wait = one quaver (app)
5170 Next note from array
5180 If tune finished will hold screen
      until key pressed. Try another
      octave.

```

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Array editor Card 1 of 1

8304SubAE

This set of routines provides general upkeeping for an array AS. The program will insert new elements, delete elements and search for particular elements.

```

270 REM Array editor
280 REM
290 REM inserts, deletes and searches elements
300 REM of the Array AS
310 REM
320 REM Uses the array AS(C,N)
330 REM C is the column to access, N is the current element
340 REM AS(C,0) contains the number of elements in column C
350 REM the routines uses NM and NI
360 REM
370 REM *** DELETE ***
380 REM pass AS(),C,N=element to delete
395 REM
400 NM = VAL(AS(C,0)): IF N=0 AND N<=NM THEN FOR NI=N TO NM-1: AS(C,NI)=AS(C,NI+1):NEXT NI: AS(C,0)=STR$(NM-1):RETURN
410 PRINT "DELETE OUT OF RANGE":RETURN
420 REM
430 REM *** INSERT ***
440 REM pass AS(),C,N=point to insert, S=string to insert
450 REM
460 NM=VAL(AS(C,0)): IF N=0 AND N<=NM THEN FOR NI=NM TO N STEP -1: AS(C,NI+1)=AS(C,NI):NEXT NI:AS(C,N)=S:AS(C,0)=STR$(NM+1):RETURN
470 IF N>NM THEN AS(C,NM+1)=S:AS(C,0)=STR$(NM+1):RETURN
480 PRINT "INSERT OUT OF RANGE":RETURN
490 REM
500 REM *** FIND ***
510 REM pass AS(),C,S=element to look for
520 REM returns N=number where element first occurs or N=-1 if not found
530 REM
540 NI=1
550 IF AS(C,N) <> S AND N<=VAL(AS(C,0)) THEN NM=N+1:GOTO 550
560 IF N=VAL(AS(C,0)) THEN N=-1
570 RETURN

```

Although written in Microsoft Basic, the program should work with only minor changes on most machines. It could be defined as a set of procedures in BBC Basic.

The routines work with an array AS(C,N) where C is the index for any number of columns. So you can use the routines with more than one list in each program. AS(C,0) contains the number of elements in list C.

400 Delete routine. Removes element N from list C and closes up.

410 Prints error message for N out of range. Could be changed to return an error flag to the calling program.

460 Insert routine. Inserts SS at element N in list C. There's no check for maximum size that AS has been DIMensioned to.

470 Attempts to insert beyond the end of the list cause SS to be added at the next free position.

480 As delete, an error for failed inserts. Could be change to a flag.

540 Find routine. Searches for SS in list C.

550 To search from a particular element onwards, set N in the main program and GOSUB here rather than the line above. This could be used to find all occurrences of a particular string.

Line editor Card 1 of 1

8304LE

This program demonstrates some of the features of the array editor routines. It is a simple line editor and uses only one list (C=1) within AS()

```

10 REM Line editor
20 REM a demonstration of the array editor
30 REM
40 DIM AS(1,100):C=1
50 CLS:PRINT "Demonstration line editor"
60 PRINT:PRINT "This is a simple line editor to show the use of the array editor. It accepts the following commands, where n is a number 1-":
70 PRINT "PRINT "C" clear text in memory":PRINT "L" list text in memory":PRINT "En edit line n":PRINT "In insert text from line n"
80 PRINT "Dn delete line n":PRINT "S search and replace":PRINT "Q quit"
90 PRINT:PRINT "To add new lines to the text, insert beyond the highest line number. To finish adding new lines, press just 'return'"
100 PRINT:PRINT
110 INPUT "Command C,L,E,I,D,S,Q ",AS
120 IF AS="" THEN S0
130 N=0:IF LEN(AS)>1 THEN N=VAL(MID$(AS,2))
140 AS=LEFT$(AS,1)
150 IF AS="Q" THEN CLS:END
160 IF AS="C" THEN AS(C,0)="0"
170 IF AS="L" AND VAL(AS(C,0))>0 THEN PRINT "FOR I=1 TO VAL(AS(1,0)):PRINT I":PRINT:GOTO 110
180 IF AS="E" AND N>0 THEN PRINT "Enter new text for line "NI":INPUT AS(C,NI):GOTO 110
190 IF AS="D" THEN GOSUB 400:GOTO 110
200 IF AS="I" AND N>0 THEN PRINT NI":INPUT "",S:IF S<>"" THEN GOSUB 460:N=N+1:GOTO 200
210 IF AS<>"S" THEN 110
220 INPUT "Replace what ",S$
230 GOSUB 540
240 IF N=-1 THEN PRINT "Not found":GOTO 110
250 INPUT "What with ",S$
260 AS(C,N)=S:GOTO 110

```

BBC micro
BBC Basic40 Sets up AS()
50 Instructions

110 Fetch next command
120 If it's a null string, print instructions to help user

130 Set N if it has been entered

150 Quit command
160 Clear array by zeroing the number of elements stored in it
170 List command

180 Edit command

190 Delete command
200 Insert new lines. Loops to enter multiple lines
210 Get a new command if AS is still not valid
220 Search and replace routine to show FIND working.

CLUBNET

Clubnet keeps you in touch with the microcosm of personal computer enthusiasts throughout the UK. It is divided into two sections — Clubs and User Groups.

Each week we list clubs alphabetically by county and user groups alphabetically by speciality, covering about two letters of the alphabet each week.

Entries include up-to-date information as far as possible, and

CLUBS

CLEVELAND

Stockton Amateur Computer Club meets at Stockton YMCA every Monday at 7pm, meetings 20p, to be reviewed.

General talks, basic programming course, some demonstrations and building up databank of current machines.

Contact PJ Cheshire at 60 Croft Road, Eaglescliffe, Stockton-on-Tees, Cleveland TS16 0DY.

CORNWALL

Cornish Radio Amateur Club — Computing Section.

Contact Bob Reason at 24 Mitchell Road, Camborne, Cornwall.

Cornwall Area Computer Club.

Contact M F Grove at 35 Causeway Head, Penzance.

St Austell Computer Club and **Computer Town** meets at ECIP Labs, Pepewar Road, St Austell, fortnightly on Mondays at 7.30pm.

Informal meeting — members demonstrate own machines.

Contact N G Day at 2 Cilendale Close, St Austell, Cornwall PL25 3DD.

DERBY

Glossop Computer Club.

Contact John Dearn, 2 Spinney

Close, Glossop, Derbyshire.

Derby Micro Society meets at Littleover Church Hall, Sheperd Street, on every other Thursday at 7pm.

Annual subs: £5, £2.50 children, £7.50 for families, 50p entrance non-members.

Contact Mike Riordan, 0332-769440.

DEVON

Exeter & District Computer Club meets at Exeter School, Magdalene Road, Exeter, on the second and fourth Tuesday every month.

Annual subs: £7.50 adults, £2.00 for students. Technical library.

Contact Ian Hodgson, 21 Dean Street, Exeter, 0392-50812.

Exeter & District Amateur Computer Club meets second Tuesday every month.

Annual subs: £7.50. Contact Doug Bates, Fortescue House, Stoke Cannon, Exeter. Specialist meetings on the third and fourth Tuesday.

Torbay Users Computer Club meets at Devon Computer Services, 96 Dartmouth Road, Paignton on Mondays fortnightly.

Annual subs: £2.00 juniors, £5.00 adults, meetings 20p, children welcome. Technical library available.

Contact J D Parker, 0803-843964.

group organisers should let us know of any changes, particularly a move to a new address.

Just started your own club? Drop us a line and we'll spread the word. Write to: Clubnet, Personal Computer News, 62 Oxford Street, London W1A 2HG.

Details of the clubs are based on the Amateur Computer Club's listing.

USER GROUPS

Commodore ICPUG

ICPUG Barnsley annual subs: £7.50.

Technical advice, newsletter and discount services.

Contact Bob Wood, 13 Word Green, Barnsley, South Yorkshire, tel: 0226-85084.

ICPUG Biggin Hill meets at Charles Darwin School, Biggin Hill Library, on holidays and third and fourth Thursday of every month at 7.30pm.

Annual subs: £5. Contact Jack Cohen, 30 Brancaster Road, Newbury Park, Ilford, Essex, tel: 01-597 1229.

ICPUG SE Canterbury meets at The Physics Lab, Canterbury University, on the first Tuesday and Wednesday of every month.

Annual subs: £7 adults, £3.50 juniors.

Contact R. Moseley, Rosemont, Romney Hill, Maidstone, tel: 0622-37643.

ICPUG Coventry meets at Stoke Park School & County College at 7-10pm on fourth Wednesday of each month except July, August and December.

Annual subs: £2.50. Informal meeting for all users of Commodore machines. Advice and software exchange.

Contact Will Light at 22 Ivybridge Road, Styvechale,

Coventry, Warwickshire.

North-East Pet and ICPUG meets at Lawson School, Burnley at 7pm second Monday of the month, software. Third Monday of the month, hardware.

Contact Jim Coocalls at 20 Worcester Road, Newton Hall Estate, Durham.

ICPUG Dyfed. This club doesn't meet at the moment. There is a software library.

Contact Simon Kniveton on 097-086 303.

ICPUG Hainault meets at Range Remedial Centre, Woodman Path, Hainault.

Contact Carol Taylor, 101 Courtlands Avenue, Cranbrook, Ilford, Essex.

ICPUG Glasgow contact Dr Jim MacBrayne, 27 Daidmyre Crescent, Newton Mearns, Glasgow, tel: 041-639 5696.

ICPUG Glasgow contact Dr Jim MacBrayne, 27 Daidmyre Crescent, Newton Mearns, Glasgow, tel: 041-639 5696.

ICPUG Gloucester & Bristol Area, meets at 23 Sheppard Leaze, Wotton-under-Edge, Gloucester, on the last Friday of every month.

ICPUG Hampshire meets at 70 Reading Road, Farnborough, on the third Wednesday of every month.

Contact Ron Geere, 109 York Road, Farnborough, Hants, tel: 0252-542921.

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
Engineering Software Exhibition Computer Technology Exhibition	April 11-13 April 13-16	Imperial College, London Recreation Centre, Newton Aycliffe, Co Durham	Computational Mechanics Centre, 0421-293223 Jan Huntley, Sedgfield District Council, Spennymoor 816166
Computer Open Day Exhibition	April 14	Midland Hotel, Manchester	Tony Kaminiski, Couchmead Communications, 01-778 1102
4th London Computer Fair Manchester Home Computer Show HP 1000 Users Exhibition & Conference Computer Trade Show	April 14-16 April 21-23 April 26-28 April 26-28	Central Hall, Westminster, London Midland Hotel, Manchester Heathrow Penta Hotel, London	Sue Manning, ALCL, 01-226 9874 Peter Freebrey, ASP Exhibitions, 01-437 1002 Conference Services, 01-584 4226
Midland Computer Show RIBA Computer Conference & Exhibition 83	April 28-30 May 10-12	Wembley Conference Centre, Wembley Bingley Hall, Birmingham Bloomsbury Crest Hotel, London	John Cole, IPC Exhibitions, 01-643 8040 Roy Bratt, IPC Exhibitions, 01-643 8040 Joe Hunting, RIBA Services Ltd, 01-637 8991

OVERSEAS EVENTS

Event	Dates	Venue	Organisers
Computerised Office Equipment Exhibition	April 5-7	O'Hare Exposition Centre, Rosemont, Illinois, USA	Cahners Exposition Group, 0483-38085
International Computer, Computer & Robot Exhibition	April 14-20	Seoul, Korea	Korea Economic Daily, 441 Chungrimdong, Chung-ku, Seoul 100
Information Management Exhibition & Conference	April 26-28	McCormick Place, Chicago, USA	Tony May, Clapp & Poliak, 021-384 3384
Compec Europe Exhibition National Computer Conference & Exhibition	May 3-5 May 16-19	Centre Rogier, Brussels Anaheim, USA	Tracey Cannon, IPC Exhibitions, 01-643 8040 American Federation of Information Processing Societies, 1815 N Lynn Street, Arlington, VA 22209

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E894	M 9x7	+	9600	220	3,4,6,8,12	200	220	66x45.7	36	5	•	•	•	•	•	•	•	•	•	•	•	M3	
E1593	M 9x7	+	9600	218	3,4,6,8,12	200	220	16	66x45.7	36	5	•	•	•	•	•	•	•	•	•	•	M3	
E1869	M 9x7	+	9600	218	6,8	10,12,5,16,9,20	160	218	48.3x24.1	7.5	4	•	•	•	•	•	•	•	•	•	•	M3	
E1747	M 9x7	+	9600	218	6,8	10,12,5,16,9,20	160	218	48.3x24.1	7.5	4	•	•	•	•	•	•	•	•	•	•	M3	
Newbury Labs 1550	M 9x7	+	9600	2000	6,8	5,6,8,5,10,12,17	120	200	55.9x30.5	11	3	•	•	•	•	•	•	•	•	•	•	N1	
E852	M 9x7	+	9600	3000	6,8	5,6,8,5,10,12,17	120	132	10	55.9x28.6	8.5	3	•	•	•	•	•	•	•	•	•	N1	
Newbury Labs BS10A	M 9x7	+	9600	3000	6,8	5,6,8,5,10,12,17	120	132	10	55.9x28.6	8.5	3	•	•	•	•	•	•	•	•	•	N1	
E1478	Daisywheel	+	2400	2000	6,8	10,12	40	163	15.5	55.9x43.2	14	2	•	•	•	•	•	•	•	•	•	X1	
E242	M 5x7	+	9600	256	6,8	5,10,16,5	80	132	9.5	34.2x24.5	6.5	4	•	•	•	•	•	•	•	•	•	X1	
E425	M 9x7	+	1200	132	6,8	5,8,3,10,16,5	120	132	9.5	36.1x32.8	8.9	4	•	•	•	•	•	•	•	•	•	X1	
E308	M 9x7	+	1200	132	6,8	5,8,3,10,16,5	120	132	15	51x32.8	14	3	•	•	•	•	•	•	•	•	•	X1	
E375	M	+	4	9600	132	6,8	5,8,3,10,12,17	200	231	15	51x32.8	14	3	•	•	•	•	•	•	•	•	X1	
E375	M 7x9	+	4	9600	1000	6	10,12,5,16,5	100	132	9	11.6x30	7.5	2	•	•	•	•	•	•	•	•	B2	
E1033	M 7x9	+	9600	256	6	10,12,16,5	140	220	14.75	59.2x40.1	17	4	•	•	•	•	•	•	•	•	•	B2	
E1033	M 7x9	+	9600	256	6	10,12,16,5	200	220	19.75	59.2x40.1	17	4	•	•	•	•	•	•	•	•	•	B2	
E862	Daisywheel	+	9600	1000	6	10,12,15	29	198	17	54.1x32.8	16.3	4	•	•	•	•	•	•	•	•	•	B2	
E1322	Daisywheel	+	9600	1000	6	10,12,15	29	225	17.25	60x50	17	4	•	•	•	•	•	•	•	•	•	B2	
E420	Dry Ink Jet	+	9600	1000	6,8	10,12,18	50	147	9	39x26.8	5.2	1	•	•	•	•	•	•	•	•	•	B2	
E661	Thermal 5x7	+	9600	1000	6	10	240	80	8.75	40.1x34	7.5	1	•	•	•	•	•	•	•	•	•	B2	
E1917	Daisywheel	+	19200	4000	6	10,12,15	24	141	17	52.8x37	13	6	•	•	•	•	•	•	•	•	•	IS	
E1263	Olympia ESW103KSR	+	19200	4000	6	10,12,15	24	212	17	52.8x43.1	14.5	6	•	•	•	•	•	•	•	•	•	IS	
E1306	Olympia ESW3000FRO	+	19200	4000	3,4,6	10,12,15	50	225	17	60.5x40.8	19.5	6	•	•	•	•	•	•	•	•	•	IS	
E2287	M	+	19200	512	3,4,6,8,12	10,12,15	300	180	14.4	64.5x23.3	34	8	•	•	•	•	•	•	•	•	•	R2	
E2012	M	+	9600	1792	6,12,16	10,12,13,3,16,7	340	227	16	59x42.5	20	4	•	•	•	•	•	•	•	•	•	T3	
E1862	Daisywheel	+	9600	500	6,8	10,12,15	35	198	15	61.3x49.9	19	3	•	•	•	•	•	•	•	•	•	O1	
E1966	Daisywheel	+	9600	500	6,8	10,12,15	45	198	15	61.7x42.5	20.4	3	•	•	•	•	•	•	•	•	•	O1	
E2403	Daisywheel	+	9600	500	3,6,8	10,12,15	55	198	15	61.7x42.5	20.4	3	•	•	•	•	•	•	•	•	•	O1	
E2261	M 7x7	+	9600	1000	2,3,4,6,8,12	5,6,8,6,8,25,10,13,2,16,5	180	132	15	69.9x60.9	46.4	3	•	•	•	•	•	•	•	•	•	O1	
E1200	M 7x9	+	300	256	2,3,4,6,8,12	5,6,8,6,8,25,10,13,2,16,5	30	127	15	57.1x39.4	11.3	3	•	•	•	•	•	•	•	•	•	R1	
E1940	Daisywheel	+	9600	768	6,8	10,16,5	40	196	15	59.8x46.4	27.2	2	•	•	•	•	•	•	•	•	•	R1	
E1820	M 9x7	+	9600	1280	6,8	10,16,5	150	132	15	66x53.4	18.2	6	•	•	•	•	•	•	•	•	•	R1	
E722	M 9x7	+	9600	N/A	6	10,16,5	150	132	10	38.1x35.6	9	2	•	•	•	•	•	•	•	•	•	R1	
Rair Centronics 150.4	M 9x7	+	300	N/A	6	10	30	80	8.5	39.1x40.6	6.1	1	•	•	•	•	•	•	•	•	•	R1	
Rair/Texas Instruments 743	Thermal	+	300	N/A	6	10,12,15	37	163	15	59.3x33.2	14	7	•	•	•	•	•	•	•	•	•	A1	
Ricoh RP1300 Follower	O	+	9600	2000	8	10,12,15	60	163	15	62.5x35.2	27	7	•	•	•	•	•	•	•	•	•	A1	
Ricoh RP1600 Follower	O	+	9600	2000	8	10,12,15	60	163	15	62.5x35.2	27	7	•	•	•	•	•	•	•	•	•	A1	
Ricoh RP1600S	Daisywheel	+	9600	4000	6,8	10,12,15	65	204	13.5	63.5x36.2	37	7	•	•	•	•	•	•	•	•	•	M4	
E2875	M	+	9600	2000	6,8	6,10,12,15,17,18	450	234	14.5	47x58.9	23.6	5	•	•	•	•	•	•	•	•	•	A2	
E247	M 5x7	+	9600	256	6,12	6,12	50	80	10	42.7x23.8	8.4	3	•	•	•	•	•	•	•	•	•	D4	
E357	Daisywheel	+	19200	N/A	3,4,5,6	10,12	120	126	13	49.5x31.5	8.5	3	•	•	•	•	•	•	•	•	•	D4	
E724	M	+	9600	136	6,8,9	10,12	120	136	15	51x36	13	5	•	•	•	•	•	•	•	•	•	S12	
Seal SWP20	M	+	9600	2000	6,8	10,12,15	16	132	15	66x44.7	22	5	•	•	•	•	•	•	•	•	•	S2	
Star DP-8480	M	+	2400	132	6,12	10,12,16,7	100	132	10.5	39.4x32.4	8.5	2	•	•	•	•	•	•	•	•	•	S3	
E1909	M	+	9600	256	6,8	10,12,16,7	100	132	16	71.7x61	53	6	•	•	•	•	•	•	•	•	•	S4	
Systeme System	M	+	9600	256	6,8	10	120	132	16	71.7x61	53	6	•	•	•	•	•	•	•	•	•	S4	
Systeme System-P	M	+	9600	256	6,8	10	120	132	16	71.7x61	53	6	•	•	•	•	•	•	•	•	•	S4	
Systeme System-S	M	+	9600	256	6,8	10	120	132	16	71.7x61	53	6	•	•	•	•	•	•	•	•	•	S4	
E1599	M	+	9600	256	6,8	10	120	132	16	71.7x61	53	6	•	•	•	•	•	•	•	•	•	S4	
E1299	Daisywheel	+	9600	2000	6	10,12	40	163	16.5	62.4x20.4	27	4	•	•	•	•	•	•	•	•	•	T1	
Texas Instruments 743	Thermal 7x5	+	300	N/A	6	10,17	30	80	8.5	39.1x40.6	6	1	•	•	•	•	•	•	•	•	•	D5	
E1470	Thermal	+	300	256	6	10,17	30	80	8.5	39.1x40.6	6	1	•	•	•	•	•	•	•	•	•	R1	

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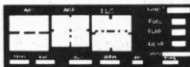


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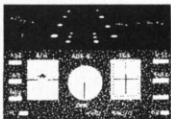


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TM 848-2	£513	1.6Mb	1	154	Soft	DS, DD	●							H1	
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TM 100-1	£158	250K	1	40	Soft	SS, DD	●							H1	
TM 100-2	£221	500K	1	80	Soft	DS, DD	●							H1	
TM 100-3/3M	£216	500K	1	80	Soft	SS, DD	●							H1	
TM 100-4/4M	£247	1Mb	1	160	Soft	DS, DD	●							H1	
Tracker 1	£373	1Mb	2	80	Soft	SS, DD					●			D7	
Tracker 2	£497	2Mb	2	80	Soft	DS, DD					●			D7	

MODEMS

A modem interfaces a computer and the telephone system so computers can communicate over long distances. It converts data to electrical pulses or sounds that can be sent down the line. A modem can be connected to the line directly or acoustically. **A** in the connection column represents direct link, while **A** indicates acoustic. The acoustic coupler is like a female telephone handset with a speaker in the coupler opposing the phone's mouthpiece and a microphone opposing the earpiece. **A** in this column indicates that both methods of attachment are available. **Baud** rate shows the speed with which the data is transmitted.

The modem must be connected to the computer through an interface. The **interface** column lists the main interfaces featured on each modem. **Asynchronous** means that data may be transferred at intervals as available or as needed. **Synchronous** data is transferred at regular intervals. **Simplex** transfers data in one direction, while **Half duplex** can transmit/receive in either direction, but not simultaneously. **Full duplex** transmits and receives information in both directions at once.

Some modems can **originate** a call or start a two-way conversation. **Answer** means they can respond to a call from another computer.

Make and Model	Price	Connection	Data Rates (baud)	Interface	Capabilities							Distributor Code
					Others	Asynchronous	Synchronous	Simplex	Half Duplex	Full Duplex	Originate	
AJ 311	£387	B	300	RS232	●	●	●	●	●	●	●	A5
AJ 1222	£736	D	1200	RS232	●	●	●	●	●	●	●	A5
AJ A211	£316	A	300	RS232	●	●	●	●	●	●	●	A5
AJ 1234	£736	A	1200	RS232	●	●	●	●	●	●	●	A5
AJ 1256	£736	B	1200	RS232	●	●	●	●	●	●	●	A5
AM 211	£387	B	300	RS232	●	●	●	●	●	●	●	A5
Bermac 1200/1 Model A	£414	D	1800	RS232	●	●	●	●	●	●	●	B3
Bermac 1200/1 Model B	£460	D	1800	RS232	●	●	●	●	●	●	●	B3

DISTRIBUTORS

A1 Appropriate Technology, 01-625 5575 **A2** Advent Data Products, Melksham 706289 **A3** Altex Microcomputers Ltd, Reading 791579 **A4** Atari International (UK), Slough 33344 **A5** Anderson Jacobson Ltd, Slough 25172
B1 Bytech, Reading 61031 **B2** British Olivetti, 01-785 6666 **B3** Barron McCann, Biggleswade 316286 **B4** Bencom Sendata (UK), 01-940 1386 **B5** Baydel Ltd, Leatherhead 378811 **B6** BASF, 01-388 4200
C1 Centronics, 01-581 1011 **C2** Commodore Business Machines, Slough 79292 **C3** Calcomp Ltd, Bracknell 50211 **C4** Crofton Electronics, 01-891 1923 **C5** Canon (UK) Ltd, 01-680 7700 **C6** Cumana, Guildford 503121 **C7** CBL, Reading 792097
D1 Discom, Evesham 3591 **D2** Datarate Ltd, Northampton 22289 **D3** DINGS Ltd, 061-643 0016 **D4** DRG, Weston-super-Mare 415399 **D5** Data Systems Division, Bedford 223889 **D6** Data Efficiency, Hempel Heppstead 63561 **D7** Data Trac Technology, New Milton 619650
E1 Epron (UK), 01-900 0466 **E2** Elecomatic, 041-881 5825 **E3** Eicon, Barhill 81825 **E4** Environmental Equipments Northern Ltd, Nantwich 625115
F1 Fastco, Reading 791557
G1 Geveke Electronics, Woking 26331 **G2** Gemini Micros, Amersham 28321
H1 HAL Computers Ltd, Farnborough 517175 **H2** Hayward Electronic Assoc. Ltd, 01-428 0111
I1 Informex Ltd, 01-318 4213 **I2** Intac Data Systems, Rotherham 547170 **I3** ITT Business Systems, Brighton 507111 **I4** ITT Consumer Products, Basildon 3040 **I5** Intelligent Interfaces, Stratford-upon-Avon 296879

Make and Model	Price	Connection	Data Rates (baud)	Interface	Others	Capabilities					Distributor Code
						Asynchronous	Synchronous	Simplex	Half Duplex	Full Duplex	
Sendata 700 Series A	£253	A	300	RS232, 20ma	1	●	●	●	●	●	B4
Sendata 700 Series B	£224	A	300	RS232, 20ma	1	●	●	●	●	●	B4
Sendata 700 Series C	£309	A	600-1200	RS232, 20ma	1	●	●	●	●	●	B4
Sendata 700 Series D	£309	A	75-1200	RS232, 20ma	1	●	●	●	●	●	B4
Sendata 700 Series E	£149	A	300-1200	RS232, 20ma	1	●	●	●	●	●	B4
Racal 126 LS1	£782	D	2400	V24		●	●	●	●	●	R2
Racal MPS 3021	£295	D	300	V24		●	●	●	●	●	R2
Racal MPS 1222	£678	D	1200	V24		●	●	●	●	●	R2

PLOTTERS

Plotters use a pen to put graphics or characters on paper under the command of a computer. They are usually one of two types—flatbed or drum. **A flatbed** holds the paper flat while the pen draws on it in two dimensions. **A drum** plotters turns the paper vertically on a cylinder while the pen moves horizontally. Most plotters can change pens during operation so a variety of colours and line thicknesses are available. **Max pens** indicates the number of pens in operation or on standby. Dimensions of the paper to be used are listed under **paper size**. **Maximum plotting speed** measures the distance in millimetres per sec covered by the pen. **Interfaces** are included in the basic price or come at extra cost.

Make and Model	Price	Type	Max Pens	Paper Size	Maximum Plotting Speed (in in/sec)	Interface (V=vertical scan)	Distribution
Calcomp 81	£3,392	Flat	8	A3	30cm	RS232 or IEEE	C3
HP 7470A	£1,317	Drum	2	A4	38.1cm	RS232 (IEEE+)	H2
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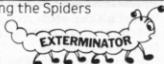
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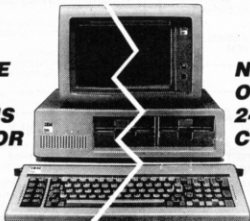
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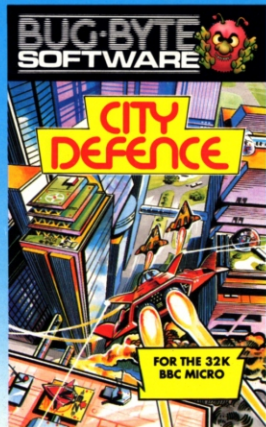
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