

PERSONAL *weekly* COMPUTER

50p April 14, 1984 No 57

NEWS

BRITAIN'S BIGGEST WEEKLY

BBC BUILD-UP...

...in a program to get you steamed up

SPECTRUM DRIVES

Exclusive Pre-Test of a new disk system

LEARN ASSEMBLER

Easy steps to faster programs

MONEY MODELS

High-class financial planner for the IBM and Sirius

THE MICROKEY

Forth-based with dozens of colours available.

Full PCN Protest inside.

MICROKEY:
the computer PCN readers helped to design

PCN
micropaedia
Vol 20 Part 3

**PULL OUT
AND KEEP**

YOUR GUIDE TO SERVICES
COMMUNICATIONS OVERSEAS
PULL-OUT COMPARISON CHART

**INSIDE!
INSIDE!
INSIDE!**

Communications directory to pull out and keep
PLUS new packages for Dragon, Commodore 64, Oric & Spectrum

TELEVIDEO TS 804

THE MASTERPIECE FOR UP TO FOUR KEYBOARDS

ITS PERFORMANCE WILL BE MUSIC TO YOUR EARS



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Initially, you may only need your system to be run by a single operator – expanding it later as the need arises. This is where the TS 804 really comes into its own. As a single-user system it is extremely efficient and powerful. As your business grows, and your requirements change, it will support up to four users – working independently – via any ASCII terminal.

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SO MUCH, FOR SO LITTLE

There's never been anything quite like the new TeleVideo TS 804.

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WHICH WAY DO YOU WANT TO GROW?

With the TS 804, you can choose not only how big you want to grow, but also in which direction. You have several choices.

Any ASCII terminal, serial printer or modem can be supported by each of the user ports, and a parallel printer can also be added. An expansion disk provides 15 Mbytes of formatted hard disk storage and a 14 Mbyte cartridge tape unit allows for easy system back-up.

TS 804 provides a high degree of compatibility with software written for the ALTO 580 product line.

AND THERE'S A LOT MORE...

We simply cannot do justice here to the impressive advantages of the TS 804. For the full, fascinating details, and for more information on the TeleVideo Business Computer range, contact **THORN EMI TeleVideo Marketing**,



Silbury Court,
372 Silbury Boulevard,
Witan Gate East,
Central Milton
Keynes, MK9 2AF,
or telephone
(0908) 668778.

TELEVIDEO. THE COMPUTER THAT MOVES WITH THE TIMES.



TeleVideo
Business Computers

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**MENU**

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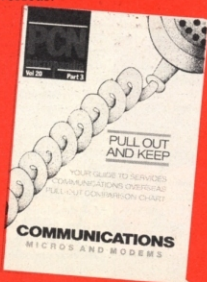
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We review the Microkey; the Forth-based micro that our readers helped to design. Ted Ball tests a machine that was designed by committee and approves heartily of what he finds.

MICROPAEDIA

Pull-out wall chart to hang by your micro

We send communications services to the wall in the final part of our communications Micropaedia. Our free pull-out wall chart lists the popular services with numbers, costs and interfacing status details. We give you all the essential details on hooking up to a range of specific bulletin boards and database services both in the UK and overseas.



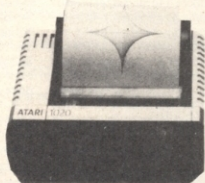
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Not the game for claustrophobics — venture down onto the ocean bed, or into the bowels of the Earth.

Dragon 50

Your missions should you choose to accept them — to control air traffic, or defeat nefarious Dr Death.

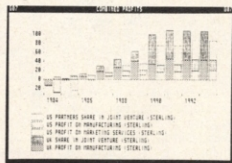
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We test two new packages to teach Français on l'Oric.

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This financial modeller could be a competitor to spreadsheets like VisiCalc or even combination packages like Lotus 1-2-3. Neville Ash gives it a forecast.



PROGRAMS

BBC Model B 59

Trainiac puts you in the civil engineering business. You must replace bridges to prevent disaster on the Dodge to Carson City route, circa 1880.

Oric 66

You can scroll your screen sideways with this machine code utility.

PCN

Games prices crash

By David Guest

Games prices are hitting the floor as the day of pocket-money software dawns.

As of last week Pulsonic is selling Commodore and Sinclair games for £2.99 and a new company, Mastertron, is going even lower at £1.99.

At those prices you probably shouldn't expect too much, and Pulsonic's Richard Bailey admitted: 'I don't pretend that our games are up to the standard of the Hobbit.' But Mastertron aims 'to ensure a flow of top quality products' by selling the software of

established software houses; even so, it declined to name its suppliers last week.

The development of a new bargain basement hasn't thrown the industry's big names into ferment. 'It sounds reasonable to me,' said Virgin Games' Nick Alexander, also chairman of the Guild of Software Houses. 'Budget albums exist quite happily alongside full price albums.'

But he added that it could be too soon for the idea to work. 'There may not be enough computers out there to sell at those particular

prices.'

One tactic both Pulsonic and Mastertron have adopted to counter that possibility is to go for the top-selling micros. Nine of Mastertron's first 12 titles are for the Spectrum, which accounts for four out of 14 from Pulsonic. The rest of the games are split between the Commodore 64 and Vic 20.

But Alan Sharam of Mastertron said that the company has a Dragon game in the works and that it will be looking at other systems as well. It also intends to sell educational software.

'We'd like to have a cluster of software houses working around us,' said Mr Sharam.

Mastertron says that software has generally been over-priced. Pulsonic disagrees. 'We're not out to rock the market,' said Mr Bailey, 'we won't take business away from other people but generate new business at a different level.'

Whatever the prospects for software at these prices they add a new dimension to the increasingly unstable software business. Nick Alexander predicts: 'It's going to be a rough year.'



Compaq — UK debut includes hard disk portable.

Compaq here at the double

The Compaq IBM-compatible portable is now available in the UK.

In its most basic form — a single floppy disk and 128K of memory — the portable sells for £1,795 plus VAT. Adding a second drive and another 128K to the system raises the price to £2,195, while the 10 Mb hard disk version of the system will cost you £3,945 (again plus VAT).

The introduction of the Compaq into the UK follows a massive success in the US. Compaq sold \$111.2 million worth of portables to the home crowd last year and has high hopes of repeating that success here. It has tied up with many dealers that sell IBM PCs, in the obvious hope that comparisons will spur sales.

Sinclair retreats on QL as delivery dates slip again

By Geoff Wheelright

Delivery dates for Sinclair's QL micro have slipped yet again.

The company had promised to begin shipping QLs from the end of March (after initially promising to start deliveries by the end of February) but now says only that deliveries will meet the promised customer delivery dates — which seem to start not much earlier than the end of April. 'No QLs have been shipped, but we remain confident that we can fulfill all customer target delivery dates,' said a Sinclair spokesperson. 'I can't comment on the exact time those deliveries will begin.'

But Sinclair has confirmed that design difficulties surrounding the development of the QL have been resolved and that delays are now due to the business of bringing QL production to full capacity. The company did not confirm earlier reports that there were problems in developing the QL's 'SuperBasic' and in fitting all the elements of the Q-DOS operating system onto a ROM.

All it would say is that earlier delays have been resolved and that a final testing program for the QL is now in progress.

Delays have dogged the QL since its launch in January. Heralded as the developer of probably the most important micro of 1984, Sinclair has since:

- announced that it cannot honour the 28-day delivery date originally printed on QL order forms and had to alter order forms to delete the 28-day promise;
- cashed thousands of cheques for orders of QLs which may take up to three months to be delivered;
- opened a 'readers account' into which it deposited the money from cashed QL cheques and from which it cannot collect until QLs are delivered;
- admitted that the interest generated by the money in that readers account will fall to Sinclair, rather than to the people whose money they are holding;
- and promised a 'free gift' to people who have had to wait an inordinately long time for deliveries of their machines.

Prize winner

Three weeks ago we promised a £10 gift to the best suggestion as to how Sinclair should reward its patient customers, ie what the famous QL gift should be.

True to our word and on schedule, we've picked a winner and the prize will be on its way long before 28 days elapse. Barry Graham wins our vote for the simplicity of one of his suggestions: Another QL, since the first one will probably go wrong.

Jobs for girls

Macs don't seem to be the major concern of Apple's multi-millionaire boss Steve Jobs. Though Lisa could be in with a chance.

Far from putting total energy into flooding the worlds with his micros, the man behind Apple Computer claims he's concentrating on searching the lands for a new girlfriend (preferably one who cooks good pasta and likes cycling . . . and, presumably, likes money . . .) After all, he is a 28-year-old Californian.

But it's not the mood of spring which has sent him on a whistlestop tour of Europe. His mission is to push Macintosh and the new Lisas and win back lost ground from IBM.

So how is the Macintosh, (Issue 46, due for delivery here in May, doing in America? 'We've sold 40,000 machines in the first 60 days,' said Jobs. This year he expects to shift a quarter of a million of the machines.

The computer, with a single floppy disk drive built-in and a high resolution black and white display, was designed to enable users to master it in a couple of hours. 'Who wants to read a novel to use a computer?' Jobs remarked.

Jobs rules out colour graphics as a Mac development. 'That can only be done for \$10,000,' he remarked. But he did promise a laser printer currently under development at the company's Cupertino headquarters



Steve Jobs: foresees flat-screen Mac.

in Southern California.

Looking ahead over the next two to three years, Jobs expects Mac to be fitted with a flat screen which could reduce the size of the system to the dimensions of a book.

Apple is determined to make Macintosh into an industry standard alongside the Apple II and the IBM PC. The company has gone out of its way to court independent software companies, and some 100 have become involved in producing Mac programs.

Apple is also wooing the young through a series of schemes to put Apple products in US schools and universities. And there is a chance that cheap machines will be offered to students in this country too.

Oric disk shock

By Piers Letcher

Oric's microdisks are at last on the verge of a general release but they could be a let-down.

A sneak preview of the manual reveals that the drive is little more than an advanced (and expensive) cassette system, relying on serial access and cassette filing commands.

The manual also gives detailed descriptions of 5.25in disks, although according to Paul Johnson, Oric's technical director, Oric has no plans to market these, preferring users to stick with the black and red microdisks.

Rumours that the disks could be

very slow for some applications caused some confusion at Oric. An engineer said: 'We haven't done any timings' and this was confirmed by Mr Johnson, who said that the timings hadn't been evaluated because Oric didn't believe that home users were interested in that sort of thing. Nor were they interested in random access, he said. Whether or not home users will be interested in the microdisk, when it arrives in the shops, remains to be seen.

On paper at least, the ITL Byte Drive 500 and hybrid cable perform much better than the microdisk — as well as curing some of the Oric's known bugs and freeing 16K of the

Oric's memory for machine code programmers. The microdisk also has a weakness in the utilities that form the DOS. These take up space on the disk (about 11K) and have to be loaded in from the disk into memory.

Barry Muncaster, Oric's managing director, said that the microdisk was in mass production, and that many thousands had been shipped. He said that they had gone abroad, mostly to France. He attributed the lack of drives in British shops to the fact that orders had not been placed at the shops in which PCN had looked — those mentioned in Oric's extensive advertising campaign.

Hannover fest springboard

By Ralph Bancroft

The German word for trade fair is 'messe' and the Hannover Messe lives up to the description. Acres and acres of exhibition space covers subjects as different as German-Italian trade and recent advances in earth-moving equipment.

Within the maze of stands is to be found one of the biggest annual congregations of computer companies. The Hannover Fair has become the traditional spring launching point for products new to the European market.

Portables are strongly in evidence with the Gavilan making its long awaited arrival on European shores. Lap-held in size, it features a unique touchpad that functions as mouse.

It also has a decent sized screen in its flip-up lid (shades of the Sharp PC-5000 here) which can display eight 66-character lines. A 50 cps thermal printer is available with its own battery supply and can plug neatly into the rear of the micro.

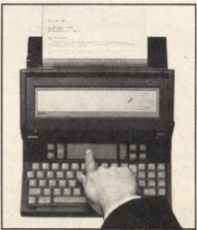
Inside the box is an 8088 processor chip with 80K of RAM, expandable to 336 bytes. Software can be loaded from either plug-in modules or the single integral 3 1/2in micro-floppy.

At the more economical end of the market is the new Sord IS-11. Costing around £1,000 it aims to challenge the NEC-8201A/Tandy Model 100/Olivetti M10-type machine. Although costing more, it does offer a built in 128K cassette drive (as in the Epson HX-20) and 64K of RAM.

A spreadsheet, database, word processor and communications program come included in the price and plug-in ROM cartridges can provide other packages. The 40 character by eight line screen is unusual in that up to eight windows can be defined.

If you are serious about word processing, the Wang PC (Honourably mentioned in the London computer marathon last year) and the Wang Professional Image Computer, it was also demonstrating all manner of ways to hook these machines up to something else.

More news from Hannover in next week's issue.



Gavilan: spring launch in Europe.

Spectral CP/M

By Piers Letcher

CP/M will soon be available to Spectrum users as part of ITL's latest disk drive and hybrid cable package (Issue 52).

The new hybrid will contain a disk interface, an output to monitors for 80 column displays and a Centronics printer interface, as well as the extra 16K RAM needed to put most CP/M software within range. The package is expected to retail at under £350, including a Byte Drive 500 and a disk containing CP/M on one side and a Spectrum DOS on the other. It should all be on display at the ZX Microfair at Alexandra Palace on April 28. Production is due to start in May.

A version of the hybrid is in the pipeline for the Commodore 64, at a similar price, and this should be available in June.

CP/M's main appeal is that there is so much applications software available. ITL plans to bring out some of this on disks to fit its Byte Drive 500 in the near future.



STEADY PLOTTER — The cost of attaching a plotter to an IBM, Apple or CP/M micro has reached a new low with the launch of the Sweet-P Personal Plotter. Now available from Reflex (0734-884611) at £574, it is a single colour plotter with a drawing speed of 6 ins a second, and is compatible with the graphic output from Lotus 1-2-3, VisiCalc, SuperCalc and other programs. To overcome the limitation of single colour plotting, the Sweet-P has a software addressable pause command to allow the user to change the colour of the pen. Reflex plans to launch a 14ins per second model in the middle of May, to sell for about £900.

Atmos sparks price rise

Will Atmos games be more expensive than their Oric versions? 'Pasta Blasta' from Arcadia Software? Cost £5.50 on the Oric-1, but the Atmos version will be 'in the region of £8'.

Arcadia says it is to increase the price of all its software because customers have been sceptical about the potential quality of its lower-priced games. This is an interesting view, especially in the light of price movements elsewhere in the software business.

Most games cost between £5.95 and £6.95, so Arcadia could be pricing itself out of the market, unless it's relying on the desperation of Oric owners because of the lack of Oric games.

Sinclair draws up list

By John Lettec

Hot on the heels of the appearance of the Microdrives in the shops, Sinclair is planning a list of Microdrive-compatible software.

Provided it gets off the ground, this will be included in the Microdrive packaging, and letters have gone out to all the major software houses as a preliminary to drawing up the list.

If the project goes ahead it could present interesting copyright questions. It is likely that the list would include tape software that can be converted to Microdrive, and the more robust of the software houses already state on their labels that they would regard such an enterprise as a breach of copyright.

Naturally, individual packages

won't be included in the list if the relevant software houses doesn't want it to be, and the criteria for inclusion can't be finalised until some measure of agreement is reached.

There may also be more space on your Microdrive cartridge than you think. If you format the same cartridge on a number of different Microdrives you may well find that you get a number of different formatted capacities. Although the cartridge capacity can vary between 80K-95K, the divergence for individual Microdrives is usually only around 3K.

This would suggest that differences in capacity have very little to do with the drive differences in capacity have very little to do with

the drive skipping faulty sectors and a lot more to do with variations in the Microdrives. So if anyone out there has a Microdrive that formats at 99K there would seem to be a market for souped-up cartridges. Sinclair says that this is due to variations in the motor speed, and that differences should be more in the region of 88K to 90K.

Sinclair has also completed development of a revised ROM for Interface 1. The company is reluctant to describe this as an enhanced version, saying rather that it is a slightly improved model, in the same way that the issue 3 is an improved Spectrum. Rumour has it, however, that the new Interface 1 ROM will include a *MOVE command for copying cartridges.

VIEW FROM AMERICA



Smokestack America lets off steam

By Chris Rowley

It's easy to second guess somebody 101 years after their death but the fact remains that Karl Marx never predicted the micro or the Japanese, which between them provide a new dynamic for US capitalism.

Look at it this way: who would have predicted that the fastest growing occupation in the US for the next 15 years would be Computer Service Technicians? Now Marx might well have foreseen that the number two occupation would be Legal Assistance—even in the 1880s the nascent industrial US was a lawyers' paradise—but Computer Service Technicians? Not even the sci-fi writers got that one right; subservience to mainframe monstrosities, yes, but having our kids become computer repair people, no.

However the US Bureau of Labour forecasts that five of the top ten growth occupations until the end of the century will be computer-related and that doesn't include good old electrical engineers.

As smokestack USA declines, Silicon America arises. These technological shifts are producing an anguished debate. Anyone thinking of holding a decent job in the '90s has to confront the issue—things are changing so fast the future is developing a split personality. Turn yourself into a highly paid CAD chip creator and you might find some pesky robot running 1-2-3 in Japanese taking your place in five years. Don't laugh, just think of all those unfortunates who might become computer repair people.

Because of the Japanese challenge, US companies have ruthlessly shed Stateside labour and flown to third world low-wage havens. In past years firms such as Atari and Tandon have shifted all their manufacturing operations to lands where people will happily assemble disk drives for \$1 an hour compared with \$6 in California. But a counter-current has developed, exemplified by Apple's Mac factory, which is 90 per cent automated and requires only 90 people per shift on a line that produces one Mac every 27 seconds.

The semiconductor industry is also building new plants in the US, having learned the Japanese lesson. Japanese semiconductor 'clean rooms' are the cleanest places on earth, with fewer than 100 dust particles per cubic foot. By comparison a hospital theatre has more than 10,000 and so-called fresh air one million particles of one micrometer or less. Since human beings (including Japanese human beings) shed dust, skin oils and hair the Japanese plants are almost totally automated. As a result their chips have at least six times fewer defects than US-made chips. With Reagan administration tax breaks to encourage them, US chip makers are abandoning cheap third world labour for no labour back home; in time they expect to make chips just as good as the Japanese ones.

This is only one example of a new trend—indeed the widespread use of micros in US business has produced vast improvements in work analysis and planning. Several pundits now predict a surge towards automation in many industries. US products may soon be just as good as their Japanese counterparts and even cheaper. Already General Motors is bringing production back from Mexico, to a Detroit factory loaded with robots instead of workers.

Micro-equipped business people are also aware of likely future pricing of micros as they descend Sinclair's Curve and wind up at \$30 giveaways. Ten years from now, if your 1Mb pocket micro ever breaks, you'll just throw it away; thus savvy parents, when confronted by children anxious to become computer repair people, will confound the poor old Bureau of Labour by counselling courses in poetry or colour graphics. They will understand the new rules, which make creativity the only advantage that human workers will have.

Marx, which is where we started, had plenty to say about workers, mechanisation, and the resultant stresses and strains. 'The labourer is worthy of his hire' is more or less what it all boils down to, but the labourer whose class consciousness consists of nothing more than an awareness of a few lines of re-entrant code and an arm with three degrees of freedom, isn't apt to be an effective class warrior. Those who lose not only their chains, but their jobs will have time to reflect on this.

Kaypro opens up with sale



Portable specialist Kaypro has set up shop in the UK with an opening sale that puts a 10Mb system well below £3,000.

The Kaypro 10, with a Winchester disk, now costs £2,640. The Kaypro 2, Kaypro's original machine, is down to £1,288. The company has also added dBase II to the bundle of software it includes in the prices of the 4 and 10, and it has enhanced the Kaypro 4.

But Andrew Kay, the company's founder, said that UK users shouldn't expect to see the IBM-compatible A4-sized Notebook Computer until much later in the year.

He revealed that Kaypro had yet to finalise an agreement with its

Japanese supplier, but hinted that the company had its own version under development in any case.

Kaypro UK will retain its earlier distributor, CK Computers, as its main distributor, and will look for extra outlets that are intended to include major high street shops.

Products like KayLink, to connect a Kaypro to any mainframe, and Kaynet, a local area network package, are not likely to come to the UK until next year.

Mr Kay himself is surprisingly reticent about where the portable business is going. But he also resists the temptation to gloat over the fate of Adam Osborne, who once upon a time wasn't slow to cast doubt on Kaypro's survival prospects.



SAAB DRIVER—Software that lets you BBC drive a Saab doesn't sound like a major contribution to road safety until you realise that in this case Saab is the name of a UK-designed controller system. The Supervisor Programmable Controller System, to give it its full title, costs £499 and is designed for use in educational establishments teaching basic control and automation techniques. Saab Industrial Systems is on 0438 814777.

IBM in time

IBM has put the pride of its text processing packages on the PC—but don't hold your breath waiting for it.

The company announced last week that with DisplayWrite 2 on the PC it could offer PC users the features of its well-established Displaywriter with links to other IBM office and data processing systems.

But deliveries won't begin until July, and there will be a further wait before a UK (as opposed to US) version is available. As for the connections to other systems, IBM has committed itself to making a statement before the end of the year

on the implementation of the architecture that will facilitate it. This statement will not, of course, make interconnection possible—you'll have another wait for that.

DisplayWrite 2 costs £275. It is based on the Textpack 4 software of the Displaywriter, requires 256K in the eventual English version, and is best used with twin 360K disks. It includes mathematical functions, a 100,000 word lexicon, and a 4,500 character reservoir for the user's own purposes.

It runs under PCDOS 2.1, the operating system announced for the Portable and Junior PCs.

99/4A bounces back

By David Guest

Far from lying down and dying, the discontinued Texas Instruments 99/4A is staging a remarkable comeback.

The manufacturer may have pulled out of the home micro business (Issue 35) but the enthusiasm of independent suppliers in the UK hasn't diminished and the number of users has grown by leaps and bounds.

"Literally thousands of people have bought the machine since Christmas," said Parco Electronics' Francis Parrish. "We've had to take on two extra staff and we're building a warehouse; our stock

level is about £250,000—need I say more?"

The exact number of users in the UK isn't known; it could be as many as 100,000. Supplying them is turning into a major operation, and new add-ons are appearing despite the apparent lack of future for the machine itself. US software modules are being imported and some UK firms are getting into the manufacturing business.

TI has put together an information package which lists the European suppliers of 99/4A-related equipment. This includes Parco (0404 44425), which has Atari-produced games modules in stock

featuring titles like Donkey Kong, Defender and others; Christine Computing (0923 672941) with its 32K expansions; Arcade Hardware (061-225 2248) with a plug-in thermal printer, an RS232 card, and the £80 MBX voice recognition system.

Tim Freeman of Carlynsoft (02514 28895) said: "There is more interest than ever. A lot of people have got the machine, and it's a very easy machine to get along with." Carlynsoft typifies the independent suppliers—it has just announced the availability of joysticks for the 99/4A, priced at £13 for a pair, with an extension lead coming in at £3.50.

Mr Freeman doesn't expect interest in the machine to wane—other suppliers joined him in forecasting that it would actually increase.

The breakthrough that will secure the 99/4A's future in the UK will come when the question of TI licences to produce ancillary equipment is sorted out.

"Quite a few people are gearing up for the off," said Mr Parrish. "But there are a lot of halfpenny and copper firms that aren't big enough, that don't have sufficient funds to get it off the ground."

It requires a major manufacturer to set the ball rolling, he said.

Rent-a-VTX scheme lures Sinclair users

Sinclair Spectrum owners are to be offered a cheaper way of hooking up their micro to the telephone system.

Prism Microproducts (01-253 2277) is launching a scheme where the user pays £11 a month and in return gets a VTX 5000 modem, Prestel membership, Micromet membership, installation of a British Telecom jack socket and free

software to allow user-to-user communications.

The subscription will drop to £20 a quarter in the second year and users will pay the subscription through their telephone bills.

With the VTX 5000 alone costing £99.95, the package should help Spectrum owners who want to spread the cost of joining the communications revolution.

The inclusion of the user-to-user software is also something of a breakthrough. So far, Prism has not provided the means to allow VTX 5000 owners to take advantage of the modem's ability to allow micro-to-micro communications.

Modem trio



Interlekt's Portman—auto-answer modem.

The Umpire strikes back

Conquer the galaxy on your Spectrum Empires, the first game from Imperial Software, offers this and more, but at a price.

For £19.95 you get four tapes for the four-player 'interactive' strategy game. Imperial hopes the high price won't daunt buyers and it sees four Spectrum users chipping in a fiver each for the game.

Each player takes the role of a race of beings with the aim of empire-building, by exploiting mineral resources on planets and by domination of the other races.

Alliances between players can be made and at the end of each move data is saved to tape and passed, or sent, to an umpire. The umpire's roles is to assess the moves, pass messages to participants about the

state of play, and generally mediate between players.

It's debatable whether games players will put up with the slow pace of the game and the need to pass tapes to and fro after each move. It's the sort of game that cries out for real-time interaction via Micromet or Interface 1 but Imperial doesn't think there are enough users of the systems to make such a venture worthwhile.

Versions of the game for other machines are being considered, but Imperial doesn't plan a Microdrive version on the grounds that it doubts the reliability of Sinclair's device.

Empires reflects the trend to more complex games, but its main failing is a lack of graphics.

Touchy H-P cuts price of new micro

No sooner has Hewlett Packard started to deliver its HP150 touch-screen micro than it has announced a 14 per cent price cut across the board.

The new prices (exclusive of VAT) are £2,595 for the dual floppy

disk machine and £4,795 for the 15MB hard disk version.

The HP decision responds to changes in the European personal computer market. With IBM recently announcing price cuts of up to 20 per cent on the PC, it was inevitable that other manufacturers would find it necessary to follow suit.

Hewlett Packard aims to sell 200,000 HP150s worldwide in 1984, a tough target in a market increasingly dominated by the Big Blue.

By Ralph Bancroft

More companies have announced modems this week, giving weight to PCN's prediction (Issue 56) that we are in for a modem war.

Along with the new releases, the Busbee from Bee Systems (0204 395440) has the seal of approval from the British Approvals Board for Telecommunications.

The £100 (plus VAT) modem operates at 1200/75 for use with Prestel and other Viewdata services and connects to the 1MHz bus on the BBC micro. The company also has approval to use the modem with the Commodore 64, Vic 20 and Commodore Pet micros.

However, it is unlikely to be marketed under the Bee Systems brand as the company intends to license the device to other distributors.

An interesting feature of the Busbee is that it allows you to dial up a telephone number by keying the number from the computer keyboard. Most modems require you to dial the number on a normal telephone until the high-pitched screech of the carrier tone indicates that the computer is on-line.

Bee Systems has designed the modem so that it can be used as a secure means of distributing software over the telephone network. The modem can be equipped with a unique serial number and software

dongle so that the downloaded software will run only if the modem is attached.

To complement the modem, the company is also bringing out a device called Viewer which generates a Prestel colour display on a VDU for micros which don't have the Prestel capability. It costs £150 (plus VAT).

On the multi-rate front, Interlekt (0734 589551) has announced the Portman modem which costs £190 (plus VAT). Like the Minor Miracles WS2000 and Pace modem (Issue 56), the Portman has the ability to operate at 300/300 baud full duplex, 1200/75 and 75/1200 full duplex and 1200/1200 half-duplex.

Switching between CCITT and Bell standards can be achieved by changing an internal link.

Unlike the other two modems, the Portman offers auto-answer as a standard feature.

The Portman has also completed the board's approval procedure, so it should be legal to use it in about six weeks' time.

For users looking for faster and more error-free communications, Tech-Nel (0295 65781) has launched a V26 modem, the DM-2426. It offers synchronous communications at either 1200 or 2400 baud and can run at either full duplex on four wires or half-duplex on two wires. It costs £350 (plus VAT).

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2. TENS AND UNITS SUBTRACTION Choose simple or difficult terms. Either of the two methods of subtraction taught in schools may be selected at the start of the program. Detailed help is given if errors are made. Correct answers add sections to a bridge. If no mistakes are made, the tank will drive across the completed bridge and fire its gun.

J. J. Warren 1983

Published by Calpac Computer Software, 108 Hermitage Woods Crescent, St Johns, Woking, Surrey GU21 1UF



3. PICTURE FLOTTER This program has been written so that children can create their own pictures on the television screen. It is so simple that even pre-reading children can use it, yet its sophistication makes it suitable for producing multicolour maps and diagrams.

4. NORTH AMERICAN INDIANS This program helps in developing reading and comprehension skills. You complete sentences using a word from the list on the screen. Correct responses are rewarded by the creation of an Indian scene which includes tips and totems.

You may replace the questions in this program with your own (create a bank of up to 250 questions with a 48K Spectrum). Any subject area may be chosen.

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PROGRAMS 1-4



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3. PICTURE FLOTTER
4. NORTH AMERICAN INDIANS

SPECTRUM 16K
FROM 6 YEARS 48K

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10. VERB PRACTICE You have to complete the sentences using the correct tense of the verb. The program concentrates on those irregular verbs that often cause difficulty. An underwater landscape is created as questions are correctly answered.

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11. THE STRUCTURE OF THE FLOWER This program explains how the parts of the flower are involved in the formation of seeds. This is a three part program which makes full use of high resolution colour graphics.

12. LONG DIVISION This creative program takes the learner through long division sums in easy stages. Correction sequences are automatically provided when they are needed. Sums with remainders can be chosen if required.

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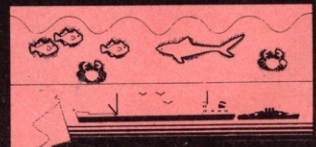


CALPAC LEARNING SERIES

ZX
VOL 3
FROM 9
YEARS

CALPAC LEARNING SERIES

PROGRAMS 9-12



9. NOUNS, VERBS, ADJECTIVES AND ADVERBS
10. VERB PRACTICE
11. THE STRUCTURE OF THE FLOWER
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Toad is set to spawn

A UK-built Apple-compatible system called the Toad (Issue 25) is making a second bid to get into the mainstream.

Phil Moore of Total Organised Analysed Data Systems first revealed his plans for the Toad last August. It had 64K, a U-Micro motherboard, a Franklin-style keyboard and Rodime disks. Though he expected no trouble from Apple, Mr Moore claimed shortly afterwards that the system had

attracted Apple's attention. Later in the year Apple took to the courts almost as often as Martina Navratilova and it was the clone makers who were on the receiving end. The Toad disappeared quietly into the mud.

Now it has re-surfaced as a Systematics-compatible machine, less provocative and possibly more descriptive than saying Apple-compatible. The Toad computer is as Mr Moore demonstrated last year,

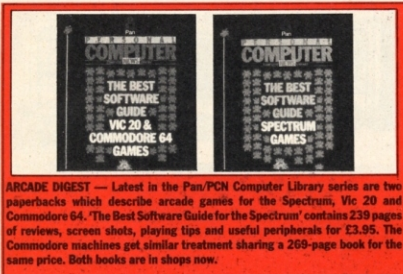
but it now runs integrated Systematics business software and the name is about to change.

Otherwise much of the emphasis is the same. Toad Systems aims to make life easy for users; Keep it Simple (KIS) is the message of its advertising and it will form the basis of the new name.

'We like to think we're selling the service and the software, and giving the computer away,' said managing director Barry Mace.

But Toad plans to replace its hardware with an acceptable Apple clone, and add IBM-compatibility by putting an IBM clone in its catalogue. 'At the moment we're bringing in boards and bits and pieces from different suppliers and assembling them in Borehamwood, but we don't see that as the way to continue,' said Mr Mace.

It expects to have a complete product range, a new identity, and a rosy future in about four weeks.



ARCADE DIGEST — Latest in the Pan/PCN Computer Library series are two paperback guides that describe arcade games for the Spectrum, Vic 20 and Commodore 64. 'The Best Software Guide for the Spectrum' contains 239 pages of reviews, screen shots, playing tips and useful peripherals for £3.95. The Commodore machines get similar treatment sharing a 209-page book for the same price. Both books are in shops now.

Coleco sheds Adam workers

The gloom from a winter of discontent shows no sign of lifting at Coleco, still struggling to make its Adam home computer a success.

The Adam (Pro-Tested, Issue 38) is a dream turned into a nightmare for the toy and home micro manufacturer. Last month it laid off workers in three separate groups, the last totalling 1,300 people. It said that it expects to recall some of the workers later in the year.

The layoffs anticipate a seasonal drop in demand, but its supply of

the Adam has never really got off the ground.

The Adam became the overnight sensation of the micro business when it made its debut last year at the Consumer Electronics Show (Issue 15).

Since then its development and production have been bedevilled by technical and legal problems, and a yawning credibility gap has opened among the kind of people who might have been expected to translate Coleco's hopes into realities — the retailers.



SOFTWARE

The new releases

Education

BBC: The first software products from the National Magazine Company, publisher of magazines *She* and *Good Housekeeping*, are early learning programs covering letter and number recognition, counting, telling the time, and others. The six programs are available for the BBC, but should be released for the Spectrum and the Commodore 64 next year.

Spectrum: Described as a program for healthy living, *Diabetes* is designed for all kinds of diabetics of all ages, and teaches newly diagnosed diabetics how to keep it under control and avoid serious complications. The program was written at Charing Cross Hospital with the support of the British Diabetic Association. It runs on the Spectrum.

Games

Spectrum: A rags to riches game from Incentive Software gives you the challenge of running or ruining your own company. The experience will only cost you £5.00. It may prove easier in the long run to escape from a maximum security prison, and Colditz Adventure from Phipps

Associates (01-393 0283) is intended to help you find out; film buffs will know most of the scenarios available. The price is £6.95. On a similar theme Lothlorien (0625 876642) has announced Special Operations in its Warmaster range — the tape costs £5.95. Meanwhile, in the dark night skies, 'Only aces survive' according to Digital Integration (0276 684959) about its Night Gunner, £6.95. Ad Astra, which coincidentally crops up in the motto of the RAF, is the title of Gargoyle Games' (021-236 2593) first production; this is a 3D combat game that starts off slow and tops you when you least expect it. Those with a Currah Microspeech unit can squeeze intelligent life out of Ocean Software's (061-980 3488) Pogo, but the game will run adequately without it. The price is £5.90. Salamander has increased its range of Spectrum games with two Jeff Minter conversions — Matrix and Metagalactic Llamas Battle at the Edge of Time, both at £6.95.

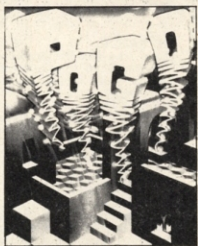
Dragon: Hewson (0273 600164) has adapted two of its Seiddab series and the third will be available for Dragon users later this month. The translated games are 3D Space Wars and 3D Seiddab Aattack, costing £7.95 each.

Orion (0203 29048) has launched Toppler, a fairground targets game, and Crazy Chaser, 'dogdems by any other name, for £6.95.

Oric: Leeds' Darkstar is selling Superior Software titles for the Oric-1 with the promise of Atmos versions 'in the near future'. At £7.95 each it has Lunar Mission, World Geography, and Krokatle Waltz. For £9.95 there are Assembler-48K and Toolkit-48K. Darkstar is on 0532 450879. A seven-level arcade game, Spooky Mansion, is available for both systems from Mercury Microwave (061-681 2875) at the price of £7.95.

Commodore: Beaver Software (Melton Mowbray) has released Brain Master for £7.95; a feature of this is the protective device called Top Secret that Beaver also produces — the company claims this makes the tape completely uncopyable.

Atari: Creative Sparks (0252 543333) has an address and is therefore presumably a company, but it is also described as a range of entertainment software from Thorn-EMI. This split identity doesn't extend to the games, which are all concerned with mayhem of one sort or another: Tank Commander, Orc Attack, Carnival Massacre, Sub-



Pogo — carrot and stick from Ocean.

marine Commander and Computer War. The software costs £8.95 or £9.95 on cartridge.

Acorn: BBC and Electron users can now enjoy Heathrow Air Traffic Control from Hewson (0273 600164) with the addition of Concordet to the earlier Spectrum version of the game. It costs £7.95.

Various: Virgin Games (01-221 7535) has launched six games for four machines. On the Spectrum it has Sorcery and Atlas Assignment (£5.95), on the Electron Jungle Jive (also the BBC) and Bugs, each £7.95, on the BBC Checkout, £7.95, and on the Commodore 64 Ambush, £7.95.

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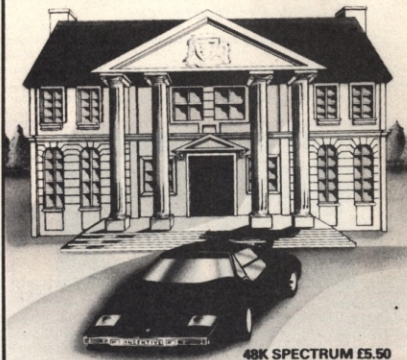
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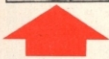
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Printer MPS 801	£220
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PCN CHARTS

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▼	2	1	Fighter Pilot	Digital Integration	SP	£7.95
▼	3	2	Chequered Flag	Psion	SP	£6.95
▼	4	3	Manic Miner	S/W Projects/Bug-Byte	SP, 64	£7.95
▲	5	22	Bugaboo (The Flea)	Quicksilva	SP, 64	£7.95
▲	6	7	Hunchback	Ocean	SP, 64, OR	£6.90
▲	7	5	Atic Atac	Ultimate	SP	£5.50
▲	8	11	Chinese Juggler	Ocean	64	£6.90
▼	9	6	3D Ant Attack	Quicksilva	SP	£6.95
▼	10	8	Flight	Psion	SP	£7.95
▼	11	15	Fred	Quicksilva	SP	£6.95
▲	12	17	Rev. of Mut.C's	Llamasoft	64	£5.95
▲	13	28	Night Gunner	Digital Integ	SP	£7.95
▲	14	26	Pinball Wizard	CP Soft	64	£5.95
▲	15	18	Blue Thunder	Richard Wilcox	SP	£5.95
▼	16	12	Lunar Jetman	Ultimate	SP	£5.50
▼	17	9	Wheeler	Microsphere	SP	£5.95
▼	18	24	Blogger	Alligata	64	£7.95
▼	19	19	Alchemist	Imagine	SP	£6.50
▼	20	4	Scuba Dive	Martech Durell	SP, 64, OR	£6.95
▼	21	—	Forbidden Forest	Cosmi	64	£8.95
▼	22	30	Twin Kingdom Valley	Bug-Byte	SP, 64	£9.50
▼	23	—	Space Pilot	Anirog	64	£7.95
▼	24	—	Super Pipeline	Taskset	64	£6.90
▼	25	10	Stonkers	Imagine	SP	£3.95
▼	26	—	Bear Bover	Artic	SP	£6.95
▼	27	—	Snooker	Visions	SP, 64, AC, OR	£5.95
▼	28	—	Pogo	Ocean	SP	£5.90
▼	29	25	Skull	Games Machine	SP	£6.95
▼	30	21	Deathchase	Micromega	SP	£6.95



MICROS

Top Ten up to £1,000

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▲	1	3	CBM 64	£200	CBM
▼	2	1	Spectrum	£99	SI
▲	3	4	BBC B	£399	AC
▼	4	2	Vic 20	£140	CBM
▲	5	9	ZX81	£40	SI
▲	6	10	Electron	£199	AC
▼	7	7	Oric 1/Atmos	£99/175	OR
▼	8	5	Dragon 32/64	£175	DD
▼	9	9	Apple IIe	£750	AP
▲	10	—	Atari 800XL	£250	AT

Top Ten over £1,000

TW	LW	MANUFACTURER	PRICE	DISTRIBUTOR	
▲	1	2	ACT Sirius	£2,525	ACT
▼	2	1	IBM PC	£2,390	IBM
▲	3	4	Apple III	£2,755	AP
▼	4	3	ACT Apricot	£1,760	ACT
▼	5	5	DEC Rainbow 100	£2,359	DEC
▲	6	7	Wang Professional	£3,076	WANG
▼	7	6	Olivetti M20	£2,180	OL
▲	8	—	Televideo TS 1603	£2,640	EN, CT, MID
▼	9	8	NCR Decision Mate V	£1,984	NCR
▼	10	9	Kaypro 10	£2,595	CKK

These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets during the fortnight up to April 5. The games chart is updated every other week.

Neither mail order nor deposit-only orders are included in these listings. The prices quoted are for the no-frills models and include VAT. Information for the top-selling micros is culled from retailers and dealers throughout the country and is updated every month.

PCN Charts are compiled exclusively for us by RAMC, who can be contacted on 01-892 6596.

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Spectrum loading needs right volume

Q I have just purchased a 16K Spectrum. Could you tell me where I can upgrade it to 48K, and roughly how much this would cost. Now for the main problem. I can't load JetPac on my Omega tape recorder, but when I try it on a Pye 9110 it works. Not many games will load on the 9110 because of a poor ear to ear connection, so why should JetPac?

*Chris Bailey,
Norton, Northants.*

A There are a number of suppliers of upgrades. Try the Buffer Micro Shop, on 01-769 2887, East London Robotics on 01-474 4430 or Fox Electronics on Basingstoke (0256) 20671. It should cost between £20 and £25.

As for your loading problem, with some newer games high volume can be as much of a problem as low volume. When the Spectrum first came out you could load most games by turning up the volume. However, tape duplication has improved to the extent that lower volumes can help.

Pasta Blasta outa now

Q I sent a cheque off to Arcadia Software for Pasta Blasta on the Oric-1 on January 21, but haven't received the goods yet. I have written five letters to the company without reply. Can you help?

*C Turner,
Cheddleton, Staffs.*

A Arcadia says there was a problem with the tape duplication on Pasta Blasta, and that deliveries were delayed until the first few weeks of March. We've passed on your details, so even if you haven't received the game yet it should, in fact, be on the way.

Quite often you'll find that games aren't actually available when the advertisement first appears, so in future check on availability first.

Rules of the game exchange

Q I want to start a software exchange club. Would I need permission from the manufacturers to use their tapes for exchange, and can I sell their tapes to club members at my own prices?

*P Ginger,
Camberley, Surrey.*

A You've probably noticed that software houses have been getting a little sensitive about enterprises of the sort you propose. Read the back of an Imagine cassette inlay to find out what the top of the market attitude to copying, loaning, hiring, part exchanging or anything at all is.

Mind you, the legal status of these dire imprecations is dubious to say the least. You'd be on much dodgier ground if your club were being used by people to pirate software. If this happened on a large scale you might find yourself on the receiving end of a good deal of sabre-rattling, or worse.

There's no need for you to sell tapes at the recommended retail price, but if you were going to do this you'd really have to go in for sales in some volume and get the tapes at wholesale prices.

Now this, if you were also offering an exchange or try and buy system, might well be difficult, because if software houses didn't like what you were doing they might well try to stop you getting the software.

Our advice to you here would be either stay very small, as just a group of friends, or go into business properly. If you choose the latter, a software exchange would probably be a lot more aggravation than it's worth.

Load Oric program before picture

Q I have a 48K Oric-1 and cannot work out how to write a short program to load a screen picture and then a program. So far I've got:

```
10 POKE #26A,43
20 PAPER @INK7:HIRES
30 CLOAD""":CLOAD"""
```

But this only loads the picture, not the main game.

*Ian Eden,
Cannock, Staffs.*

A As you probably know, the way to save a HIRES picture to tape is to save it as a block of memory. CSAVE" filename", A4090 E4919 will do this and to load it you replace CSAVE with CLOAD. The letters A and E indicate the start and end addresses of the HIRES screen.

It's not easy to load a picture then a program from Basic. You can't use CLOAD""":CLOAD"" " because the first CLOAD loads a program which overwrites the second. Nor can you use CLOAD""", A4090, E4919:CLOAD"" as the second CLOAD is ignored.

What you could do is CSAVE both the program and the picture. You'll need to know where the program begins in memory and you can get this number by DEEKING #9A. You would then use CSAVE"NAME", A(number), E4929. This will, of course, require rather a lot of tape and take a long time.

Alternatively, you could CALL the loading routines, described in 'Oric Owner' Issue 2 1983, (contact Tansoft on (02205) 2261/2/3/4). The article describes how to set up registers and call the relevant routines to CLOAD and CSAVE data, so you should be able to adapt them to suit your particular needs.

Modems for phone conversation

Q I am a hearing-impaired person thinking of buying a home computer, such as the Sinclair Spectrum, to 'phone up' my hearing-impaired friends.

However, I have been warned that if my modem operates at 300 baud and my friend has one that operates at 1200 baud, telephoning would be out of the question.

Is this really the case?

*Janet McCoy,
Birmingham.*

A The warning is totally correct. Many people have bought 1200/75 baud modems (as used to dial up Prestel) and found that they cannot talk direct to other users either because the other user has a 300/300 baud modem or because the modem they are using does not have the hardware or software to talk to other users at 1200/1200 baud.

The Spectrum may not be the

best choice of micro to buy in your case. The only modem that is available runs at 1200/75. 1200/1200 baud is possible but only by manually flicking a switch. Fine if you want to exchange programs or files, but useless for chatting.

A possible solution is to buy an Interface 1 adaptor which has an RS232 port and enables you to plug in another modem that either operates at 300/300 baud or one of the multi-rate modems that are just becoming available.

Since the adaptor costs £49.95 it could be an expensive solution. And since the Spectrum's rubber keys are a hindrance to typing at speed, you might like to take a look at other micros with a proper keyboard.

Providing the micro has an RS232 interface you should be able to plug in virtually any make of modem, one of which should be suitable for your needs.

For more information, see PCN's Communications Micropaedia (Issues 55, 56, 57).

Another Spectrum bites the dust

Q The 48K Spectrum (issue 3) I've had for over a month now has been working perfectly until quite recently, but now when I switch on, instead of getting the copyright message all I get is a black square on the screen.

Do you have any idea what can have gone wrong?

*S Ahmad,
London SW12.*

A We assume you mean that the whole of the centre of the screen is black. This is nature's way of telling you your Spectrum is bust, and you should send it back to Sinclair.

As it's still under guarantee you shouldn't have any trouble getting it replaced, just pack it off to the address shown on your guarantee card. As for what's gone wrong, one of the most common causes of this sort of breakdown is when the user has plugged in or pulled something out from the edge connector while the machine's powered up. This often zaps the Spectrum, and sometimes zaps the peripheral as well.

So if you have done this, try not to do it again.



MICROWAVES

More hints and tips to make programming a little easier.

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

ARCOS error on the NewBrain

I have recently found an unusual fault with the NewBrain's arithmetic ARCOS function. Quite by accident I happened to use a certain value in the function which the NewBrain failed to evaluate correctly. This led to hours of debugging which finally traced down the problem.

I put in two PRINT statements to check the values before going on with the program:
PRINT X
PRINT ACS (X)
of which the results were 0.8660254 and 0.0022552707 respectively.

If I then type PRINT ACS (0.8660254) I get the answer 0.52359878, which is correct. The answer to the problem lies in the fact that the full precision of the number had not been typed. If I type PRINT X(10F) I find the answer 0.8660254038. Two more tests revealed the following answers:

```
X          ACS (X)
0.8660254037 0.5235987759
0.8660254038 0.002255270665
0.8660254039 0.5235987754
```

Is this a rare case of a non-convergent algorithm? M A Ball, Kingston Park, Newcastle upon Tyne

Spectrum skips the SAVE prompt

Quite often a micro user (especially one not yet lucky enough to own a Microdrive) will want to SAVE either a program, data, or code automatically, jumping the START TAPE THEN PRESS ANY KEY prompt. This can be done simply by using the following POKE. On a Spectrum without Interface 1 connected, use POKE 23736,181 before the SAVE command. On a Spectrum with Interface 1 connected, use POKE 23794,181 before the SAVE command.

This works by changing the channel address for the

keyboard routine; in effect it is simply skipped over.

Chris Haine,
Rugby, Warwickshire

Typing on the Atari window

On the Atari 800, if you type GRAPHICS 2 or any other GRAPHICS mode as a direct command and then fill the text window up twice with any character and press Return, you will be able to type in the graphics window.

Lawrence Staveley,
Rhondda, Mid Glamorgan

to be a capital letter by ANDING the input with 223. Hence use:

```
10 XS=INKEYS:IF XS="" THEN 10
20 X=ASC(XS) AND 223
30 IF X=89 THEN PROCN5
40 IF X=78 THEN PROCNO
David Abbot,  
Horsham, Sussex  
(An alternative, on machines that have the INSTR function is:
10 XS=INKEY$: IF XS="" THEN
10
30 ON INSTR ("YYNN",XS)+1
GOTO 10,100,200,200
where 100 is the routine for yes,
and 200 is the routine for no—
BS.)
```

NewBrain CIRCLE gets around the ARC

The expansion interface for the NewBrain provides a set of extra commands. Most of these are documented in the manual. By trial and error, I have discovered an undocumented graphics command. The format of this is:

CIRCLE (X,Y,R)
where X,Y are the centre of the circle coordinates on the graphics screen and R is the radius.

David Scott,
Glenrothes, Fife, Scotland

BBC answers 'yes' or 'no'

I use this tip on my BBC, but it could work just as well on any machine, depending on the codes returned for each key.

When asking yes or no questions, it is usual to check for both upper and lower case ie
10 XS=INKEYS:IF XS="" THEN 10
20 IF (XS="Y" OR XS="y")
THEN PROCYES
30 IF (XS="N" OR XS="n")
THEN PROCNO etc.

The double comparison can be avoided by forcing the input

Stopping Oric AUTO files made easy

In a number of Routine Inquiries about stopping Oric AUTO files, you suggested this was difficult and requires some machine code to be written. On the contrary, it can be done as follows:

```
POKE #35,0          Set up filename ""
POKE #67,SPEED      Fast=0, Slow=1
CALL #E6CA           Set up VIA for tape
CALL #E4A8           Find and load the file from tape.
CALL #E804           Reset VIA.
```

All this should be entered as a single line direct command and works because the check for AUTO is within the CLOAD routine which we have avoided.

The above method will work perfectly with any Basic program but there is a slight hitch with machine code programs: a ?SYNTAX ERROR message is displayed and the keyboard remains disabled. However, pressing the reset button on the bottom of the Oric fixes this without harming the program; that is, unless it has been loaded into the area normally reserved for the character set as this is initialised on reset.

Below is a routine which sets up the ! command to do exactly the same job as above but using machine code to avoid the hitch. To use it, first of all POKE #405,SPEED (as above) then simply type ! and press return.

```
A=#405:D#="A9000535A900056720A8E44C24E9"
FOR I=1 TO LEN(D#):STEP 2:V=VAL("0"+MID(D#,I,2)):POKE
A,V:A=A+1:NEXT
DOKE #2F5,#405
```

C Hamilton, Belfast, N Ireland

Routine to POKE at Spectrum listings

The standard Spectrum does not come with a list option function (like LISTO on the BBC) so I have written a machine code version of this function. The routine will indent all FOR-NEXT loops. It can be placed anywhere in available RAM. Location 23728 may be POKED with the number of spaces wanted between the line number and the line code. For example POKE 23728,2 will leave 2 spaces. POKE 23728,32 leaves a whole line blank, in between the program lines—producing an easy-to-read listing.

As there is no printer option, it is possible to type OPEN#2,"P" to send everything to the printer and CLOSE#2 to stop the printer.

```
10 CLEAR 31999
20 FOR a=32000 TO 32076
30 READ d:POKE a,d
40 NEXT a
50 DATA 62,2,205,1,22,42,83,92,237,91,
75,92,235,167,237,82,200,216,
235,205,40,26,62,32,215,17,176,92,
26,254,0,40,8,245,62,32,215,241,
61,24,244,35,35,35,126,254,235,
32,4,235,52,52,235,126,254,243,
32,4,235,53,53,235,205,182,24,205,
55,25,126,254,13,32,226,35,24,188,
187
60 POKE 23728,2
70 RANDOMISE SEED 32000
90 REM try the routine on other
programs that use multiple FOR-NEXT
loops.
```

Jim Patterson, Huonville, Tasmania, Australia

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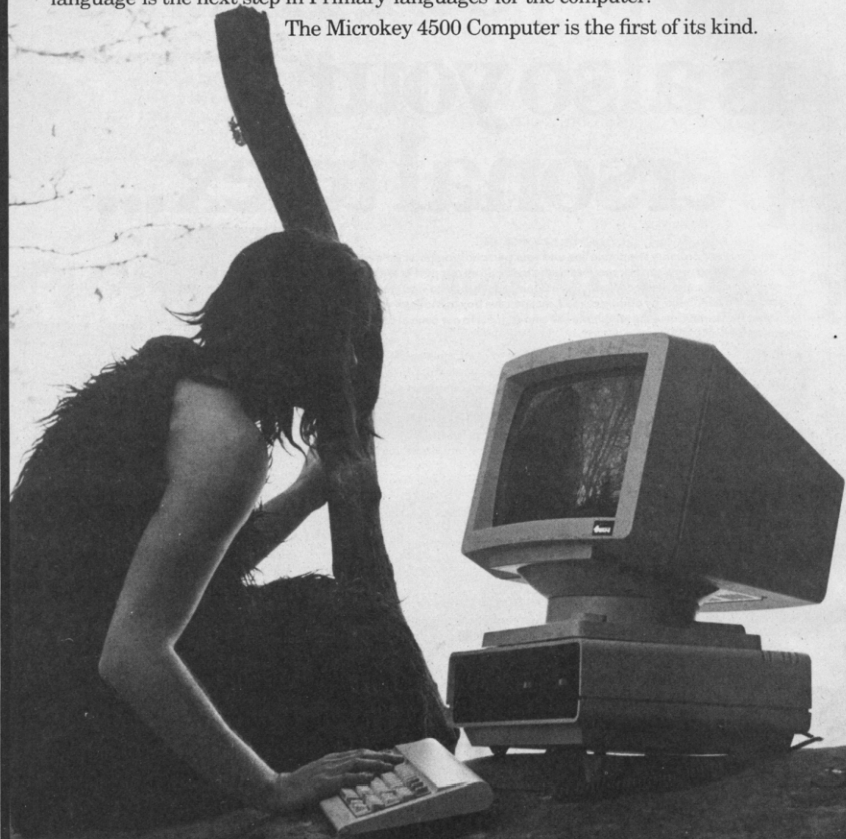
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A North London BBC user group is attracting attention to itself.

BBCs interface to mainframes

Networking of BBC micros to mainframe computers is the current main project for the North London BBC Micro User Group, which has built its own interface for the purpose.

As the 40-strong club meets in a pub, which has no facilities for using micros, members meet outside of club hours to work together on their various projects.

Recently a member working on a project at a West London hospital helped draw Acorn's attention to the fact that BBCs are being used to analyse and store data in an experiment which looks into ways of improving the diagnosis of asphyxia in newborn babies.

When this came to Acorn's attention they decided to launch an advertisement, due

for release in autumn, based on this project.

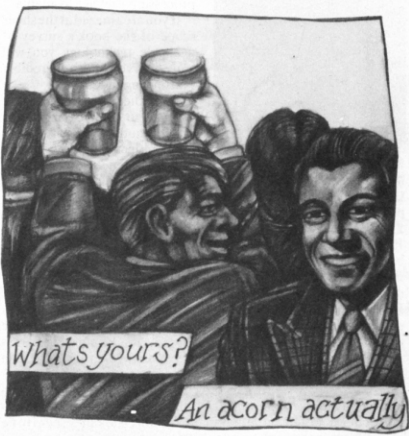
Former organiser, Dr Leo McLaughlin, a chemistry lecturer at London's Westfield College, says the group is looking to local radio to give it more publicity. The group's new leader, Ric Keyworth, has plans to make a video showing their activities, also to this end.

Several members are writing their own games, including Backgammon, and the group also had a stand at the Electron and BBC Micro Users Exhibition at Westminster on April 1.

Janice McKenzie

Name The North London BBC Micro Users Group **Venue** The Prince of Wales, 37 Fortune Green Road, London NW3
Meetings Each Tuesday at 7pm
Contact Ric Keyworth, 01-734 9235

If your association has something special on the agenda or if you've just started a new one, contact us at *Clubnet, Personal Computer News*, VNU, 62 Oxford Street, London W1A 2HG. Clubnet keeps you in touch with enthusiasts throughout the country. It is divided into clubs and user groups and lists of both will be published every four weeks.



The Sinclair QL Companion

by Boris Allan

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Covers the Sinclair SuperBASIC language and the principles of structured programming, the use of sound and graphics, and examines the QL's hardware facilities.

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Makes useful comparisons between the techniques of programming the QL and other popular micros.

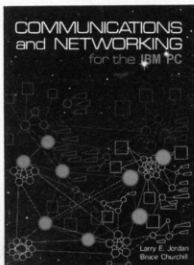
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Suffering from keyboard finger? Take a break with a book.



'Communications and Networking for the IBM PC' by Larry Jordan and Bruce Church, published by Prentice/Hall at £17.05 (paperback, 237 pages).

It says a lot for the advances in both communications hardware and applications, and the dominant position of the IBM PC in the US, that thick, substantial books can be written on the subject.

This is a competently written, meaty treatise on communications — the IBM PC tag is important, but much of the information would be equally valuable to anyone who wants to learn about communications and not necessarily do it on a PC.

The first few chapters concentrate on communications in a general sense — codes, interfaces, hardware. After this the book gets specific and covers communications software, local area networking and applications for the PC.

One interesting section is 'Answers to frequently asked questions' — whether this, coming at the end as it does, was a quick exercise in padding for the benefit of the publisher is unsure, but I like it anyway.

The appendices should ensure the book stays useful as reference material — such goodies as a table of the ASCII characters complete with hex values, and another for Baudot code should prove useful. Also included is a Basic communications program which will enable the PC user to transfer data from an IBM PC keyboard to a communications link and send received data to the screen, printer and disk drive. **IS**

'Choosing a word processor' by Francis Samish, published by Granada at £6.95 (paperback, 182 pages)

This book has all the signs of

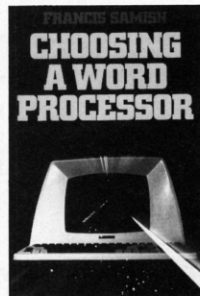
being poorly researched and two years in the writing. The author seems to think that the only micros around are made by Apple, Commodore and Tandy or are CP/M machines for which Wordstar is the only word processing package available.

If you are amazed at the sheer scope of the book's survey of available technology you will truly marvel at its incredibly patronising tone.

From the start of chapter one through to the glossary at the end, the author labours through the subject stopping every second sentence to put a word in quotes and following it up with a definition that confuses rather than clarifies what he is talking about.

Whether you will be better informed after reading the book is a moot point. In my experience someone who is at the stage of thinking of buying a word processor will have already read numerous newspaper and magazine articles on the subject.

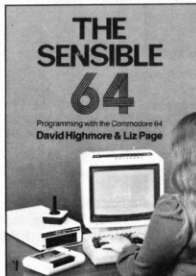
What the prospective purchaser now needs is hard facts and in this book they seem to be thin on the ground. And what there is, is hopelessly out of date. **RB**



'The Sensible 64' by David Highmore and Liz Page, published by Microbooks, distributed by John Wiley at £5.95 (paperback, 117).

Yes, yet another book on programming the Commodore 64. But, there is a difference, and a welcome one. *The Sensible 64* concentrates on practical matters with just enough theory to make things comprehensible.

Also welcome is the omission of the introduction to Commodore Basic which most au-



thors seem to regard as compulsory. There's no messing about here — by page 11 we're into user defined characters.

Production of the book leaves a little to be desired; the cover is not the most attractive and the bulk of the text seems to be daisywheel output. But do not be put off by appearances. The number and quality of example programs (all straight printouts) put this title ahead of most of the competition.

In keeping with its practical approach, most of the programs are presented as routines which can be incorporated into your own programs. Where speed is essential, the Basic listing is supplemented by a machine code version. Topics covered include high-resolution and sprite graphics, sound, and brief sections on disk drives and printers. **PW**

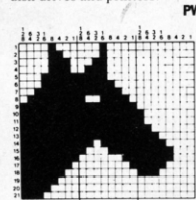


Illustration: drawing a sprite

'Fortran for Human Beings' by LWB Browne, published by Interface Publications at £3.95 (paperback, 92 pages).

There aren't too many new books these days about the Fortran programming language (perhaps because there aren't many people programming in Fortran), so Mr Browne's book won't suffer due to too much competition.

But then Mr Browne's book

and its subject matter aren't all that new either. The inside leaf reveals this book was first published in Australia in 1982 and has only just reached these shores in the form of a British version published by Interface.

Mr Browne set himself a difficult task in attempting to write a book that could seriously deserve the title 'Fortran for Human Beings' as the language in question is distinctly inhuman and unfriendly. He has responded to this challenge with a book that is short on detailed explanations of Fortran (and short in general — it's only 92 pages long), and relies instead on example program listings.

Mr Browne explains his rationale thus: 'Most Fortran texts are 'wordy'. Their intention is to fully explain all the features of Fortran and many of them do this very well. However, I believe the beginner needs a text which establishes the important features quickly, enables extensive program writing and also concentrates on programming style. This book assumes no previous knowledge of program writing.'

Though reasonably readable, the text seems to have been set on a daisywheel printer. The program examples themselves are of the iteration calculation, loan-interest calculation, spherical volume determination type (no-one ever said Fortran was going to be fun), but given the limited nature of the language this is not surprising.

If you are in the position of having to learn Fortran, then this slim volume might be a reasonable place to start — though you would need a comprehensive reference guide as a companion to it. **GW**

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Forth feature

Ted Ball looks at the prospects for a new Forth system.

Nearly a year ago, PCN readers were asked to contribute suggestions for the ideal micro. The 1,700 responses resulted in the Microkey.

In theory a computer is a general-purpose machine that can, with suitable programming and connections to the outside world, be adapted to perform any task we require. In practice each model comes equipped with a range of programs and interfaces that give it an identity and point to specific areas of application.

The Microkey 4500 does not fit into any of the usual categories. The hardware and price suggest a business system, but the machine lacks a standard operating system that would allow it to run widely available business applications programs. It resembles a home computer in having a programming language and its own operating system in ROM, but the programming language is Forth instead of the usual Basic.

The clue to the Microkey is, of course, the Forth language. Forth was developed originally for programming applications involving the control of scientific and industrial equipment, and the Microkey is ideally suited in its hardware and software for such applications, and also for use in technical education.

First impressions

The system is intended for experienced computer users, and although the manual includes sections on setting up the system and getting started, a novice is likely to have difficulty with this.

The system consists of the computer cabinet (which may include up to two disk drives), a keyboard and a monitor, which have to be plugged together. Connecting up the system is quite straightforward if you have a little technical knowledge, otherwise the terse technical labelling on the diagram of the rear panel connections could be confusing.

Once you have the system set up and switched on you have to boot the system disk following step by step instructions in the manual. The machine is then ready for you to start programming.

Documentation

The documentation consists of a reference manual and an introductory textbook on Forth.

The textbook is *The Complete Forth* by Alan Winfield, published by Sigma Technical Press. Although not written for the machine, it deals with the same standard Forth 79 language that is implemented on the Microkey. The book covers all the features of Forth systematically, with examples and exercises to try out. It is a first-class introduction to programming in Forth, and has been widely recommended

both for self-study and class use.

The reference manual gives technical details of the hardware and software and includes everything you need to make full use of the Microkey 4500 system. It covers the program editors, the Forth vocabulary (with extensions to Forth 79 listed separately), the 6502 assembler in Forth, the hardware specification (with details of all the interface connectors and pinouts but no circuit diagrams), the system monitor commands and the use of operating system routines.

The manual is purely a reference document and you need considerable technical knowledge to understand it fully.

Keyboard

The keyboard is an IBM type, and is the only thing about the Microkey that I really dislike. There has been so much criticism of the IBM keyboard that I don't need to say much here, but my main objections are the non-standard layout and the too springy feel of the keys.

Display

The Microkey 4500 has two high-resolution graphics display modes. In colour it gives 640 by 200 pixels with eight colours available (which can be extended to 16 colours by fitting an additional colour card), and in monochrome, 1280 by 200 pixels. There are no separate text and graphics modes; text and graphics can always be mixed on the screen.

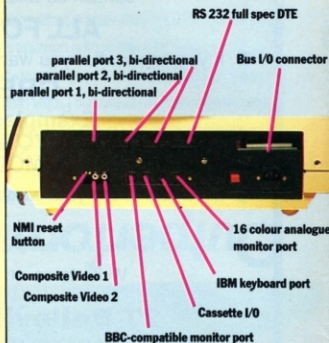
The resolution available is more than can be handled by a normal TV, so no UHF output is provided. Microkey Ltd recommend the Cotron Sword 16 colour analog monitor, but the Microkey 4500 also has video outputs for an RGB monitor and two monochrome monitors.

Hardware

The Microkey 4500 is based on a 6502 microprocessor running at 1.843 MHz, with 128K RAM and 32K ROM. It has a large number of interfaces, two parallel input/output ports, 7-line bi-directional RS232, and connectors for four disk drives (which may be any mixture of Sony 3 $\frac{1}{2}$ in, Epson 3 $\frac{1}{2}$ in, and standard 5 $\frac{1}{4}$ in), and a system bus compatible with the Apple II bus.

The machine has been designed to accept more modern processors than the 6502 in order to ensure its long term usefulness. The additional processors allowed include the 6809, (although no firmware is available for this yet) and the Western Digital 16-bit microprocessors W655C816 and W655C802. These Western Digital processors can operate as an 8-bit 6502 (so no new firmware is required) and also as full 16-bit processors with an enhanced instruction set. The Microkey's

This is a prototype version. The production model will include another IBM keyboard socket and a light pen socket.



RAM can be expanded to 512K if the W655C816 is fitted.

Software

The major part of the software is the Forth programming language, which is held partly in ROM and partly on disk. It is standard Forth 79 with a few extensions. The extensions consist of some system dependent words, for interfacing with the system monitor and handling the graphics, and some Fig Forth words that were omitted from the Forth standard.

Other software includes a system monitor in ROM which allows various input and output operations independently of Forth, an operating system ROM with the input and output routines documented so they can be called from user programs, and a 6502 assembler in Forth.

The only software available for the Microkey so far is what is included with the machine. However, there are many programming utilities in Forth available as source listings or on disk for other systems, and it is likely that much of this software will become available for the Microkey once the machine is in production.





In use

One of the advantages of a standard programming language is you don't have to relearn it or rewrite your programs every time you move to a new machine. I was able to use the Microkey quite easily after a few minutes' study of the section of the manual that describes the non-standard and machine dependent features of Microkey Forth.

The Microkey includes the usual line-oriented editor that comes with Forth, but this is difficult and tedious to use, requiring separate commands to select a line of program, position in the line and for insertion and deletion of text. However, there is also a screen editor which is much easier to use, allowing you to move the cursor to the place you want to edit and then insert or delete directly.

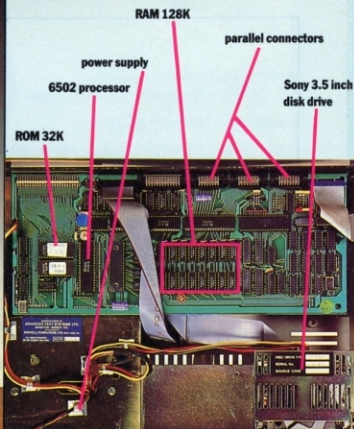
Although the Microkey system has a cassette interface to allow it to be used without disk drives it is very difficult to use with cassette only. The system monitor



allows you to save and load blocks of memory on cassette and it is possible (though not documented) to save and load programs in this way. However, without a disk drive it is not possible to edit programs without retyping everything.

The review machine included one Sony 3 1/2 inch drive, which made it possible to use the machine in the way it was intended. The main problem with only one disk drive is the difficulty of making a backup copy of a disk. It can be done, but involves frequent changing of disks. The disk copy utility in the Microkey only works when you have two disk drives.

Forth is used a lot in control applications because it is almost as fast as machine code



but much easier to write than assembly language. The speed of the Microkey is demonstrated by the software that allows two users with separate keyboards and monitors to operate the machine at the same time.

Support

Microkey Ltd intends to provide full support for the machine including the new processors mentioned earlier, extra hardware including Centronics and modem interfaces and additional software. The company will also be issuing its own 'Seal of Approval' for hardware and software provided by outside suppliers.

Verdict

The Microkey 4500 is aimed at scientific and industrial control applications and at education in these fields. The built-in Forth and the many interfaces make it well suited for these uses, and with the total cost being comparable to that of any similar hardware. The robust construction and forward-looking design make the machine good value for money.

Although the Microkey 4500 is not meant for the ordinary home user, I would expect many Forth enthusiasts to buy a Microkey system for their personal use. **PCN**

SPECIFICATIONS

Price Microkey 4500: £748. Cotron Sword 16-Colour Monitor: £402, Sony 3 1/2 inch disk drives: £241 each.

Processor 6502 (which may be upgraded to 6809, W65SC816 or W65SC802).

RAM 128K.

ROM 32K.

Text screen 80 by 25 or 160 by 25.

Graphics screen 640 by 200 in 8 colours or 1280 by 200 monochrome. Analog, RGB, and 2 composite video outputs.

Keyboard IBM types, 87 keys, 10 function keys and numeric keypad.

Storage Up to 4 disk drives, single or double density, which may be any combination of Sony 3 1/2 inch, Epson 3 1/2 inch, and 5 1/4 inch.

Interfaces RS232, 2 parallel user ports, 2 IBM-type keyboard interfaces, Apple compatible cassette interface, Apple compatible system bus.

Language Forth 79 with extensions.

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The Market Leaders

This is the first of a series on Assembler programming. Keith Hook introduces the initial concepts.

From binary to hex

Have you heard the one about 'how difficult it is to program a computer using machine language?' Many myths have grown up around this subject, but with a little help and a few easy to learn rules, most people are capable of programming in machine code. Things may seem complicated at first, but don't be put off, because the fog will soon clear, and within a short time you will be writing your own routines.

This series of articles will explain the rudiments of programming in machine code and should help overcome some of the more common obstacles encountered by the novice.

There's no substitute for writing your programs in machine code. Programs will run up to 250 per cent faster, and many techniques not appropriate in Basic will be available to you. And arcade action in the real sense is only obtainable using this method.

One of the most frequent areas of confusion concerns the difference between machine code and assembly language, so we'll get this out of the way first.

When you type a program into the computer using Basic, the computer contains a program held in ROM called an interpreter. This does exactly that — it interprets your Basic statements into machine code so the computer carries out your instructions. No matter which language you use, Pascal, Basic, Fortran etc, the only language the computer executes is machine code.

Assembly language is written using a program called an assembler. This is loaded into the computer before you begin programming. The assembler allows you to use instructions called 'mnemonics' which are normally standard, logical names assigned to the various machine code instructions. For example, the Load group of instructions uses the mnemonic 'LD'. The assembler then translates (assembles) these mnemonics into machine code instructions which the computer can understand.

```

Assembly Language:   LD A,20H
(source program)    LD(HL),A

After Assembly      3E 20 LD A,20H
(object program)    77    LD(HL),A
                    ↑
                    Machine Code
    
```

Each machine code instruction is in fact a set of binary bits arranged in a certain order which represents a state of 'on' (1) or 'off' (0). The computer recognises this to produce a desired result. The same code in binary would look like this:

```

00111110  00100000  LD A,20H
01110111  01101111  LD(HL),A
    
```

It should be apparent from the above examples that it is easier to recognise errors in hexadecimal than it is with the equivalent binary code.

The hexadecimal numbers in the assembly example are machine code instructions which have been translated from your mnemonics. Two hex digits represent 1 byte in the instruction, and instructions can be one, two, three or four bytes long. Obviously, the more bytes an instruction has the longer it takes the computer to execute — something to bear in mind when considering programming techniques.

In machine language programming such terms as 'One's Complement' and 'Two's Complement' soon appear, and one of the first stumbling blocks the novice comes across is how an 8-bit binary number can sometimes represent 255 decimal and sometimes -127 decimal. To get over these problems requires an elementary knowledge of binary and hexadecimal arithmetic. It's worth spending a bit of time on this subject as it will help overcome the problems encountered in your programming later on.

When we count in decimal, we use the digits 0 up to 9. To carry on counting after 9 we must go back to 0 and carry one into the 'Tens' column and so on. When we write 126 we can also mean $1 \times 100 + 2 \times 10 + 6 \times 1$, or $1 \times 10^2 + 2 \times 10^1 + 6 \times 10^0$. Remember: any number raised to the power of (0=1). From this it can be seen that 126 actually represents:

$$\begin{matrix} 10^2 & 10^1 & 10^0 \\ 1 & 2 & 6 \end{matrix}$$

The Binary system uses only 0 and 1. When you count in binary the same rules apply as in decimal, but after counting to 1 we go back to 0 and carry 1 into the next column left. The Binary number 0111 can be written as:

$$2^2 + 2^1 + 2^0 = 7 \text{ or } 2 \times 2 + 2 + 1 = 7$$

In binary each position represents a power of two, not ten.

Given that one byte represents eight digits (bits), and by examining the following diagram of one byte, you can see how easy it is to calculate the equivalent decimal number using positional notation ($2^7, 2^6, 2^5$ etc):

$$\begin{matrix} 2^7 & 2^6 & 2^5 & 2^4 & 2^3 & 2^2 & 2^1 & 2^0 \\ 1 & 1 & 0 & 0 & 0 & 1 & 1 & 1 \\ \text{Bit no: } & 7 & 6 & 5 & 4 & 3 & 2 & 1 & 0 \end{matrix}$$

This is: $2^7 + 2^6 + 2^2 + 2^1 + 2^0 = 128 + 64 + 4 + 2 + 1 = 199$. (2x2 seven times plus 2x2 six times and so on).

It should also be obvious that as you move to the next position left the previous decimal value doubles:

$$\begin{matrix} 128 & 64 & 32 & 16 & 8 & 4 & 2 & 1 \\ \text{Bit no: } & 7 & 6 & 5 & 4 & 3 & 2 & 1 & 0 \end{matrix}$$

Binary addition is quite a simple matter. There are only two digits,

$$\begin{array}{r} 0+0=0; 0+1=1; 1+1=10 \\ \text{so that: } 15 = 1111 \\ \quad \quad 6 = 0110 \\ \hline 21 = 10101 \end{array}$$

Hence multiplication in binary creates no serious problem. Whatever number base you use, multiplication really consists of adding a number to itself a set number of times, eg $6 \times 3 = 6 + 6 + 6 = 18$. If we examine a binary multiplication, a couple of interesting facts emerge.

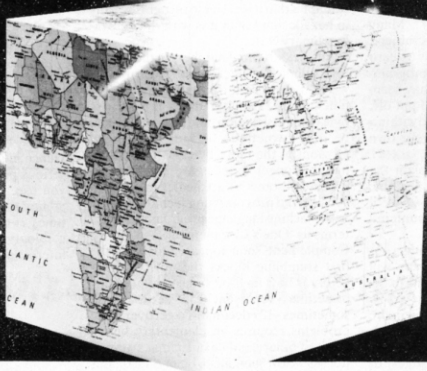
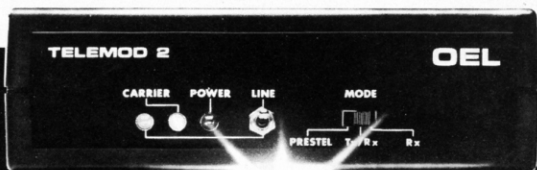
Multiplicand	1010=10
Multiplier	0110= 6
Partial answer.....	0000
	1010
	1010
	0000
	011100=60

- Whenever a 1 appears in the multiplier, the multiplicand is copied into the partial answer column. If a 0 appears in the multiplier, the multiplicand is not copied.
- On each step, the partial answer is shifted one place left, even if the multiplier contains a 0, giving an easy way of multiplying in steps of 2: $00000010=2; 2 \times 2=4$ shift binary 2 left once = $00000100=4$.

Binary division is also easy because you can see at a glance if one number will divide into another. Division can also be accomplished by successive subtraction until a negative remainder is reached. As division is the inverse of multiplication, an easy way of dividing in multiples of 2 is by shifting one place to the right, eg $8/4=2$, $8=00001000$ $00000100=4$ $00000010=2$. You can see that shifting right twice is the same as dividing by four because $4=2^2$. It follows that since $8=2^3$ shift right three times to divide by eight. Although you may not realise the significance of these observations now, rest assured they play an important part in future programming.

Binary subtraction by normal decimal means is a long-winded affair, but we can deal with this problem in another way. However, we must first understand the way computers deal with numbers.

As there are only eight bits to a byte and $00000000=0$, while $11111111=255$ in normal binary representation, there is no room for negative or signed numbers, eg -3, -4, +2. To get round this, the computer uses the seventh bit as the sign bit. If the seventh bit is 0 the number is positive. If the last bit (seventh) is 1 the number is negative. This is where the



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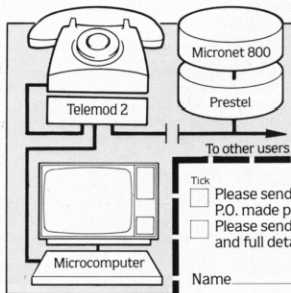
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423 machine language programmers must know which they are dealing with, eg positive integers 0 — 255 or signed numbers. From the example above we could mistakenly assume that if the positive value of a number is 16 decimal then changing the seventh bit to a 1 would make it -16; this would be wrong. When the computer deals with negative numbers, it uses the two's complement of the positive number.

There is nothing mysterious about two's complement, and it's easy to calculate. Just obtain the one's complement and then add 1. To obtain the one's complement you change all the 0s in the original positive number to 1s and all the 1s to 0s.

$$\begin{array}{r} +16 = 00010000 \\ \text{One's complement} = 11101111 \\ \text{add } 1 \end{array}$$

$$\begin{array}{r} -16 \text{ Two's complement} = 11110000 \\ \text{(which is in fact 240)} \end{array}$$

This may seem strange, but using the two's complement simplifies subtraction and addition with signed numbers. Using our first example of just changing the seventh bit to 1 to obtain the negative number would not give the correct results in all cases. Don't be too worried about the complements of numbers because the Z80 CPU has the instruction NEG, which automatically changes the positive integer to its equivalent two's complement negative number.

One final point on signed numbers. The maximum range of numbers obtainable using the seventh bit as the sign is +0 to +127 to -128. This is because, in two's complement, -0 does not exist — instead -128 takes its place. If you wonder why you should bother with this subject, when you start single-stepping through your programs to find the elusive bug you must know whether you are dealing with signed or unsigned numbers, and how they are represented.

Once you have mastered binary, hexadecimal is easy. In hexadecimal the digits start as in decimal, 0 up to 9, and as we are now working to base 16 the numbers 10 up to 15 are replaced by letters A, B, C, D, E, F. The decimal number 13 now becomes ODH, where H tells you it is an hexadecimal number. 255 becomes FFH.

$$\begin{aligned} 16^5 \ 16^4 \ 16^3 \ 16^2 \ 16^1 \ 16^0 \\ FF = (15 \times 16 \times 1) + \\ (15 \times 1) = 255 \\ FFF = (15 \times 16 \times 16) + \\ (15 \times 16 \times 1) + (15 \times 1) \\ = 4095 \end{aligned}$$

Two hexadecimal digits make up one byte, and one hexadecimal digit makes up four bits, which we call a nybble. Bearing this in mind, you can easily translate from binary to hex or the reverse by treating every four bits as a separate binary number:

$$\begin{aligned} 255 &= 1111 \ 1111 \\ 1111 &= 15 : 15 = F \text{ Hex.} \end{aligned}$$

$$\begin{aligned} 1111 &= 15 : 15 = F \text{ Hex.} \\ 255 &= FF \text{ Hex.} \end{aligned}$$

$$\begin{aligned} 224 &= 1110 \ 0000 \\ 1110 &= 14 : 14 = E \text{ Hex.} \\ 0000 &= 0 : 0 = 0 \text{ Hex.} \\ 224 &= EO \text{ Hex.} \end{aligned}$$

All this may seem a little strange at first, but you soon get the hang of it, and once mastered you'll find working in binary or hexadecimal is significantly easier than working in decimal. You will also have overcome the major obstacle in machine language programming.

Decimal	Binary	Hexadecimal
00	00000000	00
01	00000001	01
02	00000010	02
03	00000011	03
04	00000100	04
05	00000101	05
06	00000110	06
07	00000111	07
08	00001000	08
09	00001001	09
10	00001010	0A
11	00001011	0B
12	00001100	0C
13	00001101	0D
14	00001110	0E
15	00001111	0F
16	00100000	10

The next part of this series will appear in two weeks' time in PCN Issue 59.

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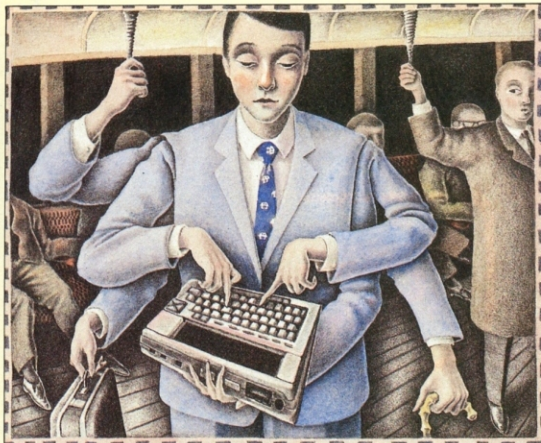
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A portable in the hand's worth any number in the office — at least, that's how it seems.



On the move

True portability in micros could mean spectacular changes in the way we work. It should make it possible to carry a fair sized chunk of our work around with us, if not the main.

The technology is just about here, though the price may have to ease a little before its use becomes really widespread.

The problems are two-fold. First, there'll always be another one along in a minute, and second, until the price of CMOS chips comes down we're not going to see portables achieving anything like the level of use they deserve.

But even now it's possible to see the way things are liable to go. You carry your Tandy, NEC, Olivetti, Epson or whatever around with you so you can work on trains, at home or in the bath (the HX20's apparent failure to replace the rubber duck is inexplicable). Then, when you get into the office your portable has a natter with the Incredibly Big Machine on your desk, and you carry on working as normal.

Strange that the information technology revolution seems to be encouraging us to work more instead of less.

So what PCN has done is to get a group of notorious portable users, plus one sceptical aficionado of the reporter's notebook, to survey lap held portables in use. We've arranged the necessary technology for them to talk to other micros, so let's take a look at the future, and find out if it works.

If you don't mind being stared at, it's an attractive idea. One book-sized micro allows you to write on the move, take notes whenever you have an idea, and store your diary dates and telephone numbers conveniently. I'm not too impressed by this 'book-sized' nonsense — the grotesquely oversized manual is one of the few books you'll ever see this size.

Still, if it doesn't change your life, it'll change your luggage. Picture, if you will, the typical journalist presented with a Tandy Model 100. The nerve centre of his life — well OK, my life — is an A4 shoulder bag containing notebook, walkman, flat hat, gloves, six tapes of software to be reviewed by last week, 15 unopened bank statements and three threatening letters from the Inland Revenue.

You could just slip it in there John — I ran into trouble almost straight away — working on the train is alright if it's a proper train, but the underground doesn't allow you enough elbow room.

But there appear to be other advantages. There's not exactly a shortage of tools of the trade back at the typical journalist's ancestral home — two typewriters, a Tasword 2 plus proper keyboard Spectrum system, and a small offset litho printer (which is another story).

Despite this, or perhaps because of this, a typical journalist would much rather spend his time having another cup of coffee or watching the telly than actually working. So it comes as something of a shock for him when he finds himself writing through

breakfast one Saturday morning. This continued through the weekend, with me just picking up the Tandy whenever an idea occurred to me.

A major problem is that it's so painless that you're liable to run short of memory pretty fast.

The only way round this I can see is to confine yourself to important phone number only, which is hardly a perfect solution. The problems here were exacerbated by the fact that the machine really needs a decent formatting program, and one this was knocked up there was even less memory available.

As a consequence of this I found myself saving to tape lot more frequently than I'd have liked. Saving was OK, but I had real problems loading back on the test machine, which limited its effectiveness.

Still, the advantages outweigh the disadvantages, and I've now just about nerved myself up to popping down to the Tandy store (or should it be NEC?) to deposit an arm and a leg. To make it worthwhile I reckon the machine would have to be at least 32K, and ultimately it would need to have a disk system or to be able to communicate with a machine with a disk system. Sure, it'll cost a fortune, but can I afford to do without it?

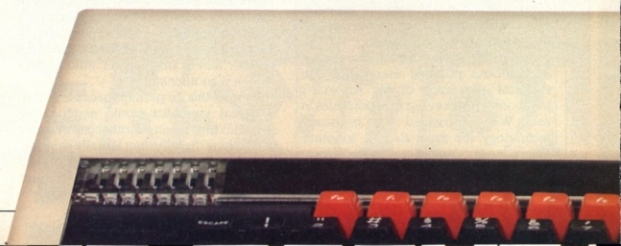
John Lettice

Anyone who is a compulsive hacker will know the frustration of having to wait until you can get to your machine before trying out that 'great new idea'. Portable micros provide the answer, but create a new problem. Using the NEC I can get quite a bit more work done or rather I could, if it wasn't for the driven urge to have a quick hack now and then.

Initially I found the memory layout quite absorbing — especially the menu system. The file names are stored in memory starting at location 63567. Each file begins with a byte that identifies its type: 176 for a machine code system file, 192 for a document file and 128 for a Basic file. Following this identifier are two bytes that specify the start location of the file in low — high byte format. After these come the eight character file name, including a two letter file type specification (DO, BA, etc).

Having found out the above details I then started messing around with them, just to see what would happen. One of the things that is virtually guaranteed to happen at this stage is for the machine to crash. This is usually because you think that something will work all right but the machine says that it won't. This occurred a few times, but with true perseverance I discovered that I could pull all sorts of stunts with the menu. Such things as hidden files and turning Basic files into editable document files are now no trouble.

Other bits and pieces are found in the oddest places. While sitting on the tube with my NEC on my lap, on the way to work, I decided to have a root through the memory, just to see what was there. There



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The BBC Microcomputer System.
Designed, produced and distributed by Acorn Computers Limited.

PORTABLES

are what appear to be a number of undocumented commands and devices, most of which seem to be for future expansion.

As far as commands go there is a **FORMAT**, presumably for disks, a **COLOUR** command, perhaps to go with the **CRT** mentioned above, plus a few more—but I hate to spoil the fun for other hackers, so I won't mention them. It is possible, of course, that these commands are leftovers from an earlier version of the Basic, though I'd like to think that they really are for future expansion.

I spend a lot of my time programming and generally hacking around with my portable, but I use it for serious things as well. I use it to take notes, send out letters, remind me of momentous events, doodle, play tunes, waste time, write programs, turns out copy, and so on. All in all I don't know what I'd do without it—it has become a compulsive toy.

Nenn Garroch

I find the NEC really comes into its own when you're writing short documents such as letters, new stories and short articles, which you don't always have time to do at work. It's also a boon when articles have to be rewritten.

Since discovering word processing I refuse to use a typewriter, and with the NEC I can write when travelling to work on the train or at home. It's then a simple task to move paragraphs around, rewrite sections or whatever is necessary. It's also useful for taking notes at press conferences, making memos and so on.

In the office the NEC's handy when all the 'proper' micros are in use. Besides, it's quicker to use for short bits of text—the time taken to open a file, edit, then save and print is vastly reduced when it's all in RAM.

If a document is too large for memory (horrors if this happens on a Saturday), it's a simply matter to upload what I've written to a disk file on the Torch in the office. I can even load directly into a Wordstar document (even if it's an excruciatingly slow process at 75 baud) for later editing, spelling checks and final formatting.

It's in the area of word processing that you come up against one of the drawbacks of a small screen (40x8 characters). I sometimes find it difficult to keep track of what has gone before in a long piece of text. On a larger screen it's more like having the document in front of you and the risk of repeating yourself is reduced. I suspect that this is a psychological problem and, just as I got used to using the relatively small window of a TV or monitor screen (small when compared with several sheets of prose), I'll probably adapt to the limited window of the NEC. It may even encourage me to be more careful in my use of words.

Finally, I use the NEC for leisure—mainly programming. It has a very good Basic and, apart from liking to keep my hand in, I've always loved hacking. I spent several hours rediscovering trigonometry—even on the tiny screen (240x64 pixels)



you get interesting graphics.

The NEC has made me find out more about telecommunications. The mysteries of communications protocols, handshaking, stop bits and other exotic terms quickly become harsh realities when you have to get one machine talking to another.

On the more serious side, I've been writing several necessary utilities.

There may be some justification for labelling the presently available lap portables as rather expensive toys, but I'm finding mine of increasing use at work and at home. Besides, it's good fun and reawakens the initial excitement of discovering microcomputers.

Bryan Skinner

I have to admit to an unshamed and unadulterated infatuation with my NEC PC-8201A.

I have used it to write in almost every location you would have thought possible—and a few you wouldn't. I find that, though the telecommunications facilities are very useful for sending stories over the phone line to *PCN*, and the Basic is good for checking programs in Microsoft Basic, the machine, for me, is mainly a dedicated word processor.

But what a word processor! You know those ads where the pin-striped city gent is carefully poring over the tiny screen of his portable while flying at 20,000 feet? I've tried that—and it's not quite what it's cut out to be. Although I wasn't wearing a pin-striped suit at the time, I did try to get some work done on my NEC while flying from London to Vancouver, Canada.

The big problem—having enough elbow-room to type properly without spilling my complimentary drink all over

my complimentary magazine and onto my not-so-complimentary micro—wasn't the computer's fault. The other problem was related to the steward. It seemed he had heard some horror story about the frequencies from a 10Mb Kaypro causing one of the engines to bomb out on a PanAm jet. He suspected my little NEC of harbouring the same ambitions. However, a subsequent chat with the pilot allayed the suspicions of the rather nervous steward.

Another thing to watch when plane-processing is the X-ray machine. An acquaintance of mine recently found, when returning from America, that a trip through the airport X-ray scan had irretrievably corrupted the RAM files in his portable. This must vary from place to place, however, as I can personally assure you that the X-ray scans at Paris' Charles De Gaulle airport didn't do anything to a Tandy Model 100 last October.

I digress. You know those other ads where this hirsute geezer tries to use a portable in the bathtub? I will blushing admit to having tried that as well though I was possessed by a mortal fear of electrocution that prevented me from doing any work while splashing about. (A dumb idea really anyway.)

On the Number 8 bus, however, feel free to use your NEC. There is so much room inside the bus (particularly on the top deck) that if you can get a seat to yourself (remembering the need for elbow room) it's an ideal place for putting the finishing touches to that novel you've always wanted to write. The thing to watch is the bus stops—they're very easy to miss when you're hunkered over your portable in full flow.

Geof Wheelwright

Machine	Price	Extra Memory	RAMpack	Disk drive
Tandy Model 100	£649 for 24K RAM	Up to 32K 8K expansion £79.95	No	£599 for drive and 80 column interface
NEC 8201A	£546 for 16K RAM	Up to 64K 8K expansion	32K for £207	No

All prices above include VAT. Apart from the memory expansion facilities, the salient difference between the two machines is that the Tandy 100 has an address and a schedule file in ROM, while the NEC does not. This is as much a disadvantage as an advantage for the Tandy, as they take up valuable memory space.

The NEC's RAMpack facility is valu-

able, but too expensive to make it a practical alternative to disk storage. The Tandy disk system, which *PCN* will review shortly, is fairly low capacity and, oddly enough, is 5 $\frac{1}{4}$ in rather than the more portable 3in.

The Tandy has a numeric keypad facility, and arguably a slightly better Basic, but loses out because of its 32K memory limit.

PCN PRE-TEST PERIPHERALS

Disk systems for the Spectrum are finally taking off, though the most interesting, from ITL and Morex, are still only at prototype stage — both these are due to arrive in the shops at the end of April. PCN inspected a Morex drive and very interesting it looks too.

The system we looked at was, as far as styling is concerned, decidedly provisional. The interface itself was uncased, but the works seemed to be sufficiently firmed up to make them worth looking at.

It consists of interface, cable, PSU, system disk and a single 200K, 400K or 800K drive. It supports up to four drives altogether, so you could spend from £286 for a single drive with 200K to £1,913 for a total of 3.2Mb. This makes it pricey, but the system itself is much classier, and much better value, than the Viscount disk drive at £245.

Disk versions of Tasword 2, Masterfile and Omnicale also come bundled with the system, so it'll now be possible to get a credible business system working on the Spectrum. The disk interface works with most drives. Those used by the test system were twin 5¼in 800K Mitsubishis, but which drives will be sold with the setup hasn't been decided yet. Hitachis or Sonys are unlikely as, according to Morex's Dimitri Koveos, the company doesn't have the capital to deal with large numbers of these.

However, Morex is currently negotiating a form of financing/manufacturing deal, and the outcome of these negotiations could well considerably influence the final product.

In use

Power up the Spectrum and drives, put a system disk in drive 1, press the reset button and the system is up and running. This is so quick that if you're lazy you will often find yourself hitting reset rather than tidying up after some operations. During testing the maximum access time was around four seconds.

For the user, the nicest thing about the Morex interface is it's use of existing Spectrum syntax, prefaced by PRINT#. This acts as a software switch, and means there's little extra to learn. The interface also supports Microdrive commands such as CAT and FORMAT; MOVE will have been implemented by the time it is in the shops.

MOVE provides a rename and copy facility. For example, MOVE "1:" "2:" PRINT 1 alters the name f1 to f2. MOVE can also be used to rename whole diskettes, and copying — protection permitting — is

— dual disk drive power backs it up.



SPECTRUM SPIN

John Lettice is impressed by a prototype Spectrum disk system.

similarly straightforward.

Morex has, by force of circumstance, a growing interest in protection. The company's printer interface has been copied twice, which is bad enough, but failure to protect disk software could be the kiss of death for the system. To succeed, Morex clearly has to stimulate the development of decent business software, and this isn't going to happen if cloning disks is dead simple.

One example of this is the way the Microdrive MERGE command has been doctored so the program can auto-run, which means that classic Spectrum auto-run stopper is no longer available. That aside, any file called AUTO and stored with a line number will auto-run. The operating system tends not to leave things lying around to be investigated by prying eyes.

A number of other improvements have been made to commands. The ERASE command doesn't in fact erase (it does on the Microdrives) but follows the more efficient disk practice of simply freeing the 'erased' file's space. You can also use a wild card to erase more than one file at a time. ERASE "a*", for example, erases all two-letter files beginning with 'a'.

The CAT command operates just as with the Microdrive — simply specify a drive number and you get the disk directory. The drives, incidentally, are numbered 1-4 in the same way as Microdrives are num-

bered: again this means you can use the commands already learned.

Software

Morex eventually intends to offer a full applications package with the drives, but the current disk versions of Tasword, Masterfile and Omnicale are well worth having. Serious Spectrum software has always been limited by cassette storage, and Tasword and Masterfile in particular come into their own on disk. However, the complexities of Tasword have forced Morex to use a 'Minidos' for it rather than the full DOS, though it doesn't seem to limit it significantly. In any event, it's good to see lower profile software companies willing to license their products.

The ultimate success of the drives will, of course, depend on more programs being written for the system, but Morex's bundled software should be enough to keep users happy for a fair while.

Verdict

It's quite possible that this system is the best, and certainly the friendliest so far for the Spectrum.

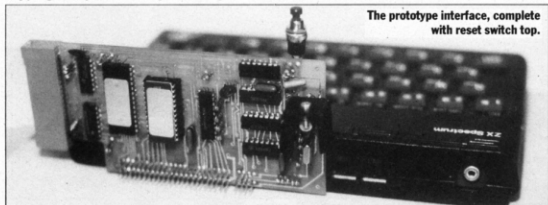
The end of April arrival date may spark off an interesting conflict, as it's also ITL Kathmill's deadline for implementing its Byte Drive 500 on the Spectrum. Should this match ITL's previous efforts, there will be two good disk systems for the Spectrum.

One postscript — Morex is already accepting cheques for the disk system, but the company assures us that it won't be cashing the cheques until the drives are ready to be sent out. Apparently a large pile of firm orders with cheques attached is a persuasive tool when negotiating financial backing.

PCN

Product Morex Disk Drive Interface
Manufacturer Morex Peripherals, Reading (0734) 584238 **System 1** One 200K drive, £286
System 2 One 400K drive, £366 **System 3** One 800K drive, £539 (Additional drives 200K £228, 400K £309, 800K £458).

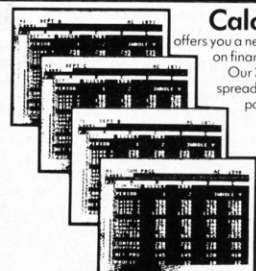
The prototype interface, complete with reset switch top.



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Thinking ahead



FOUR-PEN POWER

Piers Letcher plugs in the 1020 colour printer/plotter from Atari.

Following leads by Tandy, Commodore, Oric and Sharp, Atari is the latest company to put its own name on a printer/plotter made by another company. The 1020 has four colours (black, red, green and blue), 3 cpi (characters per inch), settings (five, ten and 20), two modes of use (text and graphics) and one type of paper (4½in roll). The printer costs £199.99 inc VAT.

First impressions

The package includes the plotter, a standard Atari data lead, a power pack, a spare set of pens, a warranty card and a glossy A4 manual.

The 1020 is very small (7.5in by 4.5in by 2in) and can fit onto a hand. It looks robust, and for the most part it is, but the lid has weak points on either side of the slot from which the paper emerges. On the printer reviewed this was already broken, probably because when the lid is lifted the pressure tends towards the weak slot edges.

With four cassette-type buttons on the front and slotted bevelled edges, the printer looks like the Atari Program Recorder, except for the smoked perspex lid.

Documentation

The documentation is as lavish as normal, and includes test programs. However, on examining the programs closely we found no internal documentation — a drastic omission, since the instructions to the printer need explanation.

Setting up

Setting up starts simply. The manual contains numbered photographs to follow

as you plug in the leads. The difficulty increases as you load the four coloured pens (small slices of biro). This is a bit fiddly, but once they're loaded you should get a test print of four coloured squares. I only got two so I checked that the pens were in properly. Taking them out, shaking them, running them across a sheet of paper and replacing them did the trick and the four squares appeared.

In use

The plotter is an interesting combination of reward and frustration — many of the special effects are great to look at but hard to achieve, needing quite a lot of extra programming.

You have to 'open' the plotter with the command `OPENEN,s,o,"P"`, where N can be from 1 to 7. Whenever you send something to the plotter you then use the same value for n, which presumably allows you to address other devices from within one program. It's rather technical and therefore a pity a default wasn't included for those using the plotter only — it becomes very tiresome to have to type 'EN' every time.

The latter is selected with a rather clumsy command: `PR.£:"ESC ESC CTRL G"`. If this is within a program and you list it back you only get `PR.£2:""` which isn't much help. Several other commands use the same format, with embedded control characters, so it's wise to document your program thoroughly to avoid confusion.

It is easiest to use the plotter in text mode, as the range of functions is smaller. Character widths and character scale can be set, but you have to go back to text mode (with a `PR.£2,"A"` command) before printing. International character sets are

available as an alternative to English rather than an addition.

Graphics mode offers a wide choice of things to do, and is quite powerful. It takes a great deal of effort to learn how to use the device properly, so could be offputting. Dotted lines, continuous lines, colour changes, drawing, relative drawing, axis drawing and alpha rotate are selectable, but you have to write a program for utilities like triangle or square.

The plotter doesn't seem capable of drawing proper curves, so a circle could be written only as a series of short straight lines. The illusion this creates is quite good, but slow to write and to use and, as a result, inflexible.

Verdict

The plotter falls short in several important areas. First is price, since an almost identical printer from Oric costs £170, and another is part of the Sharp MZ731 deal (along with keyboard, cassette, 64K RAM etc) at £420. So £200 for the Atari version seems expensive.

It is also harder to use than it need be, and would be enhanced by more friendly commands and a couple of utilities, such as the square. On quality it's fine, though the biro tend to smudge if they are used a lot.

When fast, cheap and high quality dot matrix printers arrive later this year, capable of full screen dumps, it may make people question whether the benefits of three extra coloured bios are worth the cost.

Product Atari 1020 Colour Printer/Plotter
Manufacturer Atari International, Atari House,
Railway Terrace, Slough, Berks SL2 5BZ Tel:
0753 33344 **Price** £199.99 inc VAT **Outlets** Retail.

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Tiger distribution

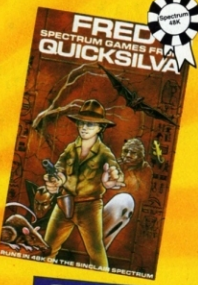
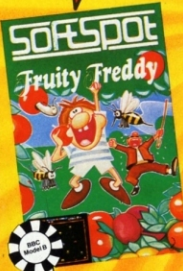
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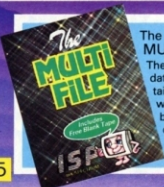
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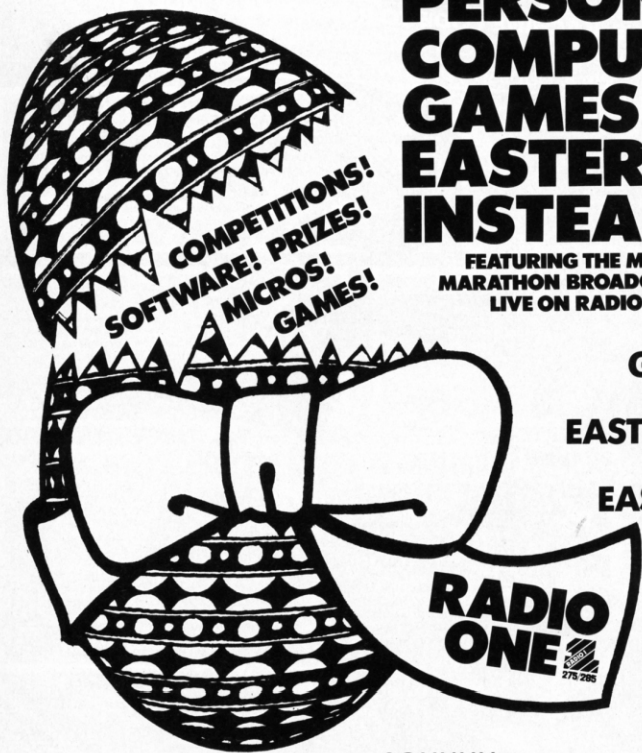


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THE FIRST 100 PCG READERS
* EVERY DAY ***

Get into communication with the most spectacular



The VTX 5000 is the unique communications solution for the Sinclair 16K and 48K Spectrum. It will dramatically increase the capability of your micro. Allowing you to "talk" to other Spectrum users and access such mighty databases and telesoftware services as Micronet 800 and Prestel.

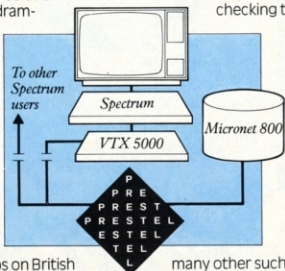
Just think of the opportunities: You could send and receive messages from your friends (no matter how far away they are). Get answers to electronically mailed letters within minutes. Try your hand at the latest adventure games on Micronet 800 (as well as looking at the news reviews, prices and "best buy" information). And on top of all this you could access Prestel to plan your trips on British

Rail, National Coaches and British Airways. As well as checking the weather forecast before you go.

To access these, and other services, the VTX 5000 offers a direct connection via your telephone line.

Furthermore all the necessary terminal software is contained in ROM - so no need to load from cassette.

For a cost of just £99.95, the Prism VTX 5000 offers you access to an exciting new world of information and communications. And combined with the Sinclair Spectrum forms an intelligent viewdata system at a fraction of the cost of many other such systems.



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**1984 British Microcomputing
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ations and viewdata add-on under the Spectrum



PRISM VTX 5000

The Prism VTX 5000 offers you the ability to:

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- Save frames on cassette.
- View frames on cassette.
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Name _____
Address _____

Telephone _____

Bryan Skinner brushes up his French with a Spectrum and an Oric.

French language lesson

Taking your hols abroad this summer? Whether you'll miss your micro, or be glad to see the back of it for a couple of weeks, between now and then it could help you learn a foreign language.

Several packages are now available to help you learn a foreign tongue. There are many aspects to language, but Tansoft's 'French' and CDS Microsystems' 'French is Fun' both concentrate on vocabulary.

Now, it's one thing to learn a few words, but to claim this is adequate to 'understand and be understood' (Tansoft) in a foreign language is pushing things a bit far. More realistic is CDS's aim to present the French language in a stimulating way.

Theory

'French' makes use of the Gruneberg Linkword system for vocabulary learning. *Linkword* is the brainchild of Dr Michael Gruneberg of University College, Swansea. Its basis is that visual association is a powerful mnemonic tool. Some famous mnemonists used techniques of remembering things by imagining them in places they were familiar with. To recall the information, they'd take an imaginary walk around the location, noting the things they'd 'left' there.

This is an effective way to memorise bits of apparently unrelated information and the Linkword system exploits this psychological fact by suggesting situations to imagine which link an English word with a French one.

In use

For example, the French word for cat is 'chat' which sounds like Shah (as in Iran), so you're asked to visualise 'The late *shah* of Iran with a cat on his lap', to help you recall the French equivalent for the English word.



Au bord de la mer.

Some of the 'linking' phrases used are strange, to say the least. How about 'Imagine driving your *chevi* to the levi with a goat in the back'? This is supposed to help you remember that the French for goat is *chevre*.

There are ten sections to 'French', each concentrating on a different area of vocabulary such as business, travel and restaurants.

There is a fair glossary for the tourist, with some intriguing inclusions: *ugly*, *worker* and *mouse*, for example. Over all you get some 350 words, and a 'basic grammar'. Basic is an appropriate adjective. With gender, for instance, you are told to imagine masculine nouns associated with a boxer, and feminine nouns with perfume, eg 'Imagine pouring a bottle of perfume over a goat to stop the smell'. Apart from the blatant sexism, the former is not useful because the subject of the masculine mnemonic is always the boxer, not the item itself.

CDS also takes the pictorial route, but doesn't ask you to do the imagining. Making use of the Spectrum's graphics, 'French is Fun' builds up pictures, labelling items with the corresponding English and French words appearing at the top of the screen.



Quelle heure est-il?

There's a main menu to which you can return during any of the sub-sections by pressing Enter. This allows you to swap about eg Seaside to Cafe, quickly and easily.

Each situation can be run in four modes:

- Picture display with corresponding words.
- Test of spelling/translation.
- Phrases.
- 1 & 3 together.

The main problem is that the words are displayed at the top of the screen for only three

seconds — hardly long enough to get a good look at them, let alone memorise spellings, so it would have been nice to have had control over this. Whenever you select a picture, the



Dans la rue.

things in it always appear in the same order. This might make the words easier to learn, but it ain't half boring.

One major advantage of this program over Tansoft's is that it has phrases, 15 per section. One nicely done section tells the time: you enter a time in standard 12hr notation, and the program writes up the time in French, then depicts it on a clockface.

One of the best features of 'French is Fun' is that you don't ever press Enter. The program clearly isn't using INPUT (which Tansoft's does) and in test mode even buzzes if you try to enter an incorrect spelling. It also keeps a tally of your mistakes, unlike 'French'.

In Tansoft's favour is that you get spoken words to listen to on the tape, but 'The pronunciation given in the course is only approximate'. And indeed, the words are not spoken by a native French speaker. Mind you they're not bad, and quite clear.

While the Linkword system may help you remember roughly what a word sounds like, it's unlikely either to help you

understand or be understood, unless you spend some considerable time practising listening and pronunciation.

Verdict

I preferred 'French is Fun', largely because it uses graphics, which are well done, while 'French' is text-only. I found 'French' boring, but there's no doubt that it works. Pictorial association is an extremely powerful learning tool. Nevertheless, learning simple vocabulary is only a small part of learning a language.

Both programs are a bit of a



Herrison (hedgehog) = hairy son ...

gimmick, just using a micro for the sake of it. A good text book gives you more pictures and phrases, where you also get details of grammar as well as important cultural information.

A modern phrase book offers far more than either of these programs and at more or less the same cost. Better still, with a record or cassette-based course you could learn to say useful French phrases.

However, the programs would be ideal for second or third year pupils because learning word lists is one of the hardest and duller parts of French at school. Both of them will make the task easier and more fun.

Rating (/5)

Usefulness

Features

Performance

Documentation

Overall value

Linkword



F is Fun



Name French is Fun **Price** £5.95 **System** Any Spectrum **Other versions** German is Fun **Publisher** CDS Microsystem 10, Westfield Close, Tickhill, Doncaster, South Yorks. (0302) 744129.

Name Linkword **Price** £12.95 **System** Oric-48K **Other versions** German, Italian, Spanish **Publisher** Tansoft, Units 1 & 2, Techno Park, Newmarket Road, Cambridge (02205) 22612/3/4. Also for Spectrum 48K, Silversoft, London House, 271-273 King St London W6 (01) 748 4125.



PCN

micropaedia

Vol 20

Part 3

**PULL OUT
AND KEEP**

YOUR GUIDE TO SERVICES
COMMUNICATIONS OVERSEAS
PULL-OUT COMPARISON CHART

COMMUNICATIONS
MICROS AND MODEMS

WHO, WHERE AND

NAME	DUPLEX (F/H)	PARITY (E,O,N,I)	STOP BITS	DATA BITS	TELEMESSAGE	TELEX	E-MAIL	STANDING CHARGES
<i>Comet</i>	F	N	I	8	No	Yes	Yes	£30/month
<i>Telecom Gold</i>	F	I	I	7	Yes	Yes	Yes	£10/month
<i>One to One</i>	F	I	I	7	Yes	Yes	Yes	None
<i>Prestel</i>	F	I	I	7	No	Yes	Yes	£1.69/month
<i>Compu Serve</i>	F	O	I	7	No	No	Yes	N/A
<i>The Source</i>	F	O	I	7	No	No	Yes	N/A
<i>Micronet</i>	F	I	I	7	No	Yes	Yes	£4.30/month
<i>Distel</i>	F	I	I	7	No	No	No	None
<i>Rewtel</i>	F	I	I	7	No	No	No	None
<i>Maptel</i>	F	I	I	7	No	No	No	None
<i>CBBS London</i>	F	I	I	7	No	No	Yes	None
<i>Forum-80 London</i>	F	I	I	7	No	No	Yes	None
<i>Computer Answers</i>	F	I	I	7	No	No	Yes	None
<i>Southern BBS</i>	F	I	I	7	No	No	Yes	None



RINGING UP REWTEL

Bulletin Boards are very much a coming craze in the UK at the moment. Not surprisingly, many of the services are run by enthusiasts for enthusiasts and often the computer and the telephone systems are used for other things besides acting as an electronic bulletin board.

It's not unknown for you to have to ring the bulletin number twice. The first time you simply let it ring once, ring back immediately and find yourself on the system. This is to enable the phone to be used for other purposes. An innocent caller is likely to be extremely confused when confronted by a carrier tone.

Bulletin Boards are designed to be easy to use since, by their nature, they attract casual users. One communications hobbyist may browse through a number of boards and continually try out any number of others. It would be nice if there were a standard set of commands, but there isn't.

After a little practice you do come to expect the things to work in certain ways. As with applications programs there is a certain commonality, but just enough variation to catch you out.

For instance, to leave the system, an important command for the first-time-logger, wouldn't a standard command have been welcome? Unfortunately commands like QUIT, EXIT, END, BYE and LEAVE are used interchangeably by various systems.

Rewtel is a good example of a bulletin board service. You ring the number and end up in a restricted public section where you can browse through the system.

Rewtel offers a sort of 'introductory offer' of eight minutes' time on the system to non-subscribers. This system is reasonably easy to use. Information can be accessed either by keying a page number next to the prompt line, or putting in keywords. This is a fairly hit and miss method however, as even those keywords you'd expect to have something under them return you another prompt.

Shopping for computer items on the system could be a fruitful exercise. Obviously bulletin board users are the ideal target market for companies trying to sell communications and micro equipment.

Rewtel has a system called Rewshop through which you can order goods through another specialist in these matters, Ambit International. The all-important question of payment is handled by credit card (you can't do anything without a credit card these days).

Bulletin boards are often run by computer clubs or user groups, and a few have now been set up by various microcomputing magazines.

MICRONET MESSAGES

Mention communications and most people will think of Micronet. Launched in a blaze of publicity just over a year ago it transformed the previously moribund Prestel.

Micronet operates as a closed user group on Prestel with over 40,000 pages of information and 8,000 members.

The chief selling point of Micronet is the promise of 100 free programs for particular micros. So far the BBC, Spectrum, Commodore, Apple and TRS-80 are included. A selection of top-selling commercial programs are available at a charge.

The software is downloaded from the Micronet database over the telephone and from the user's point of view has the advantage of ready access and quick delivery.

For the commercial software, the purchase price is added to your telephone bill. Useful for the software publisher but potentially expensive should you get carried away.

Micronet also runs a news service with around five news stories added daily. These cover all manner of items of interest to the micro user including news of product launches. Some of these stories are extended into longer reviews.

Where the articles are machine specific they are also accessible through a database specific to that micro. Therefore you can access, say, the BBC index and find out what is happening in the hardware and software fields.

You can also talk to other Micronet members via a mailbox facility. The service is available to subscribers on the Enterprise computer in London and is gradually being extended to other Prestel computers. Unlike some other services you can't talk direct. You send a message to someone's mailbox and they are notified that a message awaits them.

Micronet is in many ways like an electronic magazine with several sections devoted to particular subjects. There are sections with letters from users, user groups and computer clubs, help with technical problems, a swapshop and others.

Micronet also sublets some of its pages to other companies including micro magazine publishers and micro manufacturers.

The service is not without its drawbacks, the main one being cost. To gain access to most of its more interesting pages you have to be a member of both Micronet and Prestel (total annual cost £52). While you are logged-on to the service you pay the usual local telephone call charges plus an additional 5p a minute during business hours on any day except Sunday.

A possible bonus to some users is that as a Micronet member you have access to all the other public pages of Prestel. But beware, some of those pages carry a frame charge of anything from 1p to 50p per frame (screenful) of information.





ONE TO ONE, ONE TO MANY

One To One is run by Datacom and adds a full set of 'old technology' options to the conventional mail-box facilities, which, let's face it, only enables you to communicate with other users of the same system.

The prime features of the One To One service are its One to One Letter and One to One Telex facilities.

The Telex service has the potential to save those who need Telex facilities a lot of money as it frees the microcomputer user from the necessity of hiring a dedicated Telex machine. An added advantage is that you can receive as well as send telexes. So it is in fact a viable alternative to the telex machine which can cost up to about £1,000 per year to run. What you don't get, however, is instant access to the telexes as they come through. You have to dial in and check the status of your incoming telex box at least once a day to stay on top of the situation. If it's an urgent telex, however, this is unlikely to cause too much of a problem as these are often prefixed by a telephone call in any case.

The letter service is probably even more attractive for those of us who can never get around to actually printing out a letter, inserting it into the envelope, sealing and applying a stamp to the envelope and delivering it to a letter box, but have absolutely no trouble writing one. You simply address your mail and send it off to the system, the company does all the rest and claims the letter will be delivered by the next morning.

This facility would be equally useful to companies with large volume mailing requirements. The cost is 75p for the first page (rated at 1000 characters) and 16p per page thereafter. Not cheap when compared to doing it yourself, but as a time-saver and convenience factor it should find a lot of enthusiastic users.

The pricing structure of these services is fairly strict. It costs you £2 to change your password and you are penalised for not collecting electronic mail messages.

IBM, Sirius and CP/M computer users are being catered for by a series of terminal programs on offer from One To One for what seems the rather princely sum of £150 a shot. When you consider that connect time is 10p a minute on top of the telephone charges, it's not an entirely comfortable sensation.

Even if a set rate does seem rather high you do tend to amble about on the system to your heart's content and get your money's worth.

However, this sort of system is targeted specifically at the small business user rather than the hobbyist.

SEND A NOTE BY COMET

Comet is a new service for the UK being started by Istel. Like Telecom Gold, it is primarily a business communications tool, but it is structured in a more competitive way for the small or infrequent user.

The subscriber service has a fixed unit cost per mail box per month with no extras except, of course, telephone charges. Comet's user-interface is very easy to use. You log on to the system with your name and password. Each user has a 'mailbox' on the system.

Comet's charges actually make the mailbox viable as a file-backup facility, you simply upload a file as a message to your own mailbox. Charges are presently fixed at £30 per month, and it doesn't matter how much storage space you use on the system or how often you log-on.

Using Comet as a storage system does give you a comparatively slow access speed. At first logging-on is a tedious and time-consuming business equalled only in frustration by a cassette tape system. However, a hardwired modem and a push-button telephone make the process fairly speedy with a little practice.

Here on PCN we use the system extensively in conjunction with lap-held portables and acoustic modems. Articles can be up-loaded to the mailbox from home or out of town (on occasions out of the country) and later retrieved by one of the office desk-top machines. They are then read into a standard word processing program.

Obviously this is hardly likely to be a common application for a system like Comet, but there are undoubtedly a lot of similar



tasks which can benefit by the same treatment.

The main use for the mail-box is to leave messages for use for other subscribers. Probably the main application is information exchange between individuals or departments within a company, perhaps due to a necessity for sending data in from remote or changing locations.

Commands on the system include 'Answer', which automatically generates a return address and reference when you send material to another mail-box. You can also 'Display' files or distribution lists.

There are various editing facilities which enable you to Locate, Erase, Insert text from other messages or cut and paste from within the message on the system. You can even add comments to a received message and 'Forward' it to other mail-box users.

KNOW HOW TO USE THIS THING?



TELECOM'S GOLD MINE

Telecom Gold is British Telecom's implementation of the US-developed Dialcom service. The pricing structure puts it more within the scope of the business user rather than the hobbyist. As you would expect, Telecom Gold concentrates on communication between dispersed subscribers rather than the communication of information held on the host system as with Prestel.

As it's a Dialcom service one of its main advantages is its ability to send messages internationally to compatible services in many other countries — especially, of course, the US. A telexmessage for distribution to international users of Dialcom costs £1.25 for each message, plus of course, the carrier telephone charges involved.

Telecom Gold also handles outgoing telexes and international mail — mail sent to the US, for instance, costs 30p for the first 2K unit and 15p for each unit thereafter.

You can also use Telecom Gold for back-up storage, though this does work out as rather expensive. British Telecom charges on units of storage used per month. A unit is 2K and you pay 20p per month for each unit until you arrive at 2500 units when it drops to 15p — you're paying £500 per month for the storage of 5Mb before you reach the first rate drop, so you can see the system is aimed at businesses rather than individual users.

Telecom Gold offers free training and free 'on-going support'. Each registered user is supposed to have what's called a system manager whose task it is to be the contact for BTG and generally take responsibility for the smooth running of the service.

Although it isn't the chief service of Telecom Gold, a large database is offered. You can type in the name of a product you want to buy, how much you are willing to pay for it, and how many units you want to buy. There is also a bulletin board with standard buy and sell messages for computers, cars and other items.

Putting messages on the bulletin board doesn't cost extra, and the messages can be anything from the buy-and-sell type mentioned previously to a simple plea for help with some technical difficulty. Replies to your bulletin board messages are made through your mail-box.

The extent of the service is a source of pride to its operators; they claim, for example, that new subscribers can be connected within an hour. The strength of US competition means it may have to live up to these promises.

DIAL INTO PRESTEL

Prestel is probably the most useful of the services available in terms of breadth of information. In practical, physical terms the system places a lot of stress on colour graphics which are sent as block graphics characters. Some machines obviously don't have the facilities to deal with these (especially if they're not colour) and will spend a lot of time printing out seemingly meaningless strings of characters on the screen.

Prestel was originally designed to work on the 1200/75 baud rate — slow to send information but quick to receive it. In normal circumstances this works perfectly well — you send two or three characters and Prestel sends you a screenload in about a second. However, the modems necessary to deal with this standard tend to be a bit more expensive than the more usual 300/300 baud variety.

This problem has been part-solved with the introduction of a 300/300 baud service on Prestel, but it must be said that the operation speed drops by a quarter, and those graphics characters slowly printing themselves out can seem especially galling.

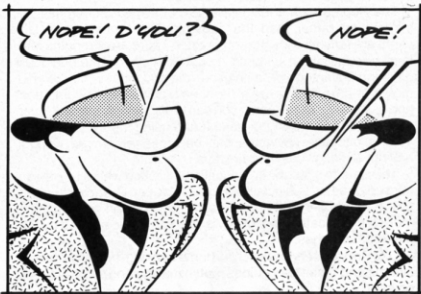
Prestel provides a wide range of information. A lot of it can be the electronic equivalent of junk mail as it's 'put up' on the system by what are called information providers — companies that hire system space on Prestel for their own purposes.

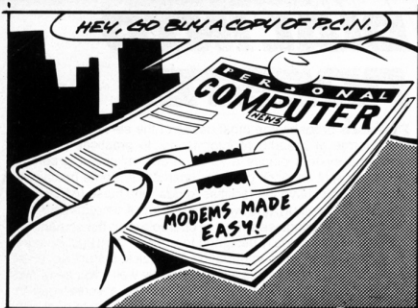
Some of the information providers offer a free service and some provide commercial pay and view facilities. A number in the corner of the screen tells you the pence cost of the screen. Many screens are free, including the directory screens. As well as regular charges (see chart) you will have to pay for the jack socket connection (if you are using a hardwired modem). British Telecom (which runs Prestel) likes to charge a minimum £18 installation charge.

Some interesting facets of Prestel include a home banking service where you can do a certain number of transactions. Other options include booking services for airline flights or packaged holidays. There are also mail-box and telex-sending facilities.

The interactive services are accessed by the subscribers through what are known as response frames. These are put up on the system by the information providers and enable them to get information on the prospective customer — name, address and telephone number.

One of Prestel's strengths is its ease of use, and the range of facilities is very broad.





TAP INTO THE SOURCE

In the US a slightly different approach has been developed. Possibly due to the way the quasi-private enterprise telephone companies are organised, there is no equivalent to Britain's Prestel system.

But in 1979, at about the same time that Prestel was getting off the ground here, a communications facility called the Source was launched specifically for micro-users. So far the pick-up curve of subscribers has been a little disappointing. For UK users it's also obviously a little expensive to place calls to the US, but during off-peak low-rate times the cost drops from outrageous to merely painful.

One of the prime features of the Source seems to be its Chat function. This is the computer-user's version of CB radio and, as the name implies, two users track each other down on the system and indulge in a two-way conversation through the keyboard. As you can imagine, conversation with a total stranger can be fairly banal — a lot of money can be spent merely determining that it's day in one place and night in another, but it is a bit of a novelty.

This sort of activity is extended on the Source into a conferencing facility where an indeterminate number of participants can read and add comments to a discussion topic.

The Source also has an interesting bulletin-board which can be searched by keyword — it tends to have a lot of diverse material on it. The Source also has a user-publishing area where subscribers can achieve immortality by putting up their own material, observations, jokes and so on.

The Source makes extensive use of keyword searches for information rather than the page-jumping tree-structure UK users are familiar with through Prestel. There are strengths and weaknesses to both systems, though the keyword method does have the advantage of saving you time and money. You're also making more effective use of the special powers of the computer, and using a keyword search you can unexpectedly stumble over information you might not have found using the tree structure. This is because keywords can be cross-referenced without having to follow strict pathways.

The Source also has an educational section where users can take courses on subjects like foreign languages and mathematics. It also has the UPI news service so you can go straight to more than 40 categories of news with extra spice added by the keyword searches.

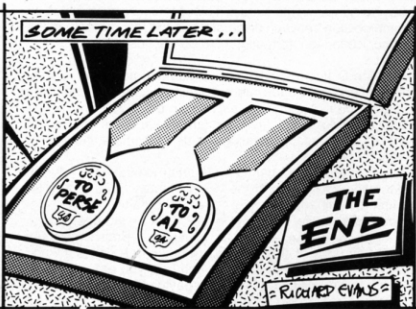
Like Prestel, services such as home banking, home shopping, cinema and restaurant guides, batch mailing and so on are also on offer.

COMPUTER SERVES YOU

Compuserve is the main contender to the Source in the US and offers a fairly similar array of services, though in many cases Compuserve seems to offer better facilities. Like the Source it offers a 'chat show' — this one's called CB simulator. This service enables you to chat to just about as many people as you can handle simultaneously. In the US this activity has inevitably taken on a flavour of its own with its own jargon, mores and traditions. Think of CB radio without trucks and you're close.

On the conferencing side of things, Compuserve offers a fairly structured approach with the development of SIGs — Special Interest Groups. Here aficionados of a particular topic leave their thoughts lying about on the system to be added to or discussed. The groups seem to break into two broad categories. The first concerns broad interest topics like photography, sports and even golf. The second concerns itself exclusively with personal computing, usually by being machine-specific.

There is also a National Bulletin Board where information and advertisements may be left. As a variation there's a 'Public Access' facility — a place for people to leave free software or scout out software left there by other users. Compuserve has a functioning home banking service where users can execute transactions and keep their accounts up to date.



A Compuserve feature is its magazine section. Here many of the US magazines in the computer and electronics field publish computerised versions of their products.

Interactive games are also on-line. These are usually of the epic adventure type which attract a host of competing enthusiasts.

News is also a big feature. Compuserve seems less reliant on the keyword search method, instead the system uses a menu-like structure familiar to Prestel users.

Another US service is called Dialog — this is very much an up-market system in terms of cost. It is also a very specialised system in terms of the information that's held on it. In other words it tends to have commercially valuable information that companies are prepared to pay for to have at hand.

The on-line charges are expensive, and to make the most of the system takes a fair amount of practice, training or both if you are to get your money's worth.

The good news, however, is that Dialog has recently come to an arrangement with British Telecom. UK subscribers can now make the link through a special Packet Switching Service which works out at about \$10 per hour.

D HOW

Here is a list of several major teletext systems and billboards with (hopefully) all the information you will need to get through to them and use them. Hang it up in a convenient place for quick and easy reference when you need it.

ONLINE CHARGES	STANDARD (CCITT/BELL)	HOURS	FEE	BAUD RATE	FEATURES	NUMBER
None	CCITT	7-22	None	300	Unlimited storage, monthly rate	0527-28515 (o)
10.5p/m	CCITT	All	£100	300 1200/75 1200/1200	BT's own system. Uses packet-switching facilities.	01 403-6777 (o)
10p/m	CCITT	All	£50	300	A new private service based on per/use charges	01 730-1155
10.5p/m	CCITT	All	None	300 1200/75	Primarily a vast Viewdata service	Freefone 2296 (o)
N/A	Bell	All	N/A	300	One of the biggest N/A US Micro-based phone information services	N/A
N/A	Bell	All	N/A	300	Time/Life's US information system	N/A
10.5p/m	CCITT	All	£50	300 1200/75	A private service on Prestel. Offers special rates on modems	01 837-3699 (o)
None	CCITT	All	None	300	A commercial service to allow ordering of equipment from Display Electronics	01 679-1888
None	CCITT	All	None	300	Radio and Electronics World's bulletin board	0277 232628
None	CCITT	All	None	300	Maplin Electronics' board for ordering Maplin equipment	0702 552941
None	CCITT	Sun 17-22	None	300	A free enthusiasts' board	01 399-2136
None	CCITT	Weekdays 17-22 Weekends 12-22	None	300	Has own program library and mail	01 902-2546
None	CCITT	Most	None	300	Our sister mag	01631-3076
None	CCITT	20-2	None	300	Messages and program downloading	0243 511077

NATIONAL INTEREST

Micro-based telecommunications are catching on quicker in the UK than in the US.

The UK has a number of thriving bulletin board services as well as useful facilities such as Prestel, Telecom Gold, Comet and Miconet. Prestel and Telecom Gold have met with success partly because they're more or less owned (though privatization is in the wind and BT Gold is a separate company) by the government.

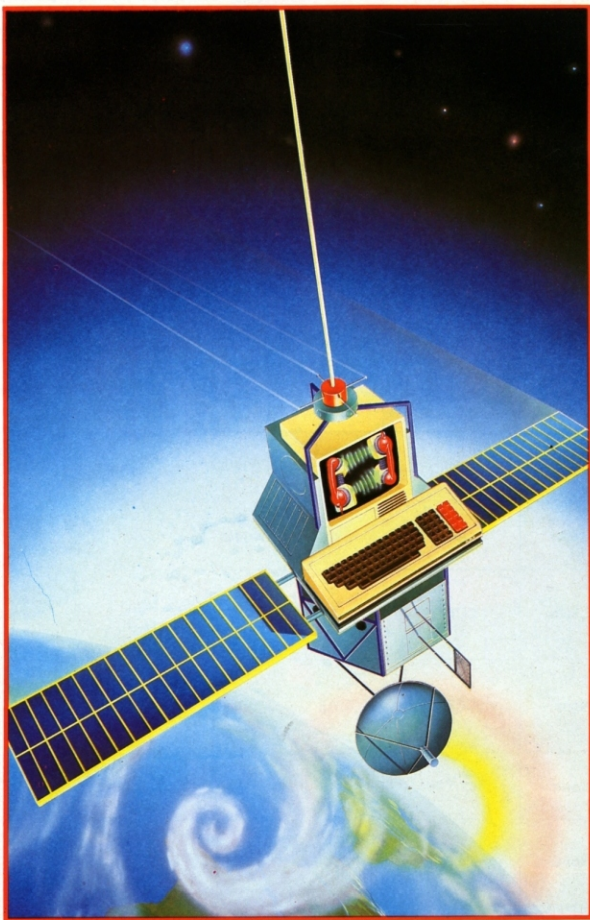
British Telecom's long-held virtual monopoly on telephone services in the UK has helped it greatly to establish a huge database and national network like Prestel. Though it is still sometimes criticised for being under-subscribed and not useful enough, Prestel does have more than a quarter of a million pages of information and has been operating successfully for a couple of years.

By contrast, the Telidon system in Canada — which uses graphics that have the potential to be a good deal more detailed than Prestel's — is still being field-tested (as it has been for two years.) The problem is that though the phone companies in Canada and the US are largely owned by private monopolies, all those private companies still have to get round the natural hurdles posed by working with one another, getting the agreements of local, regional and national political bodies and come to a consensus themselves on what their systems should offer.

Telidon started out in the hope of being adopted as the North American Viewdata standard but soon found trying to get provincial governments in Canada, US and Canadian telephone companies and the US state and federal governments to agree on anything approaching a standard was a Herculean task. Two years on, there is still no Viewdata standard.

Prestel too has tried to make inroads in North America and has been greeted with less than overwhelming enthusiasm, while Telidon is still struggling. The conclusion must be that it is the British Telecom monopoly on the phone system in the UK and the power of the UK government that has encouraged any kind of consensus.

There are private services, of course, such as The Source and Compuserve but they are believed to be far more undersubscribed than Prestel (particularly when the population of the US is taken into consideration). The only companies that seem to have taken off in any significant way are those offering electronic mail, for which the business community is slowly finding a use.



NEXT WEEK

We begin a two-week special, with loads of reviews of new games for the popular micros including the Atari computers, the Commodore 64, the Sinclair Spectrum, the BBC Micro and the Electron.

Micropaedia Editor: Geof Wheelwright
Design: Nigel Wingrove and Paul Charlton

DIAL-TEXT 50

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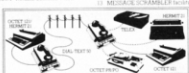
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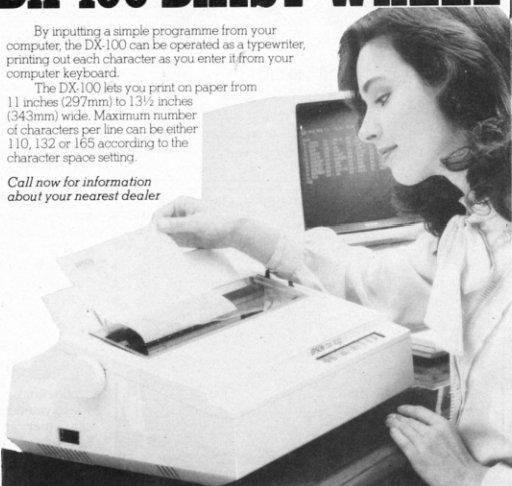
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DRAGON

Plane speaking

Name Air Traffic Control System
Dragon, joystick **Price** £8 **Publisher** Microdeal, 41 Truro Road, St Austell, Cornwall **Format** Cassette
Language Machine code **Other versions** BBC Outlets Mail order retail

Air Traffic Control is another Microdeal import from the American software house of Tom Mix, by the author of the successful *Space Shuttle and The King*.

Objectives

You control two runways, from which you must successfully guide the take-off and landing of numerous planes: two inbound and one outbound for each of the five difficulty levels *ie* ten inbound and five outbound on the hardest level.

In Play

The cursor is used to pick up and guide a particular plane. Thankfully, all planes are Remotely Piloted Vehicles, the inbound already circling at the start, the outbound queuing up at the right of the screen. You can alter the plane's bearing, its velocity or its height, within certain parameters. The outbound planes are automatically placed on the runway you've chosen (through picking the N, S, NW or SE bearing.) The alterations are easily made using the joystick to increase/decrease settings, and the fire-button to lock them in.

Before beginning, the prog-

ram very sensibly asks if your machine can handle the double-speed poke, but even though my own Dragon can't, the action was quick and smooth enough for me, the graphics matching the *Space Shuttle* standard.

Everything takes place on the one screen, across the top of which is the wind speed (increases according to skill level), the direction it's blowing from, a clock showing number of minutes elapsed (bonus points for speed), and a space for error messages, which is the worst aspect of the program as these flash up only briefly, leaving you to wonder why your plane has suddenly disappeared mysteriously with not so much as a puff of smoke.

The controls were easier to master than the average flight simulator, and I soon enjoyed trying to bring a succession of planes safely down. Once on the runway, control switches to a smaller graphics panel at the foot of the screen, the Glide Slope: you must bring your plane down here, keeping a careful eye on another panel to the right showing drift and rate of descent. The BBC version has a separate landing sequence for this part.

Verdict

Yet another piece of first-class Dragon software from Microdeal. Add it to the shopping list.

Mike Gerrard

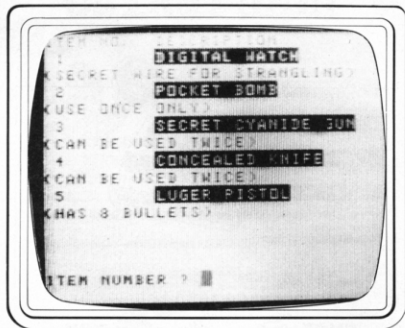
RATING (5)

Lasting appeal ☹☹☹☹☹

Playability ☹☹☹☹☹

Use of machine ☹☹☹☹☹

Overall value ☹☹☹☹☹



Bond's away

Name Super Spy System **Dragon 32**
Price £6.50 **Publisher** Richard Shepherd Software, Elm House, 23/25 Elmshott Avenue, Chippenham, Slough **Format** Cassette
Language Basic **Other versions** Spectrum 48K **Outlets** Mail order/retail.

Super Spy gave me the impression it was an all action James Bond type adventure game. To my dismay, I found it was more a series of mazes.

Objectives

Your mission is to seek out the evil Doctor Death, who is holding the world to ransom with a captured atomic missile. Once you've found him, all you do is defuse the missile and save the world — I think I've seen this at the pictures recently.

However, before the world is forever in your debt, you need to track down the evil Doc, and before you grab your passport and sun tan oil, you need some protection. The choice of weapons is rather dull — you get the choice of a bomb, a knife, guns or a digital watch with a secret wire. Only three of the five could be picked. Using a variety of the weapons, I found there was no difference between them apart from the fact some weapons could be used more than once.

So having toolled up, it's travel time. A screful of destinations are printed, from which you take your pick. You can enter any location you want and you'll either get a clue or end up in a dodgy situation. When presented with food which was supposedly

poisoned, I typed 'Examine Food' rather than 'shoot the waiter', my first reaction. To my surprise, I received a message in code from London, with directions.

Part two on Death's island is also text only. Unfortunately I found this stage lacking in atmosphere: you can only give directions or attack when confronted. The locations are mostly similar, differing only in the number of exits available. However, retracing my steps did not seem to lead back to the same places.

There's no returning to London if you run out of weapons and your strength dwindles with each attack you make. Fortunately, hidden somewhere on the island is a secret cache of energy pills which revitalise you. At one stage it seemed even the humble mountain goat was an enemy. You must use fists and feet, though I don't recall James Bond having to head-butt tarantulas. If you run away from trouble, or in sheer frustration try swearing at marauding wild natives, you'll get a severe ticking off.

If you make it through to stage three, you're in a 100 room maze. The graphics are limited to an overall plan of the building and a 3D view of each room. The plan is available only briefly and you can have only three looks altogether.

In the end, a rather disappointing game, but one saving feature — it's different every time.

Jim Ballard

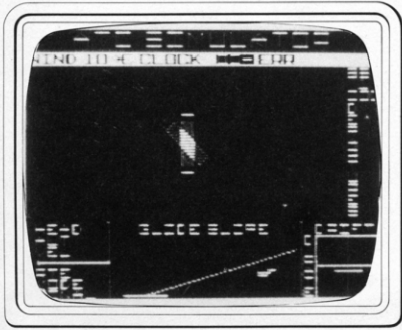
RATING (5)

Lasting appeal ☹☹☹☹☹

Playability ☹☹☹☹☹

Use of machine ☹☹☹☹☹

Overall value ☹☹☹☹☹



Taskset & Commodore

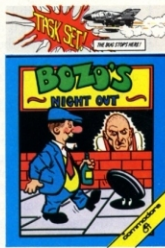
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A brand new character game. Poor old Bozo, all he has to do is to get home after a night out with the lads. That's easy until a wobble becomes a lurch and a stagger. Later into the night, all rules go out of the window as he disbelieves what's happening in front of his blood-shot eyes. An epic journey with ultra-smooth graphics and sprites which run rings round normal games.



SUPER PIPELINE

Keep the pipeline open. Foreman Fred and Plumber Pete have their work cut out. The evil ladderman drops metal wedges to plug the pipeline - and only Pete can fix 'em. Pete trusts Fred to defend him against the six-legged Venusian pipe spiders and the hard case lobster while he knocks out the plugs and restores the flow. Full accompanying music and effects, options and hi-score table.

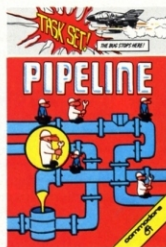
JAMMIN'

Unlike anything else, a totally musical game yet highly colourful. Guide Rankin' Rodney through the top 20 mazes - each with an interactive rock sound track. Gather the instruments and make a band but watch out for bum-notes, dischord and that most deadly effect - distortion. If you've never heard the full music capabilities of the 64, grab an instrument and join the band.

COSMIC CONVOY

Just surviving is not good enough in this giant convoy. Control three fighters at once, to defend the huge transporters as they fly between the planets. Only those transports reaching planetfall will gain galactic credits, and no-one expects promotion for losing the

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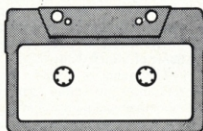
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COMMODORE 64

Aqua marine

Name Neptune's daughters **System** Commodore 64 **Price** £9.95
Publisher English Software **Format** Cassette **Language** Machine code
Other versions None **Outlets** Retail

Rescuing beautiful maidens from dragons' lairs is one thing but diving down to the ocean's floor on a mercy mission is quite a different kettle of crabs.

Objectives

Down at the bottom of the ocean lives a sea serpent whose main pastime is capturing the fair daughters of Neptune and carting them off to his slimy lair. To the rescue comes our intrepid frogman. With only a harpoon for protection, he must swim through the underwater caverns, overcoming many perils along the way.

In play

You'll need a joystick as there's no keyboard option.

It's a multi-screen game, each showing one part of the water kingdom. Aquaman must paddle safely from one side of the screen to the other, when the entire display will slide smoothly to the left, revealing a completely new scene. Starting on a new screen is particularly tough — the enemy is right beside you from the word go.

Aquaman's progress is not to be compared with a swim in the local Lido. He is pursued from the outset by a winking octopus.

Disposing of it with the harpoon offers only temporary relief—a brother octopus soon appears to take up the chase. Luckily, Aquaman has an unlimited supply of harpoons. The caverns are rather claustrophobic in places and one touch against a wall costs Aquaman one of his five lives.

Exits and tight passages are blocked by gently waving sucker-plants—they are not friendly and must be harpooned. The supply of oxygen, represented by a changing bar at the bottom of the screen, is limited. To replenish it, Aquaman must top up by desiccating swarms of killer amoeba and collecting the bubbles of air consequently released by them.

The sea serpent is bound to be a mite peckish by the time Aquaman arrives, so he'd best harpoon a monster crab. The crab must then be transported through a ruined city to reach and feed the hungry warder. The serpent is voracious — it needs five of these crabs before it will decide to have its Sunday afternoon nap. If you manage to get this far,—you can release the first of Neptune's female kin.

Verdict

The game has very crisp graphics, some of which are quite spectacular. The action is fast yet smooth and the challenge never short of demanding.

Bob Chappell

- RATING** (/5) ★★★★★
- Lasting appeal** ★★★★★
- Playability** ★★★★★
- Use of machine** ★★★★★
- Overall value** ★★★★★



China Syndrome

Name China Miner **System** Commodore 64 **Price** £7 **Publisher** Interceptor **Format** Cassette **Language** Machine code **Other versions** None **Outlets** Retail

Just when you've conquered all the screens in Manic Miner and it's time to come up for fresh air, along comes China Miner, a new game with a similar plot, to keep you chained to the keyboard.

Objectives

The hero must journey unscathed through 30 screens, each of which contains a series of differently configured platforms, ladders and miscellaneous constructions.

On every screen a lamp, candle, pickaxe, emerald and key have to be collected, this being the only way of progressing to the next screen.

In play

The game is set in the jade mines of China at the time of the Pong dynasty. The hero is a Chinaman complete with coolie-style hat, but he has the unoriental but nudge-nudge name of Miner Wally.

The game a bounds with references to other games, more than you'll find anywhere else except perhaps in an index. Some of the strange screens that Miner Wally overcomes include Pieman, Attack of the Mutant Hover Mowers, Loony Jetman, Wally Kong, The Yobbit, Fort Apuckerlips and Horace Goes Walkabout.

Wally starts at the bottom of

the right on screen 1, can walk left and right, and can jump and climb up and down. Scattered about the platform are the objects he must acquire if he is to ever leave this screen. You might think, as it's only the first level, it will be an easy one, just to break you in. Dead wrong. It took me ages to conquer just this first screen and I never completed the second.

There are two difficulties. First, you have to experiment to find the best route around the obstacles (on the first screen moving monsters, dissolving platforms and apparently unreachable treasures). Secondly, the game is so tightly designed that there is very little margin for error on your part. You can do it—but by not much more than a hair's breadth. It's a real toughie.

The graphics and screen layouts are very good, colourful and imaginative. There are no sound effects other than continuous music which bears a remarkable yet appropriate resemblance to the theme music from 'The Sting' which can't be switched off.

Verdict

Although similar in concept to Manic Miner, China Miner offers a whole new set of challenges. The references to other games keep the exercise humorous. You'll need that, since this game is extremely challenging throughout and you're likely to be emitting howls of frustration more than gales of laughter.

Bob Chappell

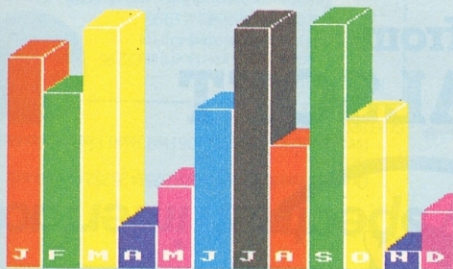
- RATING** (/5) ★★★★★
- Lasting appeal** ★★★★★
- Playability** ★★★★★
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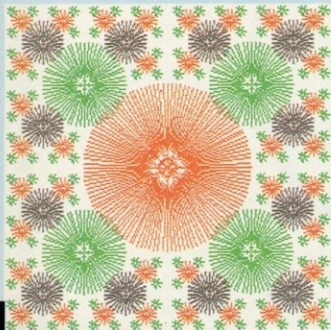
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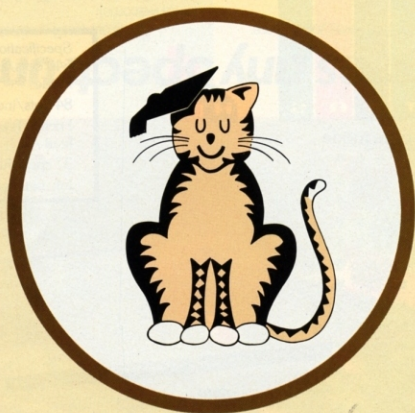
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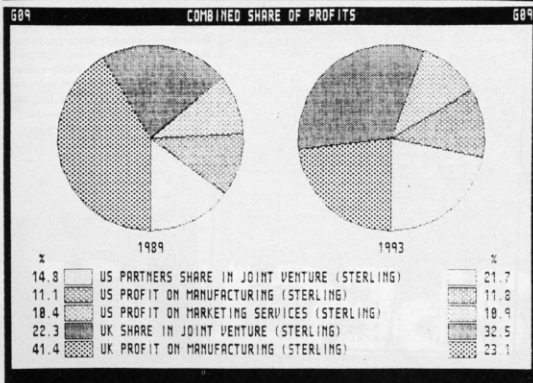
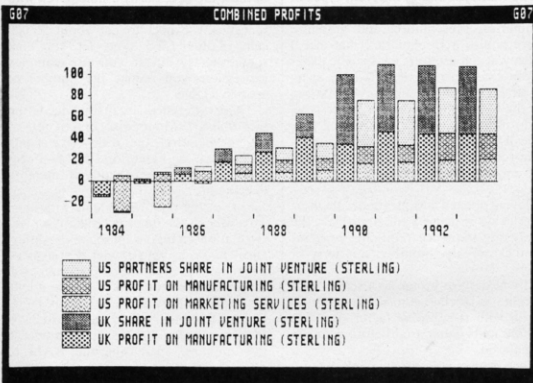
ages would take some 20 minutes to do the same task, but unfortunately I couldn't check this. One reason for FT Moneywise's speed is that it uses an intelligent algorithm which ensures that only those cells affected by changes elsewhere are recalculated. Clearly a lot of effort has gone into the overall design of the package and the programming of this 26,000 line combination of Fortran and Assembler.

Moneywise really excels in its report generation facilities. Using Moneywise terminology, this is dealt with in the Presentation stage. Each page of a report can have up to 71 rows by 28 columns, the equivalent of an A4 page. With Lotus 1-2-3 you're concerned with the spreadsheet and the report at the same time, but FT Moneywise lets you deal with a report when all the other work has been done

Two graph results pages from a Moneybook. The other side of the page, the working side, allows the user to define the shading and type of graph, while axes are automatically scaled. Graph pages like these can be included in a 'Moneyprint'.



FT.MONEYWISE SYSTEM



and you can have variable column width and free formatting of text.

If you need replication or duplication of data in cells, Moneywise offers the Keep command which means forms for reports can be produced with just the data to be dropped in to complete them. By simply changing the date a completely new report can be displayed and printed. A whole model or any part of a model can be included in a new report. Similarly, some part can be subtracted to produce the final result. For consolidating data from many Moneybooks, there's a Moneypost function.

For tidying up a report, vertical and horizontal lines can be added to give a finishing touch. It's just this sort of flexibility and ease of use that will make Moneywise dear to the heart of many.

There's an invaluable Search function

which displays 'matches' and you simply select the one required.

Usability

FT Moneywise uses conventional English terms and the menus are clear, the selected option being shown highlighted. Combining these factors with the Help facility and the 'Next Option Please' prompt makes the program far more friendly than most. It's little details such as these that help make it easier to use and more accessible to inexperienced users than many of its competitors.

Reliability

My review copy loaded first time every time, and didn't crash whatever tricks I tried. Back-up disks are available when the guarantee is returned and there's even a special hot-line phone service available for those who feel they might need detailed problem-solving, albeit at extra cost.

Documentation

The manual is thick, contains lots of screen shots to aid explanation and is written much less technically than most of its type. In addition there are the installation guide and a quick reference card.

Verdict

Strictly speaking, there's no real competition for FT Moneywise. There are similar types of program: spreadsheets, all-in-ones and modelling systems, but these are essentially general purpose packages. Where FT Moneywise really scores is in its financial dedication. Of course, this makes it unsuitable for many of the purposes which users may have in mind.

Lotus 1-2-3 compares well, but falls down when it comes to detailed comparisons of the Moneybook, Report facilities and the Find function.

One major criticism for the more up-market user is that unlike Lotus 1-2-3 there's no version which uses the Hercules Card for colour graphics. Nevertheless, the graphs produced on a standard Sirius monitor or on an IBM with colour card and monitor are very good indeed and a Hercules version is under development.

PCN

RATING (/5)

Features

Usefulness

Documentation

Performance

Reliability

Overall value



Name FT Moneywise System IBM PC (256K)

Price £395 (Moneywise support service £145

pa) Publisher Moneywise Software, 226 Sheen

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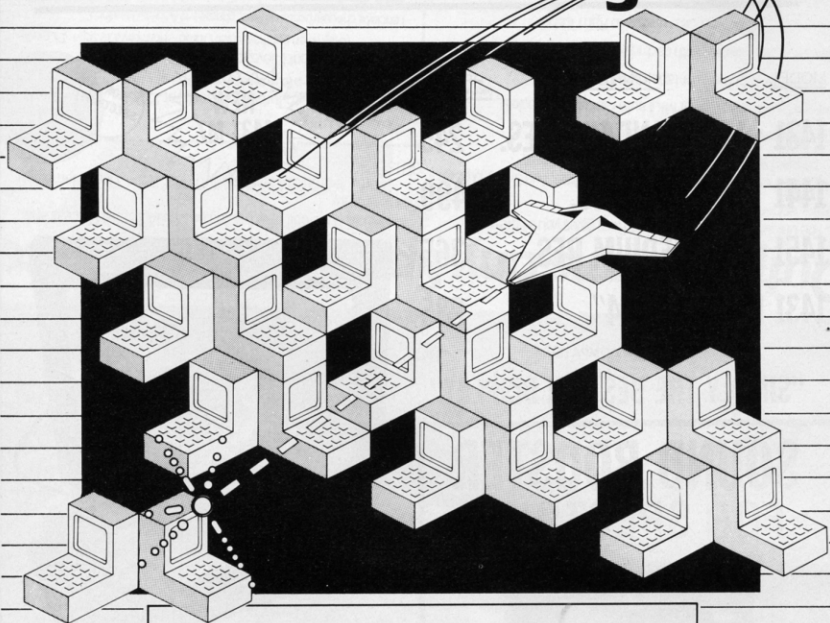
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TRAINIAC

Trainiac is an exciting game of speed and manual dexterity from Simon Williams of Beaworthy in Devon. Instead of controlling the usual angrily animated aliens and hyper-electric laser booster shooters, you play the part of the railroad company's bridge building chief engineer. Your assignment is to repair damage to the railway line, before the oncoming express is derailed.

Each level of the game consists of four screens, each one showing four strips of the line between Tombstone and Carson City. By moving a bridge-shaped cursor around the screen and using it to lay down new sections of bridge, gaps in the line may be closed so that the train can pass safely. If the train successfully completes its journey, you receive a bonus and move onto the next level, where the train thunders across the prairies and deserts at yet greater speed.

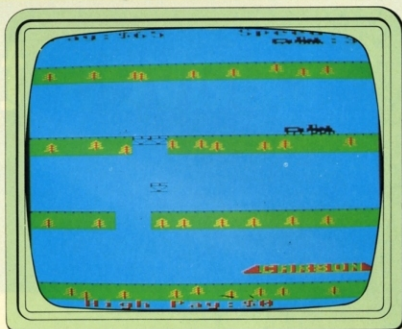
Title: Trainiac

Machine: BBC-B Electron

Language: BBC Basic

Application: Game

Author: Simon Williams



On page 71 you'll find another of PCN's utility programs. Each week a routine or program will be listed at the end of the main programs section. If you have any routines that you think will be of use to other readers, why not send them in for publication? Just send your routine on cassette together with some notes on what the routine does and how it does it to:

Kenn Garoch PCN Programs Evelyn House 62 Oxford Street London W1A 2HG

Remember, though, it must be your own work, not previously published elsewhere.

All contributions will be returned as soon as possible after I have had time to look them over.

- 50-100 Set up the user defined characters, initialise the variables and display the playing instructions.
- 110-130 Redefine the colour palette and remove the cursor.
- 140-150 Outer control loop, this sets up the start screen and plays the tune.
- 160-280 Inner control loop, this runs the game until three trains have crashed. The loop is exited if a new game is not requested.
- 290-320 Reset the machine to normal, MODE, the key repeats etc.



```

10 REM                TRAINIAC
20 REM                (c)1982 S.Williams
30 REM                For BBC Micro 32K
40 REM
50MODE 6
60PROCInitialise
70VDU19,0,210;19,1,0;0;
80VDU23;0202;0;0;0;
90PROCInstructions
100MODE 5
110VDU19,0,610;19,1,0;0;
120VDU19,2,210;19,3,1;0;
130VDU23;0202;0;0;0;
140REPEAT
150PROCscreen:PROCTune(1460,20)
160REPEAT
170IF SCREEN%=4 AND TV%=20 AND TH%>15
PROCpay:PROCnewtrain
180IF TV%=20 AND TH%>15 SCREEN%=SCREEN
%+1:PROCpay:PROCscreen
190IF TH%>15 PRINT TAB(TH%,TV%)"  ":
PROCpay:TV%=TV%+0:TH%=0:PRINT TAB(TH%,TV
%)T2$

```

```

200PROCbridge
210IF ABS(POINT(64*(TH%+3.5),990-TV%*3
2))=0 PROCcrash
220IF TRAINS%>0 TH%=TH%+1:PRINT TAB(TH
%,TV%)T1$
230FOR N%=1 TO DELAY%:NEXT
240PROCbridge
250IF TRAINS%>0 PRINT TAB(TH%,TV%)T2$
260FOR N%=1 TO DELAY%:NEXT
270SOUND 0,-10,4,2
280UNTIL TRAINS%=0:PROCnewgame
290UNTIL ENTRY=70
300MODE 7
310*FX12,0
320END
330
340DEF PROCInitialise
350VDU23,224,0,0,15,15,12,15,15,4
360VDU23,225,3,1,225,251,59,251,254,14
4
370VDU23,226,224,161,173,255,255,255,1
87,238
380VDU23,227,0,128,128,192,192,224,240

```

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*Which Micro Hardware Review – Spectravideo SV 318

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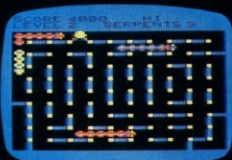
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TRAINIAC

- ◀ 59 340-590 Define the user defined characters and strings. Set the auto repeat and initialise variables.
- 610-740 Display instructions in Mode 6, using animated display.
- 760-790 Pause execution for a pre-defined period.

```

,160
390VDU23,228,0,0,254,255,195,255,255,7
3
400VDU23,229,62,26,26,191,191,191,235,
14
410VDU23,230,0,24,216,252,252,254,191,
234
420VDU23,231,0,3,14,29,59,31,14,5
430VDU23,232,192,240,241,251,239,147,6
6,3
440VDU23,233,32,112,200,144,224,248,25
1,255
450VDU23,234,126,63,46,60,14,4,0;
460VDU23,235,255,136,0;0;0;
470VDU23,236,255,136,255,129,66,36,24,
255
480VDU23,237,16,56,84,56,84,56,214,16
490VDU23,238,1,3,7,15,31,63,127,63
500VDU23,239,128,192,224,240,248,252,2
54,252
510T1$=CHR$224+CHR$225+CHR$226+CHR$227
520T2$=" "+CHR$228+CHR$229+CHR$230
530CRASH$=" "+CHR$231+CHR$232+CHR$233+
CHR$8+CHR$10+CHR$234
540TRACK$=STRING$(20,CHR$235)
550B$=CHR$236
560FIR$=CHR$237
570PAY%=0:HIPAY%=0:TRAINS%=3:SPEED%=1:
SCREEN%=1
580$FX11,10
590ENDPROC
600
610DEF PROCinstructions
620COLOUR129:CLS:COLOUR0
630FOR M%=0 TO 22:READ L$
640FOR N%=0 TO 39:PRINT TAB(N%,M%)MID$(
(L$,N%+1,1);T2$
650PROCpause(1)
660NEXT,
670REPEAT UNTIL GET=32:CLS
680ENDPROC
690DATA " TRAINIAC",",",,
An agent for The Stage Coach Company,
"
700DATA"known as Trainiac, has been s
ystematic-",",ally trying to break the T
ombstone and",",Carson City Railroad Co.
by sabotaging"
710DATA " the main line.",,
Your job is to bridge the gaps left by
",",Trainiac's bombs. If a train g
ets"
720DATA"through to Carson City, anothe
r leaves",",Tombstone faster than befor
e. The faster",",the train, the more you
earn for saving"
730DATA " it.",",Use th
e following keys to position the",",bri
dges and the space bar to place them:"
740DATA",, " A.....to move u
p",, " Z...to move down",,
<...to move left",, " >.
.to move right",",,," " Press spa

```



TRAINIAC

- 810-950 Draw the game screen with stations, trees, scores etc.
 970-1030 Draw the station using name parameter.
 1050-1180 Display the bonus at the end of each run, set up a new train and increase the speed etc.
 1200-1280 Handle the keyboard input routine and move the bridge cursor accordingly.

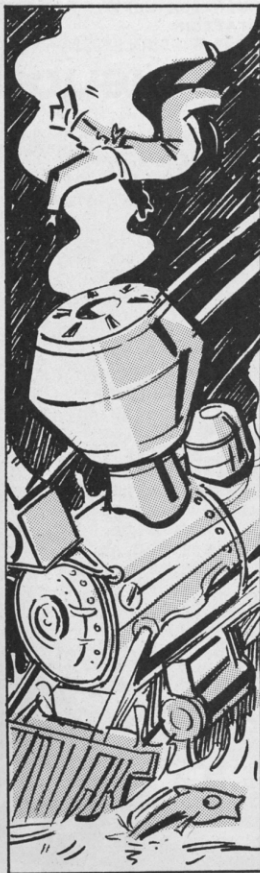


```

ce bar to start"
750
760DEF PROCpause(T%)
770TIME=0
780REPEAT UNTIL TIME>T%
790ENDPROC
800
810DEF PROCscreen
820COLOUR128:CLS:COLOUR1
830PRINT TAB(1,1)"Pay: ";PAY% TAB(12,1)
) "Speed: ";SPEED% TAB(13,2)T2$;";TRAINS
%
840COLOUR 3:PRINT TAB(3,31)"High Pay: $
";HIPAY%;
850FOR M%=5 TO 29 STEP 8
860COLOUR1:COLOUR130
870PRINT TAB(0,M%)TRACK$;SPC(20);:COLO
UR128
880VDU5:GCOL1,3:FOR N%=0 TO 1088 STEP
128:MOVEN%+RND(128),988+RND(24)-32*M%:PR
INT FIR$:NEXT:VDU4
890IF SCREEN%<4 AND M%>5 OR SCREEN%=4
AND M%>5 AND M%<28 P%=RND(12)+4:W%=RND(3)
):PRINT TAB(P%,M%)SPC(W%) TAB(P%,M%+1)SP
C(W%)
900NEXT M%
910IF SCREEN%=1 PROCstation(0,3,"TOMBS
TONE")
920IF SCREEN%=4 PROCstation(12,27,"CAR
SON")
930COLOUR1:TH%=0:TV%=4:PRINT TAB(TH%,T
V%)T2$:BH%=9:BV%=16
940DELAY%=185-37*SPEED%
950ENDPROC
960
970DEF PROCstation(H%,V%,NAME%)
980COLOUR3
990PRINT TAB(H%,V%) CHR#238 TAB(H%+LEN
(NAME%)+1,V%)CHR#239
1000COLOUR2:COLOUR131
1010PRINT TAB(H%+1,V%)NAME%
1020COLOUR128
1030ENDPROC
1040
1050DEF PROCnewtrain
1060FOR N%=0 TO 6
1070PRINT TAB(5,3)"BONUS-$";SPEED%*100
1080SOUND 2,-15,100,5
1090PROCpause(30)
1100PRINT TAB(5,3)SPC(10)
1110PROCpause(30)
1120NEXT:PAY%=PAY%+SPEED%*100
1130IF SPEED%<5 SPEED%=SPEED%+1
1140SCREEN%=1:CLS
1150PRINT TAB(2,15)"Next train ready"
1160PROCpause(500)
1170PROCscreen
1180ENDPROC
1190
1200DEF PROCbridge
1210I%=INKEY(0)
1220*FX15,1
1230BLR%=(I%=90)-(I%=88)
    
```

TRAINIAC

- 1300-1360 Display the crashed train.
1380-1490 Play the start and finish tunes from the note data held in the data statements.
1610-1710 Handle the end of game and start a fresh game if required.
1730-1770 Update the display of the pay (score) on the screen.



```

1240BUD%=(I%=58):IF BV%<30 BUD%=BUD%-(I
%=47)
1250IF POINT(64*(BH%+BLR%),992-32*(BV%+
BUD%))=0 PRINT TAB(BH%,BV%) " ":BH%=BH%+B
LR%:BV%=BV%+BUD%:PRINT TAB(BH%,BV%)B#
1260IF I%=32 AND (BV%=13 OR BV%=21 OR B
V%=29) PRINT TAB(BH%,BV%)B#:BH%=BH%+1:IF
POINT(64*BH%,992-32*BVD%)<>0 BH%=BH%-1:B
V%=BV%+1
1270IF I%=32 PRINT TAB(BH%,BV%)B#
1280ENDPROC
1290
1300DEF PROCcrash
1310PRINT TAB(TH%,TV%)CRASH#
1320FOR N%=-30 TO -16:SOUND 0,N% DIV 2,
4,1:NEXT
1330FOR N%=0 TO 30:SOUND 0,-RND(15),4,2
:NEXT
1340TRAINS%=TRAINS%-1
1350IF TRAINS%>0 SCREEN%=1:PROCscreen
1360ENDPROC
1370
1380DEF PROCtune(POINTER,NoNOTES)
1390RESTORE POINTER
1400FOR N%=1 TO NoNOTES
1410READ FREQ,DUR,REST
1420SOUND 2,-15,FREQ,DUR
1430SOUND 2,0,0,REST
1440NEXT
1450ENDPROC
1460DATA 81,2,2,101,3,3,101,2,2,101,3,3
,109,2,2,117,3,3,117,2,2,117,2,2,109,1,1
,101,2,2,81,6,6,129,2,0,121,4,0,129,6,6
1470DATA 81,2,2,101,3,3,101,2,2,101,3,3
,109,2,2,117,3,3,117,2,2,117,2,2,109,1,1
,101,2,2,129,6,6,129,2,0,121,4,0,129,6,6
1480DATA 117,2,2,129,3,3,129,2,2,129,3,
3,117,2,2,121,3,3,121,2,2,121,3,3,109,2,
2,117,3,3,117,2,2,117,2,2,109,1,1,101,2,
2,109,4,3,97,2,2,81,4,1
1490DATA 97,1,1,109,2,2,129,6,4,81,6,4,
109,6,4,81,6,4,101,8,0
1500
1510DEF PROCnewgame
1520CLS:PRINT TAB(1,1)"Pay:#";PAY% TAB(
12,1)"Speed:";SPEED%
1530COLOUR3:PRINT TAB(5,15)"GAME OVER"
TAB(3,31)"High Pay:#";HIPAY%;
1540PROCtune(1480,24)
1550PROCpause(200)
1560COLOUR1:PRINT TAB(1,17)"Another? (Y
or N)"
1570*FX15,1
1580REPEAT ENTRY=GET:UNTIL ENTRY=78 OR
ENTRY=89
1590IF HIPAY%<PAY% HIPAY%=PAY%
1600PAY%=0:SPEED%=1:SCREEN%=1:TRAINS%=3
1610ENDPROC
1620
1630DEF PROCpay
1640PAY%=PAY%+SPEED%*5
1650PRINT TAB(6,1);PAY%
1660ENDPROC

```

ORIC SCROLL

Title: *Oric Scroll*

Machine: *Oric-1 16/48K*

Language: *6502 Machine Code*

Application: *Utility*

Author: *MD Barratt*

The following program is a Basic loader for a series of screen manipulation routines written in machine code. Four of these are used as direct Basic commands, to move the entire screen one place sideways (with the column that falls off the edge either being lost, or reappearing at the other side, as required). Two others are interrupt driven routines that cause the screen to rotate slowly without interfering with the running of the Basic program.

All the routines are fully usable from Basic. To call a routine, assign the appropriate function to a dummy variable, eg:

```
500 FOR N=1 TO 10
```

```
510 HK=&(3)
```

```
520 NEXT N
```

will shift the screen display ten places to the left, putting spaces in the new columns appearing on the right.

```
500 J=&(4)
```

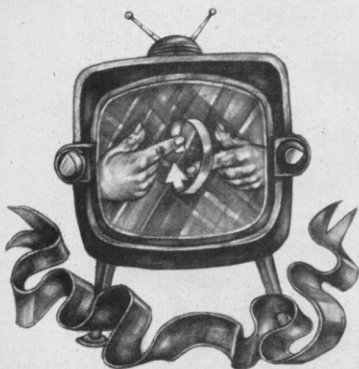
will initialise the interrupt driven rotation to the right, which will continue until

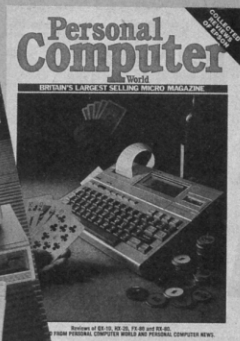
```
600 J=&(6)
```

is executed.

A full list of the functions available appears in the listing. After running the Basic (assuming the prompt 'OK' has appeared) the loader can be NEWED without damaging the keyboard routines.

```
10 REM BASIC LOADER FOR
20 REM SCREEN SCROLLING ROUTINES
30 48K ORIC-1
40 REM
50 REM &(0)=ROTATE 1 PLACE RIGHT
60 REM &(1)=ROTATE 1 PLACE LEFT
70 REM &(2)=SCROLL 1 PLACE RIGHT
80 REM &(3)=SCROLL 1 PLACE LEFT
90 REM &(4)=START ROTATION RIGHT
100 REM &(5)=START ROTATION LEFT
110 REM &(6)=STOP ROTATION
120 REM
130 REM BY M. BARRATT.
140 REM
150 HIMEM #96BD:TL=0
160 A=#96BE:REPEAT
170 READ B#:B=VAL("#"+B#)
180 TL=TL+B:POKE A,B:A=A+1
190 UNTIL B=85
200 IF TL<>34460 THEN PRINT" TYPING ERROR
- RECHECK PROGRAMME":END
210 PRINT"OK":DOKE #2FC,#979E
220 DATA A9,BB,A0,AA,85,01,84,00,A2,1B,
A0,25,88,B1,00,C8,91,00,88,D0
230 DATA F7,A9,20,91,00,A5,00,18,69,28,
85,00,A9,00,65,01,85,01,CA,D0
240 DATA E1,60,A9,BB,A0,AA,85,01,84,00,
A2,1B,A0,00,C8,B1,00,88,91,00
250 DATA C8,C0,25,D0,F5,A9,20,91,00,A5,
00,18,69,28,85,00,A9,00,65,01
260 DATA 85,01,CA,D0,DF,60,A9,BB,A0,AA,
85,01,84,00,A2,1B,A0,25,B1,00
270 DATA 48,88,B1,00,C8,91,00,88,D0,F7,
68,91,00,A9,28,18,65,00,85,00
280 DATA A9,00,65,01,85,01,CA,D0,DF,60,
A9,BB,A0,AA,85,01,84,00,A2,1B
290 DATA A0,00,B1,00,48,C8,B1,00,88,91,
00,C8,C0,25,D0,F5,68,91,00,A5
300 DATA 00,18,69,28,85,00,A9,00,65,01,
85,01,CA,D0,DD,60,C6,02,F0,01
310 DATA 40,78,48,8A,48,98,48,A9,20,85,
02,20,40,97,68,A8,68,AA,68,40
320 DATA C6,02,F0,01,40,78,48,8A,48,98,
48,A9,20,85,02,20,14,97,68,A8
330 DATA 68,AA,68,40,20,67,D8,A5,34,F0,
05,A2,E5,4C,85,C4,A5,33,D0,03
340 DATA 4C,14,97,C9,01,D0,03,4C,40,97,
C9,02,D0,03,4C,BE,96,C9,03,D0
350 DATA 03,4C,E8,96,C9,04,D0,16,A9,86,
A0,97,A2,20,86,02,0D,31,02,8C
360 DATA 32,02,A9,4C,78,8D,30,02,58,60,
C9,05,D0,06,A9,6E,A0,97,D0,E4
370 DATA C9,06,F0,05,A2,E5,4C,85,C4,A9,
40,78,8D,30,02,58,60,55
```





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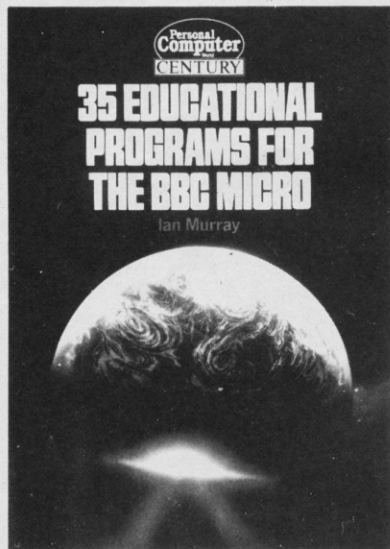
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CENTURY

Suffering from keyboard finger? Take a break with a book.



'Microwars on the Commodore 64' by Humphrey Walwyn, published by Century at £5.95 (paperback, 248 pages).

Wargaming using microcomputers has become one of the growth areas in the software market this past 12 months, but aside from the commercial products, users have been rather left to their own devices. This book goes a long way towards remedying that.

Although specifically for the Commodore 64, it includes notes for conversion to the Pet series and, since all of the programs use the bare essentials of Basic, it is a simple task to translate the programs to other machines.

Mr Walwyn is obviously an experienced and enthusiastic wargamer and no mean programmer. The book is well presented and covers the games and programming side of the subject equally well. There are six games listings here covering an ancient strategy game, Waterloo, a naval battle, a World War I dogfight (including the chance to design your own planes) and a simple flight simulator in which you must bomb a warship.

The graphics are confined to the Commodore character set but they are imaginatively used. Adding user-defined graphics and sprites should be a simple exercise. The listings are all dumps to the printer and there are plenty of mid-game screen dumps so you can see what to expect.

The only criticism I can make is that five of the games require two players. Having to trade places at the keyboard is not the ideal way to play and I suspect that many users would prefer to take on the computer. Perhaps Mr Walwyn could be induced to

write a follow-up along these lines.

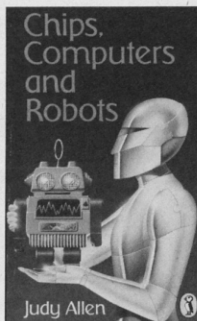
Other than that, it should fill a need for wargaming micro owners and serve as an excellent and inexpensive introduction to the genre for non-enthusiasts.

PW

'Chips, Computers and Robots' by Judy Allen, published by Puffin Books at 95p (paperback, 95 pages).

This book attempts to cover a lot of ground in a small space. To do this the 32 chapters present somewhat sketchy information on, among other subjects, integrated circuits, inside the computer and languages, giving only two or three pages to each. However, this approach may well be useful for the complete novice.

The second half of the book is essentially a list of practical aspects of computing, such as space exploration, chips in health and transport, desk top electronics, and so on. Chapters on robots are illustrated with large pictures that serve little purpose.



The book closes with a glossary of terms 'you may come across in the world of chips, computers and robots', which, like the rest of the book, is brief and sketchy. Not quite the 'invaluable guide to the great revolution of our times' it claims to be but possibly a cheap, very general, introduction to it.

NR

'Making the most of your Spectrum Microdrives' by Richard G Hurley, published by Micro Press at £5.95 (paperback, 152 pages).

MAKING THE MOST OF YOUR SPECTRUM MICRO DRIVES

Richard G Hurley



'Making the most of...' is something of a misnomer here, depending on your view of 'most'. If what you're looking for is a more in-depth guide to the Microdrives than the Sinclair manual provides you'll be disappointed—though some of the explanations are a shade clearer here, that isn't really what this book's about.

What Mr Hurley does do is provide applications and games programs that use the Microdrives, starting with files and data processing in chapter three — surely enough to kill the book stone dead on the bookshelves — and producing an address book and an electronic diary in fairly short order. The program notes are sketchier than I'd have liked, but at least the book is providing much needed software for the drives.

After the filing section, the programs become endearingly whimsical. I'm not sure of the utility of the English/French translator, but just as soon as I've rounded up 63 people and 63 Interface 1s I'll get cracking on the Adventure program. That's right, Mr Hurley has produced a networked adventure game for up to 63 players.

The Slide Show program is also a handy idea, and shows what the Microdrives are capable of. The fast loading time means you can store a number of screens on cartridge and call them up when you need them. The book winds up with a quick look at Interface 2, complete with a Very Long Arcade Game.

JL

'Book of Adventure' by Keith Campbell, published by Melbourne House at £5.95 (paperback, 137 pages).

You are sitting at your computer, the choices are: play your

favourite arcade game, update your accounts, or pick up Keith Campbell's book of adventure and create your own fantasy world. Be warned, take the final choice and you've taken on a real challenge.

The first few chapters are devoted to describing adventure games in general and briefly outline some adventure games currently on sale. Then you get down to planning your own game.

Once you have decided on your theme, objects to help or hinder and the treasure, the book shows you how to make a map of the area and from this how to work out a table of locations, exit codes and their associated destinations.

Next you draw up an object table giving the location of each object and flags indicating whether objects are fixed or movable. Mr Campbell then shows how this information can be entered as data statements.

With this data in your computer, he goes on to detail how to handle strings and set up arrays and gives a clear explanation of conditional statements, all of which are essential for interpreting input instruction.

There's also a chapter which tells you how to present the results on the screen, but these are a bit of a struggle and it is suggested you check each stage step by step.

Having produced a skeleton, you can put the 'flesh on the bone'. In Campbell's sample program this comprises doors concealed by wallpaper, swinging ropes, and a life-saving umbrella.

The sample program is written on a TRS-80 but there are listings for the Spectrum, Commodore 64 and the BBC.

NR



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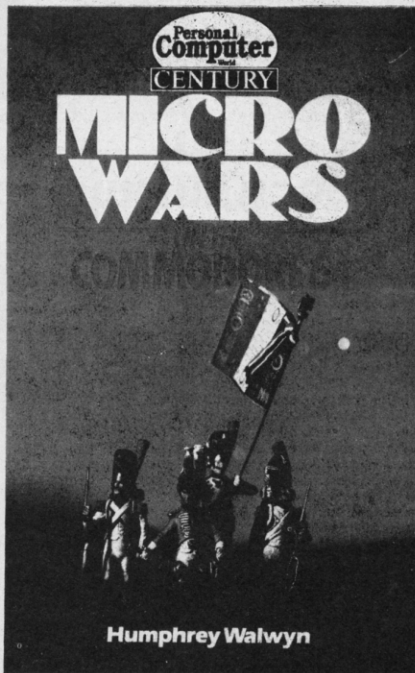
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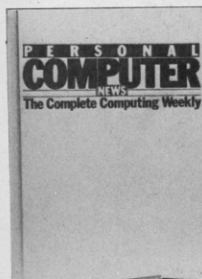
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ATARI Atari 400 new #65, 800 new #150, Atari Thermal printer new #85, Spare 16k ram packs for 800 #22, VIC, Vic 20 new #70, Starter Pack #95, 1540 disc drive demo #130, 34k ram pack new #14, 8k new #22, C2h cassette unit #27, Calc result for 54 new #25, Infomaster ditto new #25.

EPSON, Epson HX20 demo with micro drive #280, 16k Expansion demo #55, Intert #18, Epson diary demo #55, Epson sales demo #14, Epson Mailer #10, Epson Comms rom #12, MX100 Printer demo #290, RS232 interface for Epson demo #40.

HEWLETT PACKARD, HP83 cpu demo #450, HP87 cpu new #590, CPM mod for 87 from #160, 128k module for 87 from #210, HP printer demo #300, HP Dual disc drive from #625, Plotters from #390, HP41C from #65, HP41CV from #85, Card reader demo #50, HP41C printer demo #85, HP11c from #40, HP12c from #60.

OSBORNE, Osborne I demo from #370, Osborne II d-density new inc software pack #590, may have some demo, please ring, DBase 11 #120, BSTAM new #50, Osborne monitor adptr #10.

SHARP, Sharp MZ80A new #220, demo #190, Twin disc drive new #300, demo #250, Single disc drive demo #180, P8 printer new #240, demo #200, Expansion unit new #55, Universal interface new #25, CPM system from #35, Floppy dos from #25, Assembler, Pascal, & Machine Language from #8.

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Issue 1, March 11-18.

Pro-Tests: Apple's Lisa, Tekel TX800; Spectrum speech synthesizer; Apple printer, Commodore network; 3D on Spectrum, graph package for Apple and IBM, BBC graphics system.

Features: computer chess, Occam parallel processing language, Victor/Sirius function keys.

Program/Cards: Towers of Baramah (Pascal), Birthright (Apple II), Roman Year (Apple II), Shape Ulster (Apple II).

Gameplay: Darts, Soccer (Atari); Castle of Riddles (BBC Model B); Pamina (Spectrum); Flight Simulator (IBM PC).

Databases: micro and peripherals.



Issue 2, March 18-25.

Pro-Tests: Toshiba T100, Casa PB100, ZX81/Basicare, vice speech synthesiser, Spectrum spreadsheet, IBM graphics, BBC word processing.

Features: Colecovision, micro background, money computing, Gameplay: Ultima II (Apple), Trader (ZX81), Starquest (Vic 20), Hungry Horror (Spectrum).

Program/Cards: Sirius (editor), Spectrum, Analogue Clock (BBC Model B), Chart generator (Spectrum), String extractor/replace.

Databases: full software listings.

Issue 3, March 25-April 1.

Pro-Tests: TI Professional, Apple speech synthesiser, Fasic 410 printer, IBM keyboards, Pencil-aided computer, Sirius toolkit, Draganale, (Spectrum), Analogue Clock (BBC Model B), Chart generator (Spectrum).

Features: Durgations of the Oracle (Oric), The Castle (Oric), Straphic Command (BBC B), Dragon Trek, Hamilton's Formula (BBC B).

Program/Cards: Lower case (Dragon 32), CBM database cards 5-6, Monster (Spectrum), Wildcard (Spectrum), Fantasy (BBC B).

Databases: hardware.

Microgadgets: Graphics, part 4.

Issue 4, April 1-8.

Pro-Tests: Pled Piger Communicator, Olympia ESW3000 printer, Namco Superlifter, Commodore Calretel, Spectrum Pascal, Cashbook (BBC).

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

Program/Cards: Fruit Machine (C64), Tunemish (Oric), Array Editor.

Databases: peripherals.

Microgadgets: Clubs and user groups.

Microgadgets: Go Forth, part 1.

Issue 5, April 8-15.

Pro-Tests: Commodore 700, Icon Hobbit, 1-2-3 (IBM), ZX81 machine code.

Features: speech packs, monitors.

Gameplay: Grand Prix (Dragon), Derby Day (Spectrum), Deadline (Apple).

Program/Cards: Wacky Racers (Oric), Fruit Machine (C64), Parse Interpreter.

Databases: Software.

Microgadgets: full list of user groups.

Microgadgets: Go Forth, part 2.

Issue 6, April 15-22.

Pro-Tests: Iycom Microframe, IBM PC, Scorpio Discs, Dragon sound module, ZX81 graphics, Bottom Line Strategies (CPM), PaperClip word processor.

Features: IBM PC DOS, BBC word processing, PC-1251.

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

Program/Cards: Wacky Racers (Oric), Mortgage Comparison

(Sharp MZ80K), Computer Set Up

(BBC), Day of Week.

Databases: micro.

Microgadgets: Graphics, part 1.

Issue 7, April 22-29.

Pro-Tests: Mattel Aquarius, Epson FX80, Olivetti JP101, Lisp oric music part 2, transferring. Supergrid on Victor/Sirius.

Features: Dealer support, Atari graphics.

Gameplay: Krakit (ZX81), Cruising on Broadway (Spectrum), Kakuro (Vic 20), Fantastic Voyage (ZX81).

Program/Cards: CBM controls, Computer Set Up (BBC), Wacky Racers (Oric), Julian Dates.

Databases: Peripherals.

Microgadgets: Graphics, part 2.

Issue 8, April 29-May 6.

Pro-Tests: Atari Home Files Manager, Kohra's Vis Star for the Vic 20, Hestares's Accounts for the Spectrum, Epson RX80 printer, NCR's Decision Mate V, Future Computer's FX20.

Features: Micromet, Compact programming on the T1990A.

Gameplay: Harvester (Vic 20), Star (Dragon 32), A first Book of Micro Rhymes (BBC), Telling the Time/Money (Spectrum).

Program/Cards: Program Index (BBC/B), CBM Database cards 1-4.

Databases: software.

Issue 9, May 6-13.

Pro-Tests: Structured Base on the Apple, Peak Power on the Vic 20, Star DP510 printer, Dams and Interloop interfaces for Commodore 64, Micro-Professor.

Features: BBC function keys, Atari word-processing part 1.

Gameplay: Durgations of the Oracle (Oric), The Castle (Oric), Straphic Command (BBC B), Dragon Trek, Hamilton's Formula (BBC B).

Program/Cards: Lower case (Dragon 32), CBM database cards 5-6, Monster (Spectrum), Wildcard (Spectrum), Fantasy (BBC B).

Databases: hardware.

Microgadgets: Graphics, part 4.

Issue 10, May 13-20.

Pro-Tests: Informatica Commodore 64, Dragon Mac; MC20 and CM1800 music synthesizers (Apple), From direct to compiled mode; Epson OX10.

Features: ZX81 graphics part 1; Atari word-processing part 2.

Gameplay: Rescue (Spectrum), Dictator (Spectrum), Champion Empire (Spectrum), Chpflifter (Vic 20), Skyhawk (Vic 20).

Program/Cards: Union, Jack (Lynx), Escape (Spectrum), CBM Database cards 7-9, Evaluate (BBC), Formula (BBC B).

Databases: peripherals.

Microgadgets: Graphics, part 5.

Issue 11, May 20-26.

Pro-Tests: BBC Value, PFS:File Editor, Spectrum Pascal; printer comparison, Pencil Joystick Controller for ZX81 and Spectrum; USE Computer Board.

Features: ZX81 graphics part 2, Base on the Sharp MZ80K.

Gameplay: Motor Mania (Commodore 64), Oric Fight, BBC Music Synthesizer, Music Maker (Spectrum), Embroid Area (Spectrum), Tobor (Spectrum).

Program/Cards: Homeworks and Beyond (Spectrum), Connect Four (Dragon 32), CBM Database, cards 10 and 11.

Databases: Keyboards.

Issue 12, May 27-June 2.

Pro-Tests: Spectrum word processor, PFS:Report on IBM, File Manager for Colour Game, CII CP80 type 1 printer, TO Trackball.

Features: Epson Basic, Oric sound part 1, Tandb Colour graphics.

Gameplay: Motor Mania (Commodore 64), Memory Utility (BBC B), Munch (Spectrum).

Databases: Clubs and user groups.

Microgadgets: Clubs (Cambridge Micro-computer Club special).

Microgadgets: Disk Drives, part 1.

Issue 13, June 3-9.

Pro-Tests: Telewriter for Dragon 32, Aberforth Forth for Spectrum, GPS graphics processing system for Apple II 4; joystick tests, Ajile: Features: Dragon meats andy; Oric music part 2, transferring.

Gameplay: Everest Ascend (Spectrum), Colour Game roundup, Micro Maze (Jupiter Ace), Oric (Atari).

Program/Cards: Cupid (Oric), Atari (Dragon 32), Time Bomb (Atari).

Databases: peripherals.

Issue 14, June 10-15.

Pro-Tests: Apple Accelerator II, Orion Board, Modula 2 (Apple II), Oric Base, Joystick Control Unit J6, Kempston Centronics Interface.

Features: Newbrain Base part 1, Sirius designing.

Gameplay: Ah Diddums (Spectrum), Monopole (Commodore 64), Automopole (Spectrum), Dragon dramatics.

Program/Cards: Time Bomb (Atari, cont.), Sheep Drive (BBC B).

Databases: Software.

Microgadgets: Spectrum, part 1.

Issue 15, June 16-22.

Pro-Test: Com 35, Address Manager (Spectrum), Sytes (Commodore 64), MST Database (Epson HX-20), Voice Input Module (Apple II).

Features: Newbrain Base part 2, Genre scene.

Gameplay: Cleared for Landing, (Baying the Aes (Apple II), M, Valturn, Star Jammer (Dragon 32).

Program/Cards: Mover (BBC B), Colour Clock (Commodore 64), Pirate Island (Atari 32), 91, Micro-mind (Colour, 3), Genie (BBC B).

Databases: Hardware.

Microgadgets: Spectrum, part 2.

Issue 16, June 23-June 29.

Pro-Tests: Atari A Acorn, word processing for the Commodore 64, Simpliflex (CPM), MPP-II printer, Z80 Back to Back (Atari, cont).

Features: ZX81 Maths. US mail order, Atari graphics.

Gameplay: Computer Scramble (Spectrum), Education (BBC), Horace and Spiders (Spectrum), Z80 Back to Back (Atari, cont).

Program/Cards: Video Titrer (T1990A 3 of 6), Bowling (Spectrum), Jaki (Oric), Atari, cont.

Microgadgets: Spectrum, part 3.

Issue 17, June 30-July 6.

Pro-Tests: Duet-16, The Organizer (CPM), Trace and ZX Text (Spectrum), Jaki (Oric), daisy wheel, Video Ultra Text (Apple II).

Features: Leaving part 1, Atari section.

Gameplay: Oric chess, Grand Master (Commodore 64), Escape from Oric (BBC), Jet Pac (Spectrum), The Ring of Darkness (Dragon 32), Spectrum spectacle.

Program/Cards: Video Titrer (T1990A cont.), Pirate Island (Atari, cont.) Word, part 1.

Microgadgets: Sound, part 1.

Issue 18, July 7-13.

Pro-Tests: Tandy 100, RS232 interface (ZX81), ROM pager (Commodore), Interface printer buffer, IBM Personal Base, Spectrum assembler, Newbrain Var.

Databases: Software.

Microgadgets: Sound, part 2.

Issue 19, July 14-20.

Pro-Tests: 16-bit chips, Stock

Features: Insurance; buying second-hand.

Gameplay: Escape MCP (C64), Escape from Perilous (Atari), Apple round-up, Temple of Aphai (C64), Jullin (Spectrum), Healthrow (Spectrum).

Program/Cards: Colour Code (Atari), Wreck (Dragon 32), Microgadgets: Sound, part 3.

Issue 20, July 21-27.

Pro-Tests: Rade barboard, Vide digital tape drive, Sekoisha colour printer, Toolkit (Spectrum), Bonus (Per payroll), Newbrain monitor.

Features: Computer art, Oric interfaces.

Gameplay: Rabbit Trail (T1990A), Ache Challenge (Atari, Vic 20, T1990A), BBC round-up, Joust (Spectrum), Molar Mail (Spectrum), Print Shop (Spectrum), Time-Lords (Dragon), BBC printer, Brother's Tumbler (Oric), Wreck (BBC), Atari Errors, Speed Race (Vic 20).

Microgadgets: Sound, part 4.

Issue 21, July 28-August 3.

Pro-Tests: BBC graphics, Newbrain assembler, BBC turtle, Oric printer, Triumph printer.

Gameplay: Franklin's Tomb (Dragon), Hammer Hero of Horror (Spectrum), Jumpman (64), Jumping Jack (Spectrum), Fourth Encounter (Vic), Cyclons (64).

Program/Cards: Collection (Vic), Boustif (64), Defcon (BBC).

Microgadgets: Sound, part 5.

Issue 22, August 4-August 10.

Pro-Tests: Spectrum Forth, BBC graphics, Music synthesizers, IBM printer, Brother daisywheel, Maltron keyboard, Mupid.

Features: Game assembler, Dragon machine code.

Gameplay: River Rescue, Ore Attacks (Atari), Zork's Lair, Knot in 3D, Combat Zone (Spectrum), Moria (Oric), Velnor's (64), Split, General Election (Spectrum).

Microgadgets: CPM part 1.

Issue 23, August 11-17.

Pro-Tests: Spectrum Backgammon, BBC Snooker, Commodore 64 round-up, Serpentine (Vic 20), Post (Spectrum), Spectrum Salary.

Program/Cards: Word Processor (BBC), Fruit Machine (Spectrum), Microgadgets: Sound Part 2.

Issue 24, August 18-August 24.

Pro-Tests: T-Maker III, Spectrum Backgammon, Atari controllers.

Gameplay: Bridge Master, Styr, Manic Miner (Spectrum), Atari round-up, Candy Flower (Spectrum), Oric, Everest (Dragon), Microgadgets: CPM, part 2.

Issue 25, August 25-August 31.

Pro-Tests: Electron, Simons Basic, Oric monitors, Microdrive.

Features: Newbrain mixer, Acorn Atom, Dragon machine code.

Gameplay: Suspended! (BBC), Warlock, Trans AM (Spectrum), Dragon roundup, Jigger (Oric), Jigger (BBC).

Microgadgets: Commodore 64.

Issue 26, September 1-September 7.

Pro-Tests: Microtan, BBC, BBC tracer, 80 column PET, Oric interfaces.

Gameplay: Magic Mountain, Smugglers Cove (Spectrum), Spectrum roundup, Matrix (64), Ninja Warrior (Dragon), Dallas (Oric), Call to Arms (IBM).

Microgadgets: Commodore 64.

Issue 27, September 8-September 14.

Pro-Tests: Sharp MZ700, BBC Lisp, Apple editor, IBM mic.

Gameplay: Zip-Zap, Zoom (Spectrum), Spectrum roundup, Hover Beaver, Benji-Spar (Rescue 64).

Microgadgets: Dragon, part 1.

Issue 28, September 15-September 21.

Pro-Tests: Zenith Z100, Snail Logs, Atari Speechpacks, Newbrain CPM, IBM mic.

Gameplay: The Witness, Super Soccer, New Slye (BBC), Oric, More Grand Prix (Dragon), Pharaoh's Tomb (Spectrum).

Microgadgets: Dragon, part 2.

Issue 29, September 22-September 28.

Pro-Tests: Portico Miracle, Dragon discs, BBC toolkit, Dragon drives, Apple light pen.

Features: HX20 assemblies, TI transformation code.

Gameplay: Gridder, Gloopert, California God Rush (64), Oric, Fossil, Alley (BBC), Split, General Election (Spectrum).

Microgadgets: Dragon, part 3.

Issue 30, September 29-October 5.

Pro-Tests: NEC, Advanced Personal Computer, Financial Planner (IBM), Kongman's a.b.c. Counsellor, Dog Spotter (Spectrum), Prism VTX800, Extended Basic (Dragon).

Gameplay: Halls of Death/Sword of Forgery (64), 747 Flight Simulator (BBC), Drenth (Dragon), Fossil, Neco Invaders (BBC).

Databases: Search (ZX81), Composer (Oric).

Databases: Hardware.

Microgadgets: Everything you wanted to know about programming, part 1.

Chubb's Clubs:

Issue 31, October 6-October 12.

Pro-Tests: Atari 600XL, Condor



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For the home user

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RETURN OF THE ATARI

Series 20 (IBM), Acacia Non-volatile Diary Filing system (BBC), ROM extension board (BBC).
Features: Oriic sound routines.
Gameplay: Greedy Gutch (Spectrum), Kong (Spectrum), Crazy Kong (64), Colburnt Goes Walkabout/Movie Producer (Dragon).
Programs: Composer (Oric), 555 (Spectrum), Anagram (Dragon).
Databases: Peripherals.
Microcopia: Everything you want to know about programming, part 2.
Clubnet: User Groups.

Issue 33, October 13-October 19.
Pro-Tests: Mattel Computer Adapter (Intellivision), Sprite-Gen (BBC), Typing Strategy (Apple), Micolat 2 (Spectrum), Catch EPCrom Programmer (Apple).
Features: Teletext options, Inside the Genetic.
Gameplay: Space Shuttle (Dragon 32), Atari round-up, Spectralist 2/Football Pools Program (Spectrum).
Databases: Software.
Clubnet: Clubs.
Programs: Bees Away (BBC), Computer (Oric).
Microcopia: Everything you wanted to know about programming, part 3.

Issue 33, October 20-October 26.
Pro-Tests: CWP's Cortex, Sinclair ZX Interface 2, Wat

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ford DFS (BBC), Wordsworth (BBC), Atariware.
Features: Oriic Operating System.
Gameplay: Dragon round-up, Hunter (64), Chicken/Lana Cabs (Spectrum), 3 Deep Space (BBC).
Program Cards: Key Utility (Lynx), Bees Away (BBC), French Test Card (Apple).
Databases: Clubnet.
Microcopia: Everything you wanted to know about programming, part 4.

Issue 34, October 27-November 2.
Pro-Tests: NEC's PC-801A, Simply File (64), The Forest (Spectrum), Amcom DFS (BBC), Carah Microspeech (Spectrum).
Features: Oriic Machine Code.
Gameplay: Fort Apocalypse/Posyan (Atari), Death Cruise/Ching (Dragon), Trench/Canyon (BBC), Football Manager/Pro (Spectrum).
Programs: French Test (Apple), Babyfart (ZX81), Count (Vic 20), Meat/Arts (Vic 20), Road Hog (BBC).
Databases: Hardware.
Microcopia: Everything you wanted to know about programming, part 5.

Issue 35, November 3-November 9.
Pro-Tests: Kaypro 10, Stock Control (Spectrum), Educational games (BBC), Brother EP22 electronic typewriter, ADS Centronics Interface (Spectrum), Jupiter Acc.

Features: Tandy Graphics, BBC Operating System.
Gameplay: Valhalla (Spectrum), 64 round-up, Slinky (Atari), Heeper (64).
Programs: Mini Math (Spectrum), Multi-Square (Oric).
Databases: Peripherals.
Microcopia: Everything you wanted to know about programming, part 6.

Issue 36, November 10-November 16.
Pro-Tests: Tiger from HH, ZX81-Forth, Excom (Oric), Cycle Planner, Growth Tracker/Diet/Diet Master (Spectrum), U-Com 2 (Apple).
Features: Newbrain sound, BBC FX commands.
Gameplay: Creepers (Vic 20), Esterminator (64), Spectrum round-up, Death Miles of Sinus (Dragon 32).

Programs: Falklands Raid (BBC), Mini Math (Spectrum), Pyramid (Spectrum).
Databases: Software.
Microcopia: Everything you wanted to know about programming, part 7.



Issue 37, November 17-November 23.
Pro-Tests: Apricot, Paint (Atari), BBC Micro Toolbox, Spectrovid Compumate (Atari VCS 2600), Big Ears.
Features: Flight simulators, Spectrum screening.
Gameplay: Empire/Treasure Tomb, Crystal Chalice, Temple of Zoren (Dragon 32), Cobus Maze/Bewitched (Vic 20), Cosmic Convo/Planfall (64), Bugaboo/Gordon (Spectrum).
Programs: City Defense (Oric), Falklands Raid (BBC), Pyramid (Spectrum), Monitor (64).

Databases: Clubnet.
Microcopia: Everything you wanted to know about programming, part 8.

Issue 38, November 24-November 30.
Pro-Tests: Coloco's Adam, Small Business Accounts (Spectrum), Masterfile (BBC), Monitor round-up.



Features: Apple programming, NewBrain editor part 1, Dragon action part 1.
Gameplay: Dragon round-up, Zepherus/Blue Max (Atari), Skramble/Falcon Patrol (64), 737 Flight simulator (BBC).
Programs: Shipment (Spectrum), Monitor (64).
Databases: Hardware.
Microcopia: Guide to Monitors.

Issue 39, December 1-December 7.
Pro-Tests: IBM Junior, Grafpad (BBC), Walters WM80 printer (Dyvic) (Spectrum).
Features: Computerspeak, Spectrum Display, Tabs on Oric.
Gameplay: Trace Race/Finball (Dragon 32), Colour Genie round-up, Hunter Killer/Mr Wimp (Spectrum), Crazy Caveman/Sodas Gracious (64).
Programs: Jungle Chase (Oric).

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DRAGON 64
New file for old times?

FREE THIS WEEK

Microc: MicroE One Hundred & Eighty (BBC), Atari round-up.
Programs: Lower CLS (Spectrum), Shipment (Spectrum), Monitor (64), Basic Search (BBC).
Microcopia: Buyer's Guide to Micros.

Issue 40, December 8-December 14.
Pro-Tests: Times 2/58, Thermal Printer TP-10, Cambridge Computing joystick (Spectrum), Beech-Strix/The Synth Music Processor (BBC), Vifwaziv/Vifazepel (64), Education games (Spectrum).
Features: NewBrain editor part 3, Dragon Action part 3.

Gameplay: Pinball Wizard (Vic 20), The Quest of Meravid (64), Way Now/Savage/Pony (Atari).
Programs: Link Four (Spectrum), Till (Dragon).
Microcopia: Buyer's Guide to Peripherals.

Issue 41, December 15-December 21.
Pro-Tests: Apple II, Byte Drive 500, INMAC Power Cleaner, Commodore 1701 Colour Monitor, BC/Basic (64), Database/MST-Cab (Dragon).
Features: Computerised Physiotherapy (BBC), Spectrum Display.
Gameplay: Microcopy/Petrigore's Diary (Dragon), 64 round-up, Dimension Destroyers/Sheer Panic (Spectrum).
Programs: Cosmos Invader (Spectrum), Grid Bike (Vic 20).
Microcopia: Buyer's Guide to Software.

Issue 42, December 22-January 4.
Pro-Tests: Spectrum add-on (U-Microcomputers system), Oric-1 Filestar, Games Designer (Spectrum).
Features: Micros of 1983, Computer Security, BBC word processing, Dragon Action part 4.

Gameplay: International Football (64), Grouch/Chequered Flag (Spectrum), Way Out/Get Boot Jack (Atari), Super-squaders/Outback (Vic 20), Danger Round-Up/Periscope (Dragon 32).
Databases: Clubnet.
Microcopia: Games Special.

Issue 43, January 7.
Pro-Tests: IBM Junior, Grafpad (BBC), Walters WM80 printer (Dyvic) (Spectrum).
Features: Computerspeak, Spectrum Display, Tabs on Oric.
Gameplay: Trace Race/Finball (Dragon 32), Colour Genie round-up, Hunter Killer/Mr Wimp (Spectrum), Crazy Caveman/Sodas Gracious (64).
Programs: Jungle Chase (Oric).

Screen Dump (BBC).
Databases: Hardware.
Microcopia: Election part 1.

Issue 44, January 14.
Pro-Tests: Hitachi MBE-16002, Acorn Teletext (BBC), Intetex Colourjet printer, DTI-Basic (64), Dian/Microprint 4251/Multifont (Spectrum).
Features: Adventure games, Colour Genie characters.
Gameplay: Devil Assault/Wags & Dragon Racer (Dragon 32), Iren City/Forbidden Forest (64), Survival/Countdown (Vic 20).
Program: Minefield.
Databases: Peripherals.
Microcopia: Election part 2.

Issue 45, January 21.
Pro-Tests: Portables — Commodore SX64, Olivetti M10; Acorn sparkjet printer; Turbo 20 daisy-wheel; Spectrum educational software: BBC graphics extension ROM.
Features: Bargain buys: Making money with your micro.
Gameplay: Viking and Pub Crawl (Dragon), Traxx and Wild West Hero (Spectrum), Atari-Commodore 64 round-up.
Programs: Battlerist Fighter (Commodore 64).
Databases: Hardware.
Microcopia: Election part 3.



PCN SCOOP: What's hot in the world of computers

Issue 46, January 28.
Pro-Test: Apple Macintosh: BBC sideways ROM board, IEEE interface for Commodore 64; Silver Reed EX44 typewriter/printer; Badger on Spectrum and Dragon; BBC filing program.
Features: Buying by mail order; programming the Memotech.
Gameplay: Barney Burglers and Gangsters (Spectrum), Birdie Barrage and Plankwalk (BBC), Blue Moon and Dancing Fets (Commodore 64).
Programs: Caves of Treasure (ZX81).
Clubnet
Microcopia: Modems and communication.

Issue 47, February 4.
Pro-Test: Sinclair QL: Atari Touch Tablet, Silver Reed EXP500 daisywheel, IBM Cobol, BBC Spell Check.
Features: Programming the Memotech set 2; Low cost printers.
Gameplay: Mothership and Quintic W (Commodore 64), Two Gun Turtle and Multigames (Oric), Apple adventures, Spectrum round-up.
Programs: Pot Hole (Dragon).
Databases: Hardware.
Microcopia: A to Z of Atari part 1.

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Issue 48, February 11.
Pro-Test: Spectrumdrive 328; Atari 800XL; Dragon 32 disk drives; low cost monitors; Arise C (Apple), BBC educational software.
Features: Sideways printing on Epson HX20.
Gameplay: Bedlam and Morris Meets the Bikers (Spectrum); Commodore 64 round-up; Zordon's Kingdom and Flight Zero-One-Five (Vic 20).
Programs: Gridtrap (Lynx).
Databases: Peripherals.
Microcopia: A to Z of Atari part 2.



Issue 49, February 18.
Pro-Test: Oric Altom; tracker ball controllers; Spectrum speech synthesizers; Rainbow Writer (Dragon); Colour Genie assembler; Spectrum educational programs.
Features: Computer jargon; 42-column display on Spectrum.
Gameplay: Quadrant and Jetpac (Vic 20); Crazy Balloon and Supacatrotropa (Commodore 64).
Programs: Sprite generator (Commodore 64).
Databases: Software.
Microcopia: A to Z of Atari part 3.

Issue 50, February 25.
Pro-Test: Sanyo MBC5C; Commodore speech synthesiser; BBC real-time control interface; BBC machine code card; Atari home utilities.
Features: Expanding your Spectrum; introduction to Lisp.
Gameplay: Urban Upstart and Godzilla and the Martians (Spectrum), Shuttlezack and Hooked (Dragon).
Programs: Minescape (Oric).
Clubnet
Microcopia: Printers part 1.

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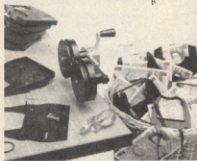
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Ribbon development



It has now been established that a significant number of business crashes, including Osborne, Grundy and Cyril Lord Carpets, have been due to the immoderate use of single pass, multi-strike printer ribbons by thoughtless employees. But all this is set to change.

As our photograph shows, all you need to do is place the offender's finger in between the two rollers, then turn the handle.

Alternatively you can use your £85 GDS Ribbon Miser to rewind your ribbons up to four times. Alternatively GDS, on Crafts Hill (0954) 81074, operates a ribbon rewinding service.

Mind you, we're not out of the woods yet. History has also shown that a major factor in the crashes of Osborne *et al* was the accounts departments' habit of storing £10 notes in waste paper bins. As our photo shows . . .

NEXT WEEK

Rabbit Run — PCN Pro-Tests a domesticated micro called the *Wrapit*.

Driving — Taking up the slack with a Microdrive, we offer you trouble-free tape transfers.

Spritely — A Dragon peripheral tones up your display potential.

Games Special — PCN wraps around a pull-out special with reviews of games for the Spectrum, BBC and Commodore 64.

64 Plus — Where to look for an extended Basic for Commodore's micro.

Novel QL

The 1983/4 Sinclair Prize for Fiction (a princely £5,000) has surprisingly gone to Londoner

Edward Fenton for a novel called *Scorched Earth*.

This has astonished many in the literary community who felt that the eagerly awaited Sinclair QL User Manual would

have been a far more appropriate winner.

But reliable sources tell us the manual may well have a second chance in next year's competition.

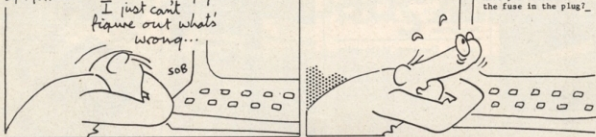
SLANTAX ERRORS

Our account of Imagine's latest moves on the prices front included a comment from Tim Best, who we promoted to director for the occasion. We hope it turns out to be prophetic, Tim.

Last week's attempt to correct the price of Upgrade Technology's Z80 second processor board for the BBC failed miserably. The price is £299 plus VAT.

PAL 2000

by Mollusc



PCN DATALINES

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

UK EVENTS

Event	Dates	Venue	Organisers
COMPEC WALES Computers for Builders Exhibition	April 10-12 April 12	Cardiff University Cavendish Conference Centre, 82 New Cavendish Street, London W1	Reed Exhibitions, 01-643 8040 A4 Publications Ltd., 088-385 2051
Communications and Public Domain Software	April 14	Lancashire Country Council Cricket Club, Old Trafford	Robin Auld, 021-458 2175 (evenings only)
London Computer Fair Computers in Instrumentation Exhibition	April 19, 21, 23 April 16-18	Central Hall, Westminster, SW1 Earls Court, SW5	Tim Collins, 01-930 1612 Reed Exhibitions, 01-643 8040
Personal Computer Games Show	April 20-22	Solihull Conference Centre, Birmingham	Mike Carroll, 01-636 6890
ZX Microfair Midland Computer Fair	April 28 May 4-7	Alexandra Palace, London N22 National Exhibition Centre Birmingham B40 1NT	Mike Johnson, 01-801 9172 Reed Exhibitions, 01-643 8040
Linslade Middle School Computer Fair	May 6	Linslade Middle School Mentmore Road Leighton Buzzard	Linslade Middle School Association, Leighton Buzzard 381664

OVERSEAS EVENTS

Event	Dates	Venue	Organisers
Videotec '84 Computerised Office Equipment Exhibition	April 16-18 May 1-3	Hyatt Regency, Chicago Rosemont, USA	Sally Summers, 0101 212 279 8890 Cahners Exposition Group, 0483 38085
Data Processing, Computer & Automatic Systems Fairs	May 9-12	Lyon, France	Societe d'Exploitation des Parc des Expositions de Lyon, S.E.P.L., BP, 6416 69413 Lyon Cedex 06.

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