

PERSONAL

Computer

NEWS

**STOP
PRESS
GOES UNDER**

THE MODEM

64 LIGHTNING
Zap your Commodore
with White Lightning

SPECTRUM QUESTS
New adventures
from Artic

VIC WRITER
Word processing
in just 3.5K

AMSTRAD ACTION
Can you beat
the Countdown?



IT'S FOR YOU

APRICOT File

What a little
stunner!





Choosing a printer is a lot easier than choosing a computer.

THERE are dozens of quality printers from which to choose. With quality price tags of around £250.

The Brother M-1009, however, breaks all the rules.

Stays defiantly below the £200 barrier.

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In the speed stakes, the M-1009 is certainly no slouch, being fully capable of up to 50 characters per second.

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Being an impact printer, the M-1009 will print on virtually any paper, including letter headings, invoices and standard office stationery.

It will even print two copies together with your original.

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COVER STORY

Spring modems 30

Modem makers have overcome the price problem — it doesn't cost an arm and a leg to get on-line any more. But do they have a convincing case when they talk about the boon of communications? We look at the Protek 1200 modem in detail and assess the prospects for micro communicators in general.



Oric crashes into receiver's arms...



Oric Products International finally gave up the ghost last Thursday, with debts estimated at £5.5 million by receiver Dennis Cross of Charter and Myhill. It's too early to give a firm figure for assets, but initially these looked to be around £3 million.

When PCN spoke to Mr Cross last Friday he said that there had already been a number of 'murmurings' on the subject of a buyer for Oric, and he had already had one formal offer from an overseas company. A management buy-out of the company had been mooted prior to the crash, and this is still on the table. Mr Cross intends to look into the offers further and should have a clearer idea of whether the company can be saved by the end of this week.

But the road to hell is paved with cash injections, as Edenspring, Oric's erstwhile backer, has found to its cost. Edenspring Investments plc came to Oric's rescue when the company got into trouble in the autumn of 1983, but it was Edenspring that called in the receiver last week. Edenspring's agreement with Oric

provided for an initial payment of £2.25 million, with a total maximum payment of £5.85 million. This was conditional on Oric achieving pre-tax profits of £2 million for the two years ended June 30 1985, but under the circumstances we can assume profits have fallen a mite short of this, and that Edenspring has decided to cut its losses.

Oric's career has been chequered to say the least. The company came out of the traps with its Oric 1 micro shortly after Sinclair brought out the Spectrum. Although troubled by bugs, the Oric 1's capabilities were at least comparable to the Spectrum's — but there the resemblance ends. While Sinclair Research went from strength to strength, Oric all too often gave the impression of stumbling from loan to loan.

The defects in the Oric 1 were corrected with the launch of the Atmos, but the pricing of the new machine was botched, dealers became disaffected, and Oric machines were discounted out of the shop windows. From then on the writing was on the wall for Oric in the UK.

OUTPUT

SPECTRUM mayhem 12

Save your spaceship, defend the planet, and teach the hostile alien hordes a lesson they won't forget in a hurry with this listing for the Sinclair Spectrum.

VIC disposable 15

Not a throw-away, more of a write-off as we present a utility that will improve your control over output from a Vic 20 to the popular MP8801 printer.

SPECTRUM Screenart II 17

Home in on the second part of our graphics utility program, a routine that will put last week's Draw on the map.

AMSTRAD bomber 18

Take over from the Bomb Disposal Squad in this testing maze/strategy/arcade game for the CPC464 — the entire human race is depending on you.

COMMODORE Caverns II 22

Continuing the presentation of our exclusive Commodore 64 game Crazy Caverns from Tony Crowther, of Potty Pigeon, Monty Mole and Suicide Express fame.

HARDWARE

A peach of an APRICOT 24

ACT has followed up the original Apricot with a trio of successors. We turn the spotlight on the F1e and find that it doesn't shy away from the attention.

SOFTWARE

Gameplay 36

The Good, the Bad and the Indifferent... our critics weigh up the latest games for the Spectrum, Commodore 64 and Amstrad on our weekly review pages.

COMMODORE Lightning 39

White Lightning was one of the packages of the year in 1984. Now it's available as the Lightning series for the 64. Has it lost anything in the translation?

REGULARS

Monitor 1

Prism shatters but the pieces aren't lost, this page; dealers rap Acorn price cuts, page 2; software houses wake up, page 3; Acornsoft toes ASA line, page 4; Home Front, page 5.

PCNCharts 5

Random Access 7

Put pen to paper and put your point of view.

Routine Enquiries 8

Scratch our experts' heads instead of your own.

Microwaves 10

Dungeon 28

Two adventures from Artic groan on the rack this week.

Software Pre-view 34

What's on the way from the software producers for your machine.

Billboard 43

No charge, no obligation; browse through our regular classifieds.

Quit/Datelines 44

The last word... at last.

... and Prism shatters in week of woe

Ailing micro distributor Prism has called it a day and appointed a receiver — but there are prospects for some areas of the company.

The receiver, Stephen Adamson of accountants Arthur Young, says he aims to keep the Prism Group trading and is negotiating the sale of some parts.

For the moment, he has an agreement with Sinclair Research that will allow a continued supply of Spectrums to Prism's customers.

Other prospects include the Wren Computers subsidiary and Prism's magazine operation, ECC Publications.

Recently Prism ventured into several new areas, including software distribution and sales, and its ranges of robots,

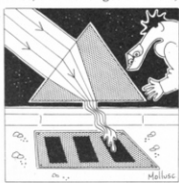
backed up by its main strengths in hardware distribution, modems, and publishing.

However, in a statement issued by the board, Prism said: 'Due to a shortfall in contribution from its principal activities and write-downs in the value of software and modem stocks, the group was unable to support its current trade and the new ventures.'

Those shortfalls included a reduction in Prism's share of the Spectrum market, and problems with the distribution of Oric and Enterprise machines. A bold move into communications also failed to pay off in the anticipated manner and it is reported that Prism has 10,000 unsold modems sitting in warehouses.

The stories of financial difficulties had been mounting for several months culminating in a £1.2 million fund-raising operation (issue 72). Even that proved to be insufficient and rumours began that Sinclair would bail the company out.

Ironically, it was Sinclair that revealed the current situation with a bland announcement that it had ended its distribution agreement with Prism because of its decision to call in a receiver.



IN BRIEF

Commodore's disk drive policy seems to have been inspired by a merry-go-round, with units dropping off and being replaced every few turns. The 1542 was never officially launched in the UK and never will be now; but the slimline device that Commodore showed at the Las Vegas show last month may be on the way this summer.

After strenuous denials Sinclair has cut the price of Microdrive cartridges to £2 this week. Shortly before it launched the Spectrum Plus it strenuously denied that it had any plans to tamper with the Spectrum. You can draw your own conclusions.

QL software will be easier to find in the near future with two releases from Quantum of Doncaster. The company has Logo packaged on a Microdrive with utilities, a file-header reader, and a game for £6.95. Another package brings together Intergalactic Trader and more utilities, at the same price.

Apple's 512K Big Mac is outselling its 128K kid brother, but neither is doing as well as Apple had hoped. Reports from the US suggest that the revamped and re-priced IBM PC Jr is more than holding its own against the Macs. There is still no sign from IBM of the Jr being launched in the UK.

Minder fans can look forward to stepping into Arthur Daley's ones and twos and finding out how good they are at selling rain-damaged umbrellas in a new game from DkTronics. Licenced by Thames Television, DkTronics has transferred Arthur, Terry and various geezers from the TV series on to the Spectrum. Commodore 64, Amstrad and MSX versions will follow. The Spectrum model is due out at the end of February for £9.95.

Nidd Valley Micro Products (0423-864488), producer of the Slomo game speed controller for various machines, has its nose out of joint since cheques for the product are being made payable to Cambridge Computing Research, its manufacturer and distributor. Worse, CCR is in receivership. Please note that Slomo is available from Nidd Valley at Stepping Stones House, Thistle Hill, Knaresborough, North Yorkshire for £14.95.

Buoyant Enterprise Computers is about to go into full production. The first priority, it says, will be to supply the 10,000 Enterprise Club members who signed up last year.

Price war victims count the cost

The price war brewing in the home micro market has taken a new turn, as computer dealers assess where the Acorn Electron and Spectrum Plus price cuts leave them in terms of survival.

Acorn in particular seems to have lost friends and has dropped 11 of its 17 distributors. One dealer described his new profit margin on the Electron as 'ridiculous—at the new rate it's not worth having them.'

Other dealers are similarly displeased, and some have either ceased stocking the Electron or are considering dropping it. Larry Jacobs of Jacobs Computers is one of those who has pulled out. He estimates the profit margin on the Electron as 26, and doesn't feel that it's worth his while continuing with it. He also claims that some distributors are considering stopping handling the Electron.

This suggestion drew a hoot of mirth from a spokesman for the Spectrum chain, but if there's talk among dealers of distributors pulling out this can't be good news for Acorn.

Another dealer voting with his feet said: 'If somebody wants an Electron I'll sell them one but I won't steer them towards it. Everything's gone down so much that we just sell what's got the best margin.'

Sinclair, on the contrary, seems to have struck the right note with dealers. Sinclair itself will only say that the deal it's offering varies from distributor to distributor depending on size, but the Spectrum chain is currently offering credit on Spectrum Minus purchases made in the 30 days up to January 21, and is swapping any old Spectrums in a dealer's stock for the new Spectrum Plus.

When PCN suggested that Sinclair might be operating a particularly favourable deal with its distributors in order to kill Acorn, a Sinclair spokesman would only comment that PCN had a vivid imagination.

Commodore seems to have won friends by imposing a price freeze over Christmas, but many dealers are still wary about over-ordering — with prices so unstable nobody wants to carry too much stock.

Acorn responded promptly and vehemently to suggestions that its dealers were unhappy about the way they'd been treated over the Electron price cut.

A spokeswoman categorically denied that the profit margin would be as low as £6, claiming that, although the deal was still being negotiated, margins

would be comparable to what they had been before. She also said that Acorn would be refunding the difference in price to those who'd lost money on existing stock, and said that there was no truth in stories that distributors were considering dropping the Electron.

The dealers PCN spoke to were all, to varying degrees, disaffected, and even before the price cut Acorn had the reputation for giving dealers low margins. Last year's 'pullout' from the UK market by Oric was to a considerable extent influenced by a collapse of dealer confidence, followed by panic discounting, and this example must even now be furrowing brows at Acorn.

Tandy goes for NEC's jugular with 100 cut

Price-cutting is turning into throat-cutting as Tandy and NEC battle it out for sales of lap-held portables.

Until the end of February the 8K Tandy Model 100 will cost £349, almost £50 less than the NEC 8201A. The 24K version comes down by £110 to £469, and it is by no means certain that prices will return to their former levels — £449 and £579 — when the sale period ends.

Tandy started off the leapfrogging match when it took £50 off the Model 100's price last September. NEC responded a month later by slashing £80 from the 8201A, bringing its price to £395. Another month later it went further, offering the machine at £299 for a limited period.

A Tandy spokesman admitted that the latest price cuts were a response to NEC's aggressive pricing.

Commodore UK pulls in its horns

Commodore is feeling the pinch after a slack Christmas, and 114 jobs have been lost at its Corby manufacturing plant.

In the US it has laid off 540 production workers but it expects to re-hire them by late spring. The jobs lost at Corby, it says, include temporary staff taken on for the Christmas peak; but some members of the permanent workforce have been laid off as well.

Commodore builds the 64, Plus/4 and 16 at Corby. It originally planned to create 1,000 jobs there, and the workforce (now at 600 people) is roughly at the level Commodore had expected to reach by the end of 1984.

The writing isn't necessarily on the wall for Commodore but the enthusiastic talk of a continually expanding market has gone.

In its place Commodore 'keeps its options open' and asserts that this year it will be equally active in the home and business markets.

General manager Howard Stanworth said last week that the challenge for manufacturers from now on would be to give you new reasons for buying a micro. Indiscriminate price-cutting is not thought to be a 'new reason' in the Commodore book.

But Stanworth's comment and the lay-offs at Corby point to the likelihood that Commodore has more machines in stock than it can sell, and possibly too much production capacity. The response in these circumstances is a quick sale — but a spokesman said that the company still has no plans to reduce the price of the 64.



OSBORNE REVISITED — The latest machine from the 'back from the dead' company Osborne is ready to be launched on the British market. The Osborne 4, more affectionately known as the Express, is a 64K, Z80-based CP/M machine. It is a transportable machine with integral 5.25in disk drives and monitor. The computer is roughly half the size of its predecessor, the Osborne 1, and of equivalent machines even though it weighs about the same. Bundled software includes Wordstar, Supercalc2 and Mailmerge, all £1,300.

Software releases spring forward

Software producers are about to come out of hibernation after some of the most barren weeks ever.

There was hardly a release worth talking about in January, but software houses must have been beavering away under the ice and snow because a crop of new games will spring up over the next few weeks.

Newcomer Cascade will launch 'something new to the computer games world' on February 13. Our guess is that this will be a flight simulator of sorts.

Micro-Mega is to hold its first ever press conference on February 14, at which it will show an important new game, probably for the Spectrum. The company is also converting some of its titles for the Commodore 64; the first of these — Full Throttle — will be on sale from March.

Micro Computers is on the verge of releasing a version of 3-2-1, with prizes sponsored by Walt Disney, Bendy Toys and Virgin Games, among others.

The end of February will see Ariolasoft selling Spectrum versions of the 64 American

hits *Raid on Bungeling Bay*, *Choplifter*, *One-on-One* and *Archon*. This shows the successful tie-up between US Gold and Ocean.

Ultimate should launch *Alienate* in mid-February, marking a departure from its *Atic Atac*, *Sabrewulf* and *Underworld* series. However, *Mirreare* and *Pentagram*, to be released later in February, will continue the winning formula.

Hewson will build on the success of its clever *Avalon* with the follow-up *Dragonorc* of *Avalon*. New Generation's immediate plans are away from the games field. The company will soon be offering a version of its *Machine Code Tutor* for the Amstrad and a new graphics package for the Spectrum, called *Light Magic*.

Mikro-Gen is preparing to release the latest in its *Wally* series of Spectrum games. Everyone's *A Wally* will be shown at the LET show (February 17-19, Olympia) and will be in sale from February 23.

Described as 'the first ever multi-role arcade adventure', the unusual feature is that the player can switch control from one character to another.

We also liked P Albericci's social concern: 'He takes VDU health hazards too seriously'; and M Williams' surreal: 'I think I just blasted my own caption.'

But, back to Mr Reagan. Anthony King was totally disrespectful with: 'It's bedtime Mr President — you can blast the Commies tomorrow.'

Finally, we decided on the entry from Julian Fuller, of Dawlish in Devon, who will receive the £100 prize. Julian came up with: 'Tell Chernenko to hold the line — one more wave of SS20s and I'm in the Hall of Fame.'



Captain marshalls Viewdata troops

Imagine for a minute that you're totally illiterate. From the television you are aware that there's an information revolution passing you by — hard copy is streaming out of printers like the wool unravelling from a de-stabilised pull-over and you can't read a word of it.

This is how non-Japanese speakers will be feeling about a system called *Captain* in the land of the rising sun at the moment. *Captain* is a character and pattern telephone-access information network along the lines of your Prestel. It's an electronic junction where information providers (IPs) and people like you and me (users) interface.

It went into operation in Japan on November 30, 1984 in Tokyo and Osaka. That might sound a little late in the day, but there are good reasons for that; besides, it has meant that the Japanese have been able to avoid some of the teething troubles that traditionally beset pioneers.

Not that it has been an instant success. Prestel, as I recall, has taken off with the lumbering reluctance of a flying boat. *Captain* opened the innings with some 2,700 customers, all but 300 of whom were IPs. But the base is expected to be 15,000 by the end of March, 50,000 by 1987, and three million by 1991, multiplied by the number of inhabitants or employees at each terminal. Unfortunately, functionally illiterate as I am in this country, I won't be among them, though members of my family might be.

The hardware for the system consists of a regular television set or a high-resolution monitor, an adaptor costing £771 (the pound has done badly against the yen recently, and this price is expected to drop anyway), a keypad about the size of a scientific calculator for interfacing with the system, and an optional printer at about £210. Data is stored in the form of screens and the current system has the potential to offer one million screens, although only 90,000 are available at present. Rates are reasonable at about 10p for three minutes

of access (from anywhere in Japan) with screens costing anywhere between 1p and £35.

Among the obvious types of information offered are news and weather, sports results, government statistics and so on. Among the major IPs offering data are Japan's leading department stores, Japan National Railways, and the main Japanese airlines. The nation's largest chain, selling concert tickets for concerts and other events (members only), is also an IP. All these IPs have a system whereby the users (all 300 of them) can and will be able to order services and merchandise. In the service category are the major Japanese banks, who are already on-line with a variety of services including networked nationwide cash withdrawal and which are developing systems for home banking.

It's important to remember that with such in-home services already operational in other countries, the problem with Japanese character writing that has plagued other aspects of computerisation has held back development in this area.

One of the methods to implement such services to special user groups — perhaps even bank customers and concert-goers — will be by forming closed user groups (CUGs). A very strong service industry candidate for this kind of IP interaction will be cramming schools, which will offer members of their CUGs home tutorials in languages, mathematics, and science, not to mention sample questions for their college entrance exams.

At present the *Captain* system is also offering a variety of programs that run simulations for users. Maybe unsuccessful crammers will be able to simulate a college career. But again, the illiterate will be excluded. For those like me who do not read Japanese, the successive screens will probably mean as much as the leaves at the bottom of a tea cup. No doubt fortune-telling will be among the regular services.

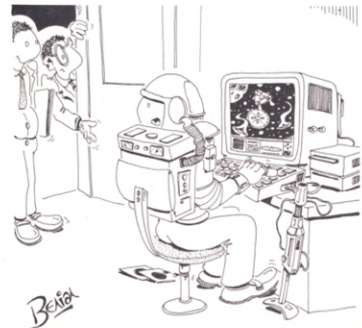
And so, in its way, Japan is gradually leap-frogging into the 21st century — with a strange gap between leaps. As *Captain* grows it will become the vehicle for electronic mail, access to more sophisticated databases, and for all kinds of other neat stuff.

As for me, I guess I'll just have to sell my micro, buy a goose from which to pluck the quills, scrape the deposit from my kerosene heater to make ink, and dream of the good old days when writers thought they controlled the flow of information. Unless the *Captain* goes down with his ship... **Serge Powell**

Captivating caption wins reader £100

A couple of weeks ago we asked you to supply a caption for one of Benian's cartoons. The response was better than we anticipated with many entries raising a laugh.

The two most popular themes were variations on *Elite*, and President Reagan's *Star Wars* programme. On the whole we preferred the more original ideas like the one from chocolate fiend IG Burns who submitted: 'It says press Space Bar for Milky Way but all I get are Galaxies.'



Acornsoft toes line after ad complaint

Acornsoft has gone on the record with a commitment not to advertise products before they're ready.

This might sound tame, but in the microcomputer business it virtually makes history. Acornsoft's promise was dragged out of it by the Advertising Standards Authority (ASA), which was following up a complaint relating to the promotion of JCB Digger and Creative Assembler on the BBC Micro in late 1983. The person who lodged the complaint had waited five months for his order to be filled.

The ASA is a watchdog set up to maintain standards in advertising. It lacks teeth, having no power to impose concrete penalties on advertisers that contravene its code, but it has bared its gums at Acorn several times in the last 18 months and has at last got a response.

Its latest report contains a comment that connoisseurs of Acorn's style will want to cut out and frame: 'The advertisers (Acornsoft) pointed out that the items featured in the brochure had all included an expected publication date, but they accepted that in this instance this had been missed by several months.'

To avoid a repetition, Acornsoft gave the ASA an undertaking that 'products would not be mentioned until their publication was imminent'.

The Acorn group turns up again in the ASA's report in a complaint upheld against Lion House, the large micro retailer on London's Tottenham Court

Road. To celebrate the opening of 'the largest Acorn Centre in Europe' Lion House promised to give away an Acorn Data Recorder with five cassettes to anybody buying a BBC B, but it ran out of Acorn models and had to offer a different type.

ACT drew the ASA's fire for advertising the availability of Word on the Apricot before it could supply the software. The ASA asked ACT to refrain from promoting in future those products the availability of which was in doubt — that should put the fear of God into them, if anybody at ACT candecipher it.

Solo leaps in at the Sharp end

Solo Software has released 45 new titles for the Sharp MZ700, the machine that gained a big brother at the *Which Computer?* Show.

Solo's new releases are almost exclusively games, varying from cheap and cheerful 'fun packs' to arcade games and graphics adventures at the £9.95 level.

But there are also four briskly businesslike packages, including stock control and payroll systems for £29.95 each.

The company says that all its software will be made available for the new MZ800 as well.

Sanyo's heavyweight hits the streets

The best you can normally hope for when yet another PC-compatible hits the streets is that its price will be low enough to set the cat among a few pigeons.

Sanyo has done better than that with its MBC775 trans-



Tough on the streets — the Sanyo MBC775 IBM compatible.

portable. The machine has 256K, twin 360K disk drives, a colour monitor and MSDOS 2.11. It costs £2,150.

The street it hits could take quite a pounding from this 36lb heavyweight, but at least the bundled software — Wordstar, Calcstar and GW Basic — won't add to the load. Also free with the machine are details of a new venture, the Sanyo Micro User Association.

To join this body will cost you £40.25 a year; in return you'll have access to a telephone hot-line service and a quarterly magazine which is expected to be a vehicle for dealers to advertise special offers.

You can get more information on the Association by calling Freephone SMUA.

Sinclair projects QL at students

Sinclair is making a bid for the allegiance of tomorrow's citizens by pumping money into Strathclyde University.

The aim of the project is to put a QL into the hands of every student 'in all relevant subjects' by the end of the decade. Sinclair is contributing £250,000 worth of support — the Computer Board for Universities and Research Councils is adding a grant of £150,000, and Epson and MBS are supplying printers and monitors respectively.

The idea is that students will use the systems at home as well as in the lecture theatre. 'The computer is the student's portable work station,' said Strathclyde's Professor James Alty, the director of the project.

Strathclyde must know something about the QL that Sinclair isn't telling the rest of us, because Professor Alty cited its 'range of applications and above all, portability' as the factors that make the QL ideal for such a scheme.

Germans offer C64 printer freedom

Thanks to the tumbling Sterling, the noted West German supplier of Commodore bits and pieces, Mikrocomputer technik, has started quoting its prices in dollars. But if you're after a printer interface for a 64 (or an Atari) you might get them to charge you in a sensible currency.

Mikro has just released its Universal printer interface, type 96000 in its catalogue, for the 64 and for the 128 when that is available. The company claims that it will make a vast number of printers behave as though they had Commodore



96000 — fit for a Commodore.

stood all over them.

That means Epson, Brother, Quenda, Seikosa, Mannesmann Tally, Centronics, and a list of others.

The interface connects to the 64's serial bus and, according to Mikro, doesn't get temperamental when called upon to go through hoops by the software you're running.

The company's Atari offering is called the 72000. It will let you connect any Centronics-type printer to an Atari 800XL without taking up any memory and without a separate software driver.

The interfaces cost \$70 each. They come with cables and an English manual. Mikrocomputer technik is at Winchenbachstrasse 3a, D-5600 Wuppertal 2, West Germany. Telephone 010-49-202 505077.



ALLEZ FRANCE — 'Allo Angleterre. Era iz your fourst sight of ze premiere micro en France, which calls itself (ow you say?) ze Goupi PC. Net anuzzer MSDOS 8085 machin, I' ear you lament. Ze Goupi 'az all of zis and meuch meure — 128K expandable to 768K, 'igh resolution grapheecs, 8MHz, and classique Frainsh good looks. In your muck-shotten isle ze Goupi woe set you back merely £1,995, unless ze Pound plummets against a basquet of francs. Claude Szaniewski on 01-785 2411 woe! apply put you in ze peinture. Hasta la vista, Angleterre.



Independence wars: only one winner

It's been simmering for ages. Since Acorn retained the BBC contract, the rivalry between Chris Curry and Sir Clive Sinclair has had an edge unusual in business competition.

The dust-up in Cambridge at the turn of the year, when Sir Clive of the Black Watch jostled briefly with the villain Curry, was an unusual interpretation of standard business practices. Can you imagine Lord Weinstock (in the red corner for GEC) going three rounds with Ernie Harrison (in the blue corner for Rascal)?

Sinclair's public relations people, faced with a disaster of Torrey Canyon proportions, attacked the spreading slick with a squirt of Sunlight washing-up liquid. The reporting of the incident had been exaggerated, they said. Acorn's image builders were more jocular, and gave the impression that Mr Curry had inflicted slight damage on Sir Clive's hand by attacking it with his other cheek.

Unfortunately, the bout turned out to be a six-day wonder, which is a pity because these are trying times and anything that adds colour to our lives must be welcome.

But it did call to mind a saying of Jack Tramiel (who actually looks like a pugilist): 'Business is war.' And in an odd, looking-glass way, the Cambridge clash of titans was a curtain-raiser to a most businesslike war.

'War is an extension of politics by other means,' said the German military theorist von Klauswitz, but in business it is the other way round. Most businessmen prefer to avoid physical violence; they sort out their differences in more civilised ways.

Sir Clive, loser on points in the first bout, suddenly discovered a big punch. It came from way back in the Christmas sales figures. Acorn should have seen it a mile off, but when it exploded in their faces and the Sinclair Plus was down to

£130 there was no time to get out of the way.

Acorn responded with a price cut to the Electron but nobody is much impressed with this as an example of its punching power. If its share price is any indication, the company is still taking a standing count. A more telling price movement is the one taking place behind Acorn's back; the BBC Micro is gradually becoming cheaper in the shops.

This began as a boxing match but the next stages will see it turn into a saloon brawl as more and more manufacturers are drawn in. The ornate mirror will be smashed, the gambling wheel will be overturned, and the brawlers will tumble out through the swinging doors into the street.

Commodore had a bad Christmas in the US and there is talk across the Atlantic of the 64 coming down to \$150. It would be no surprise to see the machine selling for £150 or £160 in this country before long. That would increase the pressure all round. It hardly matters that it could be the first stage in Commodore's phasing out of the 64 — look how long it's taking the company to phase out the Vic 20.

Atari has already cut the 800XL by so much that it might eventually give it away with corn flakes. Besides, it needs to prepare the ground for the introduction of the XE range, and its intention is to get rid of existing stocks.

Neither Sinclair nor Acorn had much of a toe-hold in the US, so their private battles aren't likely to have any effect on the struggle developing there between Atari and Commodore.

But in the reverse case, with Atari and Commodore both very much alive in the UK, the reverberations could have profound effects.

Atari declares that it employs a world-wide pricing policy. If its aim is to dominate the US market (killing off Commodore in the process) the prices it establishes there will probably set the trend for its prices here.

If it sets them low enough to undermine a company with the strength of Commodore in the US, imagine the havoc it could wreak in the UK.

Sinclair and Acorn should conserve their strength. Perhaps, with the quaint view they seem to have of business rivalry, they imagine that a British champion should be found to ally forth and take on the Americans. But at the moment neither company looks in particularly good shape for the job.

David Guest

CHRISTMAS GAMES

TW	LW TITLE	PUBLISHER	MACHINE	PRICE
1	1 Ghost Busters	Activision	SP,C64	£9.95
2	3 Match Day	Ocean	SP	£6.90
3	2 DT'sDecathlon	Ocean	SP,C64	£6.90
4	8 Airwolf	Elite	SP	£6.95
5	6 Elite	Acornsoft	AC	£15.00
6	— Blockbusters	Acornsoft	Various	£7.95
7	— Technician Ted	Hewson	SP	£5.95
8	20 Impossible Mission	CBS/EPYX	C64	£9.95
9	9 Select 1	Comp Records	SP,C64	£12.49
10	5 3D Star Strike	Real Time	SP	£5.95
11	4 Knightlore	Ultimate	SP	£9.95
12	— Zaxxon	US Gold	SP,C64	£9.95
13	7 Hunchback II	Ocean	SP,C64	£6.95
14	10 Doomdarks Rev	Beyond	SP	£9.95
15	— Monty is Innocent	Gremlin	SP	£6.95
16	— Blue Max	US Gold	SP,C64	£9.95
17	— Combat Lynx	Martech/Durell	SP,C64	£7.95
18	— One on One	Ariolasoft	SP,C64	£9.95
19	— Frak	Aardvark	C64,AC	£7.90
20	— Gift From The Gods	Ocean	SP	£9.95

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TW	TITLE	PRICE
1	Ghost Busters	£9.95
2	Match Day	£6.90
3	Airwolf	£6.95
4	Technician Ted	£5.95
5	3D Star Strike	£5.95
6	Knight Lore	£9.95
7	Zaxxon	£9.95
8	DT's Decathlon	£6.90
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9	Bruce Lee	£9.95
10	Blockbusters	£7.95

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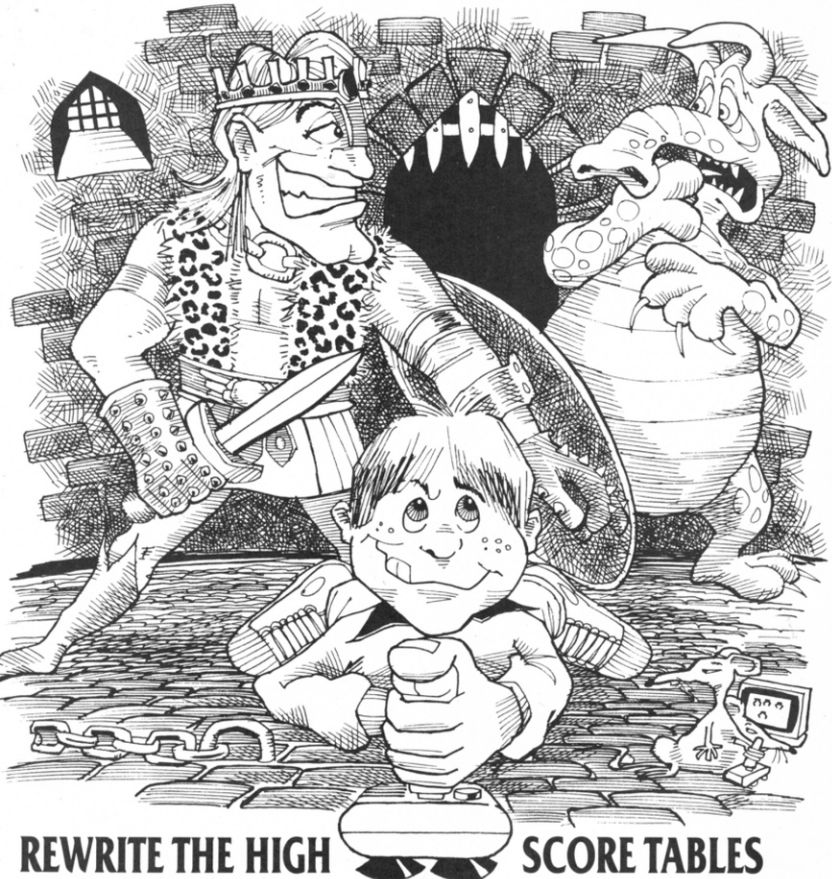
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1	Spectrum	£125
2	CBM 64	£199
3	Electron	£199
4	Amstrad	£349
5	CBM 16	£140
6	BBC B	£399
7	Atari 800XL	£125
8	MSX (series)	£250
9	Einstein	£500
10	Sharp MZ700	£250

ABOVE £1,000

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1	IBM PC XT	£2,390
2	ACT Apricot	£1,760
3	Compaq	£1,795
4	Olivetti M24	£1,595
5	Dec Rainbow	£2,359
6	Televideo 1605	£2,640
7	Wang Professional	£3,076
8	ITT Extra	£1,985
9	Ericson PC	£2,095
10	Macintosh	£1,795

These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets during the week up to January 31. The games chart is updated every week. The prices quoted are for the no-frills model 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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RANDOM ACCESS



Intrepid explorer maps out big game

I was interested to read the letter from Beyond Software about its *Doomdark Map* (issue 94) and would like to make a few comments.

First, *Doomdark's Revenge* is a brilliant piece of software but I totally agree with you that a decent map should have been included. I am so disgusted about having to fork out an extra £1.95 that I have decided to try to make my own map. If successful I will send you a free copy.

Second, has anyone won the QL that Beyond Software promised in their *Psytron* competition? I wrote to it twice, once asking about bugs in the program, and once sending in a high score of 29min on the final stage. I have received no reply so far.

Last, the article said lots of people were asking for maps of *Lords of Midnight*, could this be because the map supplied was not detailed enough to be able to play the game properly? It would certainly seem so.

William Hull,
Eveonhull, Berwickshire.

Difference of opinion on gameplay review

I am rarely moved to write to magazines but on reading your review of Realtime Software's *3D Starstrike* I must correct Mike Gerrard.

I feel he has made several mistakes in his comments. First, he says that getting through the first screen is easy. I suggest he tries the hardest skill level when he will find he is thrown into level 7.

Second, he has failed to destroy the shield in the reactor section which puts him back to the start of the corridor he has just flown through. I also wonder if he knows that you can shoot the enemy's missiles which helps to keep your own shield intact.

Finally, when you think of the number of calculations the computer must go through to create good 3D graphics, I think the speed of this game stretches the Spectrum to its limits.

G Shackelford,
Ruislip, Middlesex.

We're happy to let you put your point of view. Obviously, all

Share your words of praise or send us a rocket about PCN. We want to hear your views and feelings on the articles we print — and those you feel we ought to. Write to *Random Access, Personal Computer News, Evelyn House, 62 Oxford Street, London W1A 2HG*. You could win £15 for the best letter of the week.

software reviews are subjective which is why we publish the names of our reviewers — so you can get to know the ones who share your tastes — Ed.

Enterprise owner's second opinion

With regard to your Enterprise review (issue 94) I must first say your review must be the only one that didn't condemn the keyboard outright: it is indeed much better than the QL or Spectrum Plus boards.

I agree that the Basic is 'long-winded' but, as a once devoted Sinclair user, it is an excellent language. For instance, what Basic allows four programs in RAM at the same time, allows you to delete or renumber as many lines as necessary, a choice of eight graphic modes, a trace command switch the tape loading sound off, just a few of the 196 commands, functions and statements?

Second, the transformer does indeed buzz. Third, the disappearance of colour on the television. You were lucky — I went through three different machines and still have the same problem. The shop I bought it from early in December went through six of the last machines they had in stock and they too had the very same problems (badly tuned.) The distributor here said I should wait till the Enterprise goes in full production for a replacement model.

My demo cassette had quite a few volume problems but all programs on sides 1 and 2

loaded. I was disappointed in the interface. Maximum text of 84x56 or high-resolution graphics of 640x512? The answer is no, maximum text is only 80x50; and high-resolution is 640x320. Graphic screens only have a 180 vertical resolution (180x180). All the reviews I have read don't mention this. (These figures are in the demo manual by the way.) You fail to mention the generous length of wiring and cables, not forgetting the wall plug, that come with the Enterprise, something other manufacturers don't do.

Leslie Aust,
Dublin, Eire.

Taken to task over teletext article

TTX (issue 95), I would like to point out that the number of people using a teletext set is approaching the two million mark. That is quite a substantial 'place in the sun' to use Ian Scales' phrase.

I also disagree that teletext is a limited medium. Ian Scales compares Ceefax and Oracle with Prestel and draws attention to the fact that the volume of information is much greater on the telephone delivered system.

This is an unjustifiable comparison because the two media are completely different. Prestel was designed to be an encyclopaedic database. It has a wide-ranging brief and offers some specific and useful information for closely-targeted groups (eg the travel trade, estate agents, banks and pro-

viders of a number of retail services).

Teletext, however, began with the brief to provide news and information for a mass audience when and where they chose to look at it.

It costs the user much more to use Prestel than to use teletext. The reception equipment is cheaper for teletext and, once the viewer has bought a set, it is free.

Technological advance will also remove what many consider to be the broadcast teletext medium's biggest problem. A new generation of teletext-equipped televisions will store several pages at once, and 'chain' them together by using the so-called ghost rows in a teletext page.

From February 11 the Channel 4 teletext service, 4-Tel, will be broadcasting teletext for the Sinclair Spectrum. Initially the software will be based on the *4 Computer Buffs* show. Eventually, we hope to offer teletext for a wide range of microcomputers. Further details from 4-Tel Teletext, Channel 4, 60 Charlotte Street, London W1.

Mort Smith,
managing editor,
4-Tel Teletext, London W1.

A second very Sharp point

In issue 97 John Schofield commented on the organisation Independent Sharp User Group (ISUG), saying he had sent them £10 to join last June and had since received only one newsletter. He was fortunate. Seeing the organisation describe in *Your Spectrum* No 5 I sent off for details and duly received an application form with details of the organisation on the back (clever, no record remains). I sent this back with the £10 (cheque later presented), to Mr Vic Webber of Burnley, Lancs.

Since then I have heard nothing. I wrote to Mr Webber on November 10, asking for my money back. No reply. I rang directory enquiries to get a telephone number, to be told no phone was registered to that name at that address.

I feel sure Mr Webber has received many subscriptions in similar fashion.

M Haine,
Rugby, Warks.



Market Research reckon that after MSX we change its name and start again.

ROUTINE ENQUIRIES



Basic guide to the perfect computer

Q Could you tell me which of the following computers would be best for programming in Basic, and later, in machine code: Amstrad, Sinclair QL, Commodore Plus/4, BBC Model B, and any of the MSX machines?

Brian Turner,
Wallasey, Merseyside.

A You make it sound as though programming will be the end of your computer involvement, but it is never that simple. For example, you probably want graphics and the best Basic in the world won't help if you're programming a machine that doesn't have the facilities you want (alternatively, you might find a machine that has the facilities but not the Basic—Commodore hang your head in shame).

Of the machines you mention, the BBC has perhaps the best Basic, closely followed by the Amstrad, although none is as dire as the Commodore 64. As you can see, this isn't getting us very far.

So, what of machine code? Again, it depends. You're looking at three kinds of processor—the Z80 (Amstrad, MSX), the 6502 (Plus/4 and BBC) and the 68008 (QL). Unless you know a great deal about these different processors, the main consideration will be whether you're writing for pleasure, or whether you want to learn with an eye to making money later.

The Z80 is the most popular processor on British machines like the Spectrum, Amstrad, Enterprise and Memotech, as well as most of the smaller business machines.

The 6502 is the more popular on American home computer systems like Commodore and Apple as well as the BBC Micro. The QL is the more interesting since the 68008 is a derivative of Motorola's 68000 chip used in the Mac and the new machines from Atari and Commodore.

Your final choice really is up to you—all we can say is that you shouldn't buy a machine purely from a programming point of view. If nothing else, when you come to machine code you'll want the best development programs you can get—in which case the Amstrad, Plus/4 and MSX machines look distinctly weak.

Suffering from circuit crunch or data dyslexia? Want some sound advice on speech synthesis or the best type of printer? Then consult the experts. But remember, no SAEs, 'cos we can't reply personally. Address your queries to Routine Enquiries, PCN, Evelyn House, 62 Oxford Street, London W1A 2HG.

Tracking down the Morex disk drive

Q I read an article by Gavin Monk (issue 93) where he mentions a disk drive by the name of Morex. Can you let me know who makes it and if you are planning a review can you let me know which issue it will appear in so I don't miss it?

Daniel Demaret,
Göteborg, Sweden.

A The drive Gavin referred to is made by Morex Peripherals, of Reading. You can telephone them on 0743-584238. As to a review, you've already missed it—we published it in April last year.

However, you can order a copy of that issue from PCN Back Issues, 53 Frith Street, London W1A 2HG.

Morex was then offering a range of systems including a 200K drive for £286, and a top-of-the-range model offering 800K for £539.

Smooth path to Amstrad printout

Q I want to buy a printer which must have good quality printing and the ability to do screen dumps from my Amstrad computer. It must cost less than £250. I am considering the Amstrad DMP-1, Shinwa CP80As, the Brother HRS or the Epson RX80. Can you suggest which is the best?

Martin Cleave,
Ipswich, Suffolk.

A The only catch with using most printers with your Amstrad comes with high resolution screen dumps. Because of the way in which the Amstrad handles the graphics screen, you'll generally get white lines through your printout.

However, this can be corrected through software and we'll be publishing just such a utility in a forthcoming issue of PCN.

Until then, the only printer you mention without this trouble is Amstrad's own. There are other factors in favour of buying equipment from the manufacturer of your computer—generally there shouldn't be any problems at all.

However, if you decide to sell your Amstrad and upgrade to a machine from a different company you'll have to sell your printer too. If you buy one of the independent makes you'll prob-

ably find you can keep the printer and at most simply buy a new cable.

All of the models you suggest are worthy of consideration—the Epson stands out simply because of the company's reputation for quality and reliability. In the end, price will probably be the deciding factor.

Word processing is write up 64's street

Q I have a Commodore 64 linked to an Alphacom printer—what I require is a simple word processor that is inexpensive but that I can use for letter writing. Can you recommend something costing £25-£30?

D J King,
Huntingdon, York.

A Since you don't mention disk drives, we assume you'll be using a cassette recorder in which case we would urge you to find a little extra money and consider Heswriter. This will cost in the region of £35 but is a very good word processor.

The main advantage is that it comes on a plug-in cartridge which will give you instant extra memory space for your text. We expect you'll find that once you get used to the system you'll be using it more than you might anticipate at the moment. Heswriter is an American product from Hesware; Thorn-EMI has taken over distribution of some of its titles so your local dealer should be able to acquire it.

If you really don't want to spend the extra money, there are a couple of tape-based programs although we can't recommend any 'cos we haven't seen them.

Enterprise graphics too greedy?

Q I am thinking of buying an Enterprise computer because of its 64K of RAM but it appears that the enormous graphics capabilities of the machine would require 42K of memory for the screen.

Would it be right in assuming that the Enterprise has, at most, 22K available for Basic programs?

Mark Cytera,
Bristol, Avon.

A Exactly how much memory you have available depends on which graphics mode you are using. The maximum usable RAM in 40x24 test mode is about 58K. High resolution mode will leave you less than

40K free, and still less if you also want to use lots of colour.

This is neither a lot better nor much worse than most other popular computers.

Variable address causes confusion

Q A feature of the Oric and Spectrum Basics which has proved useful is the ability to address a line number in the form of a variable, eg:

10 GOTO V
where V has a predetermined value.

On using other machines, I have discovered that this form of entry is unacceptable, usually resulting in the Syntax Error report. It seems illogical that a machine able to evaluate PRINT V cannot respond to the GOTO V command, which in certain cases can prove invaluable.

Is it possible to insert a machine code routine to make this command acceptable on a Sanyo 555 or is there an alternative—in standard Basic?

M Thomas,
Ebbw Vale, Guent.

A While GOTO V might be useful to you, it can be a damned nuisance for someone else trying to follow your programs, which is why most Basics won't allow it. In any event, there is a standard Basic command which will achieve the same results while remaining easy to understand.

What you want is the ON...GOTO command, or its variant ON...GOSUB which will divert control of the program to a block determined by a variable—precisely what you are trying to achieve.

A simple example will illustrate the point.

```
10 LET V = INTRND(1)*3+1
20 ON V GOTO 100, 200, 300
30 END
100 PRINT "V = 1"
200 PRINT "V = 2"
300 PRINT "V = 3"
```

As you can see, control moves to the section determined in line 20, if V = 1, then it jumps to 100 and so on.

To make things even more directly comparable with your own example, if V has possible values of 100, 200 and so on, change line 20 to read:

```
20 ON V:100 GOTO
```

You can make the variable evaluate to whatever you like (as long as it's an integer value)—simply number your program in multiples that will match possible values of V.

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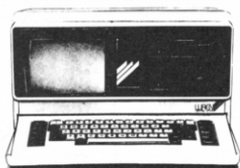
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Easier editing on the Atmos

The following routine makes the Atmos' editing system easier by allowing the repeat rate of the keys to be altered using the CTRL E keys.

The keyboard interrupt is intercepted to detect CTRL E and if detected toggles a flag at

#BFE1. It then continues and an additional IRQ routine checks to see whether the flag has been set.

To use the routine enter it, run it, and then save and new it. The toggle is via CTRL E and to restore the computer to normal:

DOKE #23C, #EB78
DOKE #245, #EE22
*Jan Barrett,
Buckinghamshire.*

```
20 FOR X=#6000 TO #6045
30 READ A#
40 A=VAL ("#" + A#)
50 POKE X, A
60 NEXT X
70 POKE #BFE1, 0
80 DOKE #23C, #6000
90 DOKE #245, #601B
100 END
120 DATA C9, 05, D0, 14, AC, E1, BF, C0
130 DATA 01, D0, 08, A0, 00, 8C, E1, BF
140 DATA 4C, 78, EB, A0, 01, 8C, E1, BF
150 DATA 4C, 78, EB
170 DATA 48, 8A, 48, 98, 48
180 DATA AD, E1, BF, C9, 01, F0, 0D, A9
190 DATA 20, 8D, 4E, 02, A9, 04, 8D, 4F
200 DATA 02, 4C, 3E, 60, A9, 20, 8D, 4E
210 DATA 02, A9, 01, 8D, 4F, 02, 68, A8
220 DATA 68, AA, 68, 4C, 22, EE
```

Checking contents of function keys

One problem with the function keys on the Amstrad CPC 464 is that, once programmed, there is no way of checking their contents short of using them, learning from your mistakes.

The following program will

display the contents of the keys to the user, including any control codes that they might use. The characters are returned as ASCII codes with any control codes, including return, displayed as the control characters 1-31.

*J Gardiner,
Norfolk.*

```
40 CLS : VB=""
70 ADDR=46150
80 FOR K=1 TO 13
90 L=PEEK(ADDR)
100 FOR C=ADDR+1 TO ADDR+L
110 C=PEEK(C)
120 VB=VB+CHR$(L)+CHR$(C)
130 NEXT C
140 PRINT "Key No. " + K + " : " + VB
150 PRINT USING "+*!"; " *VB"
160 ADDR=ADDR+L+1
170 VB=""
180 NEXT K
```

BBC combined memory dump

This one line combined hexadecimal and ASCII memory dump routine for the BBC, will only fit into a key if there is enough room in the soft key buffer.

To run it, set M% to the position in memory you want to start from, and press the selected function key (defined by 'n' in the listing). Use Shift to continue and Escape to stop.

*Stuart W Moore,
Portsmouth.*

```
*KEYn@M%=:NREP:A#="":P:"M%";":F:
I=OT07:J=M%?I:P.~J;"":A#=#+CHR$(ASC".*(J<320RJ>126)-J*(J>31ANDJ<127):N.:P.A#M%=M%+8:U.FA.:M
```

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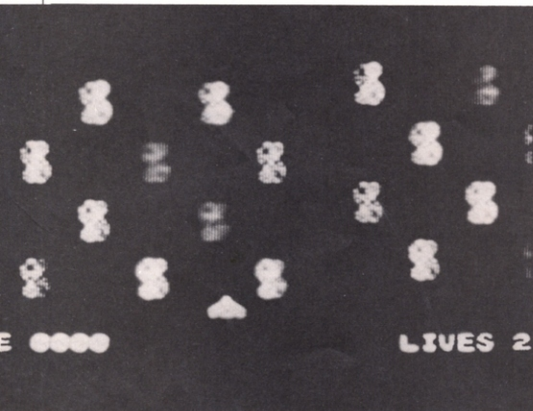
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It's action stations time again when you play this machine code, shoot-em-up arcade game. The object is to nobble hostile alien hordes who want to land and destroy your ship and planet.

First enter Listing 1 and save it on tape using :SAVE "ATAK" LINE 1. Then NEW the computer and type in Listing 2. Bear in mind that machine code could be temperamental and any attempt to run the program and type in the RANDOMIZE statement below while in the middle of the listing almost certainly results in a crash. And, don't forget to save it to tape, since even one error can crash the program.

The next step is to run the listing. Fortunately, a crash at this stage is impossible, but do give the program time — it takes roughly 30 seconds to finish. When it has run, type the following line as a direct command.

```
BORDER 0: PAPER 0: CLS:RANDOMIZE USR 60000
```

If a crash of some sort occurs (eg the keyboard is disabled and sometimes you get a multi-coloured display), the only remedy is, unfortunately, to pull the plug out, reload the listing and check through it.

The game can be broken out of by pressing the H key, which returns you to Basic. Set your cassette player to record just after where you saved Listing 1, and save the machine code alone, by typing: SAVE "ATAKCODE" CODE 49500,3000

And verify it using:

```
VERIFY "ATAKCODE" CODE 49500,3000
```

When you want to play the game, start the cassette before Listing 1 and type LOAD " ". If at any point during a game, you want to abort it and change the skill level, just press the H key.

If you feel daunted by the task of typing it all in, I would be happy to send a copy to you on tape. Just send stamped addressed envelope with a cheque/PO for £1.50 payable to Martin Connor, to: 7, Holme Rd, Didsbury, Manchester, M20 8TX.

Listing 1

```
1000 BORDER 0: PAPER 0: CLS: PR
INT AT 11,7: INK 2: PAPER 7: FLA
SH 11:"WELCOME TO ATAK!" AT 14,12
1:"LOADING" AT 21,51 FLASH 0: INK
7: PAPER 2: MARTIN CONNOR 1984"
1010 LOAD ""CODE
1030 CLS: PRINT AT 0,13: INK 7:
"CONTROLS" AT 1,131:"-----" AT
5,61:"RIGHT" AT 8,151:"LEFT" AT 8
,22:"LASER" AT 10,61 INK 61" Z
" AT 10,151:"CAPS" AT 10,22:"SPA
CE" AT 21,4: INK 2: PAPER 7: FLA
SH 11:"PRESS ANY KEY TO CONTINUE"
: PAUSE 0
1040 CLS: PRINT AT 5,1: INK 4:
SELECT SKILL LEVEL:" AT 10,201"
1:"(FAST)" AT 12,201:"2" (MEDIUM)
": AT 14,201:"3" (SLOW)
1050 IF INKEY*="1" THEN POKE 505
24,0
1060 IF INKEY*="2" THEN POKE 505
24,10
1070 IF INKEY*="3" THEN POKE 505
24,20
1080 IF INKEY*="" THEN GO TO 105
0
1095 LET M=INKEY$: IF M<>"1" A
ND M<>"2" AND M<>"3" THEN GO T
O 1050
1098 INK 7: BORDER 0: PAPER 0: C
LS: RANDOMIZE USR 50000
1100 GO TO 1040
```

Listing 2

```
1 REM **LINES 5-35 POKE
GRAPHICS AND MACHINE CODE TO
MEMORY**
5 REM **SPACESHIP CODE**
10 RESTORE 50
15 FOR n=0 TO 39: READ a: POKE
49500+n, a: NEXT n
17 REM **ALIEN CODE**
20 RESTORE 60: FOR n=0 TO 47:
READ a: POKE 49540+n, a: NEXT n
23 REM **MACHINE CODE!**
25 RESTORE 100
30 FOR n=0 TO 2399: READ a: PO
KE 50000+n, a: NEXT n
32 REM **ROUTINE THAT POKES
THE SIMPLE MISSILE SHAPE
DIRECTLY INTO MEMORY**
35 FOR n=0 TO 7: POKE 49596+n,
1: POKE 49604+n,120: NEXT n
40 STOP
45 REM **SPACESHIP GRAPHICS**
50 DATA 1,2,5,13,59,119,93,119
,129,64,160,175,220,119,186,230,
0,0,0,0,3,6,5,7,24,36,90,219,189
,231,217,126,0,0,0,0,192,96,160,
224
55 REM **ALIEN GRAPHICS**
60 DATA 3,5,10,12,10,15,9,6,19
,2,160,80,48,80,240,144,96,2,1,1
,3,6,5,6,3,64,128,128,192,48,160,
96,192
70 DATA 60,102,90,102,60,24,24
,36,102,153,255,165,195,165,90,6
0
95 REM **ROUGHLY 2.5K OF
MACHINE CODE**
97 REM **GOOD LUCK AND
HAVE FUN!**
100 DATA 62,0,205,250,202,33,71
,195,54,0,33,70,195,54,51,33,50,
195,54,8,33,51,195,54,48,33,52,1
```

Listing (cont)

95,54,48,33,53,195,54,48,33,68,1
 95,54,76,35,54,73,35,54,86,35,54
 118 DATA 54,83,35,54,32,35,54
 1,39,40,195,54,83,35,54,67,35,54
 77,35,54,82,35,54,69,35,54,32,3
 5,48,35,54,86,35,54,48,35,54
 48,6,18,33,48,195,126,215,35,16,
 251
 120 DATA 6,15,62,32,215,16,251,
 6,7,33,68,195,126,215,35,16,251,
 33,246,193,285,54,8,35,54,8,17,
 9,8,25,16,245,6,208,33,244,1,17,
 3,8,229,213,197,285,181,3,193,28
 9,125
 138 DATA 43,16,244,33,8,64,1,19
 2,2,285,111,282,285,222,282,11
 20,177,32,245,33,249,193,54,5,33
 248,193,54,5,33,226,64,17,86,19
 4,285,159,282,33,226,88,285,159
 285,23,282,17,94
 148 DATA 194,285,159,282,33,232
 88,285,159,282,33,238,64,17,106
 194,285,159,282,33,238,88,285,1
 59,282,33,244,64,17,116,194,285,
 159,282,33,249,285,159,282,33,
 1250,64,17,126,194,285,159,282,3
 3
 158 DATA 258,88,285,159,282,33,
 69,72,17,136,194,285,159,282,33,
 69,89,285,159,282,33,75,72,17,14
 6,194,285,159,282,33,75,89,285,1
 59,282,33,81,72,17,156,194,285,1
 59,282,33,81,89,285,159,282,33,
 168 DATA 33,87,72,17,166,194,285,
 5,159,282,33,87,89,285,159,282,3
 3,93,72,17,176,194,285,159,282,3
 3,93,89,285,159,282,33,133,64,17
 16,194,285,159,282,33,133,88,28
 5,159,282,33,139,64,17,46
 178 DATA 194,285,159,282,33,139
 88,285,159,282,33,145,64,17,56,
 2,285,159,282,33,145,88,285,159,
 9,282,33,151,64,17,66,194,285,15
 9,282,33,151,88,285,159,282,33,1
 57,64,17,76,194,285,159,282,33,
 188 DATA 157,88,285,159,282,33,
 59,282,33,161,88,285,159,282,33,
 88,285,159,282,33,52,64,17,16,1
 94,285,159,282,33,52,88,285,159,
 32,33,58,64,17,26,194,285,159,2
 82,33,58,88,285,159,282,33,58
 98 DATA 33,48,64,17,252,193,285,
 5,159,282,33,48,88,285,159,282,3
 3,34,64,17,242,193,285,159,282,3
 3,34,88,285,159,282,33,247,194,5
 4,45,33,245,194,54,8,243,33,175,
 88,17,236,194,285,159,282,33,126
 288 DATA 17,92,193,285,53,282,3
 3,176,98,54,6,33,175,98,54,6,17,
 238,194,285,159,282,1,1,8,11,128
 3,177,32,251,33,248,193,126,254,1
 8,282,213,197,33,249,93,126,254,
 18,282,197,195,33,71
 218 DATA 195,126,254,18,282,4,2
 83,285,38,199,285,179,198,285,14
 2,282,33,285,282,17,282,285,11
 16,198,254,39,284,18,198,254,31,
 284,63,198,254,34,284,168,197,25
 4,25,284,217,197,24,188,251,281
 4,288 DATA 17,92,193,285,53,282
 125,193,95,216,85,93,282,285,
 166,282,17,92,193,285,53,282,17,
 236,194,285,159,282,17,238,194,2
 85,153,282,285,186,282,17,238,19
 7,285,159,282,54,6,44,54,6,281,17,
 236
 238 DATA 236,194,285,153,282,12
 5,214,159,288,285,127,282,285,19
 4,282,17,92,193,285,53,282,17,23
 6,194,285,159,282,17,238,194,285
 153,282,285,214,282,17,238,194,
 285,159,282,54,6,44,54,6,281,17,
 236
 248 DATA 194,285,153,282,125,25
 4,161,288,254,129,288,254,97,288
 254,65,288,44,285,111,282,45,45
 17,92,193,285,53,282,17,236,194
 285,159,282,17,238,194,285,153,
 82,45,94,6,17,238,194,285,159,2
 82
 258 DATA 281,17,236,194,285,153
 282,125,254,198,288,254,158,288
 125,126,288,254,194,288,285,11
 282,44,17,92,193,285,53,282,17,2
 36,194,285,159,282,17,238,194,28
 5,153,282,44,44,54,6,45,17,238,1

94
 268 DATA 285,159,282,195,281,17,244
 1,285,153,282,125,254,255,288
 17,236,194,285,153,282,285,166,
 282,17,188,193,285,53,282,17,240
 194,285,159,282,17,238,194,285,
 282,285,285,186,282,54,2,44,54,2,
 45
 278 DATA 17,242,194,285,159,282
 33,247,194,54,255,33,248,194,54
 255,281,17,246,194,285,153,282,
 125,254,255,197,17,248,194,285,
 53,282,285,127,282,285,166,282,1
 7,188,193,285,53,282,17,240,194,
 285,159
 288 DATA 282,17,242,194,285,153
 282,285,186,282,54,2,44,54,2,45
 17,242,194,285,159,282,33,255,8
 17,244,194,285,159,282,17,248,1
 94,285,153,282,124,254,64,192,12
 6,194,31,288,17,248,194,285,153
 298 DATA 282,285,127,282,33,247
 194,54,45,33,245,194,54,45,33,1
 8,8,17,240,194,285,159,282,33,1
 3,34,195,54,8,6,4,17,6,194,285,1
 55,288,6,5,17,16
 388 DATA 194,285,127,288,285,18
 88,33,16,194,285,155,288,6,3,17
 26,194,285,127,288,285,184,288
 33,126,194,285,155,288,6,3,17
 193,285,127,288,285,184,288,33,
 242,193,285,155,288,6,1,17
 318 DATA 252,193,285,127,288,28
 5,184,288,33,252,93,285,155,288
 6,5,17,36,194,285,127,288,285,1
 84,288,33,36,194,285,155,288,6,3
 17,46,194,285,127,288,285,184,2
 88,33,94,285,184,288,6,3,17
 328 DATA 17,56,194,285,127,288,
 285,184,288,33,56,194,285,155,28
 8,6,17,17,66,194,285,127,288,285
 318,285,53,66,194,285,127,288,6
 4,17,76,194,285,127,288,285,184,
 288,33,76,194,285,155,288,6
 338 DATA 4,17,86,194,285,127,28
 8,285,184,288,33,86,194,285,155,
 193,285,127,288,285,184,288,33,
 5,184,288,33,96,194,285,155,288,
 6,3,17,186,194,285,127,288,285,1
 84,288,33,186,194,285,155,288,6
 288,285,16,6,17,116,194,285,127
 288,285,16,68,33,13,194,285,155
 155,288,6,6,17,126,194,285,127,2
 88,285,184,288,33,126,194,285,15
 5,288,6,6,17,136,194,285,127,288
 285,285,33,136,194,285,155
 358 DATA 288,6,17,146,194,285,
 127,288,285,184,288,33,146,194,
 285,155,288,6,4,17,156,194,285,1
 27,288,285,184,288,33,156,194,28
 9,155,288,6,5,17,166,194,285,127
 288,285,184,288,33,166,194,285,
 368 DATA 155,288,6,3,17,176,194
 285,127,288,285,184,288,33,176,
 193,193,193,288,285,176,193,28
 75,19,281,197,288,128,88,33,17,
 195,112,35,113,285,128,288,33,15
 2,35,113,285,128,288,33,28,195
 378 DATA 112,35,113,193,281,197
 17,33,193,281,197,288,112,35,11
 3,285,128,288,5,112,35,113,17,2
 8,195,285,128,288,35,112,35,113,
 193,281,17,28,195,26,254,255,288
 1,38,193,26,245,17,248,194,26
 388 DATA 183,24,188,32,24,17,3
 8,195,285,153,282,125,245,17,241
 194,26,111,241,189,282,129,281,
 198,32,189,282,129,281,17,38,195
 285,193,285,199,288,285,88,32,84,2
 5,254,128,48,27,24,77,25,198,32
 398 DATA 245,17,236,194,285,153
 282,241,189,48,11,214,32,189,48
 6,198,32,48,189,32,52,348,19
 3,54,8,6,255,17,18,8,33,18,8
 9,213,197,285,181,3,193,289,225,
 16,244,62,31,285
 488 DATA 258,282,33,78,195,126,
 285,193,285,126,282,12,282,84,2
 48,1,281,33,71,195,54,18,281,17
 38,195,285,153,282,283,110,48,19
 17,132,193,285,98,282,17,32,195
 285,1,282,33,112,285,211,282,33
 318 DATA 282,33,112,285,211,282
 2,285,222,282,17,164,193,285,85,
 282,17,38,195,285,159,282,17,32,
 195,285,153,282,35,112,195,285

159,282,281,17,38,195,285,153,2
 82,285,27,282,17,28,195,33,255,2
 55
 428 DATA 285,159,282,17,38,8,33
 188,8,285,181,3,285,1,197,38,
 195,33,8,8,285,159,282,33,58,19
 3,12,282,195,12,254,48,48,59,254
 86,254,58,48,3,119,21,281,62,7,
 285,258,282,33,52
 438 DATA 195,126,254,57,48,35,
 6,119,215,53,51,195,54,48,126,21
 5,32,282,195,12,254,48,48,59,254
 58,48,55,254,52,48,48,51,254,54,
 47,254,56,48,43,281,62,6,285,25
 8,282,33,53,195,126
 448 DATA 258,57,48,15,68,119,21
 5,62,48,43,119,215,43,62,48,119,
 215,24,1,62,48,119,215,62,48,43
 119,215,43,62,48,119,215,33,249
 193,54,18,281,285,127,282,285,1
 94,282,285,127,282,281,197
 458 DATA 6,8,26,119,36,19,16,25
 8,6,8,37,16,253,193,281,285,37,2
 82,285,222,282,285,37,282,285,2
 476 DATA 282,281,285,11,282,28
 285,222,282,285,37,282,285,282
 282,285,37,282,281,285,37,282
 468 DATA 285,194,282,285,37,282
 285,166,282,281,285,33,282,285,
 194,282,285,33,282,285,166,282,2
 81,197,6,8,62,8,119,36,16,258,6,
 8,37,16,253,193,281,285,111,282,
 285,222,282,285,111,282,285,236
 478 DATA 282,281,285,11,282,28
 5,194,282,285,111,282,285,166,28
 2,281,826,183,19,26,111,281,124,
 18,19,128,18,19,281,197,6,32,283
 16,283,28,283,28,43,283,28,283,
 28,28,28,16,4,283,281,19,2,6
 488 DATA 32,43,16,253,193,281,
 97,6,32,283,28,283,28,283,28,35,
 283,28,283,28,283,28,16,24,193,
 28,283,28,283,28,283,28,283,28,
 83,28,283,28,283,28,35,283,28,28
 3,28,283,28,281,283,28
 498 DATA 283,28,283,28,43,283,2
 8,283,28,283,28,281,245,62,22,21
 5,62,11,215,62,12,215,62,7,215,
 5,62,11,215,62,12,215,62,7,215,
 62,65,215,62,7,215,62,69,215,62
 32,215,62,79,215,62
 508 DATA 86,215,69,215,62,82
 215,62,22,215,62,15,215,62,7,21
 5,62,65,215,62,78,215,62,7,215,
 62,84,215,62,72,215,62,69,215,62
 82,215,62,32,215,62,71,215,62,7
 9,62,63,215
 518 DATA 62,32,215,62,48,215,62
 89,215,62,47,215,62,78,215,62,4
 1,215,285,142,2,123,254,2,282,88
 195,254,8,282,166,197,24,288,78
 215,62,41,215,285,142,2,123,254
 2,282,88,195,254,8
 528 DATA 282,166,197,24,248,281
 197,6,8,26,119,36,19,26,258,6,8
 58,28,28,28,28,28,28,28,28,28,28
 85,67,284,285,138,283,285,81,284
 281,285,154,283,285,67,284,285,
 67,284,285,138,283,285,81,285,34
 538 DATA 285,81,285,81,285,34
 283,285,39,285,39,285,28,283,
 11,284,281,285,154,283,285,39,28
 4,285,154,283,285,11,284,281,197
 6,8,62,8,119,36,16,258,6,8,37,1
 283,28,154,28,285,28,35,283,28
 548 DATA 67,284,285,21,283,285
 81,284,281,285,212,283,285,39,2
 84,285,212,283,285,11,284,281,26
 183,19,26,111,281,28,24,18,19,128
 18,19,281,97,6,32,283,28,283,2
 8,283,28,43,283,28,283,28,283
 558 DATA 28,16,24,193,281,197,
 632,43,16,253,193,281,197,6,32,
 283,28,154,28,285,28,35,283,28,
 83,28,283,28,16,24,193,281,197,
 6,32,35,16,253,193,281,283,28,28
 3,28,283,28,35,283,28
 568 DATA 283,28,283,28,281,283,
 28,283,28,283,28,283,28,283,28,
 8,283,28,281,245,62,22,215,62,21
 215,62,12,215,62,71,215,62,65,2
 578 DATA 62,32,215,62,79,215,62,
 86,215,62,69,215,62,82,215,62,2
 215,62,15,215,62,7,215,62,65,2
 15,62,78,215,62,69,215,62,84,215
 6,32,215,62,71



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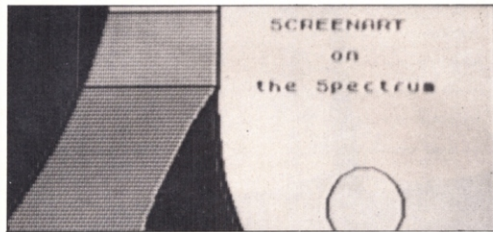
Name: _____ Signature: _____

Address: _____

(Block Capitals Please) _____ Postcode: _____ PCW3

PRINT THE PICTURE

Snazy pictures to illustrate your programs. *Loaders* is the second part of RG Luxton's *Screentart* routine (see issue 97).



Listing

```

200 RESTORE : DIM c(8000): FOR
1=1 TO 2: READ c: LET c(1)%%: NE
XT 1: PLOT c(1),c(2): FOR J=4 TO
8000 STEP 2: FOR I=J-1 TO J:
READ c: LET c(1)%%: NEXT I: DRAW
c(1)-1,c(J): BEEP .005,50: NEXT
J
210 STOP
300 REM #PROGRAM START#
310 CLEAR : GO SUB 810: BORDER
5: PAPER 5: INK 9: CLS : PRINT #
0: START RECORDER...: LOAD "da
ta" DATA d$(1): CLS : PRINT TAB 1
0: INK 11: SCREENART 2: IAT 1,101:
*****: IAT 6,9: INVERSE 1: ST
OF THE TAPE: IAT 9,9: PLEASE WAIT
:IAT 14,7: PAPER 2: INK 7: FLASH
1: "LOADING DATA NOW"
320 LET x=(LEN d$(8))/4: PRINT A
16,9: IEM no
330 LET s="": FOR I=1 TO LEN d
8: STEP 4: PRINT AT 16,17:
:IAT 16,17:K LET x=x-1
340 IF d$(I+1 TO I+3)=" " THEN
N LET s=s+d$(I) GO TO 380
350 IF d$(I+2 TO I+3)=" " THEN
LET s=s+d$(I TO I+1): GO TO 3
80
360 IF d$(I+3)=" " THEN LET s=s
+d$(I TO I+2): GO TO 380
370 LET s=s+d$(I TO I+3)
380 LET s=s+" "
390 NEXT I
400 LET s="": LET k=1: LET L: L
T #LEN s: LET k=1: FOR I=100 T
O R STEP 100
410 IF d$(I+3)=" " THEN LET k=k+
1: LET I=I+1: GO TO 410
420 NEXT I: LET r=LEN s-k: LET
y1=(r+INT (r/100))/100: LET y2=
INT y1: LET y=INT y2+1 AND y1-y
2)0
430 REM #START OF SECOND PART#
440 BORDER 11: PAPER 11: INK 7: C
LS : PRINT AT 4,5: "NOW ENTER 'y
1' DATA LINE"+(5) AND y2) IAT 6
,5: ("EACH AND y2)+ WITH 100 x
" AND IAT 8,9: THEN GOTO 500: IAT
T 10,9: INVERSE 11: FLASH 11: "DO N
OT USE 'RUN'"
450 PRINT @IAT 6,9: Press any
key<: PAUSE 0: BORDER 7: PAPER
7: INK 0: CLS : LIST 800: STOP
500 BORDER 5: PAPER 5: CLS : PR
INT AT 6,9: PAPER 7: INK 11: PLEA
SE WAIT: IAT 13,7: PAPER 5: FLASH
1: "LOADING DATA NOW"
510 PRINT AT 16,9: IEM no: L
ET x=LEN s: FOR I=1 TO x: IF PE
EK 2=13 THEN GO SUB 700
520 POKE X, CODE s(I): PRINT AT
16,17: " IAT 16,17:K LET x=x

```

```

: IAT 2: NEXT I
530 PRINT AT 16,4: PAPER 7: INK
11: FLASH 11: ...A FEW SECONDS MO
RE...
540 FOR I=2 TO 2+100: IF PEEK I
=120 AND PEEK I<13 THEN POKE I,
32
544 NEXT I
550 FOR I=FN a() TO FN b(): IF
PEEK I=44 THEN LET v=v+1
560 NEXT I: LET s=FN b()+1: IF
FN c()=200 THEN GO TO 580
570 GO TO 550
580 REM #POKE NO. DATA BYTES IN
TO LINE 200#
590 LET I=s: DIM g$(4): LET g$(
1 TO 4)=(800+STR$ v AND v<99)+
(80+STR$ v AND v<99 AND v>9)+
(80+STR$ v AND v<999 AND v>99)+
(STR$ v AND v<9999 AND v>999)
600 FOR I=(1+9) TO (1+12): POKE
I, CODE g$(I-(1+8)): NEXT I: FOR
I=(1+8) TO (1+9): POKE I, CODE
g$(I-(1+8)): NEXT I: GO TO 900
900 REM #CLEAR ENDS OF DATA
LINES ETC#
710 LET h=2-1
720 IF PEEK h=CODE " " THEN PO
KE h, CODE " ": LET I=I-1: LET H=
H-1: GO TO 720
730 IF PEEK h=CODE " " THEN POK
E h, CODE " ": LET v=v+1
740 LET z=z+1: RETURN
750 REM #100 X CHARACTERS#
800 DATA xxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
810 REM #VARIABLES#
820 LET c0: LET z=23760: LET v
=1: LET a=23785: DEF FN a(1)=41
DEF FN b(1)=3+PEEK (a+2)+256*P
EEK (a+3): DEF FN c(1)=256*PEEK a
+PEEK (a+1): RETURN
900 REM #DELETE SURPLUS LINES#
910 LET q=PEEK 23635+256*PEEK 2
3636
920 LET u=PEEK (q+2)+256*PEEK (
q+3): IF PEEK q=256*PEEK (q+1)=2
10 THEN LET a=q
930 IF PEEK q=256*PEEK (q+1)=96
0 THEN LET b=q+u+4: GO TO 950
940 LET q=q+u+4: GO TO 920
950 LET v=v+1: POKE a+2, (256
*INT (4/256): POKE a+3, INT (4/25
6)
960 BORDER 7: PAPER 7: INK 8: C
LS : PRINT PAPER 11: INK 7: "Edit
lines 1 to 200, enter "210" "
and press "ENTER"
: PAPER 7: INK 0: LIST

```

Last issue we introduced the Spectrum graphics utility program *Screentart*, with the main part of the program, called *Draw*; this week we finish things off with *Loader*, a complementary routine which will turn anything made in *Draw* into a series of data statements for use on their own, or in other programs.

The program works by turning string *c\$* into *DATA* statements in program lines. The first two coordinates constitute the initial *PLOT* statement, and the rest are *DRAW* statements, so your drawing is really one long 'string'. (To move the *Draw* position from one part of a drawing to another invisibly, you can draw over existing lines, but if you want to cease drawing at one point and start afresh at another, you will have to resort to some extra programming). You cannot use *CIRCLE*, *ARC*, *FILL*, *UDGs* or keyboard characters.

Type in the listing and debug. Save using "SAVE "loader" LINE 300". It is imperative that line 200 is entered exactly as listed.

Now run the program (from line 300), and load into it a data tape previously recorded using the *b* option in *Draw* (see last week's issue). The data, which was saved as *d\$*, will now be formatted into another string, *e\$* and a countdown will appear on screen.

When entered — and at this point you can stop the tape — you will be asked to enter a number of *DATA* lines each containing 100 *Xs*. Press any key to stop the program and using the edit key (Shift 1), call down line 800 and change this into line 1. Press Enter and then call down this line again and change it into line 2, and so on, until you have enough lines.

Now type in "GOTO 500" and Enter, and the data in *e\$* will be poked into the data statements, and the number of expressions in total will be poked twice into line 200; the *DIM* statement, and the *J* *FOR*/*TO* loop.

At this stage the data numbers are in the display file only, so use the edit facility again to bring down each line from 1 to 200 inclusive. Simply bring each line down, and then press Enter to return it to its original position.

Charts and lists

Now type in '210', and Enter for the block delete to remove all surplus lines, 'RUN' and ENTER, and your original drawing will appear on the screen.

It is a simple matter now to edit these lines to a suitable position in another program — probably at the end — and to access the routine by a *GOSUB* to whatever line 200 now is, for a rapid *DRAW* routine which is safely 'locked' into program data lines.

This is useful for quickly ruling up lines for charts or separate lists of numbers etc, within programs, and a pre-recorded self-drawing map within a suitable program can be most effective.

race against time will be renewed once more.

Your adrenalin is flowing and you must concentrate on not losing control and bumping into the skulls and cross-bones which are scattered about.

In the first level there are three bombs, three keys and three of the deadly skulls. The bombs count down from 9 to 0 in which time you must defuse them all. With three lives you aim to move up the levels (each stage involving an extra bomb, key and skull).

If you manage a score of 100 you will be awarded an extra life. Your man can be moved around the screen using the cursor keys but make sure you don't touch a bomb without a key in your hand or you will start a chain of explosions.

Program notes

- 10** For debugging purposes, restores screen when decimal on keypad is pressed
- 80-440** Data for the characters and objects
- 500-520** Set up variables and dimension arrays
- 530-570** Create windows and set up colours
- 580** Checks for the number of lives left
- 590** Checks for level
- 600** Sets up the bombs and the

- 610-640** GOSUB to position the characters on the screen
- 720-730** Prints the lattice on the screen
- 740-760** GOSUB to print skulls, bombs and keys
- 770** Hi-res coordinate position of bomb count down
- 790-800** Position man
- 810** Prints score and lives at the bottom of the screen
- 820** Checks for keypress
- 910-920** Set timer
- 940-980** GOSUB to move up, down, left or right
- 1000-1040** Found key, bomb or skull
- 1050** Updates and prints score
- 1060** Checks lives
- 1100-** Routine to move man up
- 1220** Routine to move man down
- 1300-** Routine to move man left
- 1410** Routine to move man left
- 1500-** Routine to move man left
- 1600** Routine to move man right
- 1700-** Routine to move man right
- 1800** End of game, print high score
- 1900-** Found skull, lose life
- 1970** Found key
- 2100-** Found key
- 2140**

Main variables

- a** array holding the play area
- pm** initial position of man
- pk** coordinates of keys
- pb** coordinates of bombs
- ps** coordinates of skulls
- lb** high-res coordinates of bomb count down
- ac** across locate for printing
- dc** down locate for printing
- cm** current position of man
- nm** new position of man
- ti** timing for bomb count down
- bn** number on each bomb
- x** window number
- chr** number for printing
- k** key flag
- 2200-** Found bomb, if you have a key then update the score otherwise lose life
- 2300** Insert man, key bombs and skulls on maze, the number depending on the level
- 2400-** Position characters on the screen
- 2460** Bomb countdown
- 2500-** Print blank to show your path
- 2530** Sound effects
- 2600-** Update lives
- 2710**
- 2800-**
- 2840**
- 2900-**
- 2910**
- 2930**
- 3010**
- 3020**
- 3040**

```

1310 nm(1)=cm(1)+1:IF nm(1)>10 THEN nm(1)=0
1320 nm(0)=nm(0)
1330 IF a(nm(0),nm(1))=1 THEN RETURN
1340 pm(1)=pm(1)+1:GOSUB 2800:GOSUB 2910
1350 IF x=244 THEN LOCATE 1,pm(0),pm(1):PRINT #1,CHR$(244)+CHR$(245)
1360 IF x=240 THEN LOCATE 1,pm(0),pm(1):PRINT #1,CHR$(240)+CHR$(241)
1370 pm(1)=pm(1)+1:IF pm(1)>22 THEN pm(1)=1
1380 IF x=244 THEN LOCATE 1,pm(0),pm(1):PRINT #1,CHR$(244)+CHR$(253)
1390 IF x=240 THEN LOCATE 1,pm(0),pm(1):PRINT #1,CHR$(252)+CHR$(253)
1400 GOSUB 2800:GOSUB 2840:w=1:GOSUB 2500
1410 RETURN
1500 REM **** MOVE LEFT ****
1510 nm(0)=cm(0)-1:IF nm(0)<0 THEN nm(0)=19
1520 nm(1)=cm(1)
1530 IF a(nm(0),nm(1))=1 THEN RETURN
1540 GOSUB 2800:GOSUB 2910
1550 LOCATE 1,pm(0),pm(1):ac=POS(1):do v=POS(1)+1:PRINT #1,CHR$(245):LOCATE #1,ac,do:PRINT #1,CHR$(255)
1560 pm(0)=pm(0)-1:IF pm(0)=0 THEN LET p(0)=40
1570 LOCATE #1,pm(0),pm(1):ac=POS(1):do v=POS(1)+1
1580 PRINT #1,CHR$(244):LOCATE #1,ac,do:PRINT #1,CHR$(254)
1590 pm(0)=pm(0)-1:GOSUB 2800:LOCATE #1,pm(0),pm(1):x=244:w=1:GOSUB 2500
1600 RETURN
1700 REM **** MOVE RIGHT ****
1710 nm(0)=cm(0)+1:IF nm(0)>19 THEN nm(0)=0
1720 nm(1)=cm(1)
1730 IF a(nm(0),nm(1))=1 THEN RETURN
1740 GOSUB 2800:GOSUB 2910
1750 pm(0)=pm(0)+1:LOCATE #1,pm(0),pm(1):ac=POS(1):do v=POS(1)+1:PRINT #1,CHR$(240):LOCATE #1,ac,do:PRINT #1,CHR$(252)
1760 pm(0)=pm(0)+1:IF pm(0)>40 THEN pm(0)=19
1770 LOCATE #1,pm(0),pm(1):ac=POS(1):do v=POS(1)+1:PRINT #1,CHR$(241):LOCATE #1,ac,do:PRINT #1,CHR$(253)
1780 GOSUB 2800
1790 LOCATE #1,pm(0),pm(1):x=240:w=1:GOSUB 2500
1800 RETURN
1900 REM **** END & HIGH SCORE ****
1910 CLS:PRINT #1,

```

```

1920 LOCATE #0,7,10:PRINT#0,"YOU HAVE RUN OUT OF LIVES.";LOCATE #0,12:PRINT#0,"PRESS COPY BUTTON FOR REPLAY "
1930 IF ac>hs THEN LOCATE #0,10,14:PRINT #0,"YOU HAVE ACHIEVED THE!"#ac
1940 LOCATE #0,14:PRINT#0,"HIGHEST SCORE TODAY *!"#hs
1950 INK #1,cn(0)+cnd+1:IF cnd=26 THEN cnd=0
1960 IF INKEY(9)<0 THEN 1950
1970 ERASE bn,a,x,b,pm,cm,nm,pb,pk,ps,lb:GOTO 510
2000 REM **** SKULL FOUND ****
2010 LOCATE #1,pm(0),pm(1)
2020 GOSUB 2970
2030 a(1)=x+1:GOSUB 2500:FOR j=1 TO 500:NEXT x=y
2040 LOCATE #3,32,2:PRINT#3,1111
2050 RETURN
2100 REM **** KEY FOUND ****
2110
2120 LOCATE #3,2,2:a=3:y=x+236:GOSUB 2500:x=y
2130 GOSUB 2950
2140 RETURN
2200 REM **** BOMB FOUND ****
2210 bb=(0/10)-1:IF k=1 THEN 2240
2220 do=0:GOSUB 2660
2230 RETURN
2240 k=0:LOCATE#3,2,2:PRINT#3,"LOCAT #3,2,3:PRINT#5,"
2250 GOSUB 2930
2260 no=0-1:x=(bb+1)
2270 ac=bc+(bb+1):sc=1+bn+bb:LOCATE #3,15,2:PRINT#3,ac
2280 IF sc<199 THEN 11=1:sc=1-100
2290 LOCATE #3,32,2:PRINT#3,1111
2300 RETURN
2400 REM **** INSERTS CHARACTERS ****
2410 q=INT(RND*20):r=INT(RND*11):IF a(q,r)<0 THEN 2410
2420 IF j=1 THEN pm(0)=1+(q/2):pm(1)=1+(r/2)
2430 IF j=2 THEN pm(0)=1+(q/2):pm(1)=1+(r/2)
2440 IF j=3 THEN pm(0)=1+(q/2):pm(1)=1+(r/2)
2450 IF j=4 THEN pm(0)=1+(q/2):pm(1)=1+(r/2):lb(1,0)=(q/2)+8:lb(1,1)=400-(r/2)+10
2460 RETURN
2500 REM **** POSITION ON SCREEN ****
2510 ac=POS(1):do v=POS(1)+1
2520 PRINT #1,CHR$(x)+CHR$(11):LOCATE #y,ac,do:PRINT #1,CHR$(x+2)+CHR$(1+3):2530 RETURN

```

```

2600 REM **** COUNTDOWN BOMB ****
2610 ti=0:bo=0:IF bo=1-1 THEN bo=-1:GOTO 2610
2620 IF a(bn(0)) THEN RETURN
2630 bn(bn(0))=bn(bn(0)-1)
2640 TAG#2:MOVE 15,bo,0,1,bo,1:PRINT#2,USING "###:bn(0):TAGOFF
2650 IF bn(bn(0)) THEN RETURN
2660 PEN #1,1:PAPER #1,3:LOCATE #1,pb(0),pb(1),1:w=1+248:SPEED INK #5,5:GOSUB 2500:GOSUB 3010
2670 GOSUB 2720
2680 LET #b(bo)=1:FOR i=0 TO 1-1:IF #b(i)=1 THEN GOTO 2710
2690 LOCATE #1,pb(0),pb(1),1:w=1+248:SPEED INK #5,5:GOSUB 2500:GOSUB 3010
2700 GOSUB 2720
2710 NEXT:RETURN
2720 FOR j=1 TO 500:NEXT:j=1:RETURN
2800 REM **** PRINT BLANK ****
2810 c1=1+cm(0)/2:c11=1+cm(1)/2:LOCATE #1,c1,c11:ac=POS(1):do v=POS(1)+1:PRINT #1,"LOCATE #1,ac,do:PRINT#1,"
2830 RETURN
2840 c1=1+nm(0)/2:c11=1+nm(1)/2:LOCATE #1,c1,c11:RETURN
2900 REM **** SOUND EFFECTS & UPDATE ****
2910 SOUND #4,-1,15,2,0,7: SOUND #4,750,-1,15,2,0,8
2930 SOUND #2,300,40,7,0,3: SOUND #2,200,40,7,0,3: SOUND #2,150,40,7,0,3
2940 RETURN
2950 SOUND #1,120,25,7,0,1
2960 RETURN
2970 SOUND #1,200,70,7,0,2
2980 11=1:IF 11<0 THEN 11=0
2990 #a=0:IF 11=0 THEN #a=1
3000 RETURN
3010 SOUND #7,500,-1,0,1,0,8: SOUND #0,40,-1,0,1,0,6
3020 11=1:IF 11<0 THEN 11=0
3030 LOCATE #3,32,2:PRINT#3,1111
3040 RETURN

```

The ZX Spectrum
Expansion System. Only £99⁹⁵

Sinclair's complete alternative to floppy discs...



The ZX Spectrum Expansion System contains:

- One ZX Microdrive
- One ZX Interface 1
- One wallet containing four programs on Microdrive cartridge
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- One blank Microdrive cartridge
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The new ZX Spectrum +

Fully compatible with all Spectrum software and peripherals, including this Expansion System

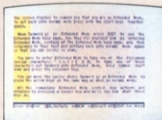


Tasword Two word processor

Turns your ZX Spectrum into a high-quality word processor

Tasword Two has all the essential features of professional word processing packages—move and copy, insert, margin settings, 'help' pages, find and copy, and much more.

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Address lists...personal files...stock inventories...stamp or album collections...club records...recipes...if you can file it, you can Masterfile it!

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The all-time classic 3D strategy game. Ant Attack combines stunning Escher-like graphics with fast-moving action and a real tactical challenge.

Your task is to enter the walled city, seek out your captured partner and escape. At all times you can choose from four angles of view. But beware: the city is patrolled by giant ants...
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Every cartridge comes in its own protective case. Simply remove the cartridge, slot it into the Microdrive, and it's ready to use.

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ZX Interface 1 connects to the back of your Spectrum and controls up to 8 Microdrives. (Additional Microdrives are available for £49.95 each.)

It also gives you:

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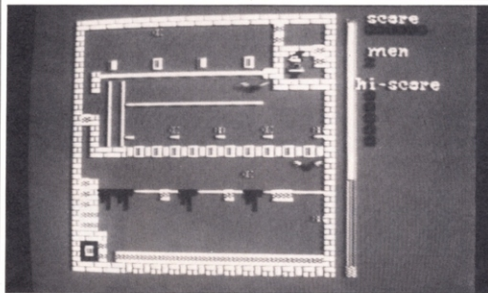
PCN proudly presents the second section of Tony Crowther's Crazy Caverns game listing.

By now you should have just about recovered from typing in the first section of Crazy Caverns, the games listing we began last week — so here the second chunk.

Crazy Caverns is an all machine code Manic Miner-type game of arcade quality, written by Tony Crowther of Potty Pigeon, Monty Mole, and Suicide Express fame). It consists of ten screens, through which you pass by collecting objects secreted around each one.

Type in the sections given below, running each as you go to check that your data statements are correct. If so, save and begin typing in the next part.

The listing here is for disk users; if you wish to use tape, you should change the last line of each section to LOAD "FILENAME", I, I. To be continued next week



Listing

Continued from issue 97

Part 7

```

60 DATA 28,214,1,22,227,1,17,511
61 DATA37,122,227,1,17,37,1,343
62 DATA14,187,1,28,214,6,38,148,548
63 DATA6,34,7,46,38,125,6,322
64 DATA74,6,43,2,38,125,4,256
65 DATA34,74,6,38,140,12,38,125,49
66 DATA6,38,74,6,38,148,6,38,324
67 DATA24,25,28,214,4,70,2,678
68 DATA34,74,6,38,125,6,34,74,391
69 DATA6,43,52,12,38,125,6,34,316
70 DATA74,6,38,140,12,38,125,4,256
71 DATA34,74,6,38,140,16,28,214,532
72 DATA32,81,143,1,76,251,1,68,653
73 DATA49,1,81,143,1,76,251,1,783
74 DATA68,149,1,81,143,1,76,251,778
75 DATA1,68,149,1,81,143,1,76,528
76 DATA251,1,68,149,1,81,143,1,495
77 DATA76,251,68,149,1,81,143,292
78 DATA1,76,251,1,68,149,1,81,628
79 DATA143,1,76,251,1,68,149,1,498
80 DATA81,143,1,76,251,1,68,149,778
81 DATA1,8,8,99,4,73,2,8,187
82 DATA146,2,4,73,2,4,73,2,386
83 DATA4,73,2,8,146,2,4,73,312
84 DATA2,4,73,2,4,73,2,8,168
85 DATA146,2,4,73,2,4,73,2,386
86 DATA4,73,2,8,146,2,4,73,312
87 DATA2,7,163,2,7,163,2,15,361
88 DATA78,2,7,163,2,7,163,2,416
89 DATA7,163,2,15,78,2,7,163,429
90 DATA2,7,163,2,7,163,2,15,361
91 DATA78,2,7,163,2,7,163,2,416
92 DATA7,163,2,15,78,2,7,163,429
93 DATA2,7,163,2,7,163,2,15,361
94 DATA78,2,7,163,2,7,163,2,416
95 DATA7,163,2,15,78,2,7,163,429
96 DATA2,7,163,2,7,163,2,15,361
97 DATA78,2,7,163,2,7,163,2,435
98 DATA5,184,2,1,113,2,5,184,586
99 DATA2,5,184,2,5,184,2,5,395
100 DATA113,2,5,184,2,5,184,2,497
101 DATA5,184,2,1,113,2,5,184,586
102 DATA2,5,184,2,5,184,2,5,395
103 DATA113,2,5,184,2,4,73,2,386
104 DATA4,73,2,8,146,2,4,73,312
105 DATA2,4,73,2,4,73,2,8,168
106 DATA146,2,4,73,2,4,73,2,386
107 DATA4,73,2,8,146,2,4,73,312
108 DATA2,7,163,2,7,163,2,15,361
109 DATA78,2,7,163,2,7,163,2,416
110 DATA7,163,2,15,78,2,7,163,429
111 DATA2,7,163,2,7,163,2,15,361
112 DATA78,2,7,163,2,7,163,2,416
113 DATA7,163,2,15,78,2,7,163,429
114 DATA2,7,163,2,7,163,2,15,361
115 DATA78,2,7,163,2,7,163,2,416
116 DATA7,163,2,15,78,2,7,163,429
117 DATA2,7,163,2,7,163,2,15,361
118 DATA78,2,7,163,2,7,163,2,416
119 DATA5,184,2,1,113,2,5,184,586
120 DATA2,5,184,2,5,184,2,5,395
121 DATA113,2,5,184,2,5,184,2,497
122 DATA5,184,2,1,113,2,5,184,586
123 DATA2,5,184,2,5,184,2,5,395
124 DATA113,2,5,184,2,5,184,2,497
125 DATA5,184,2,1,113,2,5,184,586
126 DATA2,5,184,2,5,184,2,5,395
127 DATA113,2,5,184,2,5,184,2,497
128 DATA5,184,2,1,113,2,5,184,586
    
```

Part 8

```

500 PRINT "CLEAR PLEASE WAIT!"
501 FOR I=0 TO 27:IF I=0:FOR J=0 TO 7:READ A:R=R+A:POKE35872+I*8+J,A:NEXT J
502 READ A:IF C=0:THEN PRINT "ERROR IN" I+1:IE
503 NEXT I:PRINT "OK ALL DONE!"
504 LOAD "PART8",8
    
```

Part 8

```

800 PART8:MUSIC:WARD DEVELOPMENT LTD.
1 DATA 2,5,184,2,5,184,2,1,11,395
2 DATA113,2,5,184,2,4,73,2,386
3 DATA4,73,2,8,146,2,4,73,312
4 DATA2,4,73,2,4,73,2,8,168
5 DATA146,2,4,73,2,4,73,2,386
6 DATA4,73,2,8,146,2,4,73,312
7 DATA2,4,73,2,4,73,2,8,168
8 DATA146,2,4,73,2,4,73,2,386
9 DATA4,73,2,8,146,2,4,73,312
10 DATA2,4,73,2,4,73,2,8,168
11 DATA146,2,4,73,2,4,73,2,386
12 DATA4,73,2,5,184,2,5,184,497
13 DATA2,1,113,2,5,184,2,5,324
14 DATA184,2,5,184,2,1,113,2,583
15 DATA5,184,2,5,184,2,5,184,571
16 DATA2,1,113,2,5,184,2,5,324
17 DATA184,2,5,184,2,1,113,2,583
18 DATA5,184,2,4,73,2,4,73,347
19 DATA2,8,146,2,4,73,2,4,241
20 DATA2,4,73,2,8,146,2,4,2318
21 DATA4,73,2,4,73,2,4,73,255
22 DATA2,8,146,2,4,73,2,7,244
23 DATA163,2,7,163,2,15,78,2,424
24 DATA7,163,2,7,163,2,7,163,514
25 DATA2,7,163,2,7,163,2,7,268
26 DATA163,2,7,163,2,15,78,2,424
27 DATA7,163,2,7,163,2,7,163,514
28 DATA2,15,78,2,7,163,2,7,268
29 DATA163,2,7,163,2,15,78,2,424
30 DATA7,163,2,7,163,2,7,163,514
31 DATA2,15,78,2,7,163,2,7,268
32 DATA163,2,7,163,2,15,78,2,424
33 DATA7,163,2,5,184,2,5,184,571
34 DATA2,1,113,2,5,184,2,5,324
35 DATA184,2,5,184,2,1,113,2,583
36 DATA5,184,2,5,184,2,5,184,571
37 DATA2,1,113,2,5,184,2,5,324
38 DATA184,2,5,184,2,1,113,2,583
39 DATA5,184,2,5,184,2,5,184,571
40 DATA2,1,113,2,5,184,2,5,324
41 DATA184,2,5,184,2,1,113,2,583
42 DATA5,184,2,4,73,2,4,73,347
43 DATA2,8,146,2,4,73,2,4,241
44 DATA73,2,4,73,2,8,146,2,318
45 DATA4,73,2,4,73,2,4,73,255
46 DATA2,8,146,2,4,73,2,4,241
47 DATA73,2,4,73,2,8,146,2,318
48 DATA4,73,2,4,73,2,4,73,255
49 DATA2,8,146,2,4,73,2,4,241
50 DATA5,184,2,5,184,2,5,184,497
51 DATA113,2,5,184,2,5,184,2,497
52 DATA2,5,184,2,5,184,2,5,395
53 DATA113,2,5,184,2,5,184,2,497
54 DATA2,5,184,2,5,184,2,5,395
55 DATA5,184,2,5,184,2,5,184,2,497
56 DATA2,5,184,2,5,184,2,5,395
57 DATA113,2,5,184,2,5,184,2,497
58 DATA2,5,184,2,5,184,2,5,395
59 DATA113,2,5,184,2,5,184,2,497
60 DATA2,5,184,2,5,184,2,5,395
    
```

```

62 DATA113,2,5,184,2,5,184,2,497
63 DATA5,184,2,5,184,2,5,184,586
64 DATA2,5,184,2,5,184,2,1,11,395
65 DATA113,2,5,184,2,5,184,2,497
66 DATA5,184,2,5,184,2,5,184,586
67 DATA2,5,184,2,5,184,2,1,11,395
68 DATA5,184,2,1,113,2,5,184,586
69 DATA5,184,2,1,113,2,5,184,586
70 DATA2,5,184,2,5,184,2,1,11,395
71 DATA113,2,5,184,2,5,184,2,497
72 DATA5,184,2,1,113,2,5,184,586
73 DATA2,5,184,2,5,184,2,1,11,395
74 DATA113,2,5,184,2,5,184,2,497
75 DATA5,184,2,1,113,2,5,184,586
76 DATA2,5,184,2,5,184,2,1,11,395
77 DATA5,184,2,1,113,2,5,184,586
78 DATA2,5,184,2,5,184,2,1,11,395
79 DATA5,184,2,5,184,2,5,184,586
80 DATA2,7,163,2,7,163,2,15,361
81 DATA7,163,2,7,163,2,7,163,416
82 DATA78,2,7,163,2,7,163,2,416
83 DATA2,7,163,2,7,163,2,15,361
84 DATA78,2,7,163,2,7,163,2,416
85 DATA2,7,163,2,7,163,2,15,361
86 DATA78,2,7,163,2,7,163,2,416
87 DATA7,163,2,15,78,2,7,163,429
88 DATA2,7,163,2,7,163,2,15,361
89 DATA78,2,7,163,2,7,163,2,416
90 DATA7,163,2,15,78,2,7,163,429
91 DATA2,7,163,2,7,163,2,15,361
92 DATA78,2,7,163,2,7,163,2,416
93 DATA7,163,2,15,78,2,7,163,429
94 DATA2,7,163,2,7,163,2,15,361
95 DATA78,2,7,163,2,7,163,2,416
96 DATA7,163,2,15,78,2,7,163,429
97 DATA2,7,163,2,7,163,2,15,361
98 DATA78,2,7,163,2,7,163,2,416
99 DATA7,163,2,15,78,2,7,163,429
100 DATA2,7,163,2,7,163,2,15,361
101 DATA78,2,7,163,2,7,163,2,416
102 DATA7,163,2,15,78,2,7,163,429
103 DATA2,7,163,2,7,163,2,15,361
104 DATA78,2,7,163,2,7,163,2,416
105 DATA7,163,2,15,78,2,7,163,429
106 DATA2,7,163,2,7,163,2,15,361
107 DATA78,2,7,163,2,7,163,2,416
108 DATA7,163,2,15,78,2,7,163,429
109 DATA2,7,163,2,7,163,2,15,361
110 DATA78,2,7,163,2,7,163,2,416
111 DATA7,163,2,15,78,2,7,163,429
112 DATA2,7,163,2,7,163,2,15,361
113 DATA78,2,7,163,2,7,163,2,416
114 DATA7,163,2,15,78,2,7,163,429
115 DATA2,7,163,2,7,163,2,15,361
116 DATA78,2,7,163,2,7,163,2,416
117 DATA7,163,2,15,78,2,7,163,429
118 DATA2,7,163,2,7,163,2,15,361
119 DATA78,2,7,163,2,7,163,2,416
120 DATA7,163,2,15,78,2,7,163,429
121 DATA2,7,163,2,7,163,2,15,361
122 DATA78,2,7,163,2,7,163,2,416
123 DATA7,163,2,15,78,2,7,163,429
124 DATA2,7,163,2,7,163,2,15,361
125 DATA78,2,7,163,2,7,163,2,416
126 DATA7,163,2,15,78,2,7,163,429
127 DATA2,7,163,2,7,163,2,15,361
128 DATA78,2,7,163,2,7,163,2,416
500 PRINT "CLEAR PLEASE WAIT!"
501 FOR I=0 TO 27:IF I=0:FOR J=0 TO 7:READ A:R=R+A:POKE35872+I*8+J,A:NEXT J
502 READ A:IF C=0:THEN PRINT "ERROR IN" I+1:IE
503 NEXT I:PRINT "OK ALL DONE!"
504 LOAD "PART8",8
    
```




F1e

THE RIPE

APRICOT

Apricot's no trimmings version of the F1 is a winner, says Bryan Skinner.

The Apricot F1e is probably the best available 'entry-level' micro. ACT thinks there's a need for a decent micro costing under £1,000, and seems to have delivered just that with the F1e, the cut-down version of the F1.

Shorn from the F1e are the F1's extra 128K RAM, half the disk storage capacity, MSDOS with bundled software, LAN capability and just over £500 on the price tag. You can upgrade the F1e with the 'Business Upgrade Kit' — 128K RAM, MSDOS and utilities for £280.

For £914.25, the F1e's specifications are remarkable. The basic machine comes with 128K RAM, monochrome monitor, infra-red keyboard, and a single 3.5in disk drive (315K capacity). Bundled software includes CP/M-86, Personal Basic and Dr Logo. The hardware can be upgraded with a colour monitor, more RAM, a modem board, hard disk, mouse... the list is impressive. Less impressive is that software for the F1 series is so far conspicuous by its absence.

There are no revolutions, no innovations besides the price. A 16-bit micro with the F1e's specifications for £900 would have been unthinkable a year ago.

Features

Software and storage are two areas where the F1e scores over the competition. For instance, tailored software means no frustrating hours mastering an arcane art of VDU control codes as you try to install some new piece of software.

Then there's the drives. I'm convinced the 3.5in format is the one for the future. The small disks require less storage space, and the protective jacket is ideal, with more room for labelling and less risk of damage.

All parts of the system are well-designed, aesthetically and ergonomically. The F1e looks more expensive than it is and the small footprint makes it an ideal desktop micro.

Unfortunately, no review software was supplied (apart from pre-release versions of the bundled packages), so I can't comment on ACT's Icon technology using the mouse. However, the promotional screen shots give some idea of the sophistication possible.

Keyboard

An infra-red keyboard banishes tangled wires and makes it easy to place the unit

anywhere within reach. Whether it's worth the hassle of keeping a spare set of Duracells on hand is another matter.

The keyboard must be positioned within fairly tight limits in front of the main unit. So don't envisage leaning back with the keyboard in your lap, as your knees or table-top may block the infra-red light. Anyway, the screen's so small you wouldn't be able to read the text, particularly in 80-column mode.

All the same, the lack of a thick, coiled,

The keyboard unit is light and slim, with two sprung feet which snap down when released by push-buttons at each end.

The 92 keys comprise a standard qwerty layout, a grey numeric keypad, a bank of ten function keys, a cursor cluster and some editing keys. Additionally, there are recessed buttons for reset, key repeat rate, set time and keyboard lock. The key repeat rate can be toggled between medium and slow. Set time had no effect on our version, nor did keyboard lock which allows you to disable the keyboard.

At the back are two tiny bulbs for the infra-red link, and a socket for the light pipe. Access to the four AA batteries is via a hatch on the underside.

The keytops are the fashionable, sculptured, circle-with-the-bottom-cut-off shape. The keys are too heavily sprung for my liking, but I got the impression that, together with the audible click for every received keypress, I could grow to love this keyboard quite a lot.

Monitor

The small, neat monitor's cream plastic case is supported by a single limb with a circular base. The screen, which can be tilted, sits neatly atop the main unit and is easy to read, even in strong light.

My main criticism is that it ghosts badly, probably due to the type of display used, as illuminated pixels decay slowly.



If the price is right — the F1e moves in on the competition with a 'less than £1,000' price tag.

apparently semi-sentient cable is a relief. If you can't adjust to being wireless, you can use the light pipe. This very thin lead connects keyboard to micro and prevents your keyboard driving other Apricots in the immediate vicinity.

However it's possibly made worse by the 'mad scroll' (sic) developed by ACT for 'multi-directional smooth scrolling and multiple horizontal window operations'. Programs which force the screen to scroll create blurred images, and this sometimes caused visual confusion.

The display switches between 40 and 80 column mode via .CMD files. The 40 column display is clearer, but has restrictions — a disk directory, for example, is difficult to read. The 80 column format produces small characters. What a pity that the format can apparently only be altered by dropping into CP/M-86. The default mode is 40

simple upgrade may deter many potential buyers.

Inside, there's space for modem board (but you'll need MSDOS for this), hard disk connection (an MSD costs £1,489.25 and again you'll need MSDOS) and RAM expansion (which you'd need to run Concurrent CP/M-86 for any serious purposes and costs £224.25 for 128K).



Although the monitor takes its power from the rear of the machine two power supplies are needed.

columns, so if you're used to working with 80 you'll probably want to set up boot files on your working disks. As the system looks for a SUB file called STARTUP.SUB when it's turned on, this is simplicity itself.

Resolution is 640 x 256 with four colours; using all 16 colours halves the horizontal pixel count. There are four screen modes, providing different resolutions according to the number of colours and 'planes' available.

Main unit

The front of the main unit is tidy, if unassuming. The column of lights on the left are for power, caps lock, no scroll and disk. (No scroll lights up when the screen has been frozen, as happens when you suspend a listing). Just below and to the right of the drive slot is the disk eject button. The light pipe sockets are to the left of the brown bar. There are two of them so you can use a mouse and keyboard at the same time.

The main unit is deceptively small. It's narrow at 8in wide, and only 3.5in high. But it's over 16in long. On some desks the rear of the unit overhangs the edge to make room for the keyboard. Even so, its size is a blessing—even with the monitor, the whole system's only 12in high by 10in wide.

A single drive of only 315K is limiting, and when backing up disks, it's a dead loss. This has to be a major criticism of the Flc. You can't just hang an extra disk off it; you must expand it with the business upgrade kit first: although the two machines are hardware identical, the ROMs are different. With MSDOS you could upgrade to the MSD 10Mb hard disk, or use the Expansion Box for extra 5.25in or 3.5in drives. However, I suspect that the single disk, its low storage capacity and lack of a cheap and

Software

Until about a year ago, Digital Research's CP/M was virtually the only operating system for microcomputers. It's not particularly friendly; 'PIP B:=A*.COM' copies all files with the suffix COM from drive A to drive B and 'BDOS error on A' usually means a fatal disk crash.

When 16-bit chips became available, 16-bit operating systems were developed and MSDOS beat CP/M-86 largely because DR merely extended CP/M slightly. MSDOS is easier to use and, some would say, more powerful.

ACT's front end to CP/M-86 is not brilliant: it's a straightforward menu affair and allows you to get directories, run programs etc, but little else. It may cushion the naive user from CP/M-86, but I suspect many owners to opt out.

The Basic provided was release 1.0 of DR's Personal Basic. ACT hopes to be able to offer a later release (post 1.2)

'soon'. As it is, there are some discrepancies between the documentation and the product. Basic took TIMES\$ and DATE\$ as program variables, for example, but this may be related to the non-availability of the time and date setting from the keyboard.

Experimentation and the manual reveal that Personal Basic is an almost MBasic compatible version of the dialect. Apart from niggling little details like DIR instead of FILES, most of it is virtually identical, right down to the tortuous random access file handling of:

```
10 OPEN "r", 1, "Filename"
20 FIELD # 1, 20 AS A$, 5 AS B$
```

And mention is made of the alternative format 'OPEN "Filename" FOR INPUT/OUTPUT/APPEND AS # 1'.

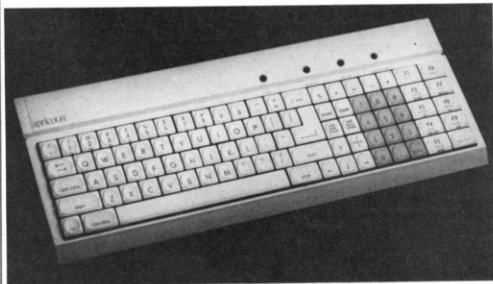
Other curiosities including the charming (if disturbing) error report, 'Something is wrong'. It makes a change from 'Syntax error' and a carat appears below offending items in the line. Error checking is performed on all input, not only direct commands and Basic program line containing syntax errors are shown with a question mark to their left when LISTED — a neat touch.

This is the first Basic I've met with a rich vocabulary of debugging commands. FOLLOW prints out the value of selected variables, together with the line number of each statement affecting the variable(s). STEP single steps a program showing each line as it's executed, and the two can be combined.

Minus points are the lack of information about driving the screen, and no full screen editor.

However, Microsoft Basic is as good as you'll get, and the DR version is thorough and competent. Personal Basic holds out the promise of a useful programming language.

The inclusion of Dr Logo might seem strange initially, but indicates ACT's hope of selling large numbers of machines to teaching establishments. The comprehensive, well-written manual guides the user through first principles, Logo primitives and into list management. There are plenty of examples and screen shots. ACT says the



An infra-red keyboard rids you of cats' cradles of wires.

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HARDWARE PRO-TEST: APRICOT F1e

425

manual is to be reprinted to take version changes and errors into account.

Realising that buyers have an application in mind, ACT provides an A-Z of software, the 'Gold' booklet. This covers applications programs for such diverse vertical markets as agriculture, hairdressing, pharmacy and video hire. Actually, A-Z is inaccurate as the last heading is word processing, an error I put down to healthy optimism.

Also listed are hardware suppliers and other software such as languages, programming aids and so on. There are some prestigious entries, eg the *dBase* series (and third party front ends), as well as *Friday!* and *Files and Folders*. *FT Moneywise* appears, but needs over 300K of RAM. And does the absence of Microsoft entries reflect ACT's close alliance with Digital Research? There are many relatively unknown companies (which you might expect, given the diverse and specialist software headings) and while ACT's support may provide a good indication of the quality of the products, you'd do well take the usual precaution of a test-drive before buying.

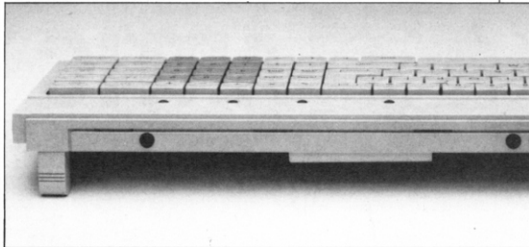
The programs listed in the 'Gold' booklet are 'for use with ACT personal computers'. This means Sirius as well as the Apricot PC and Xi models. In theory at least, any software which runs under CP/M-86 on an Apricot should work on the F1 and F1e. If you want a program running under MSDOS you must buy the operating system first. But all that's Gold doesn't necessarily glister. In this case it means you can't get your friends to back up their Apricot programs and slip them your way. While CP/M-86 programs may work, some displays might look odd. The F1 series screen differ from other Apricots (ie the mad scroll), and only the best-behaved of software (which only makes calls to the operating system, be it CP/M-86 or MSDOS, and not directly to hardware) works properly.

Software houses such as TABS, Peachtree and ACT Pulsar, of course, are in the process of writing or rewriting screen driver routines where necessary to take the screen differences into account. This means a delay in F1e software becoming available but the future does look rosy.

Documentation

The documentation is manifold: two main manuals (starter pack and Dr Logo) are joined by countless leaflets, ie the Basic, CP/M-86 and Dr Logo quick reference cards, details of the ACT insurance scheme (£240 for a standard Apricot for a year, no details for the F1 series) and accessories.

The starter pack manual begins with what you should get in your package and how to assemble it. There are overviews and introductions to CP/M-86 and Basic and the spiral-bound, clearly printed document contains some useful informa-



The rear of the keyboard holds the connections for the mouse and light pipe.

tion for the assembly language programmer. The only gripe is that the limited introduction to Basic. A whole manual is devoted to principles, primitives and examples of Logo, but ACT has no plans for a separate, detailed and instructive manual for Personal Basic.

Input/output

Apart from the light pipe, most of the F1e's I/O is round the back, as usual. There's the power input for the monochrome monitor, fuse and on/off switch, a serial port (RS232C), socket for colour monitor and another for composite and a parallel (Centronics) port for printers. To the rear of the right side is the port via which you'd connect the MSD hard disk unit.

The RS232C port can be configured via the DEVICE. CMD file. There are a number of unusual options here; for example you can set parity as none, odd, even, mark or space. Polarity can be set to high or low, handshaking may be set to none, XON, ETX, RTS or DDR. You can set the transmit and receive baud rates independently and there's a greater range of speeds than I've seen before.

Changing any parameter is easy, the arguments and their values being placed in the command tail, as in 'DEVICE AUX:= SERIAL/SPEED =7200, STOPBITS=1,

DATABITS=7]. Uploading and downloading should be a fairly simple process.

Verdict

Our test model was pre-production: boot-up announcements gave late November for version dates, and it was clear that there were several discrepancies between the manuals and what the machine would, and would not, do.

I've mentioned the lack of DATES in Basic, the non-operative calculator and set time functions and the booklet of errata for the Dr Logo manual. A 'readme' file gave screens of information about these and shows that ACT is only a little behind schedule. Some of the problems exist because Digital Research has changed some operations in the two languages, others because some ROM software is being finalised, but ACT is adamant that all problems will be resolved by the time machines hit the shops.

If the company is correct, the Apricot F1e should pose a sturdy challenge to the market.

So, if you're after an efficient, cheap micro with a professional feel, the F1e should be at the top of your list.

Remember, though, to make sure you don't need any extra kit to run the software that you want.

SPECIFICATIONS

Processor	8086 @4.77MHz
Memory	128K
Storage	Single sided 3.5in, 315K capacity
Monitor	9 or 12in green; 10 or 12in colour
Video	Mode 1: four colours, two planes, 640x256; Mode 2: 16 colours, four planes, 320x256; Mode 3: two planes, 640x200; Mode 4: four planes, 320x200
I/O	RS232C, Centronics, IRGB, Composite, TV (modulator extra)
Keyboard	92 key, ten function, infra-red or light pipe, variable repeat rate, on/off lock
Weight	9.59lbs (main unit); 2.87lbs (keyboard)
O/S	MSDOS (extra) CP/M-86
Software	Personal Basic, Dr Logo
Optional extras	Mouse, £109.25, 128K RAM board £224.25, MSDOS and utilities, Apricot Expansion Box (5 expansion slots + power supply) £224.25, Modem board £339.25, 10in colour monitor £454.25, MSD 10Mb £1489.25, TV Modulator £34.50.



ARTIC TROLL

One of Artic's new adventures, *Eye of Bain*, is first with graphics. Bob Chappell compares it with a text-only release, *Curse of Seven Faces*.

Artic has long been respected for its text adventures. Its earlier games *Espionage Island*, *Planet of Death*, *Inca Curse*, *Ship of Doom* and the highly challenging *Golden Apple*, have long posed challenges for adventure aficionados.

Now it seems to have bowed to the inevitable — adventures with graphics. Perhaps bowed is not quite the right word — modded might be more apt. For Artic has brought out two new adventures, one with graphics and (hooray) one without.

Word perfect

First, the text only adventure, *Curse Of The Seven Faces* (Spectrum and Amstrad), written by Alan McDonald. Like any text adventure worthy of the name, *Curse* has detailed and literate location descriptions, generating an atmosphere that quickly enthralls.

There are a lot of places to explore, (over 140), with plenty of objects and puzzles to stretch your inventiveness.

The plot concerns tracking down an evil wizard and takes you through caverns, mountains and forests. While accomplishing your mission, you'll pass through a trolls' lair, the inevitable maze, a castle, the domain of the elves, a mansion and the wizard's realm.

Most of the puzzles are not too difficult and, to be honest, are hardly original either, though there are a few really novel twists which should test your mettle.

Some of the objects don't sit very easily with the general theme of the adventure — I'd rather not see guns and Microdrive cartridges in an adventure that features magic wands and spell books.

Whatever the shortcomings, the presentation and the atmospheric text compensate. You'll certainly get good value for money if you buy it.

Art it isn't

Now the *Eye of Bain* (48K Spectrum, £6.95), the one with pics. Mind you, you might not realise it had any graphics, as the adventure kicks off in text mode. Only by typing LOOK or DRAW will the screen clear and a picture of the current location slowly appear. A touch of the



Enter key and the text reappears. And a good job too.

The pictures are very simple and do absolutely nothing to enhance the game. Although the textual descriptions are fairly spartan, if your own imagination cannot conjure up better images than those provided by the graphics in *Bain* then you must either be under three or a cabbage leaf.

Setting aside that grumble, the adventure itself is pretty good. The eye of the title, if you hadn't already guessed, turns out to be a priceless treasure. It is hidden in a temple and jealously guarded by a somewhat vicious tribe of Alvanians, so beware.

Pole position

I had arrived at the tribe's camp. My Alvanian, clearly being a trifle rusty, must have said something like 'May mildew strike your grass skirts', instead of saying 'Greetings from the Great White Mother across the water'. I deduced that I must have committed some such minor breach of diplomacy by the fact that I was in a native hut, shackled by one leg to pole.

Having parted myself from the pole without having to saw my leg off, I rejoined my hosts,

expecting them to be overawed by my Houdini-like escape.

I was somewhat taken aback to be executed on the spot. Still smarting, I restarted, tried a different tack and was soon clear of the Alvanian mafia.

I later passed a poor wretch tied to a whipping post and also had a fairly traumatic experience with a shapeless black beast down a well. I didn't find a way to get the chain off my leg, but that didn't matter — I died of thirst in the desert.

The text is neatly presented and response to the usual two-word input is immediate. When the program cannot understand a word, it tells you whether it's the verb or noun that's the problem. A good adventure with a decent assortment of puzzles. The text descriptions could have been beefed up if the graphics had been given the elbow.

Book look

Room for just a brief mention of two useful books published by Datamost, a division of Prentice-Hall, entitled *A Shortcut Through Adventureland*, volume one provides detailed solutions to 14 adventures that are probably better known to Atari and Apple owners. The

solutions include Sierra On-Line's *Ulysses* and the *Golden Fleece* and *The Dark Crystal* and Sirius' *Blade of Blackpool*. Volume two is likely to be of greater interest to UK adventurers, as it covers all but the latest Infocom adventures. The books are priced at \$9.95 each.

Dungeonade

For all those suffering souls who are bewitched, bothered and bewildered by Scott Adams' superb *Sorcerer of Claymorgue Castle*. The Dungeon Master takes pity on lesser mortals who do not possess a brilliant enough mind (not to mention Adventure International's detailed crib book) to enable them to complete this excellent adventure. The answers are not written in Alvanian, but merely backwards:

Can't find the secret of the Plain Room?
SNOITCERIDTN EREF FIDN
IGNI HSUP DNAG NILL
UPYR T
Can't open the Stone Door?
LLEP SDEE SESU NEHT
ELTS ACOT NIYA WREH
TONA DNIF
More help with Stone Door?
TSAE NEHT ECIW TNWO
DMIW SHTA ERBD LOHT
AOMN I

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DEPECHE MODEM

Has Protek, with its multi-interfacable 1200, come up with a modem for all micros?
David Janda gets on-line with it.

If a manufacturer wants to produce a modem for all popular micros, it can be an expensive business — which is reflected in the cost to the user. Even though the modem can be the same for all makes of micro, the interfacing between the micro and the modem, is usually different for each machine and so different models have to be produced.

Protek has overcome this problem by producing one modem with different interface packs for the BBC Micro, Commodore 64, Spectrum/Spectrum Plus, Oric/Atmos and the Electron. Each interface pack contains the cables/hardware to connect the micro to the modem as well as software to drive it. So you simply buy the modem and interface pack for your particular machine.

The batteries are placed in two holders which are situated in the modem's



Hooking into the Spectrum is more complex.

earpiece and mouthpiece, and these areas also contain the electronics that work the modem.

A small front panel of controls can be found at the earpiece end of the modem. It consists of a small battery indicator, the baud select switch, female RS232C socket and an earpiece socket.

An earpiece (like the ones supplied with the 'old' transistor radios) is supplied for monitoring the call without disturbing the acoustic link — a nice touch.

Each interface pack contains instructions, the interface itself and software to drive the modem. The Spectrum interface, for example, attaches to the back of the edge connector on the Spectrum or Interface 1. Note that the modem cannot use the RS232 port on the Interface 1.

For the 64, an edge connector is plugged into the user port, while the BBC pack simply consists of the software and cable (because the Beeb has an RS423 interface built in).

Once the interface has been attached to the micro, the cable leading from it is plugged into the modem.

Although the modem-drivers supplied with each interface pack differ between machine, they offer the same basic facilities — accessing Prestel and user-to-user communications. A main menu displays various options which include auto-log on/off and saving and loading of frames.

In use

Hats off to Protek for producing an acoustically sound modem. First I tested the modem with my own software, hoping to determine how prone the unit was to vibration and external background noise. The results? Well, even when I used the modem with a low-volume phone, results were above average.

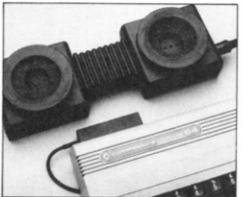
This is because the cups are well designed and allow the handset to be firmly inserted. Unlike other acoustic couplers, the connection between the ear and mouthpiece is flexible, so it is possible to 'twist' either end of the modem when inserting the handset.

The Spectrum software gave details on how it could be saved to Microdrive, but when I tried, it crashed. There were no details on how the software could be saved to disk for the Commodore and BBC versions, which was a pity.

Accessing Prestel required the user ID to be entered before connecting. With no facility to save it to tape or disk, I thought this was rather pointless. Worse still, on many occasions Prestel refused to accept the ten digit code once it was transmitted, and I had to enter my ID manually.

The Spectrum software 'builds' an incoming frame within memory and only displays it once the whole frame has been sent. This is normally okay, but it means that dynamic frames (of the 'd', 'o' and 'n' type) cannot be viewed properly.

The Commodore 64 software was not much better. It appeared to 'forget' to clear the screen. The result was a very messy display. No telesoftware downloading facility was provided.



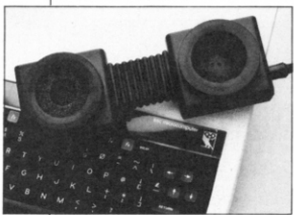
The C64 has a non-standard RS232 on its user port.

Nice modem shame about the software. I really think Protek could have done a lot better.

REPORT CARD: 1 TO 5

Features	●●
Documentation	●●●
Performance	●●●
Overall value	●●

Name Protek 1200 + Interface packs.
Price Modem 1200 £59.95 Interface packs: Spectrum £24.95; BBC £19.95; Commodore 64 £19.95; Amstrad CPC 464 £29.95; Oric/Atmos £29.95; Electron £29.95. Manufacturer Protek Computing 0506-415353.



The BBC interface is a cable.

Features

The particular model (called the 1200) is a battery powered acoustic coupler operating at 1200/75 and 1200/1200 baud rates, making it eminently suitable for accessing viewdata databases such as Prestel. The interface packs include software to do this.

Bulletin board fans can also use it to connect up to the growing number of boards that now support 1200/75 — CABB, MOBB and METRO to name a few. However, you'll need your own software to drive the modem because the software included with the interface packs is only viewdata compatible.

The modem is also capable of operating at 1200/1200 half duplex, which makes it especially useful for file transfer.

Powered by four AA batteries, it should have a 30- to 50-hour lifespan.

You're all hooked-up and ready to buzz
— where can you go? Ken Garroch
looks at board games.

Microcommunications are fast becoming one of the most popular uses for personal computers, and the most integral part of the hardware needed to grab a slice of the action is a modem, the device which effectively conveys the signals sent from computers from the actual phone line to the micro itself.

Getting on-line

One of the major uses for modems is for contacting bulletin boards — (generally) free public access computer systems run by enthusiasts that allow you to communicate, play games, load free software, and generally hack around.

Having acquired the necessities, here's a brief look at the processes of actually getting 'on-line', and at what you might find when you're there.

Getting in touch with a bulletin board system is easy: all you need is a telephone, a computer, a modem, and some software to drive it. Many computers these days have an RS232 interface which enables you to link up to most modems, and using this, it's possible to use one of the many modems available. If your computer doesn't (the Spectrum, Amstrad and C64 don't, for instance), you must buy an adaptor. Most boards use the 300/300 baud standard, but a few run at 1200/75 (receive/transmit) and use teletext to display their graphics (of the latter, there are two types — Prestel and Viewdata. On 300/300 boards, there are quite a few things to do — programs

to download, special interest groups, (SIGs), information on the system, and a chance to chat with the sysop — the person who runs the system.

Logging on (connecting your computer to the system) is done by preparing your computer to receive and putting your modem to originate, ie start the call. Dial the number and wait for a tone from the modem at the other end of the line, telling you it's ready for you to log on.

As soon as you hear it, the phone should be placed into the cups of the modem if it is an acoustic connection, or simply placed in its cradle if it is a direct connection. For the latter, you will need the new standard phone socket from British Telecom and a double adaptor (available at most Tandy stores) so the phone and modem can be connected at the same time.



The hidden face of Prestel.

Once connected, you should then receive the title page of the board and how long you can expect to be on it before it throws you off.

The bulletin board then asks for your first and second names, and where you are calling from. It is wise to use the same name every time and not a pseudonym, for simplicity's sake when sending lots of messages. If you're a new user, you may be asked to enter a password (used every time you access this board).

Since the length of the call is generally limited to between 15 and 20 minutes, it is easily possible to spend quite a long time sifting through the depths of the system; this is where a download facility comes in handy, as you can save the instructions to disk, or tape, and read them at your leisure after logging off.

Once you know how to get around, you can pre-empt the system by hitting the required key as soon as the menu starts to come through.

Stick in the MUD

Adventure nuts who are really into playing around with bulletin boards should consider obtaining access to MUD (Multi User Dungeon). This is a telephone-accessible database carrying games which callers can log onto and play either with other callers or against the base computer.

The only drawback with these kind of systems is the cost. You will need a PSS ID (01-920 0661 for details) and then a £25 fee. From then on it will cost: £6.25/quarter rental, and 90p-£1 per hour. There is also a charge of 15p-20p per kilosegment of data sent or received — not forgetting of course, your normal telephone bill. Fortunately, PSS exchanges are usually a local call away, ie about 50p an hour.

UK bulletin board systems

For ring back system, dial the number and allow the phone to ring once. Hang up and ring again immediately. * means ring back system.

TBBS Manchester	061-7368449
24 hr	300baud
TBBS City	01-6064194
24 hr	300baud
TBBS London (Metro)	01-3417840
24 hr	300 & 1200/75 baud
Micro-live BBS	01-5792288
24 hr	300baud
Computers Incorporated (CBBS NE)	0207-54355
24 hr	300baud
WABBS	0903-42013
24 hr	300baud*
PIP	0742-667983
24 hr	300baud*
North Birmingham	0827-288810
24 hr	300baud
TBBS Blandford	0258-54494
24 hr	300baud
Computer Answers	01-6313076
24 hr	300 & 1200/75 baud
Forum 80 Hull	0482-859169
1900-2200 Sat & Sun,	300baud
1700-2330 daily	

TBBS Liverpool	051-4288924
24 hr	300baud
TBBS London	01-3489400
24 hr	300baud
Microweb	061-4564157
24 hr	300baud
CBBS South West	0392-53116
24 hr	300 & 1200/75
CBBS Surrey	04862-25174
24 hr	300baud
Forum 80 London	01-9022546
Eve & weekend	300baud
Southern BBS	0243-511077
24 hr	300baud
CBBS Cumbria	06992-314*
6pm-10pm	300baud
North Birmingham BB	0827-288810
24 hr	300baud
ITEC	0782-265078
24 hr	300baud
BABB	0742-667983
24 hr	300baud
TBBS Nottingham	0602-289783
24 hr	300baud
C-View	0702-546373
24 hr	1200/75baud
Hackney BC	01-9853322
24 hr	1200/75baud
Optel	0908-71188
24 hr password	1200/75
0000000000	



The gateway to Hackney's Viewdata service.

Once you are connected, there are three games available: MUD, Valley, and Rock, all games of wizardry, magic, heroes/heroines, and necromancers. But the most interesting parts are the other people playing at the same time who you can meet, help, and fight. MUD is available 0200-0700 Monday-Friday, 2200-0800 Saturday-Sunday; Valley and Rock 0000-0700 Monday-Friday 2200-0800 Saturday-Sunday.

If adventures aren't your bag you can spend your time (and money) making 'keyboard friends', and just generally hacking around.

See page 33 for a list of modems.

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PERIPHERALS PRO-TEST: MODEMS

31

To enter the wide world of communications you need a modem. Here are some of the more common modems: generally, they require an RS232 standard interface and most computers need some kind of terminal program to reach the various services. Many manufacturers and distributors supply this with a modem, usually free. For services besides Prestel you need a modem incorporating both 300/300 and 1200/75 speeds, and software that deals with both.

Name	Dacom DSLV21 Buzzbox
Speeds	300/300 baud
BABT approval	Yes
Machine	Any RS232
BT connection	Direct
Available	Dacom Systems 0908-311885 £79.95
Price	
Name	Minor Miracles WS2000
Speeds	300/300; 1200/75; 75/1200
BABT approval	Yes
Machine	Any RS232
BT connection	Direct
Available	Minor Miracles 0743-50304 £149.95
Price	
Other features	Auto dial/answer options
Name	OEL QCOM
Speeds	1200/75; 1200/1200 half duplex
BABT approval	No
Machine	Sinclair QL
BT connection	Direct
Available	OEL 0768-66748

Price	QCON £75.95; QMOD £75.95; QCALL £49.95
Other features	QCOM comprises three modules: QCON — RS232 interface and VT100 emulator; QMOD — modem; QCALL auto answer/auto dial.

Name	OEL Telemod 3
Speeds	300/300; 1200/75; 1200/1200 half duplex

BABT approval	Yes
Machine	Any RS232
BT connection	Direct
Available	OEL 0678-66748 £175
Price	
Other features	Includes auto answer facility

Name	Sendata 700B
Speeds	300/300 baud
BABT approval	Yes
Machine	Any RS232
BT connection	Acoustic coupler
Available	Sendata 01-387 7792 and Tandy stores £235
Price	
Other features	Battery powered and portable; connects to most phones

Name	Tandata TM110
Speeds	1200/75 baud
BABT approval	Yes
Machine	Any RS232
BT connection	Direct
Available	Tandata 06845 68421

Price	£13.85
Other features	Stores six passwords and phone numbers internally

Name	Pace Nightingale
Speeds	300/300; 1200/75; 1200/1200 baud half duplex

BABT approval	Yes
Machine	Any RS232
BT connection	Direct
Available	Pace 0274-729306 £136.85
Price	
Other features	For BBC Micro Comstar ROM is available with modem for £159.95

Name	Interlekt Portman
Speeds	300/300; 1200/75; 1200/1200 baud half duplex

BABT approval	Yes
Machine	Any RS232
BT connection	Direct
Available	Interlekt 0734-589551 £136.95
Price	
Other features	With auto answer facility

Name	Digisolve Chip Chat
Speeds	300/300; 1200/75; 75/1200; 1200/1200 half duplex

BABT approval	No
Machine	Any RS232
BT connection	Direct
Available	Digisolve 0977-513141 CC2123A £149.90; CC2123AD £189.90;
Price	
Other features	CC2123AD features auto dial; CC2123A has auto answer

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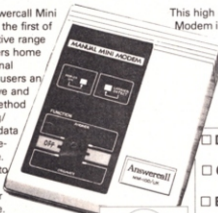
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SOFTWARE PRE-VIEW



We check out the latest contenders on the software market, and cast an eye to the future. Don't forget, if you want your company's package to be included on this page, send your latest releases to Bryan Skinner, PCN, 62 Oxford Street, London W1A 2HG, along with prices and 'phone numbers.

AMSTRAD



Virgin was among the few large software houses not to go for the Amsoft licensing arrangement, but it's still charging a full Amsoft £8.95 for its first release on the CPC464. *Sorcery* looked and played well

on the 64, and Amstrad owners should welcome it with open arms — it's far and away the best game I've yet seen on the micro. The graphics are way above those of most of Amsoft's releases to date, the music is excellent and the game is difficult, of the platform/adventure sort. All this and a fast loader too — full marks to Virgin.

Sorcery £8.95 Virgin Games 01-727 8070

ATARI



The company English Software has long been a mainstay of UK Atari software houses, as its games are of a consistently high standard. Now, the company is making the best ones available for less cash with its three volume *Smash Hits* compilations — all three volumes feature *Jet Boot Jack*. Volume One also has *Captain Sticky's Gold*, *Firefoot*, *Hyperblast* and *Dan Strikes*

Back. Number three looks the best, with *Neptune's Daughters*, *Batty Builders*, *Airstrike 2* and the so far unreleased *Breath of the Dragon*. At £14.95 per cassette, that's just under £3 each.

The company has also released *Witchswitch* and an upgrade to its excellent *Colossus Chess*. *Witchswitch* was designed by the 'Psychic Engineering Control Group' and your task is to save a village from destruction by molten lava. You can change your form from monkey to owl and witch.

Smash Hits 1	£14.95	English Software 061-835 1358
Smash Hits 2	£14.95	English Software 061-835 1358
Smash Hits 3	£14.95	English Software 061-835 1358
Witchswitch	£8.95	English Software 061-835 1358
Colossus Chess 3	£9.95	English Software 061-835 1358

ORIC

No, Orpheus hasn't managed to convert *Ultimate's* best-seller for the Oric: *Underworld* is a quilled adventure.

This partly accounts for the low price. It's a text adventure in which you visit up to 150 locations in your search for

hidden treasure in a sleepy village.

Megabase is a flexible database using a sentence type retrieval language'. It's claimed to be faster and more powerful than any other price-comparable package.

Underworld	£4.95	Orpheus 0767-51481
Megabase	£17.95	Orpheus 0767-51481

COMMODORE 64



Penetrator is well-known as the definitive version of *Skramble* for home micros. Melbourne House reckons to have brought the game bang up to date with this version. The essential game is the same, but you now can alter the landscape and number and position of enemy missile and radar emplacements. There's also a prac-

tice mode. Give those bruised shins a rest and learn something about *Bridge* with *Grand Slam*. Using the standard ACOL system of bidding you can play as declarer or defender, and 'play rubber bridge' (I thought bridge was played with cards). This looks like a good way to get in some (lonely) practice.

CYB is now offering its various BBC ledger systems on the 64. Costly they may be, but the suite is fast (it's in machine

code) and includes features often found only in more expensive systems. Each system may be used in isolation or integrated with either of the others.

Is US Gold's judgement slipping? Congo Bongo may well be a faithful translation of the arcade game, (it's the official version) but its standard just isn't what we've come to expect from a good game for the 64. It's all very well shipping in US

chart toppers, but you have to make sure that people over here really want the goods. *Congo Bongo* has only two screens, the first of which is dead easy. The second, just by way of contrast, is almost impossible. It's a Frogger scenario, but with an aquatic theme, so you hop from lily pad to rhinoceros to fish. Success here takes you back to screen one, but with more hazards. Big deal.

Congo Bongo	£9.95	US Gold 021-359 3020
Grand Slam	£8.95	Serin Software 02814-3180
Penetrator	£6.95	Melbourne House 01-940 6064
Stock Accounts	£74.95	CYB 01-764 5994
Sales/Purchase ledger	£74.95	CYB 01-764 5994
Balance Sheet/Profit & Loss	£74.95	CYB 01-764 5994

BBC



Teeth is not an arcade game with animated sprite dentures, but a quiz designed to encourage young children to look after their teeth.

Psi File offers a competent database for BBC or Electron. Its publisher, Sigma, has a reputation for high quality at low prices, both in the software and books fields. Unusually for such a program, you have up to

30 key fields for sorting and can maintain some 400 records. Wild card search facilities extend the power of the program further.

TITAN is a debugging monitor, first in a promised series of utilities from a new company. It is fully relocatable, includes a mini-assembler and disassembler, single stepping, ROM and RAM breakpoints and everything you'd expect from a professional product. At £10, the cassette version looks good value.

Hubert	£5.50	Visions 01-560 4191
Teeth	£14.50	Garland Computing 0752-41287
Psi File	£11.90	Sigma 0243-784531
TITAN	£10.00	Tomorrow's Dream 0272-47860

SPECTRUM



The Quill attracted plenty of attention at launch, and a number of commercial Quilled adventures have followed.

Gilsoft has responded to the need for illustrated adventures by producing a set of graphics extensions to use with the package. *The Illustrator* doesn't just provide a simple art package, which is the way so many other software houses would have done it. Rather, it offers such vital facilities as drawing a picture within another via the G (GOSUB) command, shading, scaling and so on. Excellent.

Users of Tasword will welcome Seven Stars' new products, as well as its price. The company is offering a patch which allows you to produce justified text, ie when all the words on a line have equal spaces between them and fill out to each margin. *Taspro* slots into *Tasword*, so no extra memory is needed. *Taspro* is approved by Tasman and comes with customising notes. At £3.95, no serious Spectrum wordsmith should be without it, and at £3.95 it's also a steal. *Taspro* is not available for Hilderbay or Morex interfaces, and your printer must be able to move its print head by amounts of the order of 1/120in.

Taspro	£3.95	Seven Stars 01-485 7775
Ski Star 2000	£7.95	Richard Shepherd 06286-63531
The Illustrator	£14.95	Gilsoft 0446-732765
Make A Million	£5.95	Delta Software 0568-3697

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AMSTRAD

FRUITY FRANK

The Amstrad's improved resolution and colour palette, compared with the Spectrum's, promised some very high quality games. But, with only a couple of exceptions, these have not materialised. *Fruity Frank* may be showing the way towards true arcade style programs on this machine.

A lot of effort has gone into the presentation which starts with a multi-coloured apple as a logo and includes, once loaded, a nicely animated title screen, instructions and a demo.

The game itself is of the Mr Do and Mr Ee variety, where you dig your way around collecting fruit, while avoiding monsters and falling apples. The apples may be dislodged by monsters passing directly under them, but may also be pushed by Frank to drop on unsuspecting hostiles. There are three main screens and three speeds of play. If you get through the first three, the speed is automatically increased and extra hazards added.

Frank and the monsters are all well drawn and smoothly animated, with four separate views of each. They disintegrate well when hit, and even

the apples split up on impact. The screen collapses at the end of each phase rather like a TV picture when you turn the set off. Frank even has a ball which may be thrown to bounce



around the tunnels until it hits a monster. All in all, very well executed.

The background music is well matched to the graphics and

makes use of a number of traditional folk tunes — a largely untapped area of non-copyrighted material. On top of these are some varied sound effects which all makes for a lively game. All can be turned off if required and the game may be paused to quaff another glass of rootbeer and plunge the smoking fingertips into a bowl of iced water.

Fruity Frank ranks in the top five Amstrad originals.

Simon Williams



Rating 9/10
Price £26.95
Publisher Kuma
Computers, 07357-4335

BBC

POLE POSITION

Following the success Atari has had converting its arcade games to its own range of home computers, it has decided to offer versions of some of its favourites on other machines. One of the first of these to be offered for the BBC Micro is a version of *Pole Position*, the car race game which features other cars and bends in the track.

Atari's usual smart box includes the cassette and instruction sheet, a colour poster and a set of stickers. With these you can follow the 'real life drama' of the Grand Prix World Cham-

ampionship. It says something about the late arrival of this software, however, that the chart is for the 1984 event.

The game itself loads easily to display a Goodyear blimp view of your car, from above and



behind. The car is in full colour, but is small in comparison with the original. The roadway stretches away into the dis-

tance, bordered by red and white bands and with a dotted white line down the middle. In the distance there are snow-capped purple mountains.

You are required to qualify before taking part in the race proper. To do this you must race against the clock without sliding off the track or hitting another car. Your controls are left and right, brake and gear change. The last of these is only really used when moving off; once you're up to speed you should be able to complete the course without changing down again. You may use either keyboard or joystick control and the two are equally easy to use.

The race proper is not a lot different from the practice session, except that you all start off from the grid. It's fairly easy to steer round the track, but rather more difficult to avoid and pass the other cars. If you do hit anything, there is a stylised explosion and you're supplied with a new car.

The sound effects are reasonable, although the squeal of tyres in a skid is more of a squeak. A good try, though I've seen better.

Simon Williams



Rating 7/10
Price £9.99
Publisher Atarisoft
0753-33344

SPECTRUM

BOMB SCARE

A silly scenario with a straightforward objective. Guide Boris the bomb disposal expert around some of the world's greatest cities and prevent a nuclear holocaust by collecting up the detonators planted by Cyril the saboteur.

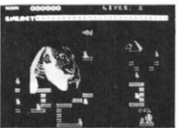
I liked the secondary title page showing the head of the Statue of Liberty lying on its side with an ominous mushroom cloud floating overhead. I was not quite so impressed with the game itself though. The strains of *Campdown Races* accompany

the opening instruction sequence and the game kicks off with *Jimmy Crack Corn* — what strange tastes in theme music these people have.

An impressively drawn sphinx dominates the first screen and around it are dotted a number of small platforms. The detonators are strewn around the platforms, while Cyril with his bomb lurk in the most inaccessible part. Boris is an attractive, smoothly animated little figure whom you control with the keyboard.

The game is extremely difficult to play, mainly because you have to get Boris to move precisely from one tiny plat-

form to another by pressing the awkward combination of the O or P key together with the Symbol Shift, and this while in a very short race against the clock.



The other major annoyance comes whenever you lose a life. You have to wait while both the tunes mentioned above have

run their course. The delay seemed intolerable after a few plays.

Without the above two factors, *Bomb Scare* would be quite an enjoyable little game. The graphics are fairly good and the animation effective, especially of Boris. Whether these qualities compensate for the vexation caused by the controls and the musical pauses you will have to decide for yourself. They didn't for me.

Bob Chappell



Rating 5/10
Price £6.50
Publisher Dollarsoft
0742-363246

SPECTRUM

OLYMPIC CHALLENGE

Puffing up to the finish nine months behind the rest of the field comes this Olympics simulation. This game must have taken to heart the maxim that it's the taking part that counts not the winning, because it certainly isn't a winner.

There are ten events in which up to four players can participate. You must pound away on two keys to get results because there's no joystick option.

The events include the 100,

400 and 1500 metres, hurdles, long jump, high jump, pole vault, shot put and discus.

The graphics are not awful, but they're not brilliant and the stadium is nothing more than a



grandstand filled with dots for spectators' heads.

Your athlete is a stiffly moving matchstick figure. Although the screen instructions are comprehensive, mastering the mechanics of some of the events is sometimes a challenge in itself. For instance, in the long jump you must keep the number one key depressed to build up speed. The matchstick man stays obstinately on the line, then off he suddenly (and woefully) goes. You're supposed to press the zero key when you want him to jump. Then everything stops until you have ceased pressing

another key to set the angle of the jump.

This is a cheap game so perhaps it's unfair to criticise it too harshly. But comparing it with Ocean's, Activision's or Quicksilver's superb Olympics simulations, you just can't help concluding that you'd get far better value saving up for one of them.

Bob Chappell



Rating 4/10
Price £1.99
Publisher Century City 0384-57077

GAMEPLAY

COMMODORE 64

BREAKDANCE

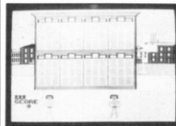
Based around the well-hyped dance craze of the same name, *Breakdance* offers the same basic idea. This is that you have to follow a sequence of moves performed by an opponent, usually the computer.

You can choose any of the alternatives to start with, but it is definitely easier to start off on the first option, as it gives you a chance to get the hang of the different moves. There is also a practice mode for novices.

You can use either the keys or the joystick to perform the moves; with the joystick, each of the directions plus fire produces

a different move. The idea behind this section is to copy the moves made by the opponent player, the number of moves increasing each time, which gets confusing after a while.

The second section adds a



little more urgency and excitement to the game. You are by a river with people moving toward you performing different dance routines. You must stand beneath each one in turn, and

copy his moves until he disappears (yes, all the dancers are male). The problem is that the longer it takes you, you are forced nearer and nearer to the river, if you don't copy them fast enough you'll end up with wet feet. There are more people in each consecutive line, so you have to be quick, and you may end up with a bogged brain and spend more time in the river than out of it.

The third choice shows a character called Boogaloo Brewster dancing a selection of first 4, then 6, then 8 moves, which you have to remember and repeat in the correct sequence. You have to get 4 right before you can move onto 6 and 8 moves. This may sound easy — until you see the speed that

Boogaloo dances at, and the limited time you have.

The final section of the game is for the more sedate minded who like designing, giving you a chance to choreograph your own dance. You have a selection of moves to choose from, and your dancer will perform your routine on stage. You can also save your routines and play them back another time.

This is certainly a game with a difference. Graphics and sound are of a high standard with a variety of tunes played.

Susan Cooke



Rating 7/10
Price £8.95
Publisher CBS
Software 01-734 8181

COMMODORE 64

BIG BEN

You'd have thought that publishers determined to bring out unoriginal games would at least look for the best ideas to imitate. But *Big Ben* is a pretty uninspired mishmash.

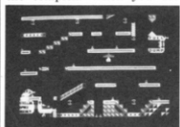
On loading, you find your hero trapped in a futuristic labyrinth. Your task is to collect 30 yellow lumps (gold coins) which will enable you to get to a bell... which, if rung, may secure your freedom. Your hero can jump, run and crawl via keyboard or wielding your joys-

tick in the usual manner. Using the keys is simple and the figure's movements are smooth and responsive.

However, it's standard stuff, and the storyline is hardly enough to make your imagination run riot. Oh yes — our hero is called Giz and he has been incarcerated by an evil wizard, called Jem. Why all this about the coins and the bell I don't know. But if I were an evil wizard I wouldn't give my prisoners such silly chances to escape — though this task does have a moderate degree of difficulty.

Apart from crashing into

walls and tripping booby traps, there are three enemy helicopters to avoid as they fly around the complex. When you use



your 'turbo plane' — as you must reach the upper levels of the complex — you'll have to work out a way of refuelling because your plane eventually

turns red and, within seconds, explodes.

Many of the nooks and crannies you'll have to delve into in order to collect the required coins are very tight. But things are even tighter higher up where it's sometimes difficult to see how you can possibly guide your turbo plane through. It's simple — the edges of the plane and the walls occasionally overlap.

Nigel Lowry



Rating 4/10
Price £7
Publisher Interceptor
Micros 07356-71145

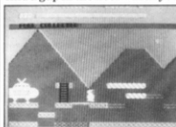
COMMODORE 64

DEMONS OF TOPAZ

Demons of Topaz is of Australian origin, and is basically a ladders and platforms game with added boomerangs. Without going into the over-complicated storyline, you use keyboard or joystick to control your character Ozzie as he meanders through an asteroid comprising dozens of interconnected screens.

You descend on the first level (rather slowly) and you can walk left and right to explore, or rather you can make the screen

scroll right and left, though to get down to move of the asteroid's eight levels you have to find a gap in the floor which you



can fall through to seek out the seven legendary Sacred Crystals.

The levels are made up of the usual combinations of walls,

gaps, ladders, moving walkways, floors that collapse beneath you, and so on, and you must thread your way through these while avoiding the killer plants which seem to grow everywhere on the asteroid. If you find a crystal you have to take it back to your ship before setting out to search for another one, which also replenishes your air supply.

There are nine skill levels, and only on the harder ones do the demons and other nasties make an appearance. These you can see off by firing your boomerang, and one nice feature is the control you have over

this. It always returns to you, so if you throw it then climb a ladder or jump you can alter its trajectory to maybe clonk a meanie on the way back too.

Overall, however, the game is a disappointment: it's slow, there's precious little sound, the graphics are average, and the control you have over the character is also not quite spot-on.

Mike Gerrard



Rating 5/10
Price £5.95
Publisher Firebird 01-379 6755

COMMODORE 64

DUNGEONS OF BA

Despite the bovine allusion in the title, this game is nothing to do with mutant mutton. Quicksilver describes it as a 'real time action interactive film'. If by film they're implying that the game is of cinema cartoon quality then take that with a fist of salt. The rest of the description is accurate.

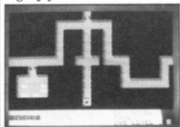
The inlay puff tells of a fabled Ba Stone hidden within a labyrinth of forbidding underground caverns. This subterranean rats' nest abounds with traps,

secret chambers and, without which no self-respecting dungeon is complete, monsters. Ba gets a five star rating in the AA (Alien-spotters Association) handbook — there are enough denizens to fill a month of nightmares.

The idea of the game is to traipse through the maze, cracking clues and monsters' pates, until you find the Ba Stone. There are 36 screens yielding some 200 rooms so take a packed lunch.

What you get is a two-dimensional, bat's eye view of part of the dungeon, shadows giving some illusion of depth.

Your character, a candle holding innocent, trots along in accordance with any of the eight joystick movements.



Four action modes are available: Shield, Arrow, Fight and Take. Shield gives temporary protection against the many arrows that come whizzing

from nowhere while Arrow mode lets you indulge in a bit of toxicity of your own. The monsters can similarly pop up out of thin air; just entering a certain room can bring them to life. Fight lets you get the jump on them but they'll fight you anyway.

The game is very large, hence disk only, so should provide many pleasurable hours of dungeonering.

Bob Chappell



Rating 8/10
Price £12.95
Publisher Quicksilver
0202-891744

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FLASH OF INSPIRATION

Arcade-style programs to rival the chart toppers are possible with *White Lightning* and its sibling packages, says Stuart Cooke. And a sprite is not a sprite as you know it already.

Would-be arcade style programmers need look no further than the *Oasis Lightning* series for the Commodore 64. With these packages you can forget what you know about hardware sprites because these packages give you sprites on software — 255 to be precise.

There are three packages altogether: an extended Basic, Forth and an assembler. It doesn't end there though as each package gives the user access to an astonishing number of graphic and sprite routines.

If you're wondering how anyone can possibly get 255 sprites on a machine that offers only eight as standard, plus the controller chip can't use any more, read on.

First, we must return to when sprites were initially used on home micros and affectionately called MOBs. The term stands for Movable Object Blocks. A MOB is essentially what the *Lightning* packages mean by a sprite. Any shape that can be moved, or manipulated at all is known as a sprite. Since the screen can be manipulated, it is also referred to as a sprite — its sprite number being 0.

Obviously, treating each object as a sprite is a new idea and it certainly takes some time to understand. To complicate matters a sprite can be up to 255 x 255 characters, which is larger than can be shown on the screen at once.

Documentation

Each package comes with its own manual, *White Lightning* (Forth) and *Machine Lightning* (assembler) come with *Basic Lightning* and its manual.

Probably the worst thing about the documentation is the grotty red paper it's printed on. In no way does this make it any easier to read the already small print. Oasis apologises for this, but says it is to prevent photocopying.

The Basic manual describes in detail all the new commands that have been added to the Basic. Unfortunately, the graphics documentation is nowhere near clear enough and could have done with a few more examples. For a package that is mainly for graphics this is a real shame.

What is really needed is a step by step introduction to using the graphics. Included with *Basic Lightning* is a

Sprite Editor program. This is also documented in the Basic manual and does have a fairly competent step by step user guide.

The manual for *White Lightning* gives only a brief refresher course on the niceties of Forth. Nevertheless, if you have ever used this language this is at least a quick refresher. The Forth supplied is standard Fig Forth to which over 100 additional graphics and sound commands have been added. A list of keywords and their functions provides the bulk of the manual — I referred to it repeatedly when using the software.

Machine Lightning has the smallest manual of the three but all the informa-

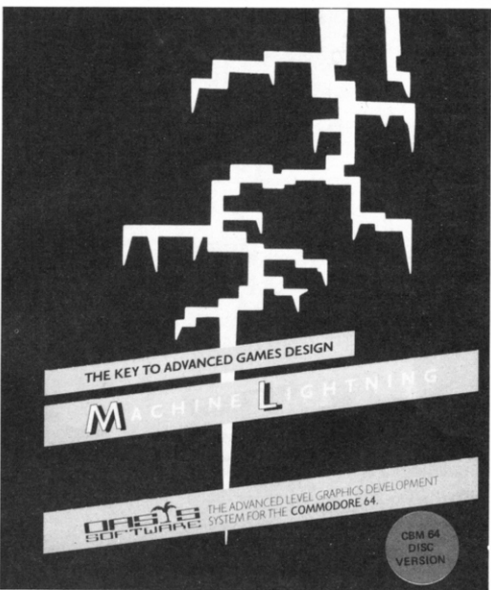
tion needed is there all the same. The first section deals with the comprehensive set of commands that can be used with the assembler/monitor. Next comes a list of the 6502 instruction set. Quite simply this is a list only, with no hints to teach you how to use the commands at all. The graphic routines have a section of their own, which does use a few commands, but not all.

It may seem strange that the latter two manuals don't explain how to use the new commands. But this is not a problem. *Basic Lightning* is supplied with both packages and the same names are given to the routines in each case. This is very handy as a program can be developed in Basic and then transferred to another package without too much difficulty.

In use

The packages are excellent. At first, getting the hang of using them is awkward, but once you have, the possibility to create some astounding graphics is at your fingertips.

As you can create a sprite larger than the screen, scrolling a background is simplicity itself. First use the sprite designer to create your background. Then position it on the screen and use one of the scroll commands to move it



across the screen. You can also run small sections of program under interrupts. For instance, you could start your screen scrolling and it would carry on till you want it to stop.

Basic Lightning adds numerous structured commands to the notorious 64 Basic, so it becomes extremely easy to write programs in small self-contained sections and test them out before use.

Taking advantage of these structured commands also makes it easier to translate your Basic programs to *Machine* and *White Lightning* in sections. It appears that whoever wrote the extended Basic also uses a BBC Micro, for many of the added commands resemble the Beeb's and the short form of commands now has a dot rather than a shifted letter, eg LI, rather than LIFORLIST.

The added commands really do make Basic programming easier. The inclusion of an IF THEN ELSE statement is extremely helpful, while CIF-CElse-CEND is similar but allows the statement to be spread over a number of lines. Labels have been added so you no longer have to jump to line numbers but can jump to a label that makes sense. REPEAT-UNTIL allows a loop to be repeated until a specified condition is met—great for games where a program could be REPEATed UNTIL dead. WHILE-WEND is similar but allows you to repeat a loop while a condition is true. Procedures have been added. These resemble subroutines, but with the added feature that not only can you call them but you can pass parameters to them. It is possible to use variables inside a procedure which are being used elsewhere in the program without affecting their value. That means you could build up a library of routines for use in all your programs without having to keep a tally on which variables you are using.

Good news for machine code programmers is the availability of hexadecimal

numbers and DEEK and DOKE which allow you to read and write a 2-byte number with none of the usual mathematics. Disk users will welcome DLOAD and DSAVE which load and save to the disk and a DIR command to get a directory from disk without deleting the existing program. Useful for anyone who types in NEW and deletes a program they wanted, is the OLD command, which retrieves the program for you.

To say that there's merely a large number of graphic statements is an understatement. It is possible to define the height and width of a sprite in characters, and sprites can then be saved to disk or cassette. Using the sprite generator program makes designing them easier. Colours are now referred to by name or by number, whichever you prefer. There is no more poking of memory to set the colours in use as variations on PAPER and BORDER are used to set the colours in text and hires modes, and INK sets the text colour for text mode. INK.BLUE (the dot signifies light) is far better than the usual POKING or pressing of buttons.

Plenty of line drawing commands are available. PLOT sets or clears individual dots on a sprite (don't forget the screen is a sprite), DRAW draws lines while BOX and POLY speak for themselves.

Naturally, a good program based around sprites has plenty of relevant commands. It is possible to MOVE, PUT and COPY a sprite, all of which can overwrite the screen. The Boolean operators AND, OR and XOR may be applied to sprites.

It is possible to FLIP them, where a sprite is reflected through its centre. SPIN rotates a figure through 90 degrees, while MIR flips a sprite through a horizontal line. Doubling the size of a sprite along a specified axis is possible with XPANX and XPANDY.

It is possible to detect sprite collisions due to the variables CCOL and CROW holding the collision coordinates.



As well as software sprites, traditional hardware sprites are still available.

Sprites can be scrolled by one, two and eight pixels, with wraparound if wanted, and left or right.

Attributes are manipulated separately from the sprites and there are commands for moving and swapping them around.

For sound breaks there are a few sound commands. VOLUME sets the master volume, and the frequency of a note is set by FRQ while the envelope is set by ADSR. This is certainly easier than the usual method of fiddling the SID chip directly.

White Lightning is standard Fig Forth apart from the added graphic commands. So, there are no real surprises, though the added commands turn your programs into something really special.

Machine Lightning offers you one of the best assemblers around for the 64. Software is included for a Centronics printer so you hook up your trusty Epson for assemblies and disassemblies. There are even commands for setting the length of the paper and for a header for each page. Assembly can be from either disk or memory. Assembling from disk allows you to use files up to 8,500 lines.

A machine code monitor supplies all the usual memory examination and manipulation commands as well as a disassembler.

Verdict

If you would like to write arcade style programs, this suite of programs is for you. It probably makes most sense to purchase either *White Lightning* or *Machine Lightning* rather than *Basic Lightning* alone, as you get this with them any way. Even if you don't know Forth or Machine code these packages will certainly give you the incentive to learn. Especially when you realise you can market the finished product. ▣

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Documentation	●●●●●
Performance	●●●●●
Overall value	●●●●●

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We think they mean add-ons but there might be something sinister behind this slip. Not, though, in the case of the Juki 6100 daisywheel manual (above right). This is a fine example of the language barrier and worth a look whether you read from left to right or the other way round. (Thanks to SR Linter for sending this in.)

The cognoscent generally think of the IBM PC and its compatibles as 'old technology'. Olivetti, however, seems to have made hitherto unheard of strides with its glamorous M24 PC.

The instruction manual for its 128K add-on RAM expansion includes a chart that hints at spectacular and undocumented technological developments. Under 'materials required for installation', for example, we find 'Motherboard with 128KB screwdriver' and under 'location of where up-

This is a code to initialize the printer. When ESC SUB I code is accepted by the printer, the printer initialized as same as POWER ON condition. If this code is accepted by the printer, every data in the data buffer are cleared unconditionally.

Therefore customer should be take care used this code.

Juki manual — is this a high-level language or completely over the top?

grade is to take place, 'location of where', of course, hints at the existence of a fourth dimension) we find 'Desert memory expansion board in first free slot bus

converter.'

Is there a whole desert memory expansion board in the M24's first free slot, and does it only work in the desert?



Mention the Acorn Electron to a dealer these days and the chances are you'll get a piece of their mind. The Electron isn't exactly flavour of the month since the price-cut. But at Cumana, where a telesales support service has just been established, they can still raise a smile despite recently becoming a distributor of the Electron.

PAL2000

by Mollusc

This game is in 3D!!



PCN DATELINES

Event	Dates	Venue	Organisers
ZX Microfair	Feb 9	Alexandra Palace, London	Mike Johnston, 01-801 9172
Intl trade show for home comp, software, etc — LET	Feb 17-19	Olympia, London	Turret-Wheatland, 0923-777000
Intl Computer Graphics User Show and Conference	Feb 19-21	Barbican, London	Mountbuild, 01-486 1951
MEXCOM	Feb 25-28	Mexico City, Mexico	AESI Ltd, 01-379 7628
PC Trade Show	Feb 26-28	Barbican, London	EMAP Intl. Exhibitions, 01-837 3699
Dauntsey's School Educational Software Fair	March 1-2	Dauntsey's School, W Lavington, Devizes, Wilts	Peter Harris, 038 081 2289-2325
Computer Conference and Exhibition — INTERFACE	March 4-7	Atlanta, USA	Interface Group, 300 First Avenue, Needham, Mass 02194
DEXPO Europe, 1985	March 6-8	Olympia 2, London	CGP 01-582 9256
Scottish Computer Show & Conference	March 12-14	Anderston Centre, Glasgow	Chapners Exhibitions, 01-891 5051
Personal Computer Show	March 13-16	Sydney, Australia	OES 01-486 1951
Personal Computer Show	March 21-24	Amsterdam, Holland	RAI Gebouw BV, Europaplein 2, 1078 GZ Amsterdam
Comp Conf and Exhbn — COMDEX/WINTER	March 21-24	Anaheim, USA	Interface Group 300 First Ave, Needham, MA 02194

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LIGHTNING STRIKES AGAIN

THREE HIGH POWERED GRAPHICS DEVELOPMENT SYSTEMS FOR THE COMMODORE 64.

Totally dedicated to writing very fast, video games, BASIC Lightning is a fully structured extension to the Commodore BASIC, which adds a staggering 200 reserved words. It allows up to five tasks to run concurrently (one in foreground and four in background). Most of the commands are dedicated to games writing and the sound and graphics commands are unparalleled. Procedures and PASCAL type structured programming commands are also a feature of BASIC Lightning.

As well as the Commodore's own 8 hardware sprites, BASIC Lightning has its own software sprites. Up to 255 can be defined with user selectable dimensions. These can be scrolled, spun, mirrored, enlarged or inverted with phenomenal speed and smoothness.

A Sprite Generator Program (written in BASIC Lightning) is also supplied and can be used to design, edit and store all your sprites for use in your main program.

White Lightning is a complete games writing package comprising a high level, Forth based, multi-tasking games writing language, the extended BASIC (see BASIC LIGHTNING) and a powerful sprite Generator Program. Programs can even be written in a combination of Forth and Commodore BASIC and the final program, which will run independently of White Lightning, can be marketed with no restrictions whatsoever.

The Basic Lightning part of the package can be used to experiment quickly and easily before the Forth program is developed.

The speed of White Lightning as it is seen to be believed and a full demo is included. As with Basic Lightning, hardware sprites are supported, together with 255 software sprites which can be scrolled, spun, reflected, enlarged or inverted.

MULTI-TASKING Without doubt the most powerful feature of the Lightning series of languages is the multi-tasking facility. This allows two programs to be run concurrently and makes those smooth landscape scrolls etc. effortless.

The BASIC Lightning Sprite Generator Program is also included in the package.

Commodore 64 Machine Lightning is probably the most advanced games writing utility available on any micro. It comes in 4 parts:

MACRO ASSEMBLER/MONITOR/DISASSEMBLER This is probably the most comprehensive machine code development system available for the Commodore 64 with features too numerous to mention.

BASIC LIGHTNING BASIC is also provided to facilitate experimentation in preparation for later assembly.

SPRITE GENERATOR Used to develop all the graphics for the final game. The Sprite Generator has numerous functions including enlargement, rotation and reflection.

OBJECT LIBRARY This is Machine Lightning's most powerful feature. 10k of re-entrant code with more than 130 documented entry points. These are the routines that provide all the superfast graphics routines in White and Basic Lightning. They contain virtually every routine you'll ever need to write on an Arcade Game and multi-tasking in Machine Lightning is covered in the comprehensive accompanying manual.

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