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Computing WEEKLY

26 September-2 October 1985

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Vol 4 No 39

New Spectrum 128K launched in Spain

SINCLAIR has this week launched its much-rumoured 128K version of the Spectrum, but in Spain.

The machine will not be available in the UK until Spring next year.

The new Spanish micro - called the Spectrum 128 - was launched at the Barcelona Computer Fair on Monday, September 23. According to a Sinclair spokesman, it features a Spanish keyboard, manual and firmware. It has 128K Ram and an enhanced sound capability.

The development costs have apparently been borne entirely by Sinclair's exclusive Spanish distributor, Investronica SA, and the version of the micro shown at Barcelona will be made entirely in Spain.

The UK version of the Spectrum 128 will be launched in this country at the beginning of 1986, the spokesman confirmed, and it will apparently

be manufactured in this country.

Rumours of a new Spectrum with expanded memory began as long ago as May (see *Popular Computing Weekly*, May 16, 1985) but Sinclair has always denied that the launch of any such machine in the UK was imminent.

It is rumoured that part of the recent £10 million deal between Sinclair and Dixons was an undertaking by the ailing computer manufacturer not to release any new Spectrum model which might threaten sales of the present Spectrum Plus until after Christmas.

Another Sinclair spokesman said of the Dixon's deal that it was "not at all a question of Sinclair dumping stock on the market - it was a good deal for us, and certainly very welcome."

When questioned about the possibility of an enhanced version of the QL, the spokesman denied that there were any plans to launch such a machine this year but added, "We are very happy with the present 128K QL, but we don't rule out the possibility of a version with more memory if the market desires it."

Development work is also continuing on the Pandora portable micro explained the

continued on page 5 ►

First Look

TOP: Level 9's game based on Sue Townsend's book *The Secret Diary of Adrian Mole Aged 13½* will be released by Mosaic in mid-October for the Spectrum, C64, Amstrad, BBC, Atari 800 and MSX machines, price £9.95.

MIDDLE: *Astro Clone* is the latest Spectrum title from Hewson. Written by Dragontorc author Steve Turner the game is scheduled for release in mid-October at £7.95.

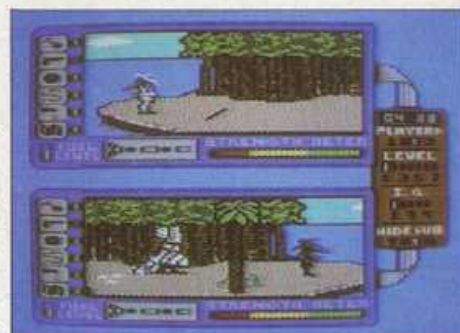
BOTTOM: *Spy vs Spy II* moves the action of its successful predecessor to a remote desert island. The C64 title is released next month price £9.95.



Commodore 64 version of Adrian Mole



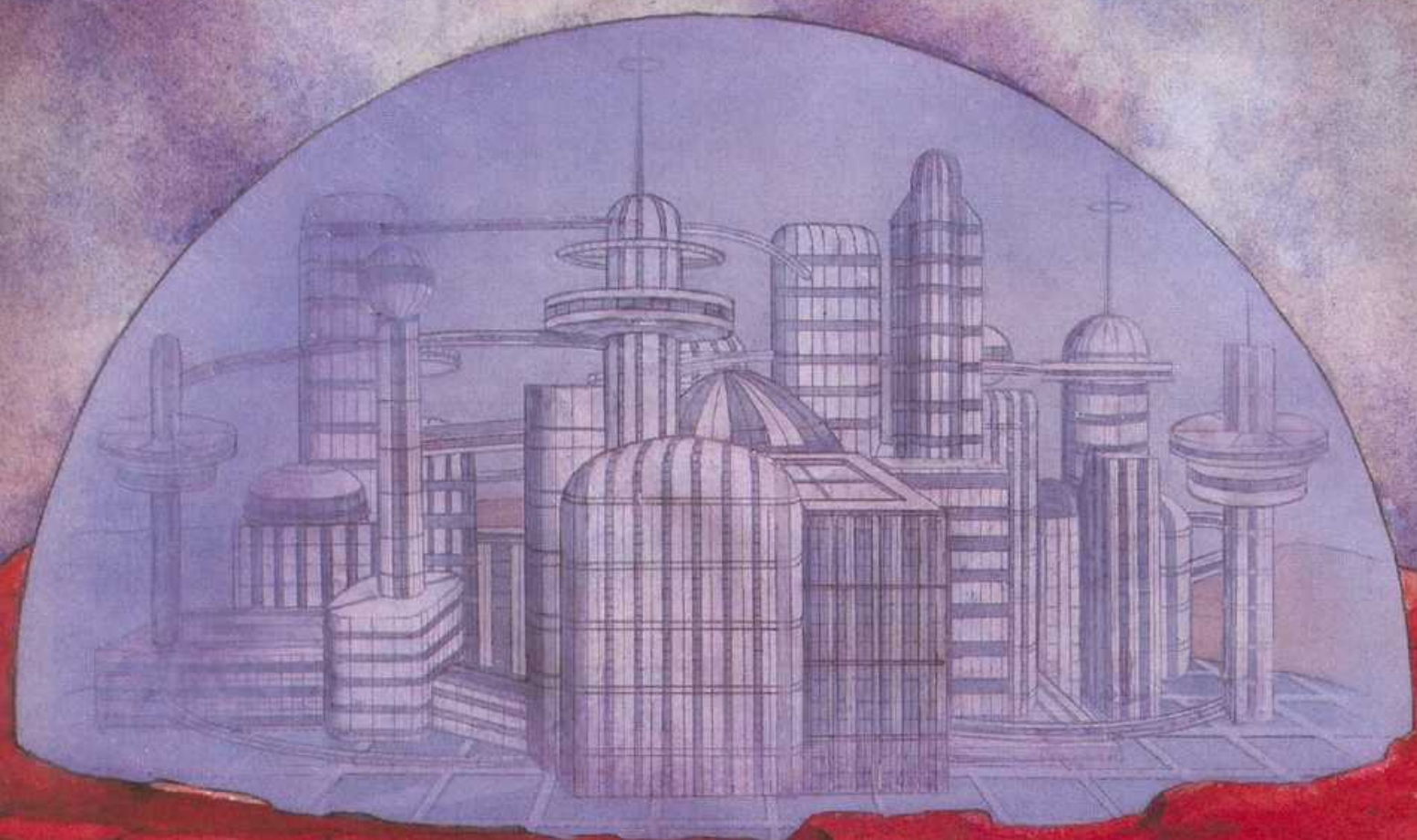
Astro Clone ground combat phase



Increased difficulty in Spy vs Spy II

TELETHON
CHARITY
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- SEE
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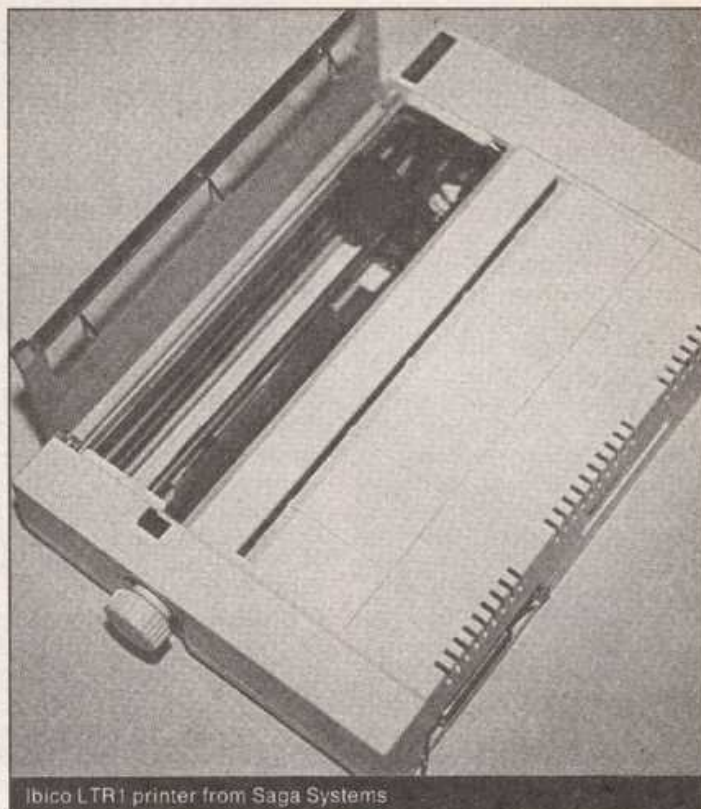
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EDITORIAL

Sinclair has always been unpredictable, but a Spanish 128K Spectrum? Few would have seen that as an obvious move!

Yet after a little while it begins to make some kind of sense. Sinclair ran out of money in the middle of the summer holding heavy stocks of Spectrum Plus and without ready cash to continue work on the QL range and Pandora portable.

So Sinclair froze all development work and tried to raise cash. Before the Maxwell deal, he sold the surplus Spectrum Plus machines to Dixons for £10m. Sinclair's Spanish distributor coughed up to develop and manufacture a 128K Spectrum. The company has been streamlined, cutting staff and contracting to a single site.

A few management changes later and Sinclair is up and running once again.

The Spectrum Plus is still the top-selling micro and Sinclair denies it has any plans to introduce the 128K Spectrum into the UK before next year. A disappointment, but maybe it makes good business sense. Perhaps it was a condition of the Dixons deal. Perhaps Sinclair is worried about possible conflict with the Commodore 64 or now the QL.

Both are priced at £199 and a 128K Spectrum would sell for around the £175 mark.

Since it hit trouble in June Sinclair has been busy, though. The Barcelona launch, combined with news of the reorganisation, is an indication of an up-turn in fortunes for Sinclair.

And work on the new QL derivative and Pandora portable has now apparently recommenced. We wish the company a speedy recovery.

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'The Enterprise is stunning for an 8-bit micro, and graphically it's the most varied machine we've come across' — Real Time Games Software

Acorn agreement shifts emphasis to education

AS DIXONS pulls off another major deal – purchasing all remaining stocks of the Electron, estimated at around 120,000 machines – the continued presence of Acorn in the home computer market becomes more and more a subject of speculation.

In what is seen as a further move for Acorn away from the consumer market the company, Olivetti, the Italian company which now owns 79.8% of Acorn, and the French state-controlled Thomson Micro Informatique last week signed a "collaboration agreement" to develop and promote a common European standard for education micros.

Interestingly, Thomson recently won a contract to supply the USSR with an experimental micro system for education, based on its TO7 and MO5 computers. Following the accession of Mikhail Gorbachev as leader of the Soviet Union, computer literacy has become of increasing importance to Russia.

Should a new standard for European educational micros come out of the tripartite agreement, Acorn must be hoping that it will be providing most of the expertise, building on its position in the British educational market.

Whilst Acorn's machines are based on the 6802 chip, though, Thomson's models all use the 6809 processor.

News of the European deal, seems unlikely to stir sluggish sales of the three existing BBC machines.

In the week when Acorn's largest dealer LVL went into receivership owing an estimated £1.5m other dealers were critical of a pricing structure which sets the BBC B (32K) at £290, the B+ (64K) at £469 and the B+ (128K) at £499.

One dealer who only stocks BBC machines said that the B and the B+ were still selling, but that they had "not yet seen a 128K – nobody has asked us for one yet. There will probably be no alteration on price: Acorn are stubborn."

Another dealer said, "The BBC model we sell most of is the B+. There is no call for the 128K – most people don't appreciate the extra memory. A third dealer said, "We have never stocked the B+, and we won't be taking the 128K – I don't think their packs are value for money. "You can build a B+ microcomputer from components I sell separately for slightly less than the micro costs in the shops."

68000 micros get new adventure

SINCLAIR is to release a text adventure for the QL next month.

The game, currently with the working title of *The Pawn*, is being developed by a new company Magnetic Scrolls, which also plans independent versions of the game for the Atari ST, Amiga and Macintosh machines.

"Although it's called *The Pawn*, it's not about chess," said Anita Sinclair of Magnetic Scrolls.

"It's based in another world and has the player being manipulated in the game by an outside force. The object is to release yourself

from the bonds – a wristband – that is keeping you in the game. "The program's real strength is its very sophisticated parser – you can use very complicated sentences and it will understand almost anything," Anita said.

The game will cost £19.95 on microdrive for the QL. The Atari ST version to be published by Firebird early next year will cost a little more, and, unlike the QL version, will also feature around 40 graphics screens.

Implementations on the Amiga and Macintosh are, at the moment, planned for the American market only.

MSX prices cut – now under £100

TOSHIBA has implemented a swingeing price cut on its HX-10 MSX computer, and at the same time, is also offering the HX-10 in a new package.

The package comprises the HX-10, the HX-C810 data recorder, three software packages and a programming guide.

The package also includes 3 amp plugs and a screwdriver so that buyers can get going straightaway. This all costs £139.99, and will be available from the end of September.

The price of the HX-10 on its own has now been reduced to £99.99.



"Talking of standards, what happened to MSX?"

New 32-column bulletin board

A NEW bulletin board has been established for modem-owning Spectrum and QL owners.

The 32-column 300 baud system operates between 12 midnight and 6 am on 01-254 1869.

Colour monitor for Atari ST

SILICA Shop has beaten Atari to releasing a colour monitor for the 520ST.

The store is offering a Fidelity colour monitor for £199, and the cable to connect the monitor to the ST for £19.95.

Atari's own colour monitor will cost £399.99, and is not yet available.

Silica Shop is also stocking a second Fidelity monitor/television in colour for £229. The same cable fits this model as well.

Details from Silica Shop, 1-4 The Mews, Hatherley Road, Sidcup, Kent DA14 4DX (01-309 1111).

Spectrum printer only £30

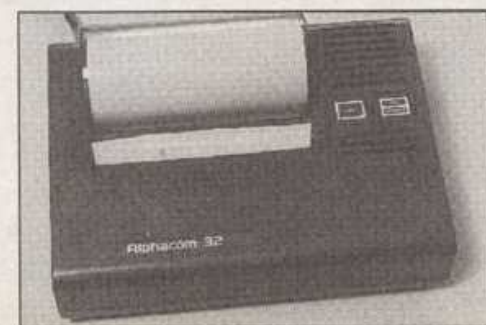
PRINTER prices continue to fall with the release of two new offers.

Dean Electronics has further cut the price of its Alphacom 32 printer for the Sinclair Spectrum down to

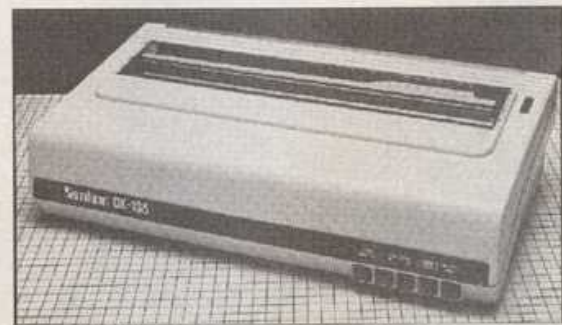
only £29.95. The 40-column model prints using a four-inch wide paper roll at 80 characters per second. Details from Dean Electronics, Glendale Park, Fernbank Road, Ascot, Berks. Tel: 0344-885661.

Samleco has announced a

new lost-cost professional quality model. The 132-column 120 characters per second DX-135 model is priced at £339.50. Details from Samleco, 9 Fairacres Industrial Estate, Dedworth Road, Windsor, Berks. Tel: 07535-54717.



Alphacom 32



Samleco DX-135

Apple counters Amiga

APPLE has reacted to the launches of Atari's 520ST model and Commodore's new Amiga by making significant price cuts on its Apple IIc and Macintosh ranges.

The complete Apple IIc system comes down from over £1,600 to just £995. The package includes the Apple IIc (Apple II software compatible) micro with 128K Ram and built-in 3½ inch disc drive, colour monitor and stand, second external disc drive, IIc mouse, *Mouse Paint*, and *AppleWorks* software and carrying case. A second IIc bundle also includes the

liquid-crystal flat-screen display, bringing the price up to £1,395.

Both the 512K and 128K Macintosh models have been cut in price. The 512K Macintosh is brought down by £600 to £1,995 while the 128K originally £1,795 will now cost £1,695.

● The company has also announced the departure of Steve Jobs, one of its two founders and encouraging estimated fourth-quarter results. Income at between \$12-15m, though half last year's figure, is better than most analysts expected.



Sinclair revamp

◀ continued from page 1

spokesman; "machines like that are being developed all the time."

Since Sinclair's summer cash crisis and failed takeover by Robert Maxwell in June the company has slimmed-down significantly reducing staff by almost 15% to 120. Its Willis Road, Cambridge offices are to close, with all its operations moving to Milton Hall, Cambridge, currently the home for Sinclair's development team, Mebalab.

The company has also announced its expected board changes. Only five directors of the original thirteen remain. Sir Clive stays as non-executive chairman and takes charge of research and long-term strategy. Bill Jeffrey re-

mains as chief executive and Kenneth Dick - himself a director of Sinclair's financial advisors NM Rothschild - also keeps his seat on the board.

Among those who lose their directorships are ICL chairman Rob Wilnot and Richard Cutting, originally recruited to head-up Metalab. Both will leave the company.

Others who will remain at Sinclair but lose their board positions include Nigel Searle, formerly UK managing director and now in charge of the US arm, Jim Westwood, Michael Pye, Dave Chatten and David Southward.

The Sinclair spokesman confirmed that, following the reorganisation, Sinclair "will be looking for further financial investment in the near future."

Plus/4 chopped under £100

COMMODORE has bundled its Plus/4 micro in two new value packs.

The first includes the Plus/4, 1531 data recorder, joystick and ten software titles

for £99.99.

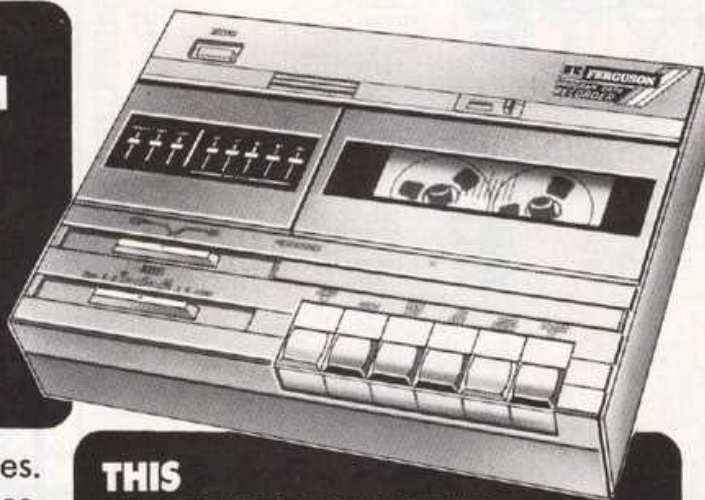
The second - exclusive to Laskys - comprises the Plus/4, 1551 disc drive, MPS 803 printer and business software packs for £299.99.

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Home market

I cannot understand why reviewers insist on comparing the Atari ST with the Commodore Amiga. Price-wise, it is like comparing a Spectrum with an Apricot Fle.

In Britain the ST will be a home and business micro, while the Amiga is too expensive to penetrate the home market in significant numbers.

I wonder how many of the home computer magazines

Gift Coupon

Here is the third of the four coupons you will need to claim your Popular Computing Weekly Free Gift - either Tony Kendle's Arcade Addicts' Handbook or a Sunshine game cassette.

Cut out the coupon and stick it on to the special reply flap attached to the front of the September 12 issue.

Free
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No 3

would have reviewed the Amiga if it was not made by Commodore. Would people compare the two machines if Jack Tramiel had not left Commodore and gone to Atari?

Gary O'Connor
10 Bannel Lane
Buckley

Despite its high price - two-thirds that of a Mac - the Amiga deserves coverage because it is very powerful, yet a natural progression from the other lower-priced 68000 machines. Unlike the 8088/8086 micros which are predominantly business machines, the 68000 micros - Macintosh included in the US - have all found favour in the enthusiast field.

Unbalanced?

We were appalled at the venomous and bitter treatment meted out by your reviewer Tony Kendle to our Biology 1 program (August 22).

We justifiably claim that

this is the best program of its kind in the revision/comparison category and, being intelligent people, we sent it in for review with the expectation of fair treatment.

The program was the result of painstaking work by a BSc (published author) in co-operation with a BEng (electronic computing) under my guidance.

In ten years I have never read a review with the bitter venom of Mr Kendle's effort - it was biased, prejudicial to a narrow point of view, lacking in interpretation, unbalanced to such a degree as to be fanatical and definitely not the work of an educationalist.

I hope that the word 'Ireland' in our address didn't unduly influence your reviewer. Please do us a favour and don't review us again.

John Jennings
Managing Director
School Software
Limerick
Ireland

The word 'Ireland' in your address had no influence on our reviewer whatsoever.

Spectrum power

I think I may have underestimated the power of my Spectrum.

Load in a copy of the Zeus Assembler and type in: What is the meaning of life? using caps shift to obtain lowercase and a space between the e of life and the ? Then press Enter. The assembler prints the correct answer - 42.

The previous best time is around 10 million years by the Deep Thought computer.

A Severn
Cheshire

Old rumour

The Amstrad 6128 had been rumoured for a long time, no surprise when computers like the Atari ST are imminent.

One must agree as to the wasteful nature of Amstrad's inflexible take-it-or-leave-it marketing though. What price one undulating GT64/GT65 monitor or unuseable 464 tape recorder?

H Williams
Northants

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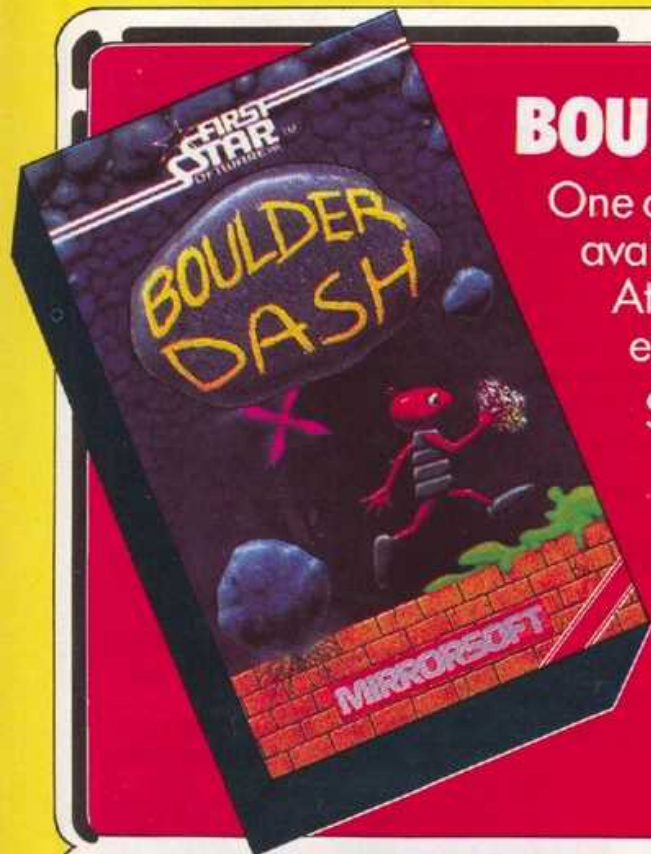
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Number attending 1 2 3 4

PCW2

MIRRORSOFT

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'A charming graphic adventure' – *MicroScope*

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MIRRORSOFT

Telethon Appeal

Thames TV/Popular Computing Weekly/GOSH



Charity Appeal



5,000 game cassettes to be given away

At the end of October, Thames Television will screen a 24 hour television extravaganza called the Thames Television Telethon 85 to raise money for charity.

This massive event – the first 24-hour show on British Television – not only features a host of stars from television and radio but a whole range of fund raising activities – the target to raise over a million pounds for charity.

Popular Computing Weekly and the Telethon

Popular Computing Weekly is proud to form part of this giant fund-raising effort and we hope our readers will join with us in trying to raise as much money as possible.

We hope to be able to present a cheque from our readers live on the

show when it is broadcast between 7.30pm on October 29 and 7.30 on October 30.

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The address to send the cheques to is the *Popular Computing Weekly* Telephone Appeal, 12/13 Little Newport Street, London WC2H 7PP.



Hardware Reviews

No trimmings

Hardware Ibico LTR-1 Printer **Price** £119.95 **Micro** Most models **Supplier** Saga Systems, 2 Eve Road, Woking, Surrey GU21 4JT.

This printer has two major virtues, it's cheap and the quality of the print is very high.

That's the good news. It is also very, very slow and has no trimmings whatsoever. Nevertheless, it may be just what you need.

It's a small, flat unit measuring about 300 x 100 x 200mm, it looks a little 'plastic' but actually feels sturdy. I think it might survive a couple of accidents anyway. It comes with a standard Centronics interface which works happily with all the computers I tried it with and a curious built-in serial option that would require quite a lot of effort to use.

The serial interface uses spare pins of the standard Centronics edge connector. It's a very simple kind of RS232C using 1200 baud and a standard one start bit eight data bits, one stop bit data format. The real problem is with the lead however. As far as I can see you have to make your own, working out which are the appropriate pins on the Centronics port and linking in to them using an Amphenol connector. Think of it as a bonus rather than a really useful facility.

The printing mechanism is also odd. The answer to the question: Is the LTR-1 dot matrix or daisywheel? is no. It isn't either really. It uses a strange barrel system a little like a golfball typewriter,

the characters are embossed on a barrel which spins round and moves left and right to

position itself in the right place to print each character, being automatically inked by a roller that sits behind the barrel. The end result is very good quality print, but very slow, with a noise which, though not loud, sounds like rain falling on a tin roof. Official printing speed is 12 characters per second; for practical purposes, what with new lines and things, it's a bit slower than that.

Here then are the bad points; it's slow, has only one typeface (Elite 12) won't do anything fancy like double-strike, expanded, italics or anything else associated with even the cheapest dot matrixes, only accepts standard A4 (or smaller) paper fed by friction and doesn't have any facilities for anything other than a manual paper feed using a smallish plastic knob on one side of the printer. This

has to be pushed in to engage and looks a bit unreliable to me and is worryingly non-standard.

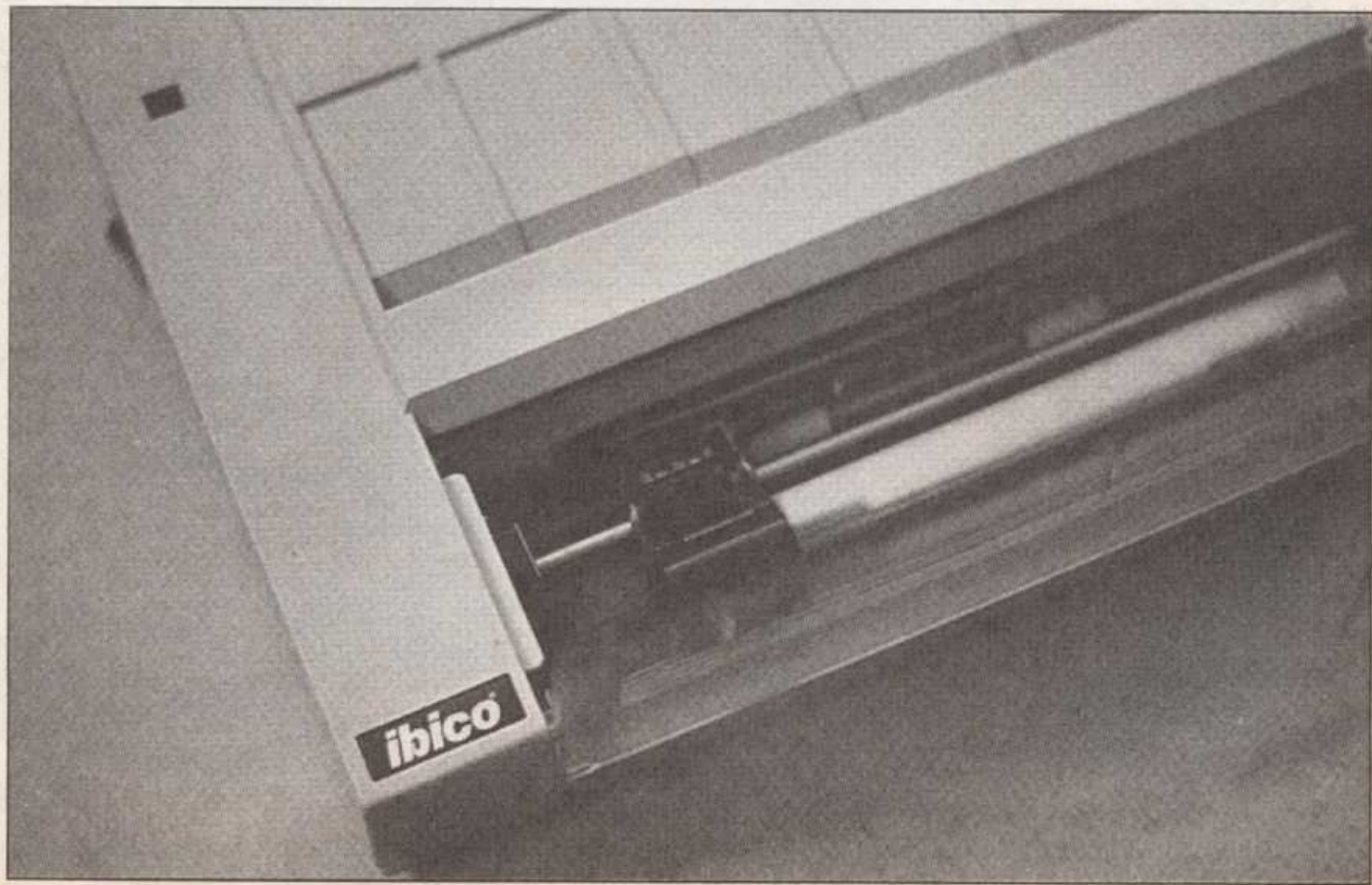
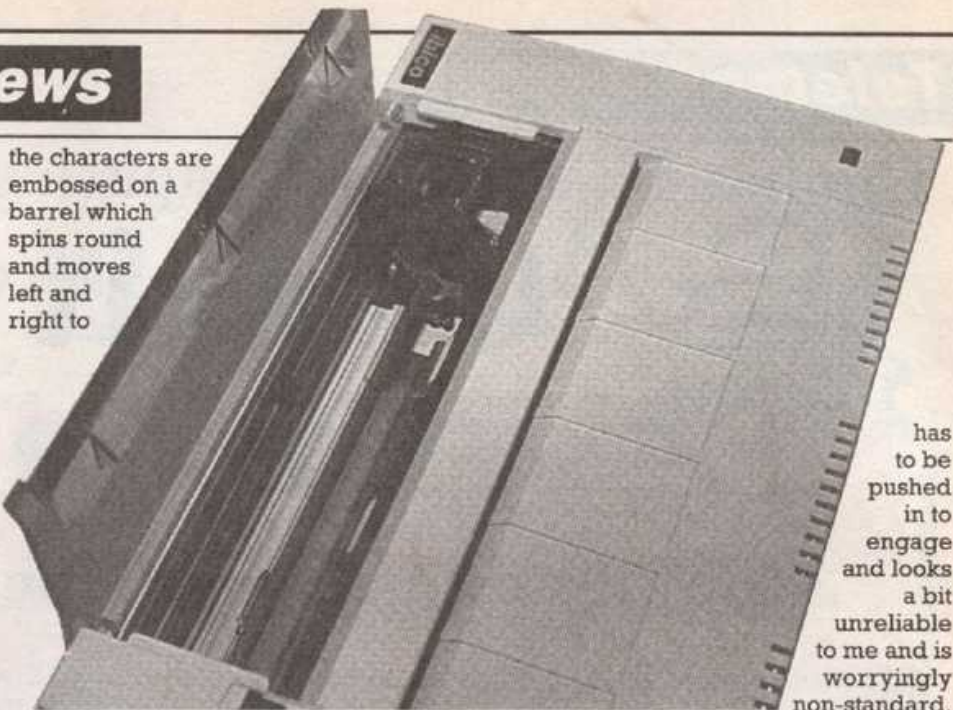
The latter is a problem not only with repairs but extends to the inking system itself – the printer uses a special ink roll that clips to a metal bar in the printer. It looks like you'd have to get replacements from Saga, I doubt if WH Smith will stock them. If you are going to buy this printer I'd advise you to get a dozen space ink rolls (£2.50) from Saga at the same time for safety.

However, and it's quite a big however, what you do get for a mere £119.95 is a printer that would be ideal for simple wordprocessing (if you have a little time to spare), producing a very acceptable printed result.

It seems to work with anything Centronics and is compact.

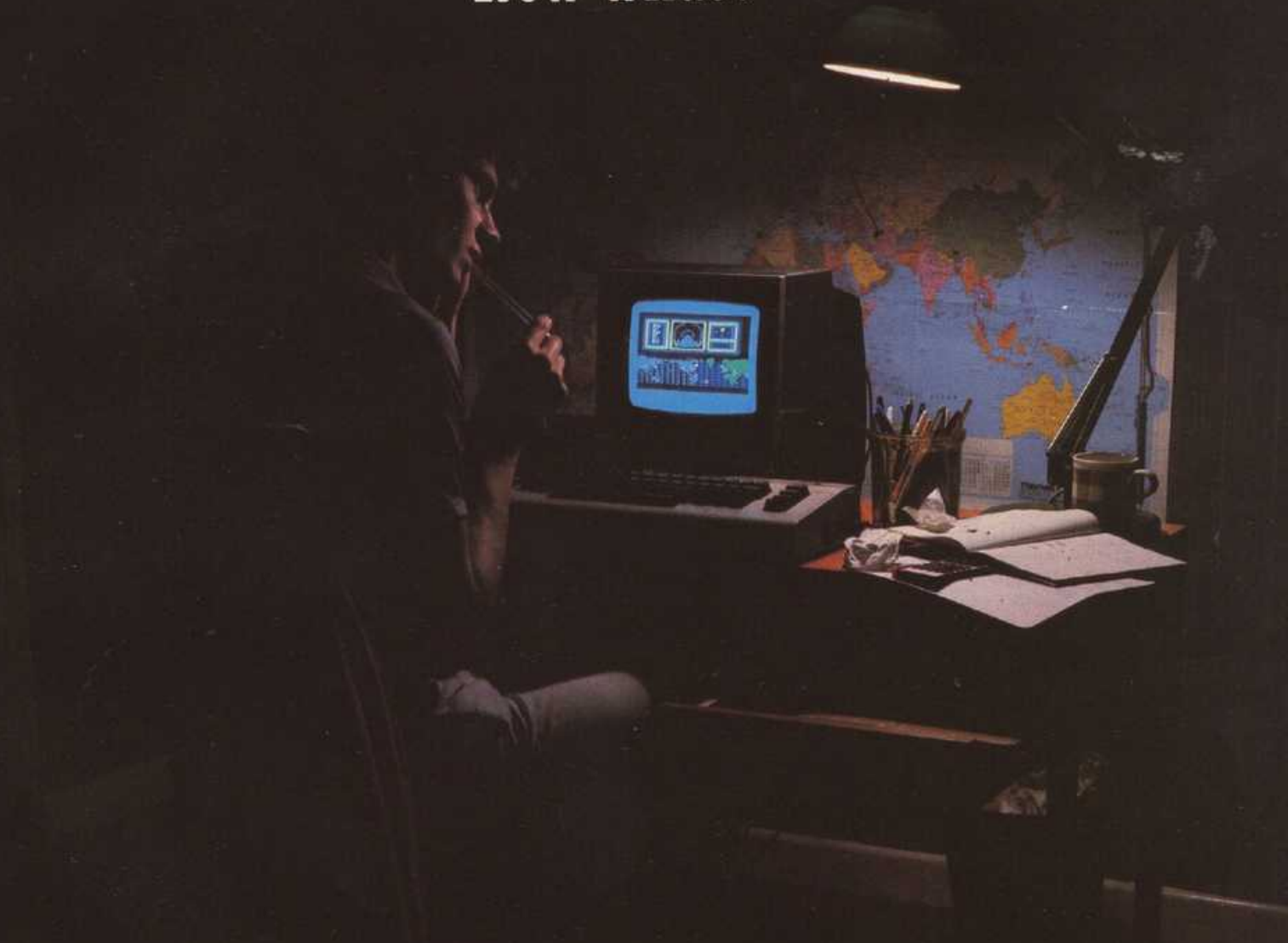
On balance I'd recommend it highly.

Graham Taylor



HACKER™

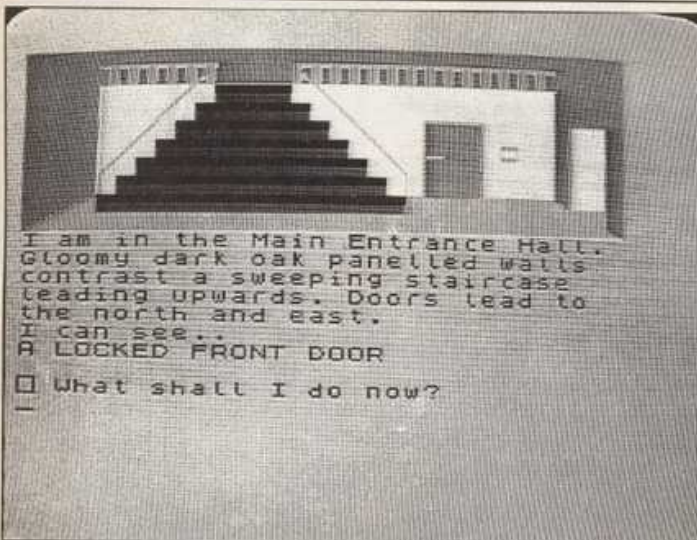
You've stumbled into an
unknown computer system.
Now what?



- "Logon please".
- One word appears on your screen.
- What do you do now?
- You don't know the password. You don't even know what computer system you've hacked into. But you do know that you must find out more.
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Dull quest

Program *The Deeds of Gengis Khan* **Micro** Spectrum 48K **Price** £5.95 **Supplier** Terminal Software, 353 Bury Old Rd, Prestwich, Manchester, M25 5AW.

This double sided cassette contains the first two challenges in which you play the part of Merlock the Mede, who, we

are informed, is the keeper of the Meadean Time Sceptre. Your first task is to help a young friend claim his rightful inheritance by finding his late uncle's deeds and bonds, unfortunately these are hidden somewhere in the gloomy mansion of the title.

On first loading the game I thought the graphic depiction of Merlock and subsequent text intro to be very good. However on playing the adventure I found this was the only interesting part, after exploring over 50 locations I

found nothing to stimulate my imagination. Text descriptions are minimal and the vocabulary is, to say the least, limited. Nevertheless there was the second challenge, awaiting me on the flip side, so with open mind I set out to find *The Ashes of Alucard*.

Treading through the lonely graveyard towards the decrepit old church, I soon realised my only chance of survival was to find the Hammer and Stake whereupon I could dispose of the evil Vampire, then by taking his ashes to the green pastures and spreading them my challenge would be completed. Sounds easy, in actual fact it was, apart from a wild dog that appears at random intervals and is easily disposed of, that is, if you are carrying the correct object. There are no real problems in the game and once again text descriptions are very brief.

Terminal have aimed these adventures at inexperienced adventurers. However even at £5.95 for two I feel they are over-priced.

Roger Garrett



Own goal

Program *Match Day* **Micro** BBC **Price** £9.95 **Supplier** Ocean, 6 Central Street, Manchester M2 5NS.

The BBC doesn't do all that well for arcade style software, many titles being little better than, say, Spectrum budget games in sophistication and quality. It's good therefore to discover games that might make owners of other machines envious. *Match Day* on the BBC is better than all the Spectrum games and comes reasonably close to the famous Commodore *International Soccer*.

The strength of the game is its graphics – nicely animated players with lots of detail and plenty of colour – very cartoon like. Backgrounds are also good; the crowd consists of recognisable faces, and managers sit on the sidelines, no dark blurs here.

The game works in the usual way – the player closest to the ball becomes the active

one, the computer automatically sets up things like throw in's and goal kicks. One problem with game is its speed. The players move rather sluggishly, which detracts from the tension a little, but with graphics as detailed as these this is probably unavoidable.

Seeing stars

Program *Star Strike 3D* **Micro** Enterprise **Price** £7.95 **Supplier** Enterprise Computers Ltd., 31-37 Hoxton Street, London N1 6NJ.

There are two main families of shoot 'em up. In one the aliens come to earth; in the second we fight an away battle, as in *Star Strike 3D*, one of the best *Star Wars* style games on the Spectrum.

Your mission comes in four parts. Starting in the black depths of space you are bombarded by hostile fighters, then you skim and swerve

The computer plays well, and I haven't managed to score a single point against it yet but perhaps that's me...

Superbly programmed and a game that really is (yuk) 'for all the family'.

Graham Taylor

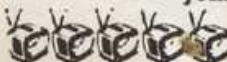


across the planet's surface contributing to the environment by blasting anonymous tower blocks. Next comes the trench, criss-crossed with catwalks and finally there's the control centre to shoot out the reactor pods – after which your reward is a view of the planet being blown to bits, hyperspace and the next level.

My initial reaction was to the speed of the game. The 3D line animation is so good I was swerving and swaying as I crossed the planet.

One of the most addictive games of mass destruction available.

John Minson



Small print

Program *Transact Micro* CPC range **Price** £26.00 **Supplier** Amsoft, Brentwood House, 169 Kings Road, Brentwood, Essex CM14 4EF.

Transact by Dialog Software has been advertised in its CP/M disc format in the £30 price range and appears to be quite a respected release so it was somewhat of a surprise to see the tape version out in a simple Amsoft cassette case with a cartoon on the front rather than a prestigious ring binder.

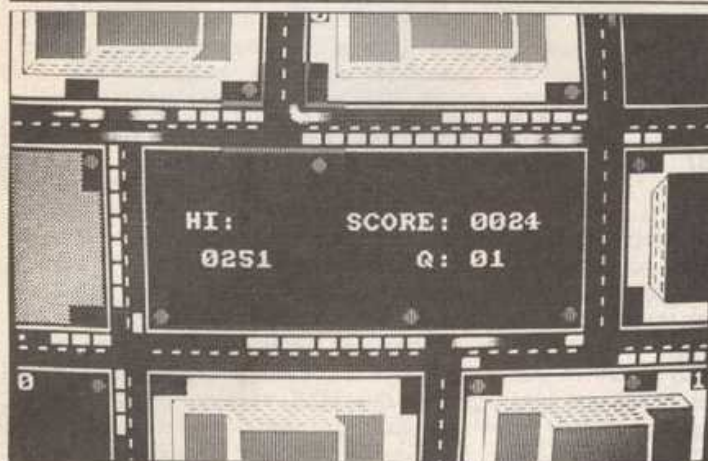
The program is an accounts/book keeping package with heavy emphasis on VAT financial credits and debts, cash flow etc. It does not appear to cover stock control, fixed assets or the like. Unfortunately one irritating disadvantage of the packaging is that the instructions have been squeezed into the tiniest booklet you can imagine, you don't have to worry about missing the small print – there isn't anything else there. The style of writing is also turgid and difficult to follow. Although I have experience of accounting I found that the two factors had my head spinning.



Once in use however, if you had any data ready to enter, it became apparent that the extensive use of menus and prompts made it a lot more user friendly than it first appeared. You can keep track of account balances, profit and loss, sales and purchases, banking, cash and input and output Vat. I think that Amsoft have probably identified a real market of very small business that have simple requirements and little money for hard and software and this program may suit them very well.

Tony Kendle





Street life

Program *Traffic Micro* CPC 464 etc **Price** £8.95 **Supplier** Amsoft, Brentwood House, 169 King's Road, Brentwood, Essex.

When driving around large towns or cities have you ever, in idle moments of enforced leisure, imagined that there was some malicious deity or 'ghost in the machine' responsible for turning every traffic light red just as you approach. This new release from Amsoft gives you the chance to become the ghost and drive innocent motorists, and yourself, berserk in the process.

Traffic gives you a simple plan view of town streets where, at the junction of each block, there are those tricoloured banes of the motorist's life. You 'simply' have to move the cursor to each junction to change the lights, keep things running smooth-

ly, and stop horrendous tail-backs building up. It is a bit like those recent railway simulation games where you have to coordinate several trains to pick up passengers etc but without any entertaining graphics of irate commuters or the like. Indeed 'bloblike' rather than 'enter-taining' summarises *Traffic's* graphics. Still it is no less maddening for all that and difficulty increases rapidly to keep you on your toes.

Some people like games which challenge the ability to think quickly under pressure, to coordinate several things at once, to face ever increasing odds with no end or feeling of achievement in sight, to keep a level head whilst all around, etc. Personally they drive me up the wall. *Traffic* is one of these, and although it had me throwing the box around the room in frustration it is a reasonable effort and may be just your thing.

Tony Kendle



The DT's

Program *Daley Thompson's Super-Test Micro* Spectrum 48K **Price** £6.95 **Supplier** Ocean Software Limited, Ocean House, 6 Central Street, Manchester 2.

Busy bloke, Daley T. As if the decathlon wasn't enough he's now involved in an eight event *Super-Test*. It's enough to make your joystick droop.

Ocean seem to have made something of a speciality of such sporting programs and as you'd expect it's a generally stylish package with many amusing touches adding to the smooth animation and a superb finish screen. But the desire to waggle joysticks

action, but pistol shooting doesn't, so why have it controlled by a sideways movement? In the end I resorted to the keyboard and still found it inconvenient.

Other events combine the joystick jiggle with fire button timing, such as the Penalties scoring, when you run to the ball then kick. The Ski Jump is similar but in Spring Board Diving the joystick controls your somersaults. The Giant Slalom has you build up speed at the start then transfer control to left/right to ski through the gates.

A final quibble; why no method of entering the first day's score when you start the second round, so as to provide an 'official' total? Still, a nice variety of games and at least armchair athletes will get more exercise than



from side to side results in some odd discrepancies.

Straight races (Cycling, Rowing and even the Tug O' War) adapt well to rapid wrist

watching *Grandstand* if they play it daily (ouch!).

John Minson



Money order

Program *QL Integrated Accounts* **Price** £89.95 **Micro** QL **Supplier** Sinclair Research

Sagesoft's Sage accounting program was first issued in 1980, and may well be the most popular UK accounting package.

It may be that this £90 microdrive cartridge based version for the QL can lay claim to being the best Value For Money accounting package today.

There is room on a car-

tridge for 1,000 transactions, so if your monthly number (ie, of payments and invoices made and received plus journal entries) is less than this, discs will not be essential.

QL Integrated Accounts seems aimed at companies with a turnover of a few hundred thousand pounds or less, that need to keep track of debts with suppliers and customers, and would benefit from a nominal analysis.

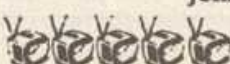
The package produces open item ledger cards, statements and remittance advices, aged schedules, day books, cash books and audit trail. Thankfully, customer

and supplier accounts are referenced by a short name. A full balance sheet and profit and loss account is maintained by the system. VAT reports to satisfy HM Customs are also produced, and it's easy to amend or add to the various ways of treating VAT.

It may seem odd that a program which prints statements can't produce invoices. The reason is, only one nominal analysis per invoice can be used (except VAT which is handled automatically). Where an invoice is to be analysed to several nominal accounts it is entered over several lines each with the

same invoice number and account reference, but differing nominal codes. Consequently, the program is weak at spotting you've done something silly. Errors are, however, easy to correct; except wrong tax codes, transaction dates and references which require an extra utility available from Sagesoft. It makes possible a turnkey accounting system for under £1,000. It should do well, not only selling to companies, but also book-keepers able to spend £300 to update their skills.

John Tucker



Looking in the mirror

Christina Erskine takes tea with Jim Mackonochie at Maxwell House

When Robert Maxwell clapped his arm around Sir Clive Sinclair's shoulder and declared that he wanted to help out a friend in trouble, it set a lot of people off speculating on how the acquisition of a micro company would fit into the Maxwell scheme of things.

In all the excitement, the micro orientated company which Maxwell had inherited when he bought Mirror Group Newspapers was largely forgotten. Yet Mirrorsoft has been doing very nicely for itself for some two years now, and has emerged to operate without overt assistance from its powerful sibling companies.

It may seem strange that Mirrorsoft should exist at all – after all, there is no Guardisoft, nor (thank goodness) Sunsoft. Why should a national newspaper company feel it should establish a home software company under its wing?

"Simply because in the 1990s homes will have terminals for cable, electronic databases and so on, and a national newspaper group whose business is information dissemination needs to be positioning now for that time," says Mirrorsoft head Jim Mackonochie.

"That's what I argued, anyway, when I was development manager at Mirror Group. My job was to steer the Mirror papers into office automation and new technology, and looking at the US as a model, I could see that databases of information which could be accessed by people were going to come about.

"I felt that a software publishing operation would help to set things up, so that we were a recognised name with experience when people in the home really begin to use computers to access information and leisure activities."

Printed page

is keen that Mirrorsoft is not tied to any particular category of software. Having earned a certain renown for its 'early learning' titles and also slightly quirky releases like *The Joffe Plan* (a weight loss schedule program) *Know Your Own Ps-Q* and *Star Seeker* (astronomy), the plan now is to move on.

Mirrorsoft is one of the first software companies to latch on to the new 68000 machines, the Atari ST and Amiga. The first program for these machines, versions of its *Fleet Street Editor*, program previewed at the *Personal Computer World Show*, will soon be available. "*Fleet Street Editor* will certainly broaden our range," said Jim. "While it's not really a business program, I suppose it is a move in that direction."

The program enables people to plan a page layout, newspaper or magazine style, with a number of separate stories, headlines and graphics, and of course print out the finished page.

Mirrorsoft expects it to go down particularly well in schools, clubs and societies – and not just computer clubs – for compiling bulletins, newsletters and leaflets. "On a very simple level, you can use it like a word processor with graphics, but it will do a lot more than that."

Fleet Street Editor is planned for an unusual combination of machines – not the usual Spectrum-Commodore-Amstrad by any manner of means. A BBC version – on two discs – and Apricot Fle implementation are planned to appeal primarily to schools. On the Atari ST, IBM PC and Amiga, the program will be expanded and rather more sophisticated. "For the last three, it could be of real practical use to a small print shop or advertising agency," Jim suggested.

"It seems to fill a real gap in the market. We looked at Broderbund's *Print Shop* (available only in the US) and felt that the idea should work just as well over here.

"Doing software for the Atari ST and Amiga machines is an investment – we're prepared to allocate resources to look for areas which have not been covered before.

"I'm keen on the new 16-bit machines. In the long term – say about five years time – I believe that the distinction between home and business machine will disappear. Micros like Amstrad's PCW 8256, for example, are exactly the direction people will go."

Types of software similar to *Fleet Street Editor* – useful rather than recreational, but not businessy – are very much the sort of program Jim Mackonochie wants Mirrorsoft to publish. On the same lines, the company is working on a conversion of *Spitfire 40* for the Atari ST, which is likely to appear on the Amiga as well.

Mirrorsoft first came to the public eye

as an educational publisher – with its *Mr Men* licence and *Caesar the Cat*. Educational games for the under tens may not seem like the mass market, yet so far *First Steps with the Mr Men* has just sold over 25000 copies.

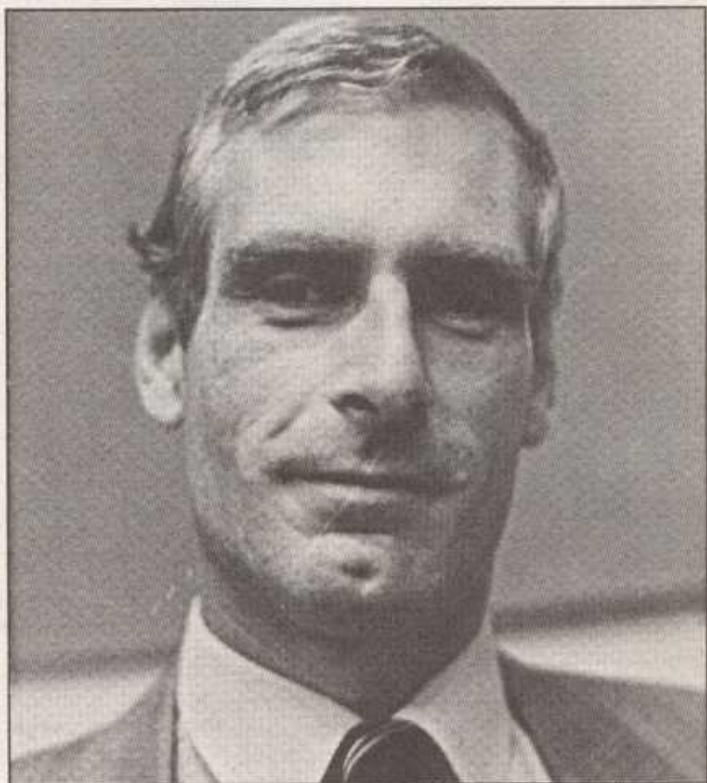
Then came the games. As a publisher, Mirrorsoft is able to commission from a variety of programmers, so it has never had a consistent brand image – you don't instantly recognise a Mirrorsoft game, as you would with Ultimate or Level9.

It has also been able to pick up publishing and conversion rights to existing titles: the MSX version of *737 Flight Simulator*, for example, and Amstrad and Atari versions of *Boulderdash*.

The company has plenty of titles planned for the end of the year and beginning of next – it will not neglect the games market entirely in favour of more serious stuff.

Conversion rights

Another newspaper orientated title, appropriately enough, is due out around the same time as *Fleet Street Editor*, called *Hold the Front Page*. "In this you



play the part of a journalist. The role of a journalist seems to be tailor-made for arcade-adventure style games, with detection work, ferreting things out and so forth," said Jim.

Two more *Mr Men* titles are also planned for the autumn, plus another game for very young children, based on a licensing deal between Mirrorsoft and Yorkshire TV's programme, *Giddy Game Show*.

As far as Mirrorsoft is concerned it is as if the Maxwell/Sinclair 'deal' never happened.



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Jumper

Fabbo arcade action on the Sinclair QL written by our Norwegian correspondent *Kristian Solaas*

This is a *Q-Bert* style game. Your aim is to cover the Pyramid with footprints and also avoid the nasty creature, which jumps all over the pyramid.

There are ten different pyramids, each with its own difficulties. If you manage to come through all ten, you must do it all over again, but this time with *two* nasty creatures.

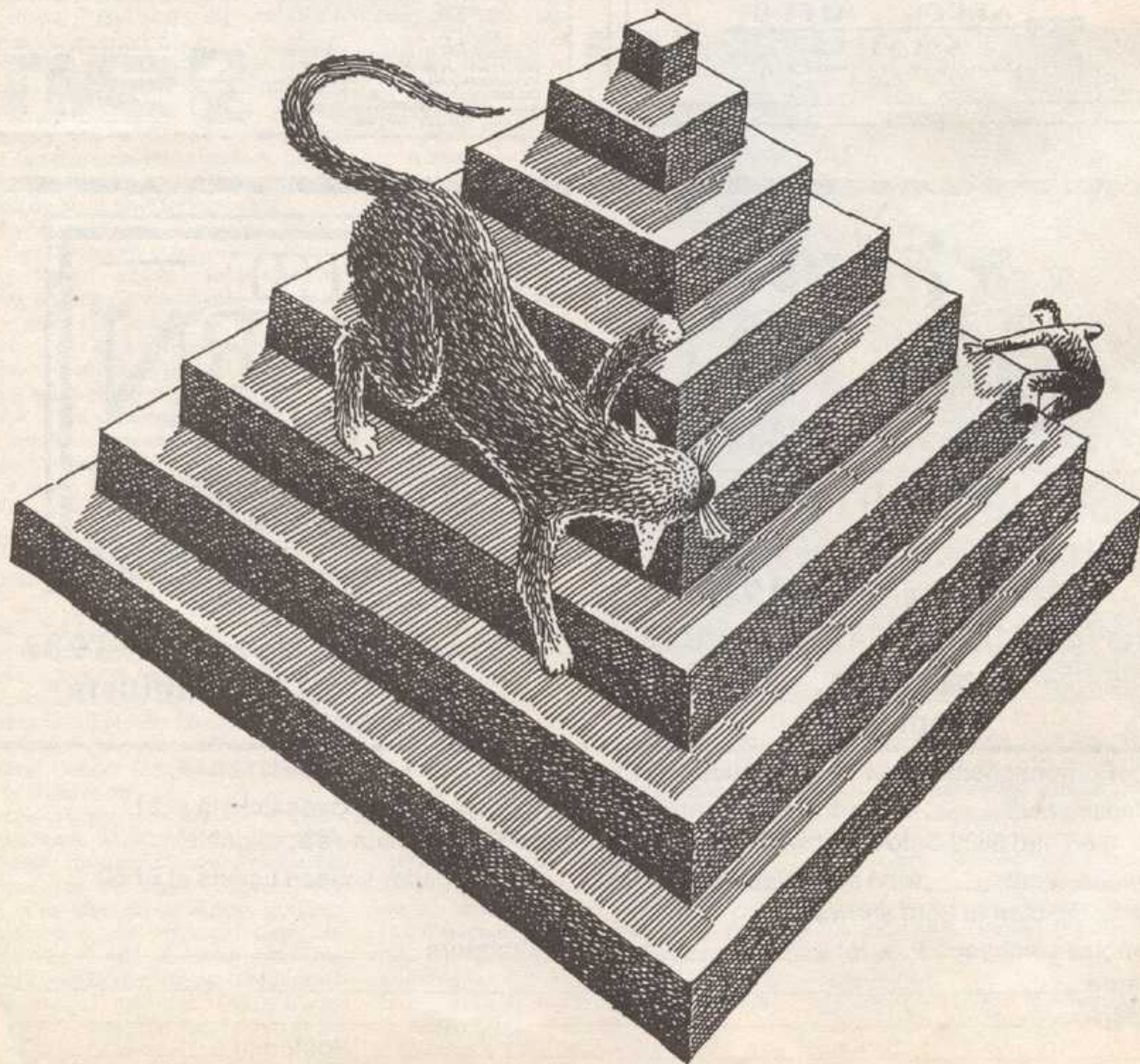
All pound signs in the listing should be entered as hash signs.

Program Notes

Char Set - makes the new

Start - characters makes windows and set variables
 Make Pyramid - makes the pyramid on the screen
 Make Square - makes a single piece of the pyramid
 Print Lives - prints the number of lives left
 Move QBert - checks if a key is pushed and move QBert
 Show All - prints characters on screen
 Check QBert - checks if QBert is dead

Make Print - prints QBert on screen
 Move Balls - moves the balls randomly
 Next Level - moves to next level
 Clean - cleans the screen + variables
 Dead - shows the death of the QBert
 Intro - introduction and instructions
 Print 3D - prints text in 3D
 All Dead - ends game when you have died
 Finished - ends game when you have won



Star Game

[illegible]

High frequency

Connect your hi-fi to your Spectrum with this program
by Michael Streeton

The following program runs on the Sinclair Spectrum 48K, but modifications are necessary if it is to run on issues 1 and 2 machines. It is, however, microdrive compatible and no extra hardware is needed to run it.

The program takes sound input from the ear socket and displays it in the form of a line graph on the screen. Issue 1 and 2 machines display the graph upside down, but this can be altered by changing one logic statement in the program.

It was written in machine code for speed and accuracy, although no attempt has been made to synchronise timings. It occupies 72 bytes plus another 256 bytes of data.

The main problem with interpreting sound on the Spectrum is that unless you have an analog to digital converter the only way to input sound is via the ear socket. The ear socket is read as a two state device either high or low. This changes depending on what issue you have.

My solution to this problem is to keep a count (pseudo frequency), this count then changes in the following way. If the ear socket is set high (1), then the count is increased by one, if it is set low (0), then the count is decreased by one. This gives a rough frequency. If the frequency is high, then the ear socket value will change more often and the count will be displaced less. The opposite applies for low frequency.

The count can now be plotted as the Y axis on the graph. I originally scrolled this graph horizontally but this proved too slow. Instead of this I decided to keep a count ranging from zero to 255. This would loop back to zero when it reached 255. This count is plotted as the X co-ordinate and a new height is calculated. At each step of the loop X is plotted to give a line across the screen. The heights for each value of X are stored; when the program loops back to this value of X the old point is plotted over to wipe it out, then the new point is plotted and stored. When this is done very rapidly it gives the appearance of a continuous line across the screen.

Program One should be entered first and saved to tape, making any changes necessary. Program Two should now be entered; issue One and Two owners should make the changes as indicated. Once the data is correct and the program run, then the code will be saved after Program One on the tape. Rewind the cassette and load it back, it should now be ready for use. The reason for the *Beep* in Line 1000 is that when something loads the speaker is muted slightly - this also happens to the graph. The short *Beep* stops this.

Once you have saved the program, with any changes that were necessary, you can load it back and use it. When no sound is being played in, the line will stay at the bottom of the screen. When music is played in the line will become jagged and jump around.

The higher the frequency the smaller the peaks on the line. The higher the line the higher the volume at that point (ie, the line will not necessarily move up the screen if you turn the volume up but will, for example, when there is a loud drum strike).

You may have to adjust the volume and tone of your cassette recorder to get these results.

Assembly Program Notes

The program may be located anywhere, but to save space it is best put before or after the data. The data must however be located at a

high byte address, ie, an address which the low byte is zero and the full address is an integer multiple of 256.

Notice Line 00000 between Lines 00190 and 00210, labelled with the pseudo op "issue" it reads: *A119 2005 00000 issue jr nz,up*, this is for issue 3 machines only. For issue 1 and 2 machines it should read: *A119 2805 0000 issue jr z,up*

Line No

- 10 Sets code to equal the address of the start of the height data.
- 30 Sets the program origin to 256 bytes of the start address of the data, ie, at the end of the data.
- 50-90 These lines set the data values to 87 a set height, even if this is not the correct height, as when the program starts the main loop it plots Over the old points to wipe them out. If none have been plotted then a new point is plotted. This results in a line being drawn on the centre of the screen when the program is called. It can be removed if required as Program Two listing shows.
- 100-110 These lines set the current height to

Program #1

```
10 LET U=USR 41216: STOP
1000 CLEAR 40959: LOAD "soundcode"
CODE 41216,72: BEEP .1,.1: RUN
```

Should you wish to remove the line across the centre of the screen add the following line.

```
5 PLOT OVER 1;0,87: DRAW OVER
1;255,0
```

Program #2

```
10 DATA 33,0,160,54,87,44,32
20 DATA 251,62,87,50,129,92
30 DATA 243,126,205,55,161,219
40 DATA 254,203,119,58,129,92
50 DATA 32
60 DATA 5,61,254,255,32,5,60
70 DATA 254,176,40,246,50,129
80 DATA 92,119,205,55,161,44
90 DATA 32,223,219,254,203,71
100 DATA 32,217,251,201,229,71
110 DATA 77,205,170,34,71,62
120 DATA 1,15,16,253,174,119
130 DATA 225,201
1000 CLEAR 41215: LET t=0: FOR a
=41216 TO 41287: READ b: POKE a,
b: LET t=t+b: NEXT a
1010 IF t<>8850 THEN PRINT "code
error check data" "out by ";885
0-t: STOP
1020 SAVE "soundcode" CODE 41216,
72
```

Owners of issue 1 & 2 machines should make the following changes to Program #2, to stop the graph being displayed upside down.

```
50 DATA 40
1010 IF t<>8858 THEN PRINT "code
error check data" "out by ";885
8-t: STOP
```


87, it is stored in address 23681 for safe keeping.

120 This line disables the interrupts to make the program run faster.

140-150 These lines wipe over the old point, if it does not exist then a new line is plotted.

160-170 These lines test the ear socket to see if it is set.

180 This line recalls the current height.

00000 Decides if the height should be increased or decreased.

220-240 These lines decrease the count by one. They also make sure the count

does not go off the bottom of the screen.

260-280 These lines increase the count by one. They also make sure the count does not go off the top of the screen.

300-320 These lines store the current height for use by the next X position, and when this point comes to be wiped out then the new position is plotted.

330-340 These points increment the X co-ordinate as well as the point to the previous heights. It then loops back if 256 points have not been plotted, ie, all the way across the screen.

360-380 These lines test to see if the user wants to exit the program. It works for a variety of keys. If the user does not want to exit then the program loops back for another loop round.

390-400 These lines enable the interrupts and return to Basic if this was requested.

420-450 These lines are a plot routine, it is the same as the one in Rom but has been modified to only do plot Over. Taking the X co-ordinate for the 1 register and the Y co-ordinate for the a register.

A000	00010	Code	equ	40950	A125	32815C	00300	store	ld	(23681),a
0000	00020				A126	77	00310		ld	(hl),a
0000	00030				A129	CD37A1	00320	call	plot	
A100	00040	org	code+256		A12C	3C	00330	inc	l	
A100	2100A0	reset	ld	hl,code	A12D	20DF	00340	jr	nz,start	
A103	00050				A12F		00350			
A103	3657	clear	ld	(hl),87	A12F	08FE	00360	finish	in	a,(254)
A105	2C		inc	l	A131	CB47	00370	bit	0,a	
A106	30F5		jr	nz,clear	A133	CD09	00380	jr	nz,start	
A106	3E57		ld	a,87	A135	FB	00390	ei		
A10A	32815C		ld	(23681),a	A136	C9	00400	ret		
A100	F3		di		A137		00410			
A10E					A137	E5	00420	plot	push	hl
A10E	7E		ld	a,(hl)	A138	47	00430		ld	b,a
A10F	CD37A1	start	call	plot	A139	4D	00440		ld	c,l
A112	08FE		in	a,(254)	A13A	CDAA22	00450		call	8874
A114	CB77		bit	0,a	A13D	47	00460		ld	b,a
A116	3A815C		ld	a,(23681)	A13E	04	00470		inc	b
A119					A13F	3E01	00480		ld	a,l
A119	2005	issue	jr	nz,up	A141		00490			
A116					A141	0F	00500	dot	rcca	
A118	3D	down	dec	a	A142	10FD	00510		djnz	dot
A110	FEFF		cp	255	A144	AE	00520		xor	(hl)
A11E	2005		jr	nz,store	A145	77	00530		ld	(hl),a
A120					A146	E1	00540		pop	hl
A120	3C	up	inc	a	A147	C9	00550		ret	
A121	FEB0		cp	176	A148		00560			
A123	28F6		jr	z,down	A148		00570		end	
A125	00290									

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Getting to the point

Speed up your cursor with this short machine code routine
by Michael St Aubyn

Most word processing programs provide some means of accelerating the cursor when large areas of screen need to be crossed. The program presented here provides a similar facility for the editing system of the BBC micro.

By pressing *Shift* at the same time as one of the grey editing keys (up, down, left, right and *Copy*), the cursor will move two character positions instead of one. Release *Shift* and the edit keys will function as normal. This is particularly

useful when editing long lines of Basic, which need to be copied out in their entirety even when only a small change is required.

The program works by intercepting the keyboard event which is generated whenever a key is pressed and a character enters the input buffer. If it is a shifted-edit key, the code of the unshifted version is calculated by subtracting 16 and the resulting value inserted into the input buffer using **FX153* - the effect is the same as press-

ing the key rapidly twice in succession. You may like to try accelerating the cursor even further by changing the variable *speedfactor*. Changing this to four, for instance, will quadruple the speed.

The basic program needs only to be run once, after which it is redundant and can be deleted or overwritten by another program. The assembled machine code can if wish be saved by typing **Save Speedup C80+80* so the next time you wish to use it you simply enter **Run Speedup*.

The routine is protected against *Break* by redirecting the *Break* intercept vector. If you need to turn the facility off, type: **FX247* followed by **FX13,2*. To re-enable it type **FX247,76* then **FX14,2*.

```

10 REM Accelerated Edit
20 REM BBC Micro OS1.0
30 REM Michael St Aubyn
40 :
50 speedfactor=2
60 osbyte=&FFF4:evntv=&220
70 FOR pass=0 TO 2 STEP 2
80 P%=&C80
90[OPT pass
100\initialise
110.init
120\set event vector
130 LDA #code MOD256:STA evntv
140 LDA #code DIV256:STA evntv+1
150 LDA #14:LDX #2:JSR osbyte
160\set BREAK vector
170 LDA #247:LDX #&4C:LDY #0
180 JSR osbyte
190 LDA #248:LDX #init MOD256:LDY #0
200 JSR osbyte
210 LDA #249:LDX #init DIV256:LDY #0
220 JSR osbyte
230 RTS

240\
250\event code
260.code
270 PHP
280 CMP #2:BNE exit
290 CPY #155:BCC exit
300 CPY #160:BCS exit
310 PHA:TXA:PHA:TYA:PHA
320 SEC:SBC #16:STA value
330 LDA #speedfactor-1:STA count
340.loop
350 LDA #153:LDX #0:LDY value
360 JSR osbyte
370 DEC count:BNE loop
380 PLA:TAY:PLA:TAX:PLA
390.exit
400 PLP
410 RTS
420\
430.count BRK
440.value BRK
450]NEXT
460 CALL init

```


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Go for your guns

Create some great on-screen effects on the CPC464 with these programs by **Brian Cadge**

The Amstrad's video display is produced by two pieces of hardware, the Video Gate Array and the CRT controller. The VGA controls the screen mode (resolution), and handles the loading of colours into palette memory. It is also used by the Amstrad to control the bank switching of ROMs.

The second part of the video hardware is the CRT (Cathode Ray Tube) Controller chip. The Amstrad uses the 6845 CRTC chip to control the positioning and size of the display on the monitor. Although the firmware uses some features of the 6845 hardware, principally for hardware scrolling the screen, there are many other useful features of this chip which the firmware does not support.

The 6845 has a total of 16 internal registers, most of which are Write-Only, that is to say we can output values to them, but we cannot read the current values from them. Two Z80 I/O port addresses are used to control the 6845, these are *BCXX* and *BDXX*. The former is the address port and the latter the data port.

Values are sent to a peripheral chip, such as the 6845, using the *Out* command in Basic. To send a value to one of the 6845 registers we first of all send out the registers number to the address port *BCXX* to tell the chip which register we want to change. The actual data value to be put in the particular 6845 register is then output to the data port. So to send the value 40 to register one in the 6845 we would use the following Basic commands: *Out &BC00,1: Out &BD00,40*.

Although the address port will keep the value one, it is always advisable to output the register number immediately before the data just in case the firmware has since updated the address port.

So just what are the 6845 registers used for? The table below lists the more useful ones. Those missing are either not implemented by the Amstrad hardware, or are only partly implemented.

Register	Function
0	Horizontal Total
1	Horizontal Displayed
2	Horizontal Sync Position
3	Sync Widths
4	Vertical Total
5	Vertical Total Adjust
6	Vertical Displayed
7	Vertical Sync Position
8	Interlace and Skew
9	Maximum Raster Address
12	Start Address (high)
13	Start Address (low)

It is generally not a good idea to alter any register involved with Sync functions, as this can lead to the loss of picture and you will have to reset the computer. The useful registers have the following functions: Register 0 controls the overall 'height' of the physical monitor screen. Program Four uses this feature to give a 'neon lights' effect that can be very useful for title displays, etc. An interesting feature of changing this register is that it controls when the frame flyback pulse occurs. Making the screen longer (as Program Four does) means it takes longer for the CRT to scan one 'screen' and so the interrupt occurs less frequently.

Register One controls the number of columns displayed on the screen. The Amstrad sets this to 40 (note this value applies to all modes), but this can be changed to display more or less of the border. Similarly, Register Six controls how many text lines are displayed, ini-

to 24 columns by 34 lines in Mode 0. The border is completely concealed as the text screen now covers the whole of the monitor screen. In practice, if you change the size of the screen it will be necessary to check that the new display uses no more than 16K of memory or else wrap-round will occur. The firmware graphics and text routines will not operate as normal on different sizes of screen.

The position of text screen can be moved in all four directions in steps of one Mode 1 character. Register Five allows fine adjustment of the vertical position; this has many uses. For example, hardware smooth scrolling of graphics and text could be implemented. Program Three uses this register to give an 'earthquake' effect that can be used in games. The screen appears to 'shake' as in an earthquake. Try adding a *Call &BD19* in Lines 75 and 105 to see an example of smooth scrolling. This firmware routine waits for the current screen scan to complete before returning and can be used to tidy up screen updating.

The four programs presented with this article only show a few of the effects possible by direct manipulation of the CRTC chip. Although some of the effects

```

10 : VDU PROGRAM #1
20 :
30 : This program allows you to alter
40 : position of the screen on the
50 : monitor, using the cursor keys.
60 :
70 horz.pos=46:vert.pos=30
80 horz.adr=2:vert.adr=7
90 BURDER 1:INK 0,3:INK 1,26:PEN 1:PAPER 0:MODE 1
100 PRINT"Press the cursor keys to move the screen"
110 PRINT:PRINT"Press ESC ESC to finish...."
120 i$=INKEY$:IF i$="" THEN 120
130 IF i$=CHR$(&F2) AND horz.pos<60
    THEN horz.pos=horz.pos+1
140 IF i$=CHR$(&F3) AND horz.pos>32
    THEN horz.pos=horz.pos-1
150 IF i$=CHR$(&F1) AND vert.pos>20
    THEN vert.pos=vert.pos-1
160 IF i$=CHR$(&F0) AND vert.pos<40
    THEN vert.pos=vert.pos+1
170 CALL &BD19
180 OUT &BC00,horz.adr:OUT &BD00,horz.pos
190 OUT &BC00,vert.adr:OUT &BD00,vert.pos
200 GOTO 120

```

tially 25. Register Two controls how far left the display starts and Register Seven controls how far down the display starts. Program One uses these positioning registers to allow you to move the text screen around on the monitor using the cursor keys.

Program Two uses the positioning registers and the size registers to reposition the screen in the top left hand corner of the monitor and then expand it

may look strange, you cannot damage your monitor or computer by changing the register contents - if you lose the display just turn the computer on and off. You'll probably find lots more uses for the 6845 by experimenting with the registers yourself. But a word of warning, restrict all addresses in the *Out* command to *BC00* and *BD00* unless you know what you're doing or you might just lose the program in memory.


```

10 ' VDU PROGRAM #2
20 '
30 ' This program demonstrates using
40 ' all of the monitor screen for text.
50 ' Giving 24 columns and 34 lines
60 ' in mode 0.
70 '
80 ON BREAK GOSUB 240
90 MODE 0:BORDER 0:INK 0,3:INK 1,12:INK
  2,20:INK 3,18,3:PEN 1:PAPER 0
100 horz.adr=2:horz.cols=1:ver4.
  adr=7:vert.lines=6
110 OUT &BC00,horz.adr
120 OUT &BD00,50 'Move screen left 4
130 OUT &BC00,vert.adr
140 OUT &BD00,35 'Move screen up 5
150 OUT &BC00,horz.cols
160 OUT &BD00,48 'Display 48 columns
170 OUT &BC00,vert.lines
180 OUT &BD00,34 'Display 34 lines
190 FOR i=1 TO 520:PRINT"*";:NEXT
200 LOCATE 1,19:PEN 2
210 PRINT STRING$(24,154)+CHR$(15)+CHR$
  (3)+"POPULAR COMPUTING WEEKLY"+
  CHR$(15)+CHR$(2)+STRING$(24,154);
220 PEN 1
230 WHILE INKEY$="":WEND
240 OUT &BC00,horz.adr
250 OUT &BD00,46
260 OUT &BC00,vert.adr
270 OUT &BD00,30
280 OUT &BC00,horz.cols
290 OUT &BD00,40
300 OUT &BC00,vert.lines

```

```

310 OUT &BD00,25
320 MODE 1:CALL &BC02 'reset default
  colours

```

```

10 ' VDU PROGRAM #3
20 '
30 ' This program can be used as a
40 ' subroutine to give an earthquake
50 ' effect in games.
60 '
70 FOR z=0 TO 2
80 OUT &BC00,5:OUT &BD00,z
90 NEXT z
100 FOR z=2 TO 0 STEP -1
110 OUT &BC00,5:OUT &BD00,z
120 NEXT z
130 IF INKEY$="" THEN 70

```

```

10 ' VDU PROGRAM #4
20 '
30 ' "Neon Signs" title program
40 '
50 MODE 0:INK 0,0:BORDER 0
60 a$=" POPULAR COMPUTING"
70 OUT &BC00,0:OUT &BD00,127
80 LOCATE 1,1:FOR x=1 TO LEN(a$):
  PRINT MID$(a$,x,1);
90 FOR d=1 TO 50:NEXT d,x
100 p=INT(RND(1)*15+1)
110 IF INKEY$="" THEN PEN p:GOTO 80
120 OUT &BC00,0:OUT &BD00,63:PEN 1:MODE 1

```



Graphic designer

Design characters for the MPS-801 printer on the 64 – from the keyboard of Peter Bartley

This program is useful for designing graphics or characters specifically for a printer (in my case, the MPS-801) as opposed to UDGs on-screen. So, say, for instance, that you wanted a gothic script, you could design the characters on the screen grids and the relevant data would be printed out to obtain that character later.

I have opted for print-out rather than saving files to disc for the simple reason that you may not be happy with certain characters, and 'dross' would then accumulate on the disc.

Program Notes

Functions

- P – up
 - @ – erase dot
 - k – plot dot
 - l – left
 - : – right
 - . – down
 - 1 will fill the entire grid
 - 2 will empty the entire grid
 - q will put in the right character stops when designing letters, leaving a space so that the defined characters don't join up when printed
 - w will remove these stops
 - a will reverse any design: all empty squares will be filled, all filled squares will be emptied
 - s will invert any design: bottom row becomes top, etc
 - z will put 'trace' on: a trail of squares will be left wherever the cursor goes
 - x will put 'rubout' on: this is the same as 'trace', but the trail is composed of spaces
 - c will cancel rubout or trace (z or c)
 - r will reset all three character grids, clearing them of designs and character stops
 - % will return you to Basic (exit)
 - F7 will output the design contained in the grid in which the cursor is flashing
 - F1 small grid
 - F3 double height grid
 - F5 double height and width grid. The current grid is indicated on the display
- Line No**
- 10-40 Start-up screen: if printer is ok, press any key.
 - 50-120 These lines set the variables, arrays etc.
 - 130-230 Print the grids and the menu.
 - 240-490 Main decision loop: decodes keypresses and acts accordingly.
 - 500 Indicates graphically on-screen the current grid.
 - 540-590 Flashes cursor by alternately poking F with 214 or 32/207.
 - 600-630 Puts in or takes out character stops depending on the values of X and C.
 - 650-670 Reverses grid.
 - 680 Fills or erases grid depending on the value of Z.

690-710 Inverts grid by reading the 'lines' into an array from top to bottom, and then poking them back in reverse order.

720-740 Clears all grids by GOSUBbing to 'erase grid' and 'erase stops' routines.

800-900 Output routine. This will output the character to the printer, followed by its relevant data.

Obviously, other routines can easily be tagged on by adding more subroutines and control lines (250-490).

```

10 PRINT "CBM-64 PRINTER CHARACTER DESIGNER"
20 PRINT "CHECK: PRINTER ON":PRINT "PAPER OK"
30 PRINT "HIT ANY KEY FOR MAIN PROGRAM"
40 GET$:IF$=""THEN40
50 POKE53280,15:POKE53281,12:DIMG(13,11),H(13):K=54272
60 POKEK+1,156:POKEK+5,9:POKEK+6,25:POKEK+15,30:POKEK+24,143
70 OPEN3,4:PRINT "P":P(1)=1068:P(2)=1428:P(3)=1440:V(1)=6:V(2)=13:V(3)=13
80 PRINT#3,CHR$(10)CHR$(10)CHR$(14)CHR$(17)"-USTOM PRINTER -CHARACTERS"CHR$(13)
90 FORA=1TO3:X(A)=0:Y(A)=0:Q(A)=32:NEXT:W(1)=5:W(2)=5:W(3)=11:M=1
100 F$(1)="F1 F3 F5 F7 F9 F11 F13 F15 F17 F19 F21 F23 F25 F27 F29 F31 F33 F35 F37 F39 F41 F43 F45 F47 F49 F51 F53 F55 F57 F59 F61 F63 F65 F67 F69 F71 F73 F75 F77 F79 F81 F83 F85 F87 F89 F91 F93 F95 F97 F99 F101 F103 F105 F107 F109 F111 F113 F115 F117 F119 F121 F123 F125 F127 F129 F131 F133 F135 F137 F139 F141 F143 F145 F147 F149 F151 F153 F155 F157 F159 F161 F163 F165 F167 F169 F171 F173 F175 F177 F179 F181 F183 F185 F187 F189 F191 F193 F195 F197 F199 F201 F203 F205 F207 F209 F211 F213 F215 F217 F219 F221 F223 F225 F227 F229 F231 F233 F235 F237 F239 F241 F243 F245 F247 F249 F251 F253 F255 F257 F259 F261 F263 F265 F267 F269 F271 F273 F275 F277 F279 F281 F283 F285 F287 F289 F291 F293 F295 F297 F299 F301 F303 F305 F307 F309 F311 F313 F315 F317 F319 F321 F323 F325 F327 F329 F331 F333 F335 F337 F339 F341 F343 F345 F347 F349 F351 F353 F355 F357 F359 F361 F363 F365 F367 F369 F371 F373 F375 F377 F379 F381 F383 F385 F387 F389 F391 F393 F395 F397 F399 F401 F403 F405 F407 F409 F411 F413 F415 F417 F419 F421 F423 F425 F427 F429 F431 F433 F435 F437 F439 F441 F443 F445 F447 F449 F451 F453 F455 F457 F459 F461 F463 F465 F467 F469 F471 F473 F475 F477 F479 F481 F483 F485 F487 F489 F491 F493 F495 F497 F499 F501 F503 F505 F507 F509 F511 F513 F515 F517 F519 F521 F523 F525 F527 F529 F531 F533 F535 F537 F539 F541 F543 F545 F547 F549 F551 F553 F555 F557 F559 F561 F563 F565 F567 F569 F571 F573 F575 F577 F579 F581 F583 F585 F587 F589 F591 F593 F595 F597 F599 F601 F603 F605 F607 F609 F611 F613 F615 F617 F619 F621 F623 F625 F627 F629 F631 F633 F635 F637 F639 F641 F643 F645 F647 F649 F651 F653 F655 F657 F659 F661 F663 F665 F667 F669 F671 F673 F675 F677 F679 F681 F683 F685 F687 F689 F691 F693 F695 F697 F699 F701 F703 F705 F707 F709 F711 F713 F715 F717 F719 F721 F723 F725 F727 F729 F731 F733 F735 F737 F739 F741 F743 F745 F747 F749 F751 F753 F755 F757 F759 F761 F763 F765 F767 F769 F771 F773 F775 F777 F779 F781 F783 F785 F787 F789 F791 F793 F795 F797 F799 F801 F803 F805 F807 F809 F811 F813 F815 F817 F819 F821 F823 F825 F827 F829 F831 F833 F835 F837 F839 F841 F843 F845 F847 F849 F851 F853 F855 F857 F859 F861 F863 F865 F867 F869 F871 F873 F875 F877 F879 F881 F883 F885 F887 F889 F891 F893 F895 F897 F899 F901 F903 F905 F907 F909 F911 F913 F915 F917 F919 F921 F923 F925 F927 F929 F931 F933 F935 F937 F939 F941 F943 F945 F947 F949 F951 F953 F955 F957 F959 F961 F963 F965 F967 F969 F971 F973 F975 F977 F979 F981 F983 F985 F987 F989 F991 F993 F995 F997 F999 F1001 F1003 F1005 F1007 F1009 F1011 F1013 F1015 F1017 F1019 F1021 F1023 F1025 F1027 F1029 F1031 F1033 F1035 F1037 F1039 F1041 F1043 F1045 F1047 F1049 F1051 F1053 F1055 F1057 F1059 F1061 F1063 F1065 F1067 F1069 F1071 F1073 F1075 F1077 F1079 F1081 F1083 F1085 F1087 F1089 F1091 F1093 F1095 F1097 F1099 F1101 F1103 F1105 F1107 F1109 F1111 F1113 F1115 F1117 F1119 F1121 F1123 F1125 F1127 F1129 F1131 F1133 F1135 F1137 F1139 F1141 F1143 F1145 F1147 F1149 F1151 F1153 F1155 F1157 F1159 F1161 F1163 F1165 F1167 F1169 F1171 F1173 F1175 F1177 F1179 F1181 F1183 F1185 F1187 F1189 F1191 F1193 F1195 F1197 F1199 F1201 F1203 F1205 F1207 F1209 F1211 F1213 F1215 F1217 F1219 F1221 F1223 F1225 F1227 F1229 F1231 F1233 F1235 F1237 F1239 F1241 F1243 F1245 F1247 F1249 F1251 F1253 F1255 F1257 F1259 F1261 F1263 F1265 F1267 F1269 F1271 F1273 F1275 F1277 F1279 F1281 F1283 F1285 F1287 F1289 F1291 F1293 F1295 F1297 F1299 F1301 F1303 F1305 F1307 F1309 F1311 F1313 F1315 F1317 F1319 F1321 F1323 F1325 F1327 F1329 F1331 F1333 F1335 F1337 F1339 F1341 F1343 F1345 F1347 F1349 F1351 F1353 F1355 F1357 F1359 F1361 F1363 F1365 F1367 F1369 F1371 F1373 F1375 F1377 F1379 F1381 F1383 F1385 F1387 F1389 F1391 F1393 F1395 F1397 F1399 F1401 F1403 F1405 F1407 F1409 F1411 F1413 F1415 F1417 F1419 F1421 F1423 F1425 F1427 F1429 F1431 F1433 F1435 F1437 F1439 F1441 F1443 F1445 F1447 F1449 F1451 F1453 F1455 F1457 F1459 F1461 F1463 F1465 F1467 F1469 F1471 F1473 F1475 F1477 F1479 F1481 F1483 F1485 F1487 F1489 F1491 F1493 F1495 F1497 F1499 F1501 F1503 F1505 F1507 F1509 F1511 F1513 F1515 F1517 F1519 F1521 F1523 F1525 F1527 F1529 F1531 F1533 F1535 F1537 F1539 F1541 F1543 F1545 F1547 F1549 F1551 F1553 F1555 F1557 F1559 F1561 F1563 F1565 F1567 F1569 F1571 F1573 F1575 F1577 F1579 F1581 F1583 F1585 F1587 F1589 F1591 F1593 F1595 F1597 F1599 F1601 F1603 F1605 F1607 F1609 F1611 F1613 F1615 F1617 F1619 F1621 F1623 F1625 F1627 F1629 F1631 F1633 F1635 F1637 F1639 F1641 F1643 F1645 F1647 F1649 F1651 F1653 F1655 F1657 F1659 F1661 F1663 F1665 F1667 F1669 F1671 F1673 F1675 F1677 F1679 F1681 F1683 F1685 F1687 F1689 F1691 F1693 F1695 F1697 F1699 F1701 F1703 F1705 F1707 F1709 F1711 F1713 F1715 F1717 F1719 F1721 F1723 F1725 F1727 F1729 F1731 F1733 F1735 F1737 F1739 F1741 F1743 F1745 F1747 F1749 F1751 F1753 F1755 F1757 F1759 F1761 F1763 F1765 F1767 F1769 F1771 F1773 F1775 F1777 F1779 F1781 F1783 F1785 F1787 F1789 F1791 F1793 F1795 F1797 F1799 F1801 F1803 F1805 F1807 F1809 F1811 F1813 F1815 F1817 F1819 F1821 F1823 F1825 F1827 F1829 F1831 F1833 F1835 F1837 F1839 F1841 F1843 F1845 F1847 F1849 F1851 F1853 F1855 F1857 F1859 F1861 F1863 F1865 F1867 F1869 F1871 F1873 F1875 F1877 F1879 F1881 F1883 F1885 F1887 F1889 F1891 F1893 F1895 F1897 F1899 F1901 F1903 F1905 F1907 F1909 F1911 F1913 F1915 F1917 F1919 F1921 F1923 F1925 F1927 F1929 F1931 F1933 F1935 F1937 F1939 F1941 F1943 F1945 F1947 F1949 F1951 F1953 F1955 F1957 F1959 F1961 F1963 F1965 F1967 F1969 F1971 F1973 F1975 F1977 F1979 F1981 F1983 F1985 F1987 F1989 F1991 F1993 F1995 F1997 F1999 F2001 F2003 F2005 F2007 F2009 F2011 F2013 F2015 F2017 F2019 F2021 F2023 F2025 F2027 F2029 F2031 F2033 F2035 F2037 F2039 F2041 F2043 F2045 F2047 F2049 F2051 F2053 F2055 F2057 F2059 F2061 F2063 F2065 F2067 F2069 F2071 F2073 F2075 F2077 F2079 F2081 F2083 F2085 F2087 F2089 F2091 F2093 F2095 F2097 F2099 F2101 F2103 F2105 F2107 F2109 F2111 F2113 F2115 F2117 F2119 F2121 F2123 F2125 F2127 F2129 F2131 F2133 F2135 F2137 F2139 F2141 F2143 F2145 F2147 F2149 F2151 F2153 F2155 F2157 F2159 F2161 F2163 F2165 F2167 F2169 F2171 F2173 F2175 F2177 F2179 F2181 F2183 F2185 F2187 F2189 F2191 F2193 F2195 F2197 F2199 F2201 F2203 F2205 F2207 F2209 F2211 F2213 F2215 F2217 F2219 F2221 F2223 F2225 F2227 F2229 F2231 F2233 F2235 F2237 F2239 F2241 F2243 F2245 F2247 F2249 F2251 F2253 F2255 F2257 F2259 F2261 F2263 F2265 F2267 F2269 F2271 F2273 F2275 F2277 F2279 F2281 F2283 F2285 F2287 F2289 F2291 F2293 F2295 F2297 F2299 F2301 F2303 F2305 F2307 F2309 F2311 F2313 F2315 F2317 F2319 F2321 F2323 F2325 F2327 F2329 F2331 F2333 F2335 F2337 F2339 F2341 F2343 F2345 F2347 F2349 F2351 F2353 F2355 F2357 F2359 F2361 F2363 F2365 F2367 F2369 F2371 F2373 F2375 F2377 F2379 F2381 F2383 F2385 F2387 F2389 F2391 F2393 F2395 F2397 F2399 F2401 F2403 F2405 F2407 F2409 F2411 F2413 F2415 F2417 F2419 F2421 F2423 F2425 F2427 F2429 F2431 F2433 F2435 F2437 F2439 F2441 F2443 F2445 F2447 F2449 F2451 F2453 F2455 F2457 F2459 F2461 F2463 F2465 F2467 F2469 F2471 F2473 F2475 F2477 F2479 F2481 F2483 F2485 F2487 F2489 F2491 F2493 F2495 F2497 F2499 F2501 F2503 F2505 F2507 F2509 F2511 F2513 F2515 F2517 F2519 F2521 F2523 F2525 F2527 F2529 F2531 F2533 F2535 F2537 F2539 F2541 F2543 F2545 F2547 F2549 F2551 F2553 F2555 F2557 F2559 F2561 F2563 F2565 F2567 F2569 F2571 F2573 F2575 F2577 F2579 F2581 F2583 F2585 F2587 F2589 F2591 F2593 F2595 F2597 F2599 F2601 F2603 F2605 F2607 F2609 F2611 F2613 F2615 F2617 F2619 F2621 F2623 F2625 F2627 F2629 F2631 F2633 F2635 F2637 F2639 F2641 F2643 F2645 F2647 F2649 F2651 F2653 F2655 F2657 F2659 F2661 F2663 F2665 F2667 F2669 F2671 F2673 F2675 F2677 F2679 F2681 F2683 F2685 F2687 F2689 F2691 F2693 F2695 F2697 F2699 F2701 F2703 F2705 F2707 F2709 F2711 F2713 F2715 F2717 F2719 F2721 F2723 F2725 F2727 F2729 F2731 F2733 F2735 F2737 F2739 F2741 F2743 F2745 F2747 F2749 F2751 F2753 F2755 F2757 F2759 F2761 F2763 F2765 F2767 F2769 F2771 F2773 F2775 F2777 F2779 F2781 F2783 F2785 F2787 F2789 F2791 F2793 F2795 F2797 F2799 F2801 F2803 F2805 F2807 F2809 F2811 F2813 F2815 F2817 F2819 F2821 F2823 F2825 F2827 F2829 F2831 F2833 F2835 F2837 F2839 F2841 F2843 F2845 F2847 F2849 F2851 F2853 F2855 F2857 F2859 F2861 F2863 F2865 F2867 F2869 F2871 F2873 F2875 F2877 F2879 F2881 F2883 F2885 F2887 F2889 F2891 F2893 F2895 F2897 F2899 F2901 F2903 F2905 F2907 F2909 F2911 F2913 F2915 F2917 F2919 F2921 F2923 F2925 F2927 F2929 F2931 F2933 F2935 F2937 F2939 F2941 F2943 F2945 F2947 F2949 F2951 F2953 F2955 F2957 F2959 F2961 F2963 F2965 F2967 F2969 F2971 F2973 F2975 F2977 F2979 F2981 F2983 F2985 F2987 F2989 F2991 F2993 F2995 F2997 F2999 F3001 F3003 F3005 F3007 F3009 F3011 F3013 F3015 F3017 F3019 F3021 F3023 F3025 F3027 F3029 F3031 F3033 F3035 F3037 F3039 F3041 F3043 F3045 F3047 F3049 F3051 F3053 F3055 F3057 F3059 F3061 F3063 F3065 F3067 F3069 F3071 F3073 F3075 F3077 F3079 F3081 F3083 F3085 F3087 F3089 F3091 F3093 F3095 F3097 F3099 F3101 F3103 F3105 F3107 F3109 F3111 F3113 F3115 F3117 F3119 F3121 F3123 F3125 F3127 F3129 F3131 F3133 F3135 F3137 F3139 F3141 F3143 F3145 F3147 F3149 F3151 F3153 F3155 F3157 F3159 F3161 F3163 F3165 F3167 F3169 F3171 F3173 F3175 F3177 F3179 F3181 F3183 F3185 F3187 F3189 F3191 F3193 F3195 F3197 F3199 F3201 F3203 F3205 F3207 F3209 F3211 F3213 F3215 F3217 F3219 F3221 F3223 F3225 F3227 F3229 F3231 F3233 F3235 F3237 F3239 F3241 F3243 F3245 F3247 F3249 F3251 F3253 F3255 F3257 F3259 F3261 F3263 F3265 F3267 F3269 F3271 F3273 F3275 F3277 F3279 F3281 F3283 F3285 F3287 F3289 F3291 F3293 F3295 F3297 F3299 F3301 F3303 F3305 F3307 F3309 F3311 F3313 F3315 F3317 F3319 F3321 F3323 F3325 F3327 F3329 F3331 F3333 F3335 F3337 F3339 F3341 F3343 F3345 F3347 F3349 F3351 F3353 F3355 F3357 F3359 F3361 F3363 F3365 F3367 F3369 F3371 F3373 F3375 F3377 F3379 F3381 F3383 F3385 F3387 F3389 F3391 F3393 F3395 F3397 F3399 F3401 F3403 F3405 F3407 F3409 F3411 F3413 F3415 F3417 F3419 F3421 F3423 F3425 F3427 F3429 F3431 F3433 F3435 F3437 F3439 F3441 F3443 F3445 F3447 F3449 F3451 F3453 F3455 F3457 F3459 F3461 F3463 F3465 F3467 F3469 F3471 F3473 F3475 F3477 F3479 F3481 F3483 F3485 F3487 F3489 F3491 F3493 F3495 F3497 F3499 F3501 F3503 F3505 F3507 F3509 F3511 F3513 F3515 F3517 F3519 F3521 F3523 F3525 F3527 F3529 F3531 F3533 F3535 F3537 F3539 F3541 F3543 F3545 F3547 F3549 F3551 F3553 F3555 F3557 F3559 F3561 F3563 F3565 F3567 F3569 F3571 F3573 F3575 F3577 F3579 F3581 F3583 F3585 F3587 F3589 F3591 F3593 F3595 F3597 F3599 F3601 F3603 F3605 F3607 F3609 F3611 F3613 F3615 F3617 F3619 F3621 F3623 F3625 F3627 F3629 F3631 F3633 F3635 F3637 F3639 F3641 F3643 F3645 F3647 F3649 F3651 F3653 F3655 F3657 F3659 F3661 F3663 F3665 F3667 F3669 F3671 F3673 F3675 F3677 F3679 F3681 F3683 F3685 F3687 F3689 F3691 F3693 F3695 F3697 F3699 F3701 F3703 F3705 F3707 F3709 F3711 F3713 F3715 F3717 F3719 F3721 F3723 F3725 F3727 F3729 F3731 F3733 F3735 F3737 F3739 F3741 F3743 F3745 F3747 F3749 F3751 F3753 F3755 F3757 F3759 F3761 F3763 F3765 F3767 F3769 F3771 F3773 F3775 F3777 F3779 F3781 F3783 F3785 F3787 F3789 F3791 F3793 F3795 F3797 F3799 F3801 F3803 F3805 F3807 F3809 F3811 F3813 F3815 F3817 F3819 F3821 F3823 F3825 F3827 F3829 F3831 F3833 F3835 F3837 F3839 F3841 F3843 F3845 F3847 F3849 F3851 F3853 F3855 F3857 F3859 F3861 F3863 F3865 F3867 F3869 F3871 F3873 F3875 F3877 F3879 F3881 F3883 F3885 F3887 F3889 F3891 F3893 F3895 F3897 F3899 F3901 F3903 F3905 F3907 F3909 F3911 F3913 F3915 F3917 F3919 F3921 F3923 F3925 F3927 F3929 F3931 F3933 F3935 F3937 F3939 F3941 F3943 F3945 F3947 F3949 F3951 F3953 F3955 F3957 F3959 F3961 F3963 F3965 F3967 F3969 F3971 F3973 F3975 F3977 F3979 F3981 F3983 F3985 F3987 F3989 F3991 F3993 F3995 F3997 F3999 F4001 F4003 F4005 F4007 F4009 F4011 F4013 F4015 F4017 F4019 F4021 F4023 F4025 F4027 F4029 F4031 F4033 F4035 F4037 F4039 F4041 F4043 F4045 F4047 F4049 F4051 F4053 F4055 F4057 F4059 F4061 F4063 F4065 F4067 F4069 F4071 F4073 F4075 F4077 F4079 F4081 F4083 F4085 F4087 F4089 F4091 F4093 F4095 F4097 F4099 F4101 F4103 F4105 F4107 F4109 F4111 F4113 F4115 F4117 F4119 F4121 F4123 F4125 F4127 F4129 F4131 F4133 F4135 F4137 F4139 F4141 F4143 F4145 F4147 F4149 F4151 F4153 F4155 F4157 F4159 F4161 F4163 F4165 F4167 F4169 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F4503 F4505 F4507 F4509 F4511 F4513 F4515 F4517 F4519 F4521 F4523 F4525 F4527 F4529 F4531 F4533 F4535 F4537
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600 REM ***** CHAR STOPS IN/OUT *****
610 FORA=W(M)+P(M)TOW(M)+P(M)+V(M)*40STEP40:POKEA,X:POKEA+54272,C:NEXT
620 IFX(M)=W(M)THENX(M)=X(M)-1
630 RETURN
649 REM ***** REVERSE *****
650 FORA=0TOV(M):FORB=P(M)+A*40TOP(M)+A*40+W(M):IFPEEK(B)=207THENPOKEB,32:GOTO67
660 POKEB,207
670 NEXTB,A:RETURN
679 REM ***** FILL/ERASE GRID *****
680 FORA=0TOV(M):FORB=P(M)+A*40TOP(M)+A*40+W(M):POKEB,Z:NEXTB,A:RETURN
689 REM ***** INVERT *****
690 GOSUB750:FORA=0TOV(M):FORB=0TOW(M):G(A,B)=PEEK(P(M)+A*40+B):NEXTB,A
700 FORA=V(M)TO0STEP-1:FORB=0TOW(M):POKEP(M)+A*40+B,G(V(M)-A,B)
710 NEXTB,A:RETURN
719 REM ***** CLEAR ALL OUT *****
720 GOSUB750:FORM=1TO3:GOSUB500:Z=32:GOSUB680:T(M)=0:X(M)=0:Y(M)=0
730 IFS(M)=1THENW(M)=W(M)+1:X=32:C=7:GOSUB600:S(M)=0
740 NEXTM=1:GOSUB500:RETURN
750 REM ***** BELL *****
770 POKEK+4,31:POKEK+4,32:RETURN
799 REM ***** OUTPUT *****
800 GOSUB750:IFS(M)=1THENW(M)=W(M)+1
810 V=P(M):PP$="03":GOSUB850
820 IFM>1THENV=P(M)+7*40:M$="":S=0:PP$="06":GOSUB850
830 IFS(M)=1THENW(M)=W(M)-1
840 PRINT#3,CHR$(13):RETURN
850 M$="":FORA=0TOW(M):S=0:FORB=0TO6
860 IFPEEK(V+A*B*40)=207THENS=S+2+(B-INT(B/7)*7)
870 NEXT:H(A)=S+128:M$=M$+CHR$(H(A)):NEXT
880 PRINT#3,CHR$(8)M$CHR$(15)CHR$(16)PP$
890 FORQ=0TOW(M):PRINT#3,H(Q)" ":NEXT:PRINT#3,CHR$(8)
900 RETURN
  
```

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Arcade Avenue



Just the start

Here are two letters giving tips for *Dragonlord*. This program, which is perhaps the most successful attempt at an arcade adventure yet, has just appeared on the Amstrad which will please a lot of people. If you haven't had a chance to buy a copy yet I suggest you keep this week's column in a safe (but don't peek at the answers too soon).

Peter Martin writes all the way from Cyprus. "The information you gave for this wonderful game was great and helped me to progress as far as Morag's fortress, although I haven't found any crowns yet. Here are my tips. Run the leyrod on the stones of the Dragon's teeth and then go to the green leycube which takes you to the dream downs. Here you can take the squirrel and put it over the leaves to get a torch and uncover a stone slab. Light the torch with the fire, exchange the bow beside it with an elf for a nut which can be opened by the squirrel. Take the key which is revealed with you to the ruins of Cantii.

"Open the chest and use the symbol to move a slab to reveal the demon spell. I have not found a use for this. [Think on the message 'Set a thief...'] Peter, this spell is invaluable in Hellsmouth, but could backfire if used elsewhere.] Go to the forest and move the symbol over the slab which can take you to the ruins of Cantii. You need the torch to burn the snakes here. In the dark room you will see a faint figure of the symbol you have and if you put one on the other a ley cube appears."

Thanks for those, Pete, although I suspect you have many hours of enjoyment still in front of you.

Pete continues with some questions. "How do you kill the demons?" With the ex-

ception of Hellsmouth you must use the *Missile* spell and *Mantle* to protect yourself. "How do you kill werewolves?" The Werewolves slow you down and deduct energy if they bite. Use *Heal* to move at normal speed. They can be killed with a warrior spell but this makes them very angry and it's best not to do so.

"How do you find Merlyn's cave in Webwood?" You need to use the M symbol to move the flagstones. "Where is the frog in Witchwood?" In the pool of course - you may have trouble finding this if you are blinded by the imps; use *Warrior* to destroy them, use *Heal* and move or *Light* to see again.

Marcus Marr and John Gray of Aberdeen have some more prosaic tips. "Try completing as much as possible of the Citadel of Morag because after that everything is easy.

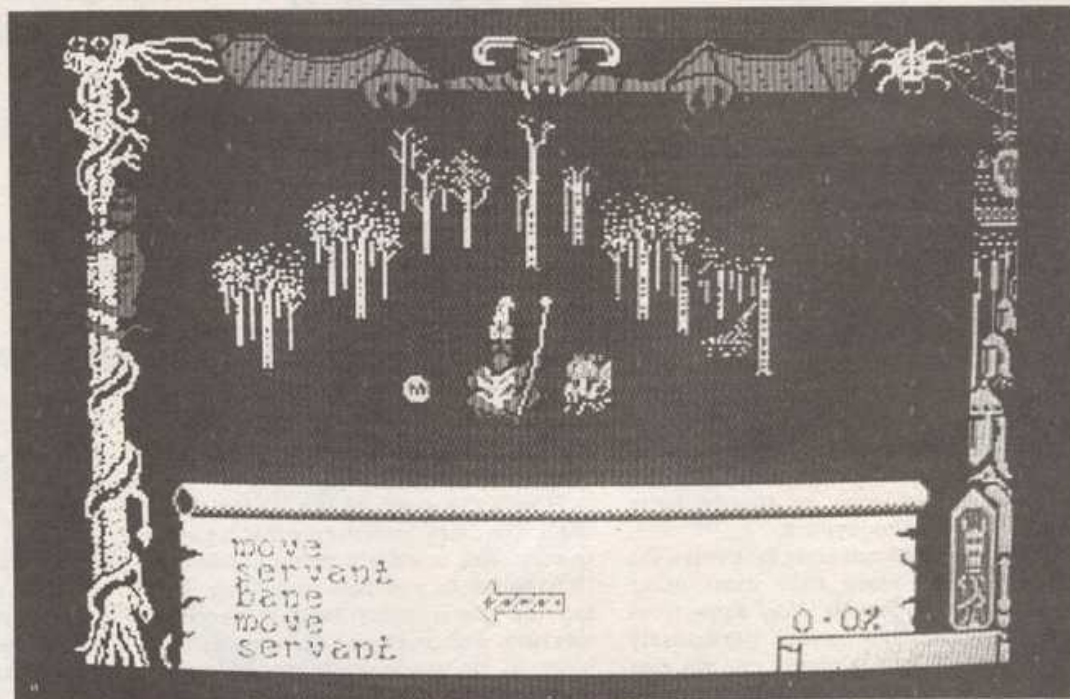
clue is "Wyrmbane does not need batteries".

They want help on these points. "So far we have got 66.3% and two crowns and now we are stuck! What use is the *Undo* spell?" It removes curses, eg, in the vault of Locris after you have the Sunkey. "Where and how do you get the Sunkey and the Cursed Key?" Both of these keys are in Sanctuary. The Sunkey is held by a Goblin, another Goblin has a green key that opens three green chests. If you can solve the mysteries of Sanctuary enough to locate (hint) the hidden chest in an empty room you will find the Cursed Key.

"How do we get the sword?" You have to use the wand that you construct in Witchwood, and I'm sure you have that since you need it to get the full moon. "What do we do with the full moon?"

brief it is very useful once you have destroyed four crowns on the anvil. I hope that helps, and thanks again to Hewson for the answers.

Anyway, there's just room to begin our complete solution to a game of a rather similar vein on the Beeb - *Castle Quest* - with many thanks to Dave Noble for the help. Unfortunately it's a little confusing without the game in front of you but here goes. "From start go up ladder, left and up to Green guards. Jump across gap, collect torch from top platform avoiding guard and back down to lower lever. Trap monkeys in dead end to left of the ladder using the torch to push them back. Make way quickly to the other torch and throw old one down to the bottom. The monkeys go down this ladder. Turn back up the ladder where you are standing with the torch. The monkeys now



Dragonlord from Hewson Consultants

One useful tactic is to lead creatures into dead ends or places you never go to. Let yourself die there as long as you aren't carrying objects you must keep. To kill creatures go into the adjacent room and get missile/warrior ready and wait for them. Elves can walk over anything that can be killed by a missile, but snakes and winged demons and skeletons can kill them. Try to avoid this as they are very useful (invaluable in the Citadel). A final cryptic

You get to Sanctuary with it! Once you have the full moon first deactivate the magic sword and take that. Cut sapling to make a magic broom. Sweep leaves and you find a hedgehog (avoid it) a stone and a message - you should be able to figure it out from here but before you go make sure you find the light spell.

"What do you do with the Crystal of Antithought?" There are a couple of helpful messages that refer to this 'Stone' in the game, but in

go along the bottom to the left.

"Stand at the top of the next ladder with the torch and they should continue left to the spider. Follow them closely past the first spider and pick up the sword. Chase them back past the same spider and drop the torch. Return to green guard area and collect the ruby, killing the guards in the way. Store both the ruby and the sword." More next week.

Tony Kendle

Tony Bridge's Adventure Corner



Heavy-metal hero

Ask any keen adventurer for a list of things that s/he reckons to be essential to a good adventure, and you'll find "atmosphere" – a sense of "being there" – comes close to the top.

Text adventures retain a very loyal following because a well-written scenario and detailed descriptions will lay a solid foundation for the player's own imagination.

Often graphic adventures, too, can convey atmosphere well. The rather abstract pictures in Level 9's more recent games are good examples of unobtrusive graphics supporting rather than replacing the text.

The other route, of course, that adventure writers can take is to make the pictures an integral part of the adventure. The *Doomdark* series, for example, or Alan Davis' *Runestone* are among the better examples. In these adventures, the player must interpret information gleaned for the on-screen picture and piece the situation together with the help of maps. Replacing text entirely is the other side of the coin, in games like *The Fourth Protocol* and the *Shadowfire* series. This can be done, as in these cases, with the use of icons, or simply, as in arcade games, the joystick.

One series that manages to involve the player rather more than most other games, is the *Tir Na Nog* saga from Gargoyle. The games are particularly popular because the player can wander around a landscape of fantasy – the open country in *Tir Na Nog*, and a town in *Dun Durach*. The authors have created very attractive graphics and the heavy-metal

hero, Cuchulainn, is surely the 'baadest' character ever seen!

I want to concentrate on *Dun Durach* over the next couple of weeks, but a few hints on *Tir Na Nog* won't go far amiss for those players still working through it. These are from John Wilson, who has been a fount of much welcome advice over the past couple of months or so.

To get the second part of the Torc, go West from the tall Tablet in Lon Liath, then North, East, North and East again (7 paces) then dig. The complete Torc will render you invisible, so is useful for getting past Nathir – but be careful, as power reverses the effect. To reveal a hidden door, carry the Crystal, and to pass Cave Wights, carry a gem of the same colour as the cave.

There are so many facets of this game to cover them all, but to complete the game the player must collect Nuada's Sword, The Stone of Fal, Lugh's Spear, Dagda's Cauldron and Calum's Hammer – and then what? Simply drop them at the base of the Altar.

Now to *Dun Durach*. The game has much of the same feel as the earlier part of the trilogy, but now takes place in the town of Durach. The player can explore

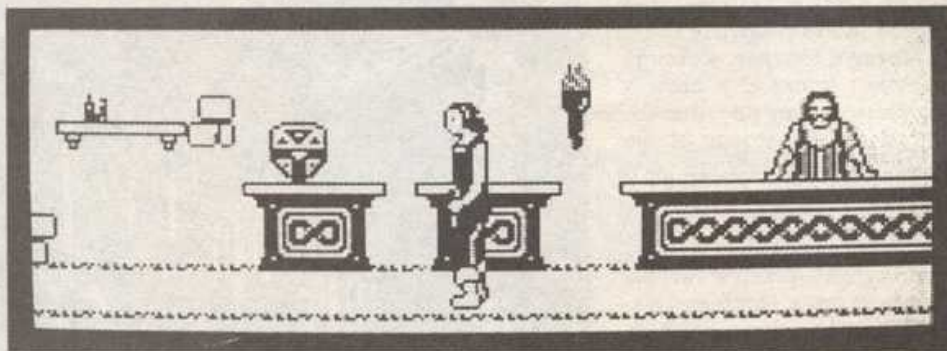
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P Kenton writes from 21 Mayfield Road, Liverpool L19 9QA with plenty of tips, as did Harry Wright (10 Masonfield, Bamber Bridge, Preston PR8 8HN), Dave Simpson (Fire Section, RAF Wildenrath, BFPO 42) and Mr A J Carless (4 Avondale Avenue, Worcester Park, Surrey KT4 7PD).

The rest of this week's Corner and next week's are an amalgam of all the advice that they've given.

The first thing in the process of exploring the town is to find four galleries – two are situated at Herne Hill (you can find the numbers yourself), another at Stone Road and the last at Marah Street. Gargoyle Games' play on words form a major part of both games, and bearing in mind GG's sense of humour, the cryptic symbols on the doors must be translated in order to find out what objects to deposit behind the door. Once the correct decision is made, you will receive a gift of jewellery. Giving each of these gifts to Pita results in her giving you a message.

You'll find pictures in every house. If you note the house numbers along with the picture therein, and then put them in



Dun Durach from Gargoyle Games

the game area in much the same way, but now other characters share the landscape with the hero.

What's the point of the whole thing? Well, Ron Smith informs me that his quest to solve this excellent game has ended: "I have found and released Loeg. During the game many riddles need answering, doors require unlocking, deals have to be made and lots of money gambled."

This seems to put it in a nutshell – Ron goes on to offer help in *Dun Durach* as well as *Tir Na Nog*. His address is 11

numerical order, you'll end up with another cryptic message, and this is where a Periodic Table might come in handy.

Having visited all the galleries, you must buy a moleskin from the skinner and then give it to Bren, who gives you a map in return. Go to 21 Cinder Bank where you will find pyrites (Fool's Gold!). Buy the platinum and give this to Bren for another map. If you now give this to Ryde, you'll receive a shield. Take this to Hail Belinus to find another clue (the number of a hidden door in Cross Street).

Another object to buy (or steal!) is the statue of the rat. If you now go to Claw Lane (follow the rats and they'll lead you to a hidden door) you will come across Teth. Give him the statue and he will give you a key – this will get you into gaol. Before doing this, however, you should buy some philtres and give one each to Kara, Kel and Kahn in return for a script from each. Once in the gaol, you will need the information gained from these scripts.

Next Week: more information and a map of Durach's environs.

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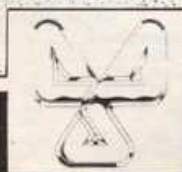
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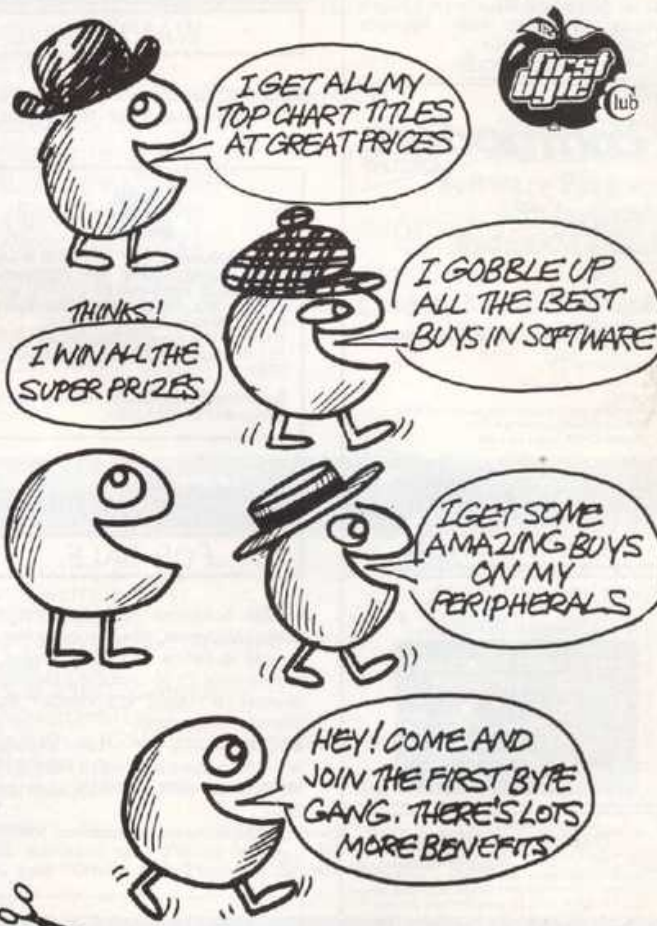
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Charts

Amstrad

1	(1)	Way of the Exploding Fist (Melbourne House)	£9.95
2	(4)	Finders Keepers (Mastertronic)	£1.95
3	(7)	Chiller (Mastertronic)	£1.99
4	(2)	Frank Bruno's Boxing (Elite)	£8.95
5	(3)	Nonterraqueous (Mastertronic)	£1.99
6	(8)	Scrabble (Leisure Genius)	£9.95
7	(6)	Beach-head (Access/US Gold)	£9.95
8	(9)	Red Arrows (Database)	£8.95
9	(10)	Locomotion (Mastertronic)	£1.99
10	(-)	Air Wolf (Elite)	£8.95

Atari

1	(1)	Chop Suey (English Software)	£9.95
2	(6)	Mig Alley Ace (Microprose/Trans-Atlantic Simulations)	£9.95
3	(-)	Red Moon (Level 9)	£9.95
4	(2)	Ghost Chaser (US Gold)	£9.95
5	(5)	Boulder Dash (First Star/Mirrorsoft)	£9.95
6	(-)	Atari Smash Hits (English Software)	£9.95
7	(-)	F15 Strike Eagle (Microprose/US Gold)	£9.95
8	(-)	Pacman (Konami/US Gold)	£9.95
9	(3)	Bounty Bob Strikes Back (Datsoft/US Gold)	£9.95
10	(-)	Pinball Construction Set (Electronic Arts/Ariolasoft)	£14.95

BBC

1	(1)	Match Day (Ocean)	£9.95
2	(2)	Beach-head (Access/US Gold)	£9.95
3	(3)	Combat Lynx (Durell)	£8.95
4	(8)	Alien 8 (Ultimate)	£9.95
5	(6)	Knight Lore (Ultimate)	£9.95
6	(4)	Revs (Acornsoft)	£14.95
7	(-)	Repton (Superior)	£8.75
8	(7)	Mini Office (Database)	£8.95
9	(-)	Wizardore (Imagine)	£9.95
10	(-)	Elite (Acornsoft)	£14.95

Commodore 64

1	(2)	Summer Games II (Epyx/US Gold)	£9.95
2	(1)	Sky Fox (Electronic Arts/Ariolasoft)	£9.95
3	(6)	Now Games (Virgin)	£8.95
4	(4)	Beach Head II (Access/US Gold)	£9.95
5	(3)	Way of the Exploding Fist (Melbourne House)	£9.95
6	(7)	Barry McGuigan's World Championship Boxing (Activision)	£9.95
7	(-)	Kik Start (Mastertronic)	£1.99
8	(-)	Hypersports (Imagine)	£9.95
9	(5)	Karateka (Broderbund/Ariolasoft)	£9.95
10	(-)	Blackwyche (Ultimate)	£8.95

Spectrum

1	(-)	Daley Thompson's Super Test (Ocean)	£9.95
2	(1)	Way Of The Exploding Fist (Melbourne House)	£9.95
3	(4)	Now Games (Virgin)	£8.95
4	(2)	Nightshade (Ultimate)	£9.95
5	(3)	Frank Bruno's Boxing (Elite)	£8.95
6	(5)	Hypersports (Imagine)	£9.95
7	(6)	Highway Encounter (Vortex)	£7.95
8	(-)	Fairlight (The Edge)	£9.95
9	(7)	Frankie goes to Hollywood (Ocean)	£9.95
10	(8)	Southern Belle (Hewson Consultants)	£8.95

All figures compiled by Gallup/LeisureScope

Top Twenty

1	(1)	Way of the Exploding Fist (Spectrum/64/Amstrad/Melbourne House)	Ocean
2	(-)	Daley Thompson's Supertest (Spectrum)	Virgin
3	(4)	Now Games (Spectrum/C64)	Epyx/US Gold
4	(3)	Summer Games II (C64)	Imagine
5	(6)	Hypersports (Spectrum/64)	Ariolasoft
6	(2)	Sky Fox (C64)	Elite
7	(8)	Frank Bruno's Boxing (Spectrum/Amstrad)	Mastertronic
8	(10)	Finders Keepers (Spectrum/64/Amstrad/MSX)	Ultimate
9	(5)	Nightshade (Spectrum)	Access/US Gold
10	(11)	Beach-head II (C64)	Ocean
11	(7)	Frankie Goes to Hollywood (Spectrum/C64)	Mastertronic
12	(-)	Chiller (Spectrum/C64/Amstrad)	Mastertronic
13	(15)	BMX Racers (Spectrum/C64/C16)	Software Projects
14	(-)	Jet Set Willy II (Spectrum/C64)	Mastertronic
15	(9)	Action Biker (Spectrum/C64)	Sydney/US Gold
16	(18)	Dambusters (Spectrum/C64)	Level 9
17	(20)	Red Moon (Spectrum/C64/BBC/Electron/Amstrad)	Access/US Gold
18	(13)	Beach-head (Spectrum/C64/BBC/Amstrad/Atari)	Various Artists
19	(-)	Soft Aid (Spectrum/C64)	Firebird
20	(-)	Cylu (Spectrum/C64)	

Figures compiled by Gallup/LeisureScope

Readers' Chart No 43

1	(1)	Way of the Exploding Fist (Spectrum/C64/Amstrad/Melbourne House)	Imagine
2	(2)	Hypersports (Spectrum/C64)	Firebird/Acornsoft
3	(3)	Elite (C64/BBC/Electron)	Ocean
4	(7)	Frankie Goes To Hollywood (Spectrum/64)	Epyx/US Gold
5	(6)	Summer Games II (C64)	Elite
6	(4)	Frank Bruno's Boxing (Spectrum)	Beyond
7	(5)	Shadowfire (Spectrum/64)	Level 9
8	(10)	Red Moon (Spectrum/C64/BBC/Electron/Amstrad)	Ultimate
9	(-)	Nightshade (Spectrum)	Various Artists
10	(-)	Soft Aid (Spectrum/C64)	

Winning phrase No 43: "Fiddler on the roof scared pussy away!" from P Walker of Whitehaven, Cumbria, who receives £25. Runners up: "Tories laugh at Dr Owen's SDP hype" from Philip Bastable, Sevenoaks, Kent, and "Owen hits Thatcher for six any day" from M Valentine of Shrewsbury.

Now voting on week 45 - £25 to win

Each week *Popular* is compiling its own special software top ten chart - compiled by YOU.

And each week we will send £25 to the person who sends in, with their chart votes, the most original (witty, neat or clever - but never rude) phrase or sentence made up from the letters (you don't have to use them all) in the titles of the top three programs in this week's Readers' Chart, published above.

You can still vote in the chart without making up a slogan - but you won't be in with a chance of winning the prize.

All you have to do is fill in the form below (or copy it out if you don't want to damage your magazine) and send it off to: Top 10, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP.

Voting for Week 45 closes at 2pm on Wednesday October 2 1985. Entries received after that time will not be eligible for inclusion in that week's voting. The judges decision is final. Only one entry per individual per week will be allowed.

Name	My top 3: Voting Week 45
Address	1.....
.....	2.....
.....	3.....
My phrase is:	

New Releases

ALTER-EGO

The latest release from Quicksilver is called *Schizofrenia* a game which consists of you and your alter-ego battling it out over several screens to reach eventual psychic reconstitution. Someone is almost certainly going to be offended by this and I wouldn't blame them.

Anyway to the game. It features reasonable graphics, the two 'yous' looking like a cross between Basil Fawlty and Frank Zappa; the mad leg movements make me more confident that the former was the intention. The joystick performs a variety of different controls beyond the usual directions, which change according to what screen you are on. The first screen requires you to set two switches and release some door bolts. The problem is that the other you resets switches and pushes back the door bolts as he comes past.

I found it utterly infuriating and, perhaps because of our naff Popular joysticks, impossible to control the man with

any degree of dexterity. Those who venture further will find four other screens which require things to be switched on and off, codes to be found and the like.

Program *Schizofrenia*
Price £7.95
Micro Commodore 64
Supplier Quicksilver Ltd
222 Regent St
London W1R 7DB

BUNDLED

I have a feeling that this Christmas's thing is going to be the bundled collection - old games all together on one tape at a reduced price. There's no arguing that it represents good value for the customer (assuming the collection consists of what were reasonably successful programs) but it's hard to get very excited about it.

English Software has put together four of its best Commodore 64 titles on one tape at £6.95. The programs are *Henry's House*, *Jet Boot Jack*, *Stranded* and *Neptune's Daughters*.

Henry's House is a fairly entertaining Minerish platform and ladders game with some wacky touches - collect lots of things, dodge lots of other things. *Jet Boot Jack* is sort of similar, but involves platforms and ladders over several levels and has more strategy to it.

Stranded is a graphics adventure of some merit and *Neptune's Daughters* is a destroy various things at various times, get to later levels and if you're lucky rescue two naked women in the bottom of the sea. The usual stuff.

Not a duff game here, al-



though none of them will make you go gaga with delight. The price is incredibly reasonable - you get four games cheap and English Software get to make some more money out of otherwise dead games. Seems fine to me.

Program *Henry's House Vol 1*
Price £6.95
Micro Commodore 64
Supplier The English Software Co
1 North Parade
Parsonage Gardens
Manchester
M60 1BX

YOUR MOVE

One of the few programs that in any way vindicated the QL as 'a powerful machine' was Psion's *QL Chess*.

Now even that virtue has been shattered by the fact that *Cyrus II 3D Chess* which runs on the Amstrad CPC464 looks just as good and, at least at the lower levels appears to play

Pick of the week

VERY

Fairlight may be one of the most sophisticated games the Spectrum has ever seen.

It uses some of the ideas and screen layout of *Knight Lore* and *Alien 8* and gives them greater flexibility and detail. The notion that 'you can do whatever you want' with objects is extended beyond the Ultimate idea of moving objects around putting them on top of one another to reach other objects and so on. In *Fairlight* there are many different kinds of objects and they may be used in many different kinds of ways.

The central figure is a little moustachioed knight, neatly animated, he can move around, jump, bend down to pick up things and wield a nifty blade when required to fight, which is pretty often. The settings are the chambers, ledges, turrets and battlements of an expensive castle. Here and there guards march back and forth, you can kill them and they disappear leaving only their helmets behind.

However, the guard's death is temporary - they reappear again where their helmets lie. This could be tricky but, if you pick up the helmet you can then drop it where it can't do any harm -

just as well.

Cyrus II Chess forms part of Amsoft's new Amsoft Gold range and retails for £9.95 on cassette. The main feature of the game apart from, obviously, its ability to play a very



This Week

Program	Type	Micro	Price	Supplier	Program	Type	Micro	Price	Supplier
Magic	Ed	Amstrad	£8.95	Macmillan	Super Scramble	Arc	Commodore 64	£1.99	Martham Micros
Screenplay	Ed	Amstrad	£8.95	Macmillan	Topper the Copper	Arc	Commodore 64	£8.95	English
World Cup Soccer	Ed	Amstrad	£8.95	Macmillan	Orm and Cheep	Ed	Commodore 64	£8.95	Macmillan
Southern Belle	S	Amstrad	£7.95	Hewson	Micro Prolog	Ut	Commodore 64	£79.93	Logic Program
Spot the Ball	Arc	Atari	£9.95	Creative Sparks	Astro Clone	Arc	Spectrum	£7.95	Hewson
Monitor	Ut	BBC	£39.95	BBC Soft	Sparklers Special	Arc	Spectrum	£7.50	Creative Sparks
Payslip	Ut	BBC	£2.00	Computer Soft	Magic	Ed	Spectrum	£8.95	Macmillan
Terrormolinos	Ad	Commodore 64	£7.95	Melbourne House	Orm and Cheep	Ed	Spectrum	£6.95	Macmillan
Blackwyche	Arc	Commodore 64	£9.95	Ultimate	Screenplay	Ed	Spectrum	£8.95	Macmillan
Mega Compilation	Arc	Commodore 64	£7.95	Interceptor	World Cup Soccer	Ed	Spectrum	£8.95	Macmillan
Sparklers Special	Arc	Commodore 64	£7.50	Creative Sparks	Class List	Ut	Spectrum	£3.00	Computer Soft
					Cos Sin Tan	Ut	Spectrum	£3.00	Computer Soft
					Fuel Consumption	Ut	Spectrum	£2.00	Computer Soft

SOPHISTICATED



like the courtyard from which there is no escape. All part of the 'do anything you like' style of the game and it goes beyond what the Ultimate games allow.

Presumably for the usual reasons of colour attribute clash and memory saving, the screens are mostly two-colour only, black main characters with different coloured backgrounds.

As I've said before, I find that not only does this not matter in some ways I prefer it - it has a style of its own. I'm slightly less sure about some of the graphic design in the game, mostly it's good but occasionally screens

look a bit less slick - they lack the graphic neatness of the Ultimate settings.

That's by way of niggles though. Probably The Edge will be irked by comparisons with Ultimate all the time but given the look of the game and its technical sophistication that's rather inevitable.

I think The Edge has actually trounced Ultimate with *Fairlight* though. There is more game, more subtlety and a greater sense of it being all up to you.

And in many ways it is a more worthy successor to *Alien 8* than Ultimate's own *Nightshade*.

Two final points, *Fairlight* also features what appears to be three-channel sound on the Spectrum - it had us Spectrum sound loathers of old, open mouthed with disbelief. Secondly, *Fairlight* is still one of the ten best programs ever made for the Spectrum - put it on your Christmas list now (if you can wait that long).

Program *Fairlight*
Price £9.95
Micro Spectrum
Supplier The Edge
31 Maiden Lane
London
WC2 8LH

good game of chess, is the screen display. This presents the chess board in edge-on rather than the usual aerial view, just like *QL Chess*. Consequently, pieces appear to move around and between

one another rather than jumping from square to square. It's a beautiful effect, each of the pieces being fully shaped in the classic chess-piece way rather simply being a symbolic crown or whatever.

My only niggle is that, because of the restrictions of the high resolution screen, there isn't much colour distinction between the various visual elements, one side is blue the other white, squares are two different shades of blue and your side is white. It can get a little confusing especially when your piece is between two opposing pieces.

There are a vast number of special options available in the game: many skill levels defined by time taken to think, set up positions (to solve chess puzzles), take back moves, and even a 'normal' display of the board from above if you want.

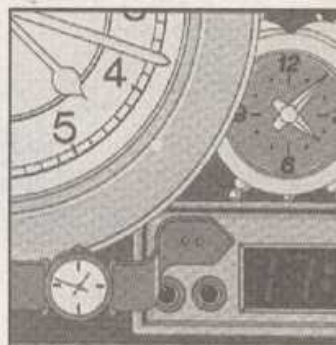
Really a splendid program and certainly the best chess program on the Amstrad. By comparison with other chess programs it's even cheap.



Program *Cyrus II Chess*
Price £9.95
Micro Amstrad
Supplier Amsoft
Brentwood House
169 Kings Road
Brentwood
Essex

DIGITAL

It's educational computing time again - supposedly the reason why, according to the



adverts, you had to buy a computer for your children in the first place. I know there are a few good packages out there, but it's the pointless ones that proliferate.

Take *Tell the Time* from Duckworth Educational Computing, for example. Who is it aimed at? Do you really need a computer to teach young children to tell the time?

Let's not be too unfair to Duckworth, though. The various programs cover analogue and digital displays, plus the 24 hour clock using methods - "designed by Psychologists". And for once, the packages go for a half-way reasonable price. But if a program can't make significant advances over a well designed book, one feels compelled to ask fundamental questions about the point of it.

Program *Tell the Time*
Price £5.95
Micro BBC B/Amstrad
Supplier Duckworth
The Old Piano
Factory
43 Gloucester Cres
London NW1

Russian	UI	Spectrum	£1.00	Computer Soft
School Funds	UI	Spectrum	£3.00	Computer Soft
YHA Costs	UI	Spectrum	£3.00	Computer Soft
Mountain Planner	UI	Spectrum	£3.00	Computer Soft

Key: Ad - adventure S - strategy-simulation

Arc - arcade UI - Utility

Ed - education

This Week

BBC Soft, 35 Marylebone High Street, London W1M 4AA, 01-580 5577. **Computer Soft**, P Nethercot, 2 Chantry Close, Sunderland, SR3 2SL. **Creative Sparks**, Thompson House, 296 Farnborough Rd, Farnborough, Hants, 0252 543333. **English**, Box 43 Manchester M60 3AD. 061-835 1358. **Hewson**, 7 Grahame Close, Blewbury, Oxon, OX11 9QE. 0235-832939. **Interceptor**, Interceptor Micro's, Lindon House, The Green, Tadley, Hampshire, 07356 71145. **Macmillan**, Macmillan Information Systems, 4 Little Essex Street, London WC2R 3LF, 01-836 6633. **Martham Micros**, 15 Elmcroft Road, Yardley, Birmingham, B26 1PJ, 021-783 8065. **Melbourne House**, 39 Milton Trading Estate, Abingdon, Oxon OX14 4TD, 0235 835001. **Ultimate**, Ultimate Play the Game, Ashby de la Zouch, Leicester, LE6 5JV, 0530 411485.



Horse power

It is strange, but something makes us want some kind of easy evaluation of a machine's power.

Whatever sort of machine – cars are measured in performance terms by their 0-60 mph acceleration times (if sports models) or in miles per gallon (for economy versions). Washing machines by their spin speed.

For micros we have evolved a similar system – every bit a misleading as those for cars and spin driers. Micros are often classified by processor and by Ram size.

Sinclair always reckoned that one of its mistakes was to call the Spectrum a 48K machine. Numbers matter, yet sometimes even by processor speed or instruction handling speed (x million instructions per second) the Spectrum actually has more useable memory than the Commodore's 64. Those who remember the Lynx 48K will recall that it only offered around 13K of programming space.

These days the distinctions are becoming even more blurred. Atari's 260ST, when it is finished, will have over 100K of Rom software built-in. The system software doesn't reside in Ram, making the classification by memory size even more misleading.

Equally, classifying machines by which microprocessor chip they use at their heart, whilst being quite a good guide, can be pretty unhelpful. Obviously,

whether it is 8-or 16-bit gives a good indication of power, but beyond that things can get confused. The reason why the Amiga is such a powerful machine is not just due to its 68000 processor. The machine's strength derives from the support chips surrounding the processor. In the Amiga's case three complex custom chips take complete control of the machine's graphics, sound and memory handling. The incredibly fast line drawing and area filling has nothing whatever to do with the 68000. And, the 256K Ram capacity gives a completely false impression of the machine's power – compared say with the 512K Atari ST.

Both the Amstrad and Spectrum are Z80 processor based, yet the Amstrad has considerably better sound than the Spectrum. For that matter, the QL is a machine which uses the fast 68008 processor and which has some software available for it (from Sinclair even) which would look perfectly at home on a ZX81.

Quite why there is this need to develop a simple-to-use ranking system isn't clear. But the desire for a conclusive answer to 'Which machine is best' is ever present. Micro owners often indulge in conversations about why one micro is better than all the others. It's the basic competitive nature of human beings. Two cars are always better than one, even if you can't drive them both at once.

It is an odd perverse human trait, and one which runs the whole gamut of mankind's endeavours.

Every micro has its particular strengths and weaknesses. And you end up buying the one for you, governed by price, performance, what you want it for – graphics, music, word processing – and how much you are really going to use it.

To choose a micro on the basis of its processor and Ram capacity is highly unsatisfactory, though.

Unfortunately, there isn't any obvious alternative indication of power.

There is no sensible 0-60 equivalent for micros.

David Kelly

Face down

Puzzle No 176

I have a gross of cards numbered one to 144. These cards have been dealt, in order, in a circle face upwards on the floor. I then choose any card and turn it face down. Suppose this card was 54. Having turned this card face downwards I count round clockwise this value. This would bring me to card 108. I turn this face down and count round again, only this time counting 108. This would bring me round to card 72. Repeating this procedure, I continue for as long as possible until I reach a card which has already been turned face down. In the case above the sequence would run 54, 108, 72, and 144. The final card turned (144) would end the sequence as a count of 144 would bring me round to the same card.

Therefore, a start value of 54 would result in a score of four points as there would be four face down cards at the end. Note that in counting, the face-down cards are counted in passing over.

Starting again, with all cards face up I choose my age, in years, as the starting point. I find that my score is exactly the same as it would have been had I had started at the next card (my age plus one). How many points did I score?

Solution to Puzzle No 171

The field measured 693 by 1924 yards. The diagonal will therefore be 2045 yards in length.

```
10 AREA=1333332
20 FOR A=1 TO 1154
30 LET B=AREA/A
40 IF B<>INT(B) THEN GOTO 80
50 LET H=SQR(A*A+B*B):LET H=VAL(STR$(H))
60 IF H<>INT(H) THEN GOTO 80
70 PRINT A:B:H
80 NEXT A
```

It is necessary to find two integers having a product of 1333332, and which, if they were the legs of a right-angled triangle, would produce an hypotenuse that is also integral.

Winner of Puzzle No 171

The winner is Ewen McRobbie of Inverness, Scotland, who receives £10.

Rules

The closing date for Puzzle No 176 is October 23.

The Hackers



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GYRON · Spectrum 48K
"A serious contender for the
Game of the Year award"
Personal Computer World, Mar. 1985

"Hyperbrill!"
Crash 'Smash', 93% rating, Mar. 1985

ELITE · Commodore 64
"The game of a lifetime"
Zzap! 64, Gold Medal Award, May 1985

BUGGY BLAST · Spectrum 48K
"This is what I call fun... an
addictive and very playable
game"
Crash 'Smash', 91% rating, Feb. 1985

DEMONS OF TOPAZ ·
Commodore 64
"Its addictiveness grows from
strength to strength"
Commodore Computing Int.
Game of the Month, May 1985

£5.95



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colourfull and gripping
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