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Computing WEEKLY

23 May – 30 May 1985

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Vol 4 No 21

Atari offers 520 ST in three versions

ATARI has now confirmed its pricing plans for the 520ST.

Initially the machine will be sold in a bundled package, comprising the 520ST cpu, 1 M disc drive and a high-resolution monochrome monitor, which will retail for £899.90.

The company has also now affirmed that the 512K 520ST model is the only ST machine the company will be market-

ing (see *Popular Computing Weekly*, May 16). Two other ST models announced earlier this year by Atari – the 256K 260ST and the 128K 130ST will not now be manufactured.

However, Atari is eventually planning to sell the 520ST in three different packages. The first batch of final production machines, at £899.90, will probably now reach the

shops in September. Shortly afterward, Atari intends to offer a second package comprising the 520ST with the 1 M disc drive, but no monitor, for £699. While the first version did not contain a modulator,

this second version will have one built in, and can thus be used with an ordinary domestic television.

The third package will probably not appear this
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PREVIEW

INSIDE ATARI'S NEW 520 ST



Japanese turn to compact discs

SEVERAL of the major Japanese electronics companies, including Sony, are developing versions of their compact audio disc players for use as microcomputer data storage devices.

The eventual intention is to develop a single compact disc player that will handle both audio and compact discs.

As a floppy-disc alternative the compact disc offers a number of advantages – it is less prone to damage, more reliable and cannot be easily copied.

Its most important advantage, though, is the much increased capacity – up to 0.5 gigabyte (500M).

"Sony has been researching into the use of the compact disc for a long time," said Mike Margolis, Sony UK's MSX product develop-

ment manager. "Virtually since CD first appeared, we have been looking into the possibilities of digital data storage on it. It has advantages of reliability, and room – you can get half a gigabyte on each disc. We have made prototypes of CDs as data
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**Acornsoft's
REVS
see page 45**

INSIDE ► NEW ENTERPRISE 128K MICRO – PRICE DETAILS ON P4



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View

News that the Japanese electronics giants are developing compact disc players as a means of mass computer software storage is intriguing.

At present floppy disc drives can maybe store 1 megabyte of information. A typical hard disc unit may store 10M. Now here is a system capable of quickly and reliably storing and retrieving around 500M, on a disc costing about £10.

Admittedly it will be several years before such a system will be available. Also, the first generation of CD computer software players will not be able to run audio discs; you will need to buy a special CD player.

Yet, in the slightly longer term CD storage will revolutionise computing. The ultimate goal of the Japanese manufacturers to incorporate the micro as part of a complete home entertainment centre comes a step closer. With CD software the micro becomes part of a racked system incorporating a hi-fi, video, television and radio. Just as you might play a disc of Springsteen, so you could slot in and play a computer game, several megabytes in size, looking more like an interactive film than *Space Invaders*.

In such a system the concept of 'computing' disappears. Writing a program of comparable quality with commercially produced efforts becomes as difficult as it now would be to make a video film.

Already most home users are now disappointed at their own attempts when compared with those of the 'professionals'.

Soon there will be no need to know what goes on under the bonnet of your computer. There will be no need to learn Basic or machine-code — in order to drive it.

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Computer Trade Association Magazine of the Year

Enterprise 128 vies with QL

ENTERPRISE launched its 128K machine this week, at a price of £249.95. At the same time, the price of the 64K model will fall to £179.95. Lim-

its going to be a 128K Christmas," said Enterprise commercial director, Mike Shirley. "It significantly outperforms machines such as



ited quantities of the upwardly compatible 128K model should now be in the shops, while it is not expected to be available in volume until mid-June.

"I don't believe there is anything else around to challenge us on quality and price

the BBC B Plus and the QL at almost half the price."

Based on the Z80 chip - the same as the Enterprise 64K - the 128K capacity is achieved by switching in different 16K blocks of Ram. Using the same mechanism, Ram can be expanded up to 3.9M.

Compact discs

◀ continued from page 1

storage systems, but anything finished is a very long way off."

Mitsubishi's product manager Steve Wankling confirmed that compact discs presented an attractive means of data storage. "It would be very feasible," he said. "Access time would be particularly quick. Before one could be manufactured for MSX, though, obviously we would have to come to an agreement with Ascii Microsoft as to a standard for all the group."

It seems that the first such CD data storage devices will not be capable of also playing audio discs. An interface would need to be developed that could extract data digitally from the disc. Sony's research regarding software at present has concentrated on solely digital CD players.

Nevertheless the long-term aim is to develop one system for both software and audio use.

BBC B+ meets caution in High Street

ACORN'S new BBC B+ has met with a guarded reaction from the multiple retail outlets.

Although Acorn had built up large quantities of the new machine prior to its launch, three weeks ago, it is still very difficult to buy one in the shops.

"The High Street is still making decisions over whether or not to carry the machine," said an Acorn spokesman. "After all, it is intended for the professional home market and for educational and small business use rather than as a hackers' machine."

And while Acorn expects the B+ to become available in a wide range of independent stores, the major outlets are treating it with caution.

"We are not taking the B+ at the moment," said Peter Frost of Boots. "At £499, it is not really viable for Boots' range. We are, however,

Kempston to develop QL's first mouse package

KEMPSTON is working on a series of interfaces for the QL including the first QL mouse and mouse interface, a disc interface and a sophisticated Centronics interface.

Details on the mouse are still to be finalised, but Kempston hopes to bring out both the mouse and interface in a single package, including software, for around £100 within the next two months.

The disc interface will work with any disc drive, whether 3 inch, 3½ inch or 5¼ inch.

Its software has been written by QDOS author Tony Tebby, so compatibility with the QL's operating system is assured. The interface fits inside the QL casing and costs £115.00.

The Centronics interface plugs into the Rom cartridge port, and has been designed to operate with any printer. "The on-board Rom allows screen dumps on nine different types of printer, including ink-jet and full colour, but it can be adapted to work with any others," said Ab Pandaal of Kempston.

Kempston will be showing the new interface at CES at the beginning of June.

CPC464 Roms released by Micro Power

MICRO POWER, the software company best known for its BBC programs, is bringing out a Rom card for the Amstrad 464 next month.

"The card fits into the expansion port on the machine, and can carry up to seven Roms," said Bob Simpson of Micro Power. "It also comprises an extension bus, so that peripherals which would normally use the Amstrad expansion port can slot into the back of the Rom card. It can also chain additional Rom cards."

At the moment the Rom card can only be used with the 464 model, but this is due to the card not fitting on the back of the 664, rather than a question of software compatibility. Micro Power is working on a version for the 664.

continuing to stock the BBC B with disc interface at £399, but not the model without."

Dixon's, Lasky's and WH Smith's also confirmed that they had not yet made up their minds over the B+. Dixon's and Lasky's are both currently selling a discounted model B at £349.99 (Dixon's) and £349.90 (Lasky's). Dixon's price includes a data recorder, Lasky's a data recorder and software.

Atari 520 ST - three versions

◀ continued from page 1

year, but will add a colour monitor to the second package and retail at around £900. The colour monitor will have a lower resolution than the monochrome monitor.

There are currently about 40 520ST models in this country, which are being delivered mainly to software houses.

These machines all have the firmware on disc, rather than in Rom, as is planned for the machines that will be sold in the shops.

Any further additions to Atari's ST range now look like being bigger memory versions - 1 M Ram and upwards - of the ST rather than cut-down models.

Games Workshop backs off

GAMES Workshop, which moved into the software market last autumn, is pulling out again, informed sources suggest.

Angus Ryall, Software Marketing Manager, would not comment except to say, "We would not normally be doing things at this time of year anyway - there is a possibility of releasing more stuff in the autumn."

But Workshop employees have been told that further software releases are unlikely due to distributors' overstocking at Christmas and the influx of American software - "the American stuff has cleared up the market," Angus Ryall claimed.

Attempts are



Angus Ryall

being made to sell at least one game which was planned for release to another software house. This is *Runestone*, which combines a *Lords of Midnight* style graphics adventure with a full sentence parser text adventure.

Other games and conversions are apparently being shelved indefinitely - including *QLD-Day* and the planned Judge Dredd arcade game, announced a fortnight ago.

Basic computer for Spectrum from OCS

OXFORD Computer Systems, the company which specialises in high-level languages on home computers, is bringing out a Basic compiler for the Spectrum.

Called *Blast*, it will compile all Spectrum Basic programs, line by line, leaving programs which will run independently of the compiler program. *Blast* is being released this week, on cassette at £24.95.

DK'Tronics Popeye and Hagar out soon

DK'Tronics' *Popeye* will finally be launched in about a month, after being completely rewritten.

The company is also working on an arcade title based on another cartoon character, *Hagar the Horrible*.

The original version of *Popeye*, which should have been launched at the end of last year, was shelved. "It wasn't really good enough, so we scrapped it - there just wasn't enough depth," according to Neil Rawlinson, DK'Tronic's company secretary.

"We couldn't let a licensed character of the stature of *Popeye* go out unless it was a blockbuster game," he said.

The version due for release soon is completely different from the first try. *Popeye* mark 2 is being written by Don Priestly, the programmer responsible for *Minder*.

"It's a very visual game - nothing like *Minder* at all. It departs from the standard

format because the central character is so large - *Popeye* is 11 characters high, which is about a third of the screen."

The screen is made up of three layers, which means that *Popeye* can walk in front of and behind objects on the screen, as well as bumping into them.

It is "part arcade and part adventure" Don Priestly said, and will feature Bluto and Olive Oyl.

Don is also working on an arcade game based on the *Hagar the Horrible* cartoon character, which is likely to be released in about two months.

Both games will be for the Spectrum 48K, Commodore 64, Amstrad, MSX and "probably Atari and Memotech", stated Neil Rawlinson.

No price has yet been fixed, but it is probable that both *Popeye* and *Hagar* will sell for considerably less than the £9.95 that *Minder* cost.

THE COMPLETE ARCADE ADDICT'S GUIDE

The next feature issue of *Popular Computing Weekly* is all about arcade games. As part of that issue we want to compile the biggest collections of arcade game hints, tips, tricks, infinite lives pokes, get to any level cheats, redesign sprites, secret programmers jokes you've discovered, bizarre bugs, etc, etc, about absolutely any arcade game. If you know anything about any arcade game that might be useful or interesting to other arcade addicts we want to know. Keep your information as brief as possible and fill in the form below.

ACCURACY

Please double check any Pokes/lines of Basic included in your tip. We won't have time to double check everything and a tip that doesn't work is worse than useless. Also note down if your Poke/whatever only works on some versions of the game.

REWARD

Anybody who sends in a tip (that works), even if we already have it, will be entitled to buy any of the Sunshine books listed below for a mere £2.00, saving pounds on the cover price. Just fill in your tip(s), indicate the books you want, enclosing a cheque for the appropriate total made payable to Sunshine Books. Send the lot to *Popular Computing Weekly*, Arcade Tips, 12-13 Little Newport Street, London WC2H 7PP.

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Round the bend?

Who are Acorn trying to kid? £500 for a 64K micro – they must be absolutely round the bend.

This is what the Model B should have been back in the heady days of 1981 when a Commodore 64 was £349 + VAT and Clive had just launched the Spectrum.

Now in AD1985, 64K is the norm and by the beginning of next year it will only be half enough to fully satisfy people. In all seriousness, how many B+'s do Acorn expect to sell in competition with £200 for a Commodore 64? Amstrad throws in a monitor and still costs below £400, and – ultimate highlight of Acorn's folly – a 128K Atari machine sells for £170. Think about it – the Atari has twice as much memory but you can buy three Ataris for the price of a B+. My simple northern logic tells me Atari are going to flatten Acorn in the sales stakes.

Little wonder Acorn got into financial difficulties. I can't believe they have been selling many machines at those ridiculously high prices. Olivetti may yet regret purchasing 50% of Chris and Hermann's little company.

Michael George
9 Rockhouse Close
Barton
Eccles
Manchester M30 7AJ

Mixed feelings

Icouldn't help reading James Lucy's *Ziggurat* article (May 9) with very mixed feelings.

Firstly I had to agree wholeheartedly with his observations regarding the all too frequent demise of the specialist computer outlet willing to dispense valuable technical advice. I bought my machine from a high street multiple and am greeted with blank stares from the 'assistant' whenever I have any queries.

But Mr Lucy's closing comments about Amstrad computers being aimed at "the lorry driver and his family" raised my hackles. The CPC 464 and 664 do use established and proven technology. However, the design

philosophy and implementation were a considerable advance on existing home computers. Locomotive's Basic and the operating system were given a "software of the year, 1984" award for good reasons. The information available to Amstrad users from the very start has set a standard that other manufacturers have yet to reach. The CPC 464 has been called a "hacker's delight". I have yet to hear appreciation expressed for the hardware implementation and documentation of the QL, the "cutting edge of technology" (sic). I understand that the first release of the 16-bit Atari ST range featuring Gem will have a large proportion of the operating system on disc in order that the 'true enthusiast' will have the opportunity of debugging the software so that it will eventually be implemented on Rom, unlike the Sinclair system of releasing Eprom upgrades.

I would suggest that the philosophy behind MSX and its ilk is more deserving of Mr Lucy's observations than Amstrad's approach, which has future expansion in mind. When 16- and 32-bit technology has matured to the level that now exists for 8-bit machines, manufacturers who implement the same approach as Amstrad's will enjoy the same appreciation of enthusiasts that the 464 and 664 have today.

A distinction must be made between those of us interested in programming and those interested in electronic projects. Purchasing printers, modems and disc drives as off the shelf add-ons that integrate with the system enables the enthusiast to take

advantage of proven advances in technology immediately without the need to design and implement hardware at unnecessary extra cost.

In reply to BA Pedder's letter in the same issue, there is no bug in 464 string handling as the documentation illustrates and specifies the format produced by the STR\$ function as including a leading space for representing the sign of the number. It refers to the PRINT format specifically. DEC\$ can be used in the form:

```
DEC$( (<numeric  
expression> , <format  
template> )
```

Note the two opening brackets. This rather odd syntax is a bug Amstrad freely admits to. An undocumented house-keeping bug which has been removed from the 664 operating system occurs in *Auto* mode. The line number produced in *Auto* is not entered into the line buffer until *Enter* is pressed, hence if the line is 256 characters long, the trailing characters will be truncated by the length of the line number and a space. This of course is only detected on either *RUNning* or *LISTing*. Be warned.

Rob Baxter
50 Milton Grove
Whalley Range
Manchester M16 0BP

James Lucy was only paraphrasing what Alan Sugar, Managing Director of Amstrad said himself – that Amstrad computers were aimed at "the truck driver and his wife".

A passing interest

Further to my letter published in the May 2 issue I would like to put your comments into perspective.

Your circulation figures of 56,052 indicate that, (assuming that 'several hundred' means, say, 500 people) 0.89% of your readers have a passing interest in the Sinclair C5, but only perhaps, if they are free, ie, given away as a prize.

Go on, admit it, less than 1% want one, even if you give it away. Please abandon Sir Clive's Carriage in favour of computers, for the benefit of

the other 99.11% of your readers!!!

Malcolm S Collins
7 Heath Drive
Chelmsford
Essex CM2 9HA

Farewell PiMan

Farewell to the Pi man,
Fat happy pink rye man,
With a nose like a tie man,
That kept PCWer's hi man.
So say goodbye with a tear
and a sigh
To the great back page and
the funny pink Pi.

JK Martin
120 Forest Road
London E8 3BH

A new home

Who was the PiMan, Daddy? "Where has he gone?", "Why has he left the back page?", "Has Automata gone bust?". These are just some of the hundreds of questioning letters and telephone calls we have had from around the world, since the PiMan left his customary spot, on the back page of *Popular Computing Weekly*.

The PiMan and "Chums", as Uncle Arnold would say, are, much to the surprise of others, well and still very much in business, with new titles under development.

Automata is primarily a mail order software house. This means all advertising must pay for itself!

For over two years we ran the back page cartoon strip with *Popular Computing Weekly*, as an advert. This meant we paid for the page, Gremlin to draw it and our time to write the scripts. Twelve months ago, you, the readers, started treating the back page as editorial. Mail order sales dropped so dramatically that we asked *Popular Computing Weekly* to help carry some of the costs. Alas, things have not worked out. It would seem that PiMan must look for a new home.

The PiMan will return!

Christian Penfold
Director
Automata UK Ltd
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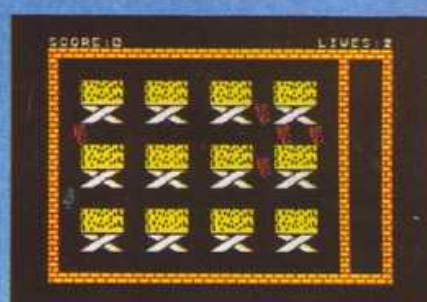
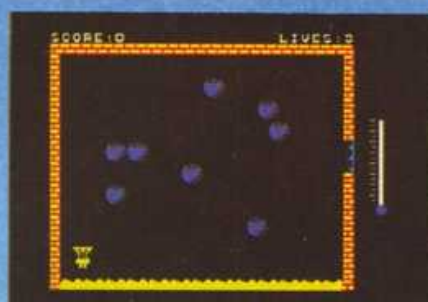


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Pick of
the week

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Legend is the only company I can think of at the moment that manages to be both famous and infamous at the same time. I would describe the credibility history of the company roughly like this: *Valhalla*, two steps forward, *The Great Space Race*, two steps back. Now we have *Komplex* and I'm pleased to say it's at least $1\frac{1}{2}$ steps forward again.

Komplex is not, in any significant way, an adventure - it looks vaguely like *3D Battlezone* but it's better than that. Call it an abstract arcade game that could last for a couple of hours in play.

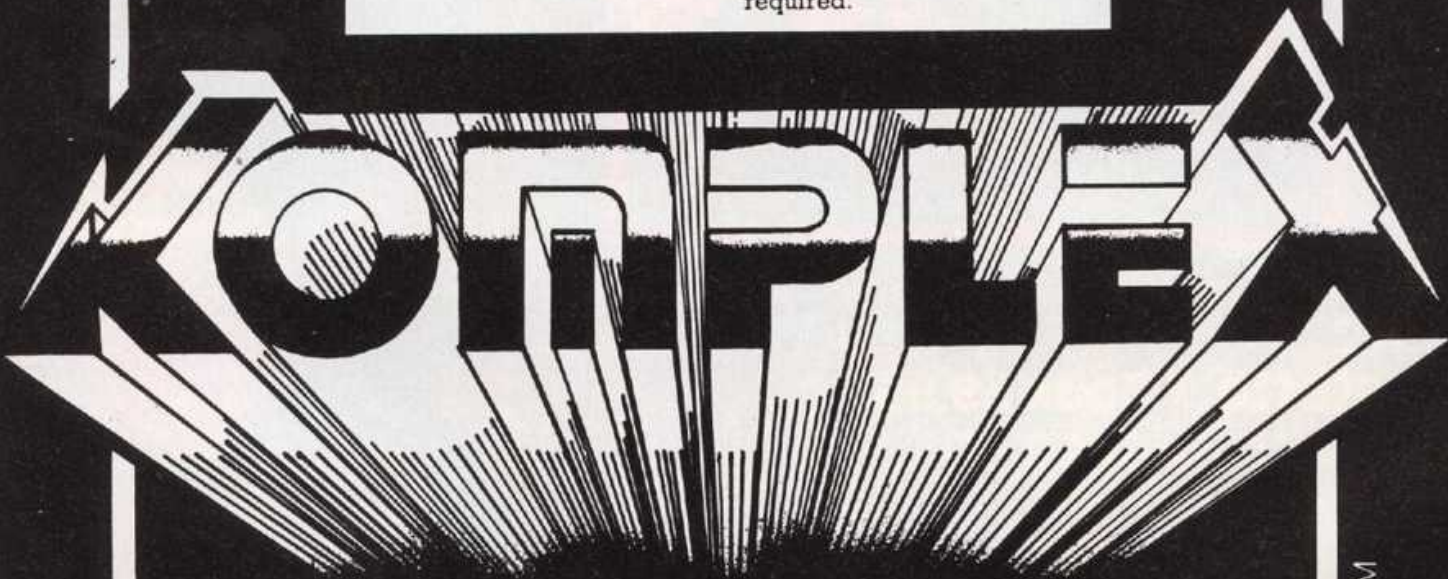
It works like this: two thirds of the screen displays a three dimensional view of the decks and levels of an alien world. In this world are scattered letters of the title K,O,M,P,L,E,X. You must locate each letter and place it in the central control computer.

Moving from level to level takes place via a tube which is protected by various devices. Other devices on each deck drain power from you.

You could say *Komplex* is a 3D collect and dodge type of game but that's to denigrate it. The strategy elements of the game are fairly sophisticated and you don't just blast and blast - there is no question of three lives here.

But the most impressive thing for me is the look of the game. The landscape where all this action takes place is genuinely strange and alien. What you see, as you move around this world (in excellent hi-res scrolling perspective), are rectangles in the middle of nowhere, curious spindly poles, sudden holes in the ground, dream-like floating geometrical aliens and the fact that it's all in black and white just adds to the faintly mathematical and disturbing effect.

Komplex is a truly imagination gripping game, something that cannot be said for many others. You'll need to map its world if you're going to stand any chance of locating the letters and finding your way through the service tubes to the CCC. It's mostly brains, not brawn, that's required.



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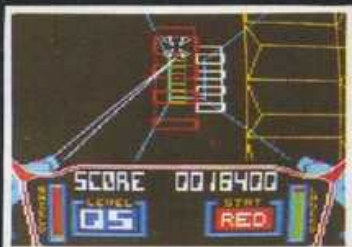


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Muddy waters

Martin Croft talks to Simon Dally about his interactive adventure being launched by British Telecom later this year

Few computer literates can have survived the last 12 months without having heard of *MUD* - Multi User Dungeon - the play-by-modem interactive adventure game.

MUD is already running on the Compunet database and now, through a licencing deal with British Telecom worth well into five figures, it will be available to ordinary phone users in an enhanced form - *MUD 2* - before the end of this year.

Simon Dally is the man largely responsible for *MUD*'s new-found recognition. He was senior editor of Century Communications when the game's two authors Richard Bartle and Roy Trubshaw, decided to go commercial after four years of running *MUD* on the University of Essex computer. Simon saw the potential of the game and signed a licensing deal for Century.

Now Simon Dally is managing director of Multi User Entertainment, a new company set up specifically to develop and market games like *MUD*. Bartle and Trubshaw are directors, and the firm has financial backing from Century.

The heart of *MUD* is the database, which runs on any mini computer. Players can access that database via their modems, turning their micros into remote terminals for the mini. They can then communicate with the game by typing in the standard range of commands that can be found on just about any adventure game.

But the important thing about *MUD* - what makes it unique, certainly in this country, and possibly the rest of the world as well - is that more than one player can take part at the same time. This means that characters in the same area of the Land of Mud can talk to each other, even though the actual players may be hundreds of miles apart.

In addition, certain of the puzzles within the game require co-operation between players. The most obvious example is the getting the crown, the most valuable treasure in the game. It is hidden in the swamp, which is a maze. But the usual method of solving mazes - leaving objects in each location so as to be able to tell them apart - won't work as inanimate objects sink into the mud.

The only objects which do not sink are people - other players' characters. So to solve the riddle of the swamp, a group of players must act together.

Of course, only one of them can score points for the crown - but then, diplomacy is half the fun of the game.

Treasure is important because players score points for it. The more points scored, the higher up the status ladder

the players climb. The ultimate objective is to reach the exalted rank of Wizard - which enables you to have enormous fun teasing less powerful players.

Up until the time Simon Dally left Century, his career was moving along conventional lines. After leaving Oxford University he joined Weidenfeld, the publishing house, and after 18 months was given the editorship of their books list covering sports, games and leisure. His publishing philosophy is simple.

"It doesn't matter what books you do, it's how you set about marketing them."

Simon then moved from Weidenfeld to Harrap, where he was in charge of their general books list. Later, he went to Century to edit computer books.

But while Simon was moving up the publishing ladder, his real interest lay elsewhere - with games.

"I've always been a games player - bridge and chess to begin with, then *Diplomacy* in the mid seventies, at the same time as Richard Bartle was running his diplomacy magazine, *Sauce of the Nile*."

He became interested in micros pretty early on. "I had an Atari games console imported from the States in 1978, before they were available here."

His first professional involvement in computing came when a fellow editor at Harrap went to Addison Valley to set up *Acorn User*.

Simon was asked to invent a competition for the first issue, and he has been setting the puzzles for the magazine ever since.

Simon now has three micros - a BBC B, a Tandy Model 3, and a Tandy Model 100 which sits on his desk at work. With an acoustic modem, he uses the Model 100 for all his business needs.

"I came across *MUD* because all the teenage authors I was seeing at the time were talking about it.

"I must admit that I had no idea *MUD* would attract as much publicity as it did last year - I hadn't even played it when I signed up Richard Bartle."

Multi User Entertainment was set up because, as Simon says, "It dawned on me that the only way to get *MUD* off the ground was to create a company for it.

"Century did a lot to help set the company up, and are shareholders

along with myself, Richard and Roy.

"*MUD* is still the best game of its kind - and *MUD 2* will amaze the world," says Simon.

The present *MUD* contains about 400 rooms, but the new one will have around 1,000. The idea, according to Simon Dally, is to have some 10 rooms for each player - so *MUD 2* will be able to handle up to 100 players at the same time.

Another difference is in the mobiles - that's the term used to refer to the wandering monsters that can be found in the game. In *MUD*, they just run around being general nuisances and giving players the opportunity to pick up some more points (if they are brave enough!).

MUD 2's mobiles, however, will be far more powerful, and will also be given artificial intelligence, so that they will act in much the same way as player characters. This means that you will be able to talk to them, trade with them, even ally with them. Obviously, this opens up far more possibilities.

MUD 2 will be launched in September and British Telecom will initially be running the game with 36 lines, increasing to 100 when demand justifies.

If you want to play *MUD 2*, you will need to register with BT and get a modem. Baud rate will be both 1200/75 and 300/300. The game will be running between 6.00 in the evening and 8.00 in



the morning - basically during the slack period outside the business day. As such BT are very keen on the idea - it maximises the use and profit of their own minicomputers.

To register, you will have to buy a *MUD* starter pack. (This will probably be called a *MUD Pack*!). It will contain an introduction to the game, a rule book, a map of *MUD*, and a certain number of free credits. The packs will sell for around £20.00.

Once the initial free credits are gone, the cost of the game will be approximately £2.00 per hour.

"It's a big step to take the plunge and become your own boss, but I'm fascinated by what I'm doing now - it's akin to setting up my own publishing company," Simon says.

"I know the BT venture is just the start of something truly enormous."

The Mac-buster?

Jeff Naylor previews this year's most eagerly awaited machine – the Atari ST

At the beginning of the year, Jack Tramiel announced the ST range, with the basic model, the 130ST, costing just \$399. The intention was obvious: to make a machine that would be as good, if not better than, the Apple Macintosh. The same microprocessor, Motorola's 68000, is at the heart of the ST design and it sports a mouse with Gem, Digital Research's icon-driven menu operating system.

Although the Macintosh is a highly desirable computer, it is priced well above the level which the average home computer user can afford. If the price of the ST is low enough, personal and business computing will merge into one.

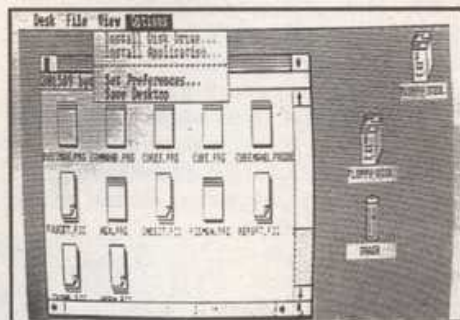
So much for the hype. Does the Atari ST really promise to move home computing up into the big league? Since January the 130ST has been dropped in favour of the more expensive bigger memory 520ST model. So far there are no more than a couple of pre-production machines in Europe. The machine previewed here is one of these, a 512K 520 ST that had spent the last few weeks on a grand tour of the continent. Although well advanced on the hardware side, the system software for the micro was – on the evidence of this machine – still far from completion.

Hardware

The ST occupies a good deal of desk space; it is nearly two feet long and nine inches deep, even bigger than an Amstrad 664. Yet styling is very pleasant to the eye, with the diagonal lines at the

back of the case doubling as cooling slots. A row of ten function keys above the main keyboard are also angled to enhance the lines of the computer, but this does not make them awkward to use.

The main keyboard is split into three sections: the qwerty layout and standard control keys; a group of eight editing keys; and on the far right a numerical keypad complete with arithmetic functions and an enter key. The switch mechanisms give a good, positive feel to the keys without being in the luxury class. They appear to be of the same type of construction as those in the other new Atari model, the 130 XE – a dimpled membrane pad but with individual re-



The ST's Mac-style user interface

turn springs. On the pre-production model the space bar had become intermittent, perhaps because it has had a very gruelling life to date, indicating that the keyboard is not very heavy-duty, or, just as likely someone may have done some damage while taking it apart.

Along the back edge of the ST is a whole host of ports. The one that is missing is a cassette interface – alien to the philosophy of the ST, and rather akin to giving the Flying Squad a bicycle. Without a disc

drive an Atari ST is as good as useless, although a tape port would not improve matters much.

The reset switch and on/off switch are next to the power input socket, which expects a 5 volt supply along with a sniff of 12 volts to operate the RS232 circuitry. Midi Through and Midi In allows you to connect the ST up to electronic musical instruments, although the same ports can also be pressed into service for networking. The pre-production model was fitted with a modulated video output and channel switch, but this feature will be omitted from the first batch of machines to arrive – only the later models will have the facility to feed a domestic television.

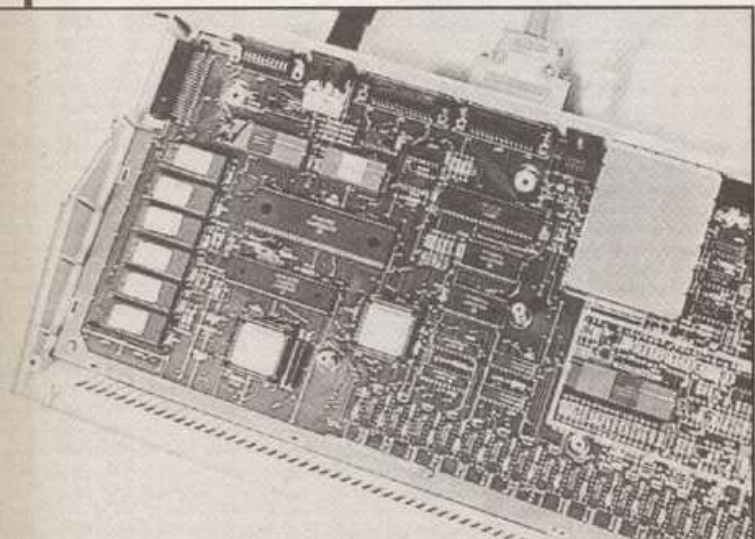
A monitor socket carries both composite and RGB signals, as well as sound.

Next in line comes both Centronics parallel and RS232 serial ports, and while the Centronics port is marked 'printer' it is bi-directional and could be used for many other purposes. Likewise, the RS232 port marked 'modem' can be used to communicate with much more. Between these two ports and the Midi interface, the ST is handsomely equipped for dealing with standard peripherals.

The floppy disc port takes the form of a circular parallel connector that gives 8-bit communication with one or two disc drives. The plug arrangement, although professional looking, actually fell out on two occasions – again, the hard treatment at the hands of the Europeans may be to blame. The final port at the back of the computer is a connector intended for Atari's planned 10 Megabyte hard disc unit.

One slot is situated at the left-hand side of the ST. The Rom port that allows you to plug in cartridges containing up to 128K's worth of Rom. It is not clear what sort of programs are intended for this port, but it is nice to see full use being made of the 68000's large memory map. On the right-hand side are two joystick ports. Joystick 0 is used to plug in the mouse, a neat, two button affair which comes as part of the standard package.

Inside the whole space along the bottom of the case is taken up with a single printed-circuit board. This looks well produced with none of the patching that you might expect to see on a pre-pro-



The 520 ST's printed-circuit board. The 68000 processor is the largest chip (centre left); the Eprom chips containing TOS, Gem and eventually Basic are the six chips in a row (far left); the two square chips (bottom centre) are the Atari custom chips and the 512K Ram is the row of chips (bottom, centre to right).





duction model. It is very neat and I suspect that the components might have been squeezed on to a smaller board. The size of the ST is really dictated by the decision to provide 95 keys.

Not surprisingly, the circuit board is dominated by the huge 68000 CPU encased in its 64-pin DIL package. This is the original processor from the Motorola 68000 range, not the cut-down version used in the Sinclair QL. It boasts eight address and eight data registers, all 32 bits wide, a 16-bit data bus and a 24-bit address bus. So without any form of bank switching at all, 16 Mbytes of memory can be addressed. Running at a clock speed of 8MHz, this CPU is a very fast and powerful device, especially by 8-bit standards.

Giving hardware support to the CPU is a 68901 chip, which sorts out things such as interrupts, a custom chip from Atari called Glue to handle the jobs that would otherwise require a massive amount of TTL, and two 6850 parallel interface chips. A memory controller, again a custom Atari device, looks after the Ram and Rom. Sixteen 256 K-bit Ram chips to provide the 512K of memory on the 520 ST. On the left of the board are the six Roms that can hold up to 192K of permanent information. Other chips in evidence include a Dynamic Memory Access (DMA) device for use with the hard disc and a Western Digital 1770 floppy-disc controller, so the disc drives themselves need no special interfacing arrangements.

An integrated circuit which will be much more familiar to home computer specialists is the AY-3812, a sound chip that has been included in many computers, most recently the Amstrad. This has one noise and three tone channels, and will produce sounds up to arcade, but

not quite synthesizer, standards. An extra feature that is put to good use are the two data ports; these drive the Centronics interface and allow its use in both directions.

A whole section of the circuit board (top right) is given over to video display generation, but most of the work is done by another non-standard Atari device. It handles all the graphics, taking the information from a 32K area of Ram and converting it to RGB and composite video of either the NTSC (US standard) or PAL (UK system) variety, depending on how the CPU programs it.

The display does not have any sprite-like hardware (or player-missile graphics, as Atari calls them), so moving shapes smoothly around the screen depends upon the CPU's ability to manipulate the large bit-mapped screen quickly. This it appears to do with consummate ease; a combination of a fast clock speed and good firmware routines seems to do the trick.

There are three levels of video resolution available on the Atari ST.

Low-resolution is 320 x 200 pixels in 16 colours, which can be chosen from a palette of 256 (if you are using a composite monitor). This is the sort of video display that earlier computers would have been proud to call high-resolution!

Moving up to medium-resolution, the ST gives 640 x 200 pixels in four colours, which again you can choose from the palette.

Finally, hi-resolution only allows two colours but at a resolution of 640 x 400, which compares well with the Macintosh at 512 x 342. To resolve this amount of detail you will need a high-definition monochrome monitor. An interesting feature of the ST is its ability to check the monitor socket to see what is plugged in - if the correct connections have not been made by the monitor cable then you will not be allowed to enter an inappropriate video mode.

The standard of graphics produced by demonstration software was well up to the standards that we have come to expect from Atari. In low-resolution mode the pictures on display - some of which are printed in this article and on the front page - although obviously the product of much patient programming, were outstanding. In the medium-resolution mode the detail was more than sufficient for the Gem operating system to work well, but there was no monochrome monitor available, and I could not fool the ST into giving me a hi-res display - though if it's better than the Mac then it must be good.

The keyboard is by no means a passive device. Located beneath the keys is a one-chip microcomputer, the 6301, which scans the keyboard and joystick ports. The data it collects is returned to the main CPU, which is thereby relieved of a tedious task that would otherwise slow it down. Decoding the signals from the mouse is also a job for the slave CPU,

and this information is returned as coded data to the 68000.

There are three floppy disc drives available for the ST, the SF324 (250K), SF354 (500K) and SF314 (1M), although the 250K drive may not be marketed. All are 3½ inch Sony format drives with external power supplies. Two monitors will be offered, a very high resolution monochrome unit and a colour monitor.

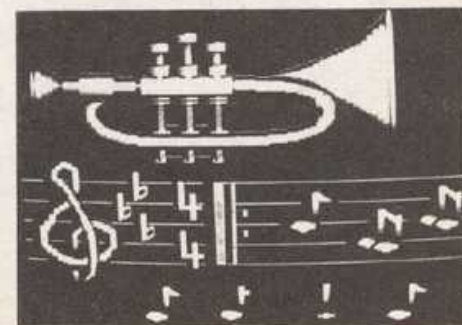
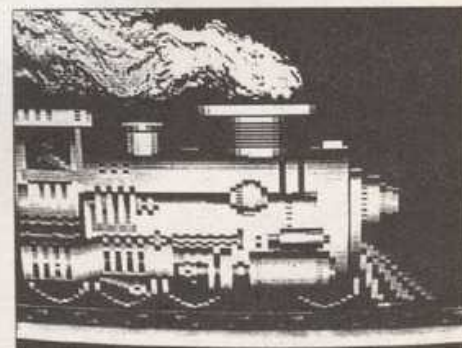
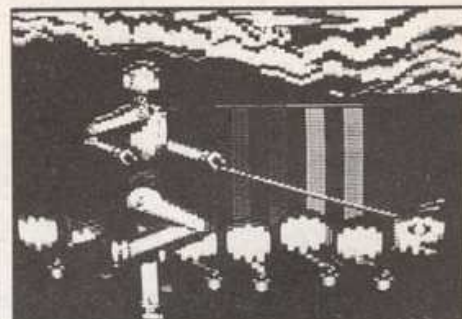
A range of printers in matching livery will also be available, including a cheap daisywheel.

As a piece of hardware, the 520 ST deserves much praise. It uses the most modern technology that is affordable, in a package that gives a professional impression. As a working environment, software writers will find little to complain about. The only facility that is missing is some form of expansion bus - add-on manufacturers will find it hard to interface devices directly with the CPU.

Atari are rightly proud that such a state-of-the-art configuration was designed, built and working inside six months.

TOS and Gem

The jewel in the crown of the ST, though, is not the hardware. Instead it is a product bought in from outside: the Gem Desk-top operating system.



Machine Review

Any computer is only as good as its software, and the 520 ST will be supplied as standard with an impressive suite of programs.

The 192K Rom will contain the TOS disc operating system, *Gem Desktop*, *Gem Write*, *Gem Paint*, Personal Basic and DR Logo – all except the first supplied by Digital.

Atari's TOS disc-operating system (Tramiel Operating System) is a cross between CP/M-68K, a 68000 version of CP/M, and MS-DOS. It offers many of the same facilities as most microcomputer disc-operating systems, but the fact that it may be no easier to use than any of the others is irrelevant.

The sort of thing that a lay person might need to use a DOS for – formatting and copying discs, and clearing out the redundant files in order to make space – can all be achieved by using Gem – the second level of operating system – and you can have fun at the same time.

The ST normally powers up into the Gem system. In its simplest form, you are presented with an icon graphics display representing disc drives and a trash can and a few menu headings such as *File*, *View* and *Options*. Move the on-screen – by moving the mouse – over a disc icon with the mouse, double-click the mouse button, and the contents of the disc are displayed in a window. If the window is not to your liking, you can drag it about, expand or shrink it or even make it fill the screen, all with the aid of the mouse. If you now pick up a file and drag it to the trash can, Gem will ask you if you really

want to erase the file; confirm this by clicking the mouse over the OK option, and the task is performed.

Using Gem (which stands for Graphics Environment Manager) is a pleasure. Whether it is any more efficient than getting to grips with the average DOS is not the point. Because it is obvious what is happening anyone can have the confidence to use it.

The ST will use Digital's Personal Basic. The final version of Personal Basic is still quite a long way off by the looks of the ST previewed here. Atari UK do not even have a command word list for it yet. Writing Basic programs is enhanced by the provision under Gem of three windows, one for the listing, one for screen output and one command line, much in the same manner as the arrangement on the QL in monitor mode. Because of the unfinished state of the Basic it still very much remains to be seen just how many of the Gem graphics features will be available to the Basic programmer.

DR Logo will also be included in the price of the ST and here again it isn't clear to what extent Logo will be integrated with the Gem environment.

There were no signs of even preliminary versions of either the wordprocessing or drawing programs *Gem Write* and *Gem Paint* at Atari UK.

The big question now is – what will be available, when and at what price?

First of all, the 130ST with the \$399 price tag now seems lost, perhaps for ever.

Secondly, the first batch of machines that Atari plan to produce reflects the current unfinished state of the software. Instead of being burnt into the on-board Roms, the system software will be supplied on disc, with little more in



Rom than a boot-strap loader. These machines will begin to arrive in small quantities at the end of June, though don't expect to get one unless you are one of the many software houses that have fallen under the ST's spell.

Prices and availability

Now, most importantly, prices. Atari has decided that bundling items together is the best way to keep costs down.

Three versions will be offered – the first in quantity from September, the second beginning around a month later and the third probably from 1986.

The first comprises a high-resolution monochrome monitor, 500K disc drive and 520 ST and will retail at £899.99 – an astounding £2000 less than the equivalent Macintosh, but still a great deal more than most people can afford.

The second will include a 512K ST, 500K disc unit, but no monitor. Instead it will be fitted with a modulator for use with a domestic TV. This version will cost £699.

The third version, as yet unpriced, will be as the first version but replace the monochrome monitor with a colour one. It is expected to cost around £900.

Conclusion

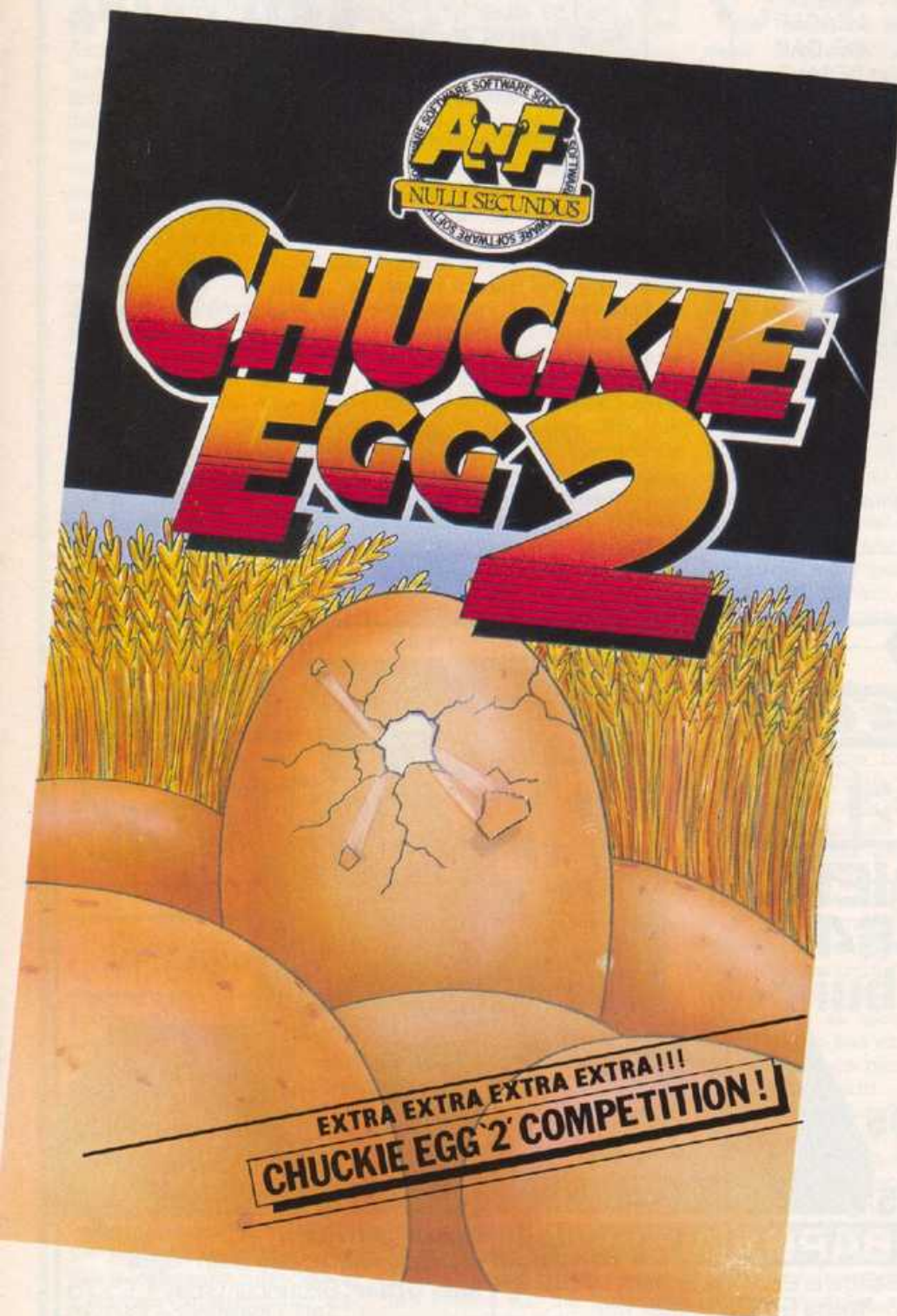
The ST is undoubtedly a most exciting product. But while Atari has got its act together in terms of hardware, it is, it would seem, at the mercy of Digital Research for delivery of the software. If this fulfills its promise then the ST could clean-up in the US as a Mac-beater.

Sadly, though, it may still be too expensive to bridge the gap between the home and business in Britain. At £700 for the lowest-price configuration, it is still too expensive to achieve very large volume sales in this country.

The 520 ST is not the £500 disc-based 128K machine promised back in January. That Atari has decided, apparently for reasons of global economy, to drop its 130ST model is a great disappointment.



A great NEW game from A&F.



Our intrepid hero "Hen House Harry" of "Chuckie Egg" fame has been called in to help a "Chocolate Egg" manufacturer sort out his automated factory, which has gone haywire. Harry, using all the skills he acquired working in the Hen House must get the wheels of industry moving.

Not only does Harry have to collect the ingredients to mix the eggs, but he will also have to collect the parts for the toys that go inside the eggs.

As if all these problems were not enough there are a number of other items that Harry will need to find and use to be able to complete the task. Things like ladders, bits of girders, keys and many more.

Chuckie Egg 2 contains 120 screens, plenty of surprises, and it is a true Arcade/Adventure game - you don't just find things, you actually move them and use them.



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Software Reviews

Automatic

Program Zapp Price £5.95
Micro Amstrad CPC 464
Publishers Hewson Consultants, Milton Trading Estate, Milton, Abingdon, Oxford.

Machine code development tools released for the Amstrad must expect to be compared with the official offering, *Devpac*. The first thing you notice about *Zapp*, a combined assembler, editor and monitor, is that it is considerably easier to use than the Amsoft program.

Assembler mnemonics are entered at the bottom of the screen, the syntax is checked, and if you have given a valid instruction (or assembler pseudo-mnemonic), it is inserted in the listing displayed above. The position it takes, the *Current Line*, is marked by a cursor which can be moved around to allow the insertion or deletion of lines at any point. One time-saving feature of *Zapp* is that you never need to bother with line numbers; these are provided automatically, re-numbering the routine as new lines are entered.

The assembler uses a one-pass technique which speeds up assembly, but puts some restrictions on the user. Forward references must avoid offsets, so the instruction *JR LABEL+5* is illegal if the address *Label* is further

down the listing.

The monitor and disassembler are designed to work with your own program – they even display any labels that are known – but are clumsy when looking at other sections of memory. The monitor will single-step routines and insert breakpoints, but its "front panel" display (the report of the state of the CPU) could be better labelled and contain more information.

After using *Zapp* for some time, I began to find some of its shortcomings tiresome – no DEFS or ENT pseudo-mnemonics and the slowness with which the screen cursor moves around. Most of all, the program runs in the 40-column mode, so if you add comments to your listing you find the display becomes ragged.

I suspect that Amstrad *Zapp* is a fairly straight forward conversion from the Spectrum program. Hewson have patched the user RST for printing (as the Spectrum's RST 10), which is fair enough; but the manual gives the impression that the user RST will always print a character, when it normally causes a reset!

While I can recommend *Zapp* to newcomers and dabblers in machine code, if you are intending to write a magnum opus then the extra money and patience needed to get to grips with *Devpac* will be worthwhile.

Jeff Naylor



In language

Program QC - C compiler/assembler/linker Micro QL Price £59.95 Supplier GST Computing Systems Cambridge, 91 High Street, Longstanton, Cambridge

There cannot be many programmers who have not heard of C – the 'in' language of the 1980s. While originally intended as a systems programming language, it is in fact one of the best general purpose languages around and is ideal for many areas of application programming. Now at last we have a C compiler for the QL written by the highly respect-

ed systems house which produced the original QL operating system.

In addition to the C compiler itself you get a machine code assembler and a general purpose linker. There is a comprehensive 74-page manual which comes in a handy A-5 ring binder and a copy of *A book on C* by R E Berry and B A E Meekings. The compiler will run on any QL, and does not need additional Ram or discs and runs on the normal QDOS operating system not the "alternative" GST 68K/OS system.

The language implemented by QC is not the full C but an enhanced version of *Short C*. The principal features missing are floating point and structure. It is still an excel-

Near genius

Program Leonardo Price £7.95 Micro Spectrum 48K Supplier Creative Sparks, Thorn EMI Computer Software.

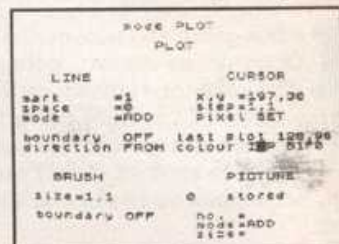
Calling a graphics package *Leonardo* could be seen as almost foolhardy self-confidence, creating a comparison with the Renaissance's greatest thinker.

In fairness, *Leonardo* is one of the better offerings in this highly competitive market. Freehand drawing by cursor keys or more conveniently joystick, is catered for with line, rubber-banding, variable brush width, etc. The cursor can draw continuous or broken lines and there are also very good circle, arc and ellipse commands.

The windowing commands allow for picture element manipulation, such as magnification and mirror imaging (although a bug caused my copy to lock up). Details can be held in memory and repeated as a brush pattern. Windows or the full screen can be

scrolled as well, which is useful for avoiding attribute problems.

UDG creation is not the best system I've seen, but incorporating them in a picture is relatively simple. Finally, a sophisticated programmed drawing system allows for handling of repetitive elements, and finished works can be saved to tape or print-



er. The manual is almost 100 pages thick, its first half introducing these features via practical examples, the second summarising the stroke commands.

My main criticism of *Leonardo* is that it is far from immediately friendly. However, perseverance should bring a Mona Lisa-ish smile to the user's face, if not a full-blown grin.

John Minson



lent language, entirely suitable for most types of program development, except for applications heavily dependent of floating point. In addition a comprehensive library is supplied including both sequential and random I/O and numerous String and Character Handling Routines.

A nice feature of the QC compiler is an option which lists the assembly language produced with the original C statements as comments, so that you can see exactly what code has been produced for each C statement.

The assembler *QCASM* is a general purpose assembler with the usual facilities and can be used to assemble machine code quite independently of C if you wish.

The linker is used to combine your program with any library modules needed or other modules.

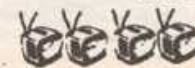
So what are the advantages of using C on the QL over SuperBasic? Firstly, there is an enormous increase in speed – C programs run about 100 times faster than the

Secondly, you now have the means to write programs which are able to use the full power and flexibility of the machine, including multi-tasking. Lastly, you have the ability to combine easily with machine language and with modules written in any other language using the linker.

And the disadvantages? Compared with SuperBasic it is much more laborious to develop a program and the program is much more difficult to debug. There are also memory problems, but these are much reduced if you have discs or extra Ram. With microdrives only storage, it is a bit tight, with about 160 sectors free for use (and the editor has to be fitted in). This limits the size of a C program that can be handled to a few hundred lines.

Nevertheless, C is a big software advance for the QL and, for anyone interested in serious programming, a bargain at £59.95.

Norman Macleod



Freestyle Challenge

Take the plunge with this decathlon type game for swimmers - on Spectrum by *Martin Mann*

In this game you take on the roll of an Olympic swimmer, going for the World Record (shown on the bottom of the screen). You must press the space bar at a constant speed for a good stroke - it is best to start off slowly then speed up, beginning when the starter fires his gun.

Your speed is shown by a line placed under the watching crowd, and your time in the top left hand corner.

After the title screen appears, press Space to begin - and take the plunge!

Graphics

Line 59 A, B and C

Line 140 D
Line 256 E and F
Line 258 G and H
Line 260 I and J
Line 262 E and K
Line 461 N and M
Line 462 P and Q
Line 464 L and O




```

1 BORDER 1: PAPER 1: INK 4: CLS : GO SUB 9000
2 LET ink=0
3 LET hi=20.12
4 LET a$="MANNY"
5 CIRCLE 125,100,30: CIRCLE 80,100,30: CIRCLE 170
,100,30: CIRCLE 102,60,30: CIRCLE 147,60,30
6 LET gogo=0
7 PRINT INK 7: FLASH 1: AT 21,12: "WELCOME"
10 PRINT INK 7: AT 1,8: "OLYMPIC SWIMMER"
20 PRINT FLASH 1: INK 2: AT 0,7: " "
30 PRINT FLASH 1: INK 2: AT 2,7: " "
40 PRINT FLASH 1: INK 2: AT 1,7: " "
51 PRINT FLASH 1: INK 2: AT 1,23: " "
52 IF gogo=1 THEN GO TO 59
53 BORDER 2: BORDER 7: BORDER 1
54 IF INKEY$="" THEN GO TO 56
55 GO TO 53
56 BORDER 1: CLS
57 LET gogo=1: GO TO 10
59 PRINT AT 12,2: "A": AT 13,2: "B": AT 12,3: "C"
60 PLOT 0,0: DRAW 50,95: DRAW 205,0: PLOT 255,0: DR
AW 255,0
70 PLOT 10,0: DRAW 42,85: DRAW 0,10: DRAW 0,-10: DR
AW 203,0
80 PLOT 0,152: DRAW 53,0: PLOT 195,152: DRAW 60,0:
PLOT 0,110: DRAW 255,0
81 FOR y=0 TO 31 STEP 2
89 PRINT INK 3: AT 3,y+1: "a"
90 PRINT INK 0: AT 3,y: "a"
100 NEXT y
101 FOR y=0 TO 31 STEP 2
102 LET i=INT (RND*4)
103 PRINT INK 0: AT 4,y+1: "a"
104 PRINT INK 3: AT 4,y: "a"
105 NEXT y
106 FOR y=0 TO 31 STEP 2
107 LET i=INT (RND*4)
108 PRINT INK 3: AT 5,y+1: "a"
109 PRINT INK 0: AT 5,y: "a"
110 NEXT y
111 FOR y=0 TO 31 STEP 2
112 LET i=INT (RND*4)
113 PRINT INK 0: AT 6,y+1: "a"
114 PRINT INK 3: AT 6,y: "a"
115 NEXT y
116 FOR y=0 TO 31 STEP 2
117 LET i=INT (RND*4)
118 PRINT INK 3: AT 7,y+1: "a"
119 PRINT INK 0: AT 7,y: "a"
120 NEXT y
122 PRINT AT 9,24: "SPEED"
123 FOR p=0 TO 5
124 FOR t=23 TO 5 STEP -1
125 PRINT AT 9,t: "<"
126 NEXT t
127 FOR t=23 TO 5 STEP -1
128 PRINT AT 9,t: " "
129 NEXT t
130 NEXT p
131 PRINT AT 9,24: " "
132 FOR b=0 TO 200
133 NEXT b
140 PRINT INK 7: AT 11,3: "D"
150 BEEP .1,10
160 PAUSE 10
170 PRINT AT 11,3: " "
200 LET l=0
205 LET z=0
210 LET m=5
211 LET z=30
212 LET p=10
215 POKE 23674,0: POKE 23673,0: POKE 23672,0
220 PLOT 0,102: DRAW x,0
225 LET time=(65536+PEEK 23674+256*PEEK 23673+PEEK 2
3672)/50
230 PLOT 0,101: DRAW x,0
242 PRINT AT 0,0: "YOUR ": PRINT AT 1,0: "TIME:": PRIN
T AT 2,0: time
243 PRINT #1: AT 0,0: "RECORD TIME:": hi: BY "a$
256 PRINT AT 15,z: "EF"
257 PAUSE p
258 PRINT AT 15,z: "GH"
259 PAUSE p
260 PRINT AT 15,z: "IJ"
261 PAUSE p
262 PRINT AT 15,z: "EK"
263 PAUSE p
264 LET l=l+1
265 IF l=m THEN GO SUB 295
268 IF INKEY$="" THEN GO SUB 270
269 GO TO 220
270 IF INKEY$(">") THEN GO TO 270
275 BEEP .005,(z/3)
280 LET z=z+5
281 LET z=z-1
283 IF z<5 THEN GO TO 400
285 IF z=200 THEN GO TO 9000
286 LET p=p-3
287 IF p<1 THEN LET p=1
290 RETURN
295 LET z=z-3
296 LET p=p+1
300 BEEP .002,(z/3)
305 LET m=m+10
310 IF z<0 THEN LET z=0

```

```

315 PRINT AT 9,0: " "
320 RETURN
400 PLOT 94,49: DRAW 120,0: DRAW 0,-10: DRAW -120,0:
DRAW 0,10
410 PRINT AT 16,12: "YOUR TIME": time
411 FOR v=0 TO 500
412 NEXT v
420 IF time<hi THEN GO TO 450
430 GO TO 700
450 CLS : PLOT 45,95: DRAW 132,0: DRAW 0,9: DRAW -13
2,0: DRAW 0,-9
460 PRINT AT 9,6: "NEW WORLD RECORD"
461 FOR b=0 TO 10: PRINT AT 18,13: "NM"
462 PRINT AT 19,13: "PQ"
463 PAUSE 10
464 PRINT AT 18,13: "LO"
470 PLOT 81,0: DRAW 0,10: DRAW 20,0: DRAW 0,-10: DRA
W 0,15: DRAW 20,0: DRAW 0,-15: DRAW 0,5: DRAW 20,0: D
RAW 0,-5
480 DRAW -60,0
481 PAUSE 10
490 NEXT b
500 BEEP .5,5: PAUSE 2: BEEP .5,5: PAUSE 5: BEEP .5,
7: PAUSE 3: BEEP .5,4: PAUSE 5: BEEP .3,5: BEEP .5,7:
PAUSE 10: BEEP .5,9: PAUSE 2: BEEP .5,9: PAUSE 5: BE
EP .5,10: PAUSE 3: BEEP .5,9: PAUSE 5: BEEP .3,7: BEE
P .3,5
501 PAUSE 7: BEEP .5,7: PAUSE 5: BEEP .5,5: PAUSE 5:
BEEP .5,4: PAUSE 2: BEEP .6,5
502 FOR q=0 TO 100
503 NEXT q
504 CLS
505 LET hi=time
506 INPUT AT 20,0: "INPUT NAME SUPER STAR "a$
509 CLS
510 GO TO 10
700 CLS : PRINT AT 8,8: "BAD LUCK AMATEUR": PRINT AT
10,5: "YOU NEVER BEAT "a$: PRINT AT 12,10: "PRESS A KE
Y": PAUSE 0: CLS : GO TO 10
9000 FOR n=0 TO 7: READ a: POKE USR "a"+n,a: NEXT n
9001 FOR n=0 TO 7: READ a: POKE USR "b"+n,a: NEXT n
9002 FOR n=0 TO 7: READ a: POKE USR "c"+n,a: NEXT n
9003 FOR q=0 TO 7: READ a: POKE USR "d"+q,a: NEXT q
9100 DATA BIN 00111100,BIN 00111100,BIN 01111110,BIN
00111100,BIN 00111100,BIN 00111100,BIN 00011001,BIN 1
1111111
9110 DATA BIN 11111110,BIN 10111100,BIN 10111100,BIN
10111100,BIN 10111100,BIN 01111100,BIN 00111100,BIN 0
1111110
9120 DATA BIN 00000000,BIN 00100000,BIN 00100000,BIN
00100000,BIN 00110000,BIN 01100000,BIN 11000000,BIN 1
00000000
9130 DATA BIN 01010010,BIN 00100010,BIN 10100101,BIN
01011010,BIN 01001010,BIN 00110100,BIN 00100100,BIN 0
0011000
9140 FOR v=0 TO 7: READ s: POKE USR "e"+v,s: NEXT v
9150 DATA BIN 00000000,BIN 00000000,BIN 00111000,BIN
01111100,BIN 01111100,BIN 01111100,BIN 00111111,BIN 0
0000011
9160 FOR v=0 TO 7: READ s: POKE USR "f"+v,s: NEXT v
9170 DATA BIN 01110000,BIN 00011000,BIN 00001100,BIN
00000110,BIN 00001100,BIN 00011000,BIN 11111000,BIN 1
1111100
9180 FOR v=0 TO 7: READ s: POKE USR "g"+v,s: NEXT v
9190 DATA BIN 00000001,BIN 0,BIN 00111000,BIN 0111110
0,BIN 01111100,BIN 01111100,BIN 00111111,BIN 00000011
9200 FOR v=0 TO 7: READ s: POKE USR "h"+v,s: NEXT v
9210 DATA BIN 10000000,BIN 11000000,BIN 01100000,BIN
00110000,BIN 01110000,BIN 01100000,BIN 11100000,BIN 1
1110000
9220 FOR v=0 TO 7: READ s: POKE USR "i"+v,s: NEXT v
9230 DATA BIN 00001111,BIN 00000011,BIN 00111001,BIN
01111100,BIN 01111100,BIN 01111100,BIN 00111111,BIN 0
0000011
9240 FOR v=0 TO 7: READ s: POKE USR "j"+v,s: NEXT v
9250 DATA BIN 0,BIN 10000000,BIN 11000000,BIN 1100000
0,BIN 11100000,BIN 01100000,BIN 11100000,BIN 1111000
0
9251 FOR v=0 TO 7: READ s: POKE USR "k"+v,s: NEXT v
9252 DATA BIN 0,BIN 0,BIN 0,BIN 0,BIN 0,BIN 0,BIN 111
1000,BIN 11111111
9253 FOR v=0 TO 7: READ s: POKE USR "l"+v,s: NEXT v
9254 DATA BIN 00000011,BIN 00000011,BIN 10000011,BIN
01000011,BIN 00100001,BIN 00011111,BIN 00000001,BIN 0
0000001
9255 FOR v=0 TO 7: READ s: POKE USR "m"+v,s: NEXT v
9256 DATA BIN 11000000,BIN 11001000,BIN 11001000,BIN
11001000,BIN 10001000,BIN 11111000,BIN 10000000,BIN 1
0000000
9257 FOR v=0 TO 7: READ s: POKE USR "n"+v,s: NEXT v
9258 DATA BIN 00000011,BIN 00010011,BIN 00010011,BIN
00010011,BIN 00010011,BIN 00011111,BIN 00000001,BIN 0
0000001
9259 FOR v=0 TO 7: READ s: POKE USR "o"+v,s: NEXT v
9260 DATA BIN 11000000,BIN 11000000,BIN 11000001,BIN
11000010,BIN 10000100,BIN 11111000,BIN 10000000,BIN 1
0000000
9261 FOR v=0 TO 7: READ s: POKE USR "p"+v,s: NEXT v
9262 DATA BIN 00000001,BIN 00000011,BIN 00000011,BIN
00000110,BIN 00001000,BIN 00001000,BIN 00001100,BIN 0
9263 FOR v=0 TO 7: READ s: POKE USR "q"+v,s: NEXT v
9264 DATA BIN 10000000,BIN 11000000,BIN 11100000,BIN
00110000,BIN 00010000,BIN 00010000,BIN 00011000,BIN 0
9265 RETURN

```


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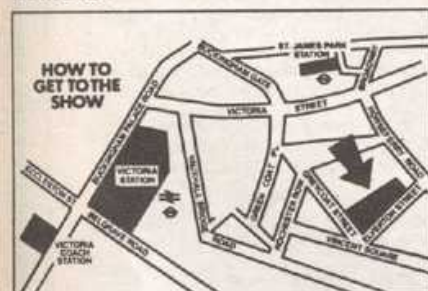


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POPULAR COMPUTING WEEKLY

Room with a view

You won't be addressed properly without this hex dump routine for the QL by **Malcolm Scorer**

For anyone interested in machine code programming a hex dump routine is a useful utility. It allows the user to view large chunks of data at once and is ideal for checking that machine code routines have been entered correctly, or perhaps examining the contents of the QL Roms.

This program is an attempt to produce such a routine. Not only does it show the actual hex data, but also displays the equivalent Ascii codes.

After loading and typing 'run' the title screen is displayed and you are presented with the following three options: 1) Direct output to printer and screen (F1), 2) Quit (F2), 3) Output to screen (F3).

When options one or three are selected you will be asked to enter the start and end addresses of the area of memory to be examined. You may enter these either in decimal or if preceded by a '\$' in hex. The data will then be displayed in the following format:

Address (5 bytes) followed by 16 bytes of data and then the equivalent Ascii codes. All control and non printable characters are replaced by a dot ('.') This format allows nearly 300 bytes to be displayed on the screen at one time.

The output can be stopped and started by pressing **Ctrl** and **F5** keys together and may be aborted by holding down the **Esc** key.

Program Notes

Line No

- 100-150 Sets up the initial display.
- 160-360 Gives option to direct output to printer and then prompts for start and end addresses. Calls dump procedure.
- 380-460 General purpose decimal to hex conversion routine which allows the number of hex digits to be specified.
- 480 Start of actual 'dump' routine.
- 520 Converts address to 5 digit hex.
- 530-570 Loops around building up two strings. One consists of 16 bytes of hex data and the other contains the Ascii codes.
- 580 Outputs to printer if option (F1) selected.
- 590 Outputs to screen.
- 600 Checks for **Esc** key. Exits if pressed.
- 640-660 Converts a number < 255 to two hex digits. This has been used instead of the more general purpose routine (hex) to speed up the program.
- 680-820 Converts a number from either base 10 or base 16, depending on whether the number is preceded by a '\$' or not.

```

100 MODE 4:CSIZE 0,0:PAPER 0:PAPER #0,2:BORDER #0,5:INK 4:CLS
110 s$="0123456789ABCDEF"
120 msb=1.048575E6
130 OPEN #5,ser1:BAUD 1200
140 CSIZE 3,1:AT 5,7:PRINT "H E X D U M P":CSIZE 0,0
150 PRINT:PRINT TO 30, 1984 M.Scorer"
160 REPEAT loop
170   CLS #0
180   PRINT #0,"'F1' for printout"
190   PRINT #0,"'F2' to quit"
200   PRINT #0,"'F3' to continue"
210   REPEAT kloop
220     k=KEYROW(0):IF k<>0 THEN EXIT kloop
230   END REPEAT kloop
240   IF k=8 THEN EXIT loop
250   IF k=2 THEN printer=1:ELSE printer=0
260   CLS #0
270   INPUT #0,"Start Address " ! sadd$:sadd=addr(sadd$)
280   INPUT #0,"End Address " ! eadd$:eadd=addr(eadd$)
290   IF eadd>msb THEN eadd=msb
300   IF sadd>= eadd THEN sadd=(eadd-255)
310   CLS
320   dump sadd,eadd
330 END REPEAT loop
340 CLOSE #5
350 CLS:CLS #0
360 STOP
370 :
380 DEFINE PROCEDURE hex(dec,lg1)
390   LOCAL loop
400   h$="":a=0
410   REPEAT loop
420     IF NOT dec THEN EXIT loop
430     a=INT(dec/16):dig=1+dec-a*16:h$=s$(dig)&h$:dec=a
440   END REPEAT loop
450   h$=FILL$("0",lg1-LEN(h$))&h$
460 END DEFINE
470 :
480 DEFINE PROCEDURE dump(sadd,eadd)
490   LOCAL loop,loop2,char$,byte
500   FOR loop = sadd TO eadd STEP 16
510     char$="":hx$="":dec=loop
520     hex dec,5
530     FOR loop2 = loop TO loop+15
540       byte=PEEK(loop2)
550       IF byte > 31 AND byte < 122 THEN char$=char$ &CHR$(byte)
560       :ELSE char$=char$ & "."
570       hx$ = hx$ & conv$(byte) & " "
580     END FOR loop2
590     IF printer THEN PRINT #5,h$ ! hx$:char$
600     PRINT h$ ! hx$:char$
610     IF KEYROW(1)=8 THEN EXIT loop
620   END FOR loop
630 :
640 DEFINE FUNCTION conv$(byte)
650   RETURN s$(INT((byte && 255)/16)+1) & s$(INT(byte && 15)+1)
660 END DEFINE
670 :
680 DEFINE FUNCTION addr(x$)
690   LOCAL base,x,y,z
700   IF x$(1)="$" THEN base=16:x=x$(2 TO):ELSE base=10
710   x=0:FOR y=1 TO LEN(x$)
720     z=CODE(x$(y))
730     SELECT ON z
740       =48 TO 57 :z=z-48
750       =65 TO 70 :z=z-55
760       =97 TO 102:z=z-87
770     =REMAINDER :RETURN 0
780   END SELECT
790   x= x * base + z
800 END FOR y
810 RETURN x
820 END DEFINE

```


"...a jewel of Spectrum programming..."

(Popular Computing Weekly)



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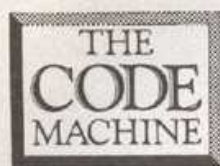
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PL188

Number conversion

Convert numbers into words with this routine for the CBM 64 by N A Syed

This is a program that will convert numbers into words. You can enter any number (in numerals) from -999999999 to 999999999 with or without decimals. The number is then

displayed in words.

As an application, the program could be useful as a tool for teaching children reading and writing numbers, or be used as a sub-routine in a program if

numbers were required to be displayed as words.

Program Notes

Line No	
35-90	Main routine of program
300-410	Input number and separate decimal digits
500-600	Separates number into groups of three starting from the right hand side
700-1100	Converts numbers of each group into words

```

10 REM***NUMBER CONVERTER***
20 REM***N.A.SYED***
30 DIM A$(19)
35 REM***MAIN ROUTINE***
40 GOSUB 100 :REM READ DATA
50 GOSUB 300 :REM INPUT A NUMBER
60 GOSUB 500 :REM SEPERATE IN GROUP
70 GOSUB 700 :REM CHANGE NUMBER IN WORD
72 IF FL$="Y" THEN GOSUB 1000
75 PRINT:PRINT:PRINT:PRINT
80 INPUT " DO YOU WANT TO ENTER NUMBER
  AGAIN";NW$
85 IF NW$ <> "N" AND NW$ <> "Y" THEN 80
87 IF NW$ ="Y" THEN 50
90 END
100 REM***READ DATA***
110 FOR I= 1 TO 19
120 READ A$(I)
130 NEXT I
140 FOR I=2 TO 9
150 READ B$(I)
160 NEXT I
170 C$(2)="THOUSAND":C$(3)="MILLION"
200 DATA "ONE","TWO","THREE","FOUR"
210 DATA "FIVE","SIX","SEVEN","EIGHT"
220 DATA "NINE","TEN","ELEVEN","TWELVE"
230 DATA "THIRTEEN","FOURTEEN","FIFTEEN"
240 DATA "SIXTEEN","SEVENTEEN"
250 DATA "EIGHTEEN","NINETEEN"
260 DATA "TWENTY","THIRTY","FORTY"
270 DATA "FIFTY","SIXTY","SEVENTY"
280 DATA "EIGHTY","NINETY"
295 RETURN
300 REM*** INPUT A NUMBER ***
310 PRINT "I"
315 PRINT:PRINT
320 INPUT"GIVE A NUMBER PLEASE";KL$
321 NO=VAL(KL$)
322 IF NO>999999999 THEN 310
324 HL=0
325 IF NO < 0 THEN HL=NO
330 IF NO < 0 THEN NO=NO*-1
340 IF NO= 0 THEN PRINT "ZERO"
350 IN= INT(NO):NN$=STR$(IN)
360 N$=KL$:L=LEN(N$)
362 DK=0:ZP=0
365 HJ$="N"
370 FOR I= 1 TO L
380 IF MID$(N$,I,1)=". " THEN HJ$="Y"
390 IF HJ$="N" THEN DK=DK+1
392 IF HJ$="Y" THEN ZP=ZP+1
395 NEXT I
397 DK = DK+2
400 DF$=MID$(N$,DK,ZP)
405 PRINT:PRINT
406 FL$="N"
407 IF NO <> IN THEN FL$="Y"
410 RETURN
500 REM*** SEPERATE IN GROUP ***
510 M=1:X$(M)="" :L=LEN(NN$)
515 CO=0
520 FOR I= L TO 2 STEP -1
530 CO=CO+1
540 TE$=MID$(NN$,I,1)
550 X$(M)=TE$+X$(M)
560 IF CO=3 THEN 580
570 GOTO 590
580 CO=0:M=M+1:X$(M)=""
590 NEXT I
600 RETURN
700 REM*** CHANGE GROUPS IN WORD ***
710 IF HL < 0 THEN PRINT "MINUS ";
720 H=0:T=0:E=0
730 FOR I = M TO 1 STEP -1
740 Z$=X$(I):L=LEN(Z$)
750 E=L+1
755 JK$="N"
760 FOR J=1TO L
770 TE$=MID$(Z$,J,1)
780 T=VAL(TE$)
785 E= E-1
790 IF T= 0 THEN 860
810 IF E=3 THEN 830
820 GOTO 840
830 H=T:D$=A$(T)+" HUNDRED"
840 IF E= 2 THEN GOSUB 900
845 IF E= 1 THEN D$=A$(T)
850 PRINT D$;SPC(2)
860 NEXT
870 IF VAL(Z$)= 0 THEN 890
880 PRINT C$(I)
890 NEXT
895 RETURN
900 W=0:R=0
910 W=VAL(Z$):R=W-H*100
915 IF W <=19 THEN R=W
920 IF R > 0 AND R <= 19 THEN 940
930 GO TO 950
940 D$=A$(R):J=J+1
950 IF T > 1 THEN D$=B$(T)
960 RETURN
1000 PRINT "DECIMAL ";
1010 L=LEN(DF$)
1020 FOR I= 1 TO L
1030 X$=MID$(DF$,I,1)
1040 IF X$="0" THEN PRINT " ZERO ";
1060 K=VAL(X$)
1070 IF K<> 0 THEN 1075
1072 GOTO 1080
1075 PRINT A$(K);SPC(2);
1080 NEXT I
1090 PRINT
1100 RETURN
1120 END

```


Window framed

Smooth scrolling windows on the BBC B and Electron –
from the keyboard of Philip Whitehurst

This program will produce a smooth-scrolling window on a Mode 4 screen. The window is set up in Line 1020, and follows the normal Tab co-ordinates.

The majority of the program is in machine code which is described line by

line within the listing – for those who don't know the mnemonics off by heart!

The routine can easily be adapted for Modes 0 or 3, but not the colour modes, as in these cases a different method is used for storing screen data.

A demonstration is given using the

data in Lines 100 to 290 – acting much like a moving notice board.

Changes for Mode 0 and 3 are given in lines 3000-3060.

Program Notes

Line No	Calls assembly routine
80	initialising routine
100-290	Demo program
1020	Window parameters
1030	Calculates last byte in window
1040-1480	Assembly language
2000-2070	Data for demo program

```

10REM* scrolling window for text *
20REM* P.D.Whitehurst *
50PROC_assemble
100MODE3
110VDU23,1,0,0,0,0,0,0,0,0
190REM* DEMO *
200READA$
210IFA$="*"THENRESTORE2010:GOTO200
220PRINTTAB(X2%,Y%);A$;
250FORF=1TO8
260CALLscroll
280NEXT
290GOTO200
1000DEFPROC_assemble
1010REM Set up scroll screen params.
1020X1%=2:X2%=37:Y%=23
1030end%=&4007+Y%*640+X2%*8
1040DIMQ% 200
1050FOR pass=0 TO 2 STEP 2
1060P%=Q%
1070[
10800PT pass
1090.scroll LDA#19:JSR&FFF4
1100\ Set up end of scrolling area
1110\ addresses
1120LDA#end% MOD 256:STA&70:STA&73
1130LDA#end% DIV 256:STA&71:STA&74
1140LDY#0:STY&72
1150\ set up counter.
1160.loop1 LDX#(X2%-X1%)+1
1170CLC:PHP \ set stack-clear carry
1180.loop PLP \ load processor status
1190LDA(&70),Y \ screen byte
1200ROLA \ rotate it left
1210STA(&70),Y \ & put it back.
1220PHP \ Save the carry bit.
1230LDA&70 \ decrement present
1240SEC \ screen byte
1250SBC#8 \ by eight
1260STA&70 \ to obtain
1270LDA&71 \ the location
1280SBC#0 \ of the screen byte
1290STA&71 \ to the left of it.
1300DEX \ Reduce counter
1310BNEloop \ Go back if non-zero
1320.next PLP \ clear stack
1330LDA&73 \ Load old values
1340SEC \ of end of scrolling
1350SBC#1 \ area & reduce them
1360STA&73 \ by 1.
1370STA&70 \
1380LDA&74 \
1390STA&71 \
1400LDX&72 \ increase counter
1410INX \ by one
1420STX&72 \ put it back
1430CPX#8 \ last time?
1440BNEloop1 \ If not-go back.
1450RTS \ end routine.
1460]
1470NEXT
1480ENDPROC
2000REM demo data
2010DATAT,h,i,s, ,p,r,o,g,r,a,m
2020DATA ,w,i,l,l, ,s,c,r,o,l,l
2030DATA ,w,o,r,d,s, ,a,c,r,o,s,s
2040DATA ,t,h,i,s, ,m,i,n,i,a,t,u,r,e
2050DATA ,s,c,r,e,e,n, ,l,i,k,e
2060DATA ,t,h,i,s, ,. ,. ,. ,. ,. ,.
2070DATA ,*
3000REM changes to program for mode0
3020REMline100MODE0
3030REMline1030end%=&3007+Y%*640+X2%*8
3040REM changes to program for mode3
3050REMline100MODE3
3060REMline1030end%=&4007+Y%*640+X2%*8

```


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PD385

Balanced accounts

The final part of the home financial program for all Amstrad users by **D G Shedden**

This week, a blow by blow account of the listing. If you don't want to type it in send me £3 at Lomand, The Green, Belchamp St Paul, Sudbury, Suffolk, and I'll send you a tape.

Program notes

Lines 1 to 920—Contain various subroutines used regularly in the program such as error reports, checking if Standing Orders are due, checking if the entry just made is one in which you are interested in running totals, sorting routines and validation of dates.

1000 to 1180—Handle initialisation and declare sizes of arrays, etc. If a different size of account is required then the alterations should be made here. If all the available space is not used there is no loss in saving and loading times because only occupied areas of the arrays are saved.

2000 to 2180—Main menu section. You return here after all the subroutines and variables used are returned to standard conditions. You are not allowed to call options unless they can be satisfied, for example, you cannot display the account until details have been loaded or entered.

3000 to 3640—Display the statement. On the screen display debits are shown in red and credits in black. To keep to 40 columns the details are shortened but appear in full on the hard copy. This is the only routine to have separate parts to carry out the two forms of display. A complete check on all previous months is made to ensure that brought forward balances are correct in case there have been any retrospective entries.

4000 to 5580—This section handles the reconciliation section. A marker is added to each entry made and changed if the entry has been cleared. It makes no difference to the data length whether or not this option is ever used. Reconciliation is effected by displaying each entry in turn and responding y/n to the prompts.

6000 to 6260—Allow examination or deletion of entries. Alteration was considered but rejected because of the complexity for what it hoped will be a rarely used option. If an error has got through the check before entry it must be deleted and re-entered.

8000 to 8400—This is the input section. Having determined the month you are

invited to enter the date and details of the entry. A check is made for valid date — eg, 31st June. If any Standing Orders are due before this date then they will be posted. To exit, an entry of '99' is requested so all remaining S.O.s are entered.

Finally entries are sorted into date order before returning to the menu. Projected cashflow can be achieved merely by entering the *Input Data* mode and then leaving it.

9000 to 9600—These save and load the *Data* files. As written the program will handle any number of accounts, but if only one is to be used the following procedures will save time. Add to Lines 9050 to 9530, *File\$*. Delete 9500 and 9510 and make 9520 into 9500.

10000 to 11720—Handle the creation of the Standing Orders file. These can either be displayed individually showing all months each is payable or alternatively which S.O.s are due in any month. These can be added to or deleted at any time.

12000 to 14580—Create the special category entries. Once established, any debit or credit entry or standing order with the same name will be added to a running total. It pays to spend some time considering your interests before entering any data since changes are only possible by deleting and re-entering details.

The remainder of the program consists of instructions and an autosave line.

```
6240 IF q$="Q" THEN CLS#3:RETURN
6250 IF q$="" THEN NEXT
6260 RETURN
7999 REM *** INPUT DATA ***
8000 DIM tem$(pa+1,1),tem(pa+1,1)
8020 GOSUB 460
8030 q$="INPUT DATA FOR "+mo$(zz):GOSUB 440
8035 PRINT#3,"Please wait a moment"
8040 co=1
8050 FOR i=0 TO pa
8060 d=0:WHILE MID$(a$(i,1),Q,1)="1" AND d=0
AND a(i,1)<>0:d=1
8070 tem(co,1)=a(i,1):tem$(co,0)=a$(i,0):tem(
co,0)=a(i,0)
8080 IF tem(co,1)>f AND zz=1 THEN tem(co,1)=f
8090 IF tem(co,1)>30 AND (zz=3 OR zz=5 OR zz=
8 OR zz=10) THEN tem(co,1)=30
8100 co=co+1
8110 WEND
8120 NEXT
8130 IF p(z)>1 THEN 8140 ELSE 8230
8140 FOR n=1 TO p(z):FOR x=1 TO co
8150 IF tem(x,1)=b(n,z) AND INSTR(b$(n,z),tem
$(x,0)) THEN tem(x,1)=99
8160 NEXT:NEXT
8170 IF p(z)=1 THEN 8230
8180 CLS#3:FOR n=1 TO p(z)
8190 IF b(n,z)=99 THEN GOSUB 620:GOTO 8220
8200 PEN 2: PRINT USING "###";b(n,z):PRINT TA
B(4):LEFT$(b$(n,z),LEN(b$(n,z))-1):TAB(30):P
EN 2+(1 AND s(n,z)<0):PRINT USING "#####.##-"
; s(n,z):REM all hashes
8210 IF n MOD 17=0 THEN GOSUB 300:GOSUB 440
```

```
8220 NEXT
8230 CLS#3:er=0: INPUT #3,"Date e.g. 3, - or
99 to QUIT";s:CLS#3
8240 IF s=99 THEN 8270
8250 GOSUB 900
8260 IF er THEN 8230
8270 FOR x=1 TO co:GOSUB 200:NEXT
8280 IF s=99 THEN GOSUB 600:GOTO 8400
8290 INPUT #3,"Cheque No (or just ENTER) ",d
a$
8295 INPUT #3,"Details ";det$:det$=UPPER$(det
$):CLS#3
8300 INPUT #3,"Debit or Credit (D or C)";d$:d
$=UPPER$(d$):CLS#3
8305 IF d$<>"D" AND d$<>"C" THEN PRINT CHR$(7
):CLS#3:GOTO 8300
8310 INPUT #3,"Amount ";am:CLS#3
8320 IF d$="D" THEN am=-am
8330 PRINT#3,s;da$;" ";LEFT$(det$,20);" ";PR
INT#3,USING "#####.##-" ;am:GOSUB 540:REM 1st
item is pound
8340 IF x$<>"Y" THEN 8230
8345 b$(p(z),z)=det$:s(p(z),z)=am:GOSUB 350
8350 b(p(z),z)=s:b$(p(z),z)=da$+" "+det$+"#"
8360 PEN 2: PRINT USING "###";b(p(z),z):PRINT
TAB(4):LEFT$(b$(p(z),z),LEN(b$(p(z),z))-1):T
AB(30):PEN 2+(1 AND s(p(z),z)<0):PRINT USING
"#####.##-" ;s(p(z),z):REM all hashes
8380 p(z)=p(z)+1
8385 IF p(z)=60 THEN CLS#3:PRINT#3,"** MONTH
NOW FULL **":GOSUB 500:s=99:GOTO 8270
8390 GOTO 8230
8400 ERASE tem$,tem:RETURN
```

```
8999 REM *** SAVE DATA ***
9000 CLS:LOCATE 10,12:PRINT"PREPARE RECORDER
TO SAVE":LOCATE 15,13:PRINT"PRESS ANY KEY"
9010 WHILE INKEY$=""WEND
9020 REM *** IF USING WITH DISC THEN DO NOT T
YPE LINES 9000 & 9010 AND TYPE LINE 9030 AS 9
000
9030 CLS:LOCATE 5,10:PRINT"SAVING DATA - PLEA
SE WAIT":SPEED WRITE 1
9040 OPENOUT file$
9050 WRITE #9,pa,ct,year,f,start,name$
9060 FOR i=0 TO pa
9070 WRITE #9,a$(i,0);a$(i,1);a(i,0);a(i,1)
9080 NEXT
9090 FOR i=0 TO 12:WRITE #9,bfud(i):NEXT
9100 FOR i=0 TO 11:WRITE #9,p(i):NEXT
9110 FOR i=0 TO 11:FOR x=0 TO p(i):WRITE #9,b
$(x,i);b(x,i);s(x,i):NEXT:NEXT
9120 FOR i=1 TO ct:WRITE #9,ct$(i);spend(i):N
EXT
9130 CLOSEOUT
9140 RETURN
9499 REM *** LOAD DATA ***
9500 CLS:INPUT#3,"WHAT IS THE ACCOUNT NAME ";
file$:CLS#3:file$="!" + file$
9510 LOCATE 12,12:PRINT"LOADING DATA"
9520 OPENIN file$
9530 INPUT #9,pa,ct,year,f,start,name$
9540 FOR i=0 TO pa
9550 INPUT #9,a$(i,0);a$(i,1);a(i,0);a(i,1):N
EXT
9560 FOR i=0 TO 12:INPUT #9,bfud(i):NEXT
9570 FOR i=0 TO 11:INPUT #9,p(i):NEXT
```



```

9580 FOR i=0 TO 11:FOR x=0 TO p(i):INPUT #9,b
$(x,i),b(x,i),s(x,i):NEXT:EXT
9590 FOR i=1 TO ct:INPUT #9,ct$(i),spend(i):N
EXT
9600 CLOSEIN:GOSUB 530:RETURN
9999 REM *** STANDING ORDERS ***
10000 x=0:CLS
10010 q$="STANDING ORDERS MENU":GOSUB 440
10020 PRINT " 1) NEW PAYMENTS":PRINT
10030 PRINT " 2) EXAMINE/DELETE ENTRIES":PRIN
T
10040 PRINT " 3) PRINT STANDING ORDERS":PRINT
10050 PRINT " 4) RETURN TO MAIN MENU":PRINT:P
RINT
10060 INPUT #3, "PLEASE ENTER SELECTION (1-4)
",x:CLS#3
10070 WHILE pa=0 AND (x=2 OR x=3)
10080 GOSUB 420:RETURN
10090 x=0
10100 WEND
10110 IF x<1 OR x>4 THEN GOSUB 400:GOTO 10060
10120 IF x=4 THEN RETURN
10130 ON x GOSUB 10500,11000,11500
10140 CLS:ch=0:GOTO 10000
10499 REM *** ENTER NEW ITEMS ***
10500 CLS:CLS#3:PEN 2:q$="STANDING ORDERS":G0
SUB 440
10510 IF pa>19 THEN PRINT#3,"** FILE FULL **"
:GOSUB 500:CLS#3:RETURN
10520 q$="New Items":GOSUB 440
10530 PRINT"(C)redit,(D)ebit or (Q)uit :- ";
10540 INPUT #3, "Which do you require C, D or
Q ";x$:x$=UPPER$(x$):IF x$<>"D" AND x$<>"C"
AND x$<>"Q" THEN PRINT CHR$(7):CLS#3:GOTO 105
40
10550 PRINT x$:PRINT:CLS#3
10560 IF x$="Q" THEN RETURN
10570 q$="":WHILE q$="" :PRINT"Name of payment
Max 18 Characters :- ":INPUT "",q$:q$=LEFT$(
UPPER$(q$),18):WEND
10580 PRINT:INPUT "Amount: ",q
10590 IF x$="D" THEN q=-q
10600 en=1:WHILE en
10610 LOCATE 1,11:PRINT:INPUT "Months Due e.g
. 01040710 would be months1,4,7 &10 (Jan, Apr,
Jul & Oct) or M if Every Month :-",r$:PRINT
10620 IF LEN(r$)<1 THEN PRINT CHR$(7):GOTO 10
600
10630 IF UPPER$(r$)="M" THEN r$="01020304050
6070809101112"
10640 en=0:FOR i=1 TO LEN(r$) STEP 2
10650 m=VAL( MID$(r$,i,2))-1
10660 IF m<0 OR m>11 THEN GOSUB 400:GOTO 1061
0
10670 IF en=0 THEN PRINT mo$(m);"";
10680 NEXT:PRINT:PRINT
10690 WEND
10700 er=0:INPUT#3, "Day of payment: ",s:GOSUB
930:CLS#3
10710 IF er THEN 10700
10720 PRINT"Day of payment:-";s
10730 GOSUB 540:IF x$<>"Y" THEN CLS:GOTO 1050
0
10740 a$(pa,1)="0000000000000"
10750 FOR i=1 TO LEN(r$) STEP 2
10760 M=VAL( MID$(r$,i,2))
10770 a$(pa,1)=LEFT$(a$(pa,1),m-1)+"1"+RIGHT$(
a$(pa,1),12-m):NEXT
10780 a$(pa,0)=q$:a(pa,0)=q$:a(pa,1)=s
10790 pa=pa+1
10800 PRINT #3,"Add any more S.O.s Y/N ":GOSUB
100:CLS#3
10810 IF x$="Y" THEN CLS:GOTO 10500
10820 FOR jj=1 TO pa-1
10830 FOR j=0 TO pa-jj
10840 IF a(j,1)<=0 THEN FOR q=j TO pa-1:FOR k
=0 TO 1:a$(q,k)=a$(j+1,k):a(q,k)=a(j+1,k):NEX
T:NEXT:pa=pa-1
10850 IF a(j,1)<=a(j+1,1) THEN 10920
10860 FOR k=0 TO 1
10870 c$(k)=a$(j+1,k)
10880 c(k)=a(j+1,k)
10890 a$(j+1,k)=a$(j,k):a(j+1,k)=a(j,k)
10900 a$(j,k)=c$(k):a(j,k)=c(k)
10910 NEXT
10920 NEXT
10930 NEXT
10940 FOR i=0 TO pa-1
10950 IF a(i,1)>31 THEN pa=pa-1
10960 NEXT
10970 RETURN
10999 REM *** EXAMINE/DELETE S.O.s ***
11000 FOR i=0 TO pa:CLS:PEN 2
11010 IF a(i,0)=0 THEN q$="":GOTO 11290
11020 q$="STANDING ORDERS":GOSUB 440
11030 PEN 1:PRINT#ch,"Payment: ";:PEN 2:PRINT#
ch, a$(i,0):PRINT#ch
11040 PEN 1:PRINT#ch,"Amount #";:PEN 2:PRINT#
ch, USING "####.##";a(i,0):PRINT#ch
11050 PEN 1:PRINT#ch,"Months Payable ";:PEN 2
11060 FOR j=1 TO 12
11070 IF MID$(a$(i,1),j,1)="1" THEN PRINT#ch
, mo$(j-1);"";
11080 NEXT:PRINT#ch:PRINT#ch
11090 PEN 1:PRINT#ch,"Day of Payment: ";:PEN 2
:PRINT#ch,a(i,1)
11100 IF ch=8 THEN PRINT#8:PRINT#8:GOTO 11160
11110 PEN 2:PRINT:PRINT"Commands Available:":
PRINT
11120 PEN 1:PRINT"ENTER";:PEN 2:PRINT" Next i
tem"
11130 PEN 1: PRINT""Q";:PEN 2:PRINT" Quit"
11140 IF PR THEN PEN 1: PRINT""P";:PEN 2:PRI
NT" Output to printer
11150 PEN 1:PRINT""D";:PEN 2:PRINT" Delete"
11160 IF ch=8 THEN q$="":CLS:GOTO 11280
11170 q$="":PRINT#3,"Please Select 'ENTER',Q,
D ";:IF pr THEN PRINT#3,"or P ";
11180 INPUT #3, "",q$:q$=UPPER$(q$):CLS#3
11190 IF q$<>"Q" AND q$<>"Q" AND q$<>"D" AND q
$<>"P" THEN PRINT CHR$(7):GOTO 11170
11200 WHILE q$="D"
11210 FOR j=i TO pa-1
11220 FOR k=0 TO 1
11230 a$(j,k)=a$(j+1,k):a(j,k)=a(j+1,k)
11240 NEXT:NEXT
11250 pa=pa-1:q$=""
11260 WEND
11270 IF q$="P" THEN ch=8:GOTO 11020
11280 ch=0
11290 IF q$="" OR q$="D" THEN CLS:NEXT
11300 RETURN
11499 REM *** DISPLAY S.O.File ***
11500 CLS:PEN 2
11510 q$="STANDING ORDERS ":GOSUB 440
11520 q=0:WHILE q<1 OR q>12
11530 INPUT #3,"Month No for Standing Orders
(1 to 12) ";q:CLS#3:CLS
11540 WEND
11550 PRINT:q$=q$+mo$(q-1)
11560 GOSUB 440:PRINT#ch,STRING$(39,"-")
11570 PRINT#ch,"DAY & DETAILS";TAB(35);"ITEM
"
11580 PRINT#ch,STRING$(39,"-")
11590 sosum=0:co=1
11600 FOR i=0 TO pa
11610 d=0:WHILE MID$(a$(i,1),q,1)="1" AND d=
0:d=1
11620 PEN 2:PRINT#ch,USING "## &";a(i,1);a$(i
,0);
11630 PEN 2+(1 AND a(i,0)<0):PRINT#ch,TAB(32)
;USING "####.##";a(i,0)
11640 sosum=sosum+a(i,0):co=co+1
11650 WEND
11660 IF co MOD 12=0 AND ch=0 THEN GOSUB 300:
CLS:PRINT q$;" cont":PRINT
11670 NEXT:PEN 2
11680 PRINT#ch,TAB(32);STRING$(7,"=")
11690 PRINT#ch,TAB(10);"Total for ";mo$(q-1);
:PEN 2+(1 AND sosum<0):PRINT#ch,TAB(32);USING
"####.##";sosum
11700 IF ch=8 THEN FOR n=1 TO 2:PRINT#ch:NEXT
:CLS:ch=0:RETURN
11710 IF pr THEN GOSUB 560:IF x$="Y" THEN 115
60 ELSE ch=0:prc=0:co=0:RETURN
11720 GOSUB 300:RETURN
11999 REM *** REM SELECTIVE ENTRIES ***
12000 CLS:CLS#3:q$="SELECTIVE ENTRIES MENU":G
OSUB 440:PRINT
12010 PRINT " 1) CREATE SPECIAL CATEGORIES":P
RINT
12020 PRINT " 2) ADD TO CATEGORIES":PRINT
12030 PRINT " 3) DISPLAY ENTRIES YEAR TO DATE
":PRINT
12040 PRINT " 4) INSTRUCTIONS":PRINT
12050 PRINT " 5) EXAMINE/DELETE ENTRIES":PRIN
T
12060 PRINT " 6) RETURN TO MAIN MENU":PRINT
12070 INPUT #3,"PLEASE ENTER SELECTION (1-6)"
;x$:CLS#3
12080 x=VAL(x$)
12090 IF x<1 OR x>6 THEN GOSUB 400:GOTO 1207
0
12100 IF x=6 THEN RETURN
12110 IF x=3 AND ct<1 THEN GOSUB 420:GOTO 120
00
12120 CLS
12130 ON x GOSUB 12500,13000,13500,14000,1406
0
12140 ch=0:prc=0:GOTO 12000
12150 REM *** CREATE SPECIAL ENTRIES **
12500 IF ct=0 THEN 12550
12510 CLS:PEN 3:LOCATE 16,2:PRINT"WARNING !":
PRINT:PRINT:PEN 2:PRINT"CATEGORIES ARE ALREAD
Y ESTABLISHED. IF YOU CONTINUE ALL OF THESE
WILL BE ERASED":PRINT"PRESS Y TO CONTINUE OR
N TO RETURN TO MENU WHERE OPTION 2) SHOULD
BE SELECTED"
12520 PRINT #3,"Press Y to continue or N to R
eturn "
12530 GOSUB 100
12540 IF x$<>"Y" THEN RETURN
12550 q$="CREATE HEADINGS":GOSUB 440:ct=0
12560 IF ct=18 THEN CLS#3:PRINT#3,"FILE FULL
":GOSUB 500:RETURN
12570 INPUT #3,"NAME OF CATEGORY OR 99 TO QUI
T ";y$:CLS#3
12580 IF y$="99" THEN RETURN
12590 y$=UPPER$(y$)
12600 PRINT#3,y$:PRINT #3,"IS THIS CORRECT Y/

```



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N ?":GOSUB 100
12610 IF x%<>"Y" THEN 12570
12620 ct=ct+1:ct$(ct)=y$
12630 PRINT USING"##" &"ct;ct$(ct)
12640 GOTO 12560
12999 REM *** ADD HEADINGS ***
13000 CLS:q$="ADDITIONS TO HEADINGS":GOSUB 44
0
13010 FOR n=1 TO ct
13020 PRINT USING"##" &"n;ct$(n)
13030 NEXT
13040 GOTO 12560
13500 CLS:REM *** YEAR TOTALS ***
13510 q$="YEAR TO DATE TOTALS":GOSUB 440
13520 FOR n=1 TO ct
13530 PEN 2:PRINT#ch, USING "##" &"n;ct$(n);
:PRINT#ch,TAB(32);PEN 2+(1 AND spend(n)<0):P
RINT#ch, USING "###.##-";spend(n)
13540 NEXT:IF prc THEN 13570
13550 IF pr=0 THEN GOSUB 300 ELSE GOSUB 560
13560 IF ch=8 AND prc THEN 13510
13570 ch=0:prc=0:CLS:PEN 2:RETURN
14000 q$="INSTRUCTIONS FOR SELECTIVE ENTRIES"
:GOSUB 440
14010 PRINT"The purpose of this section is to
keep a running total of expenditure within
named sections for example Electricity, Tel
ephone, credit cards etc.
14020 PRINT:PRINT"You may enter a maximum of

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eighteen such sub-sections and once having na
med these entries in the INPUT DATA section th
ey must conform to the specified entry.
14030 PRINT:PRINT"You may not change the entr
ies after setting up although you may add
to the categories at any time up to the limi
t of eighteen although any expenditure be
fore this time will be ignored unless deleted
and re-entered.
14040 GOSUB 300
14050 RETURN
14060 CLS:CLS#3
14500 q$="SPECIAL CATEGORY ENTRIES":GOSUB 440
14510 FOR n=1 TO ct:PRINT USING "##" &"n;ct$
(n):NEXT
14520 INPUT #3,"Enter number of entry to be d
eleted or ** to QUIT ",x$
14530 IF x$="**" THEN RETURN
14540 x=VAL(x$):IF x>ct THEN GOSUB 400:GOTO 1
4520
14550 CLS#3:PRINT#3,x;ct$(x)
14560 INPUT #3,"Is this the correct entry Y/N
",x$
14570 IF UPPER$(x$)<>"Y" THEN CLS#3:GOTO 1452
0
14580 FOR n=x TO ct:ct$(n)=ct$(n+1):spend$(n)
=spend$(n+1):NEXT:ct=ct-1:GOTO 14060
14590 RETURN
15000 CLS:CLS#3:PRINT"The program will hold u

```

p to 60 entries in each month and will handl
e all trans-actions for a full 12 month perio
d.

15010 PRINT:PRINT"Up to 20 Standing Orders wi
ll be posted to the Account on the correct da
te. SOs may be at any frequency and can also
be changed during the course of the year.

15020 PRINT:PRINT"Up to 18 categories of espe
nditure may be named and year to date totals
in each will be accurately recorded.

15030 PRINT:PRINT"Facilities are included for
reconcilia- tion with your Bank Statement an
d output can be sent to a printer wherever thi
s is appropriate.

15040 GOSUB 300

15050 PRINT"It is recommended that the Standi
ng Orders file and the Special Expenditur
e categories are created before any data is
entered.

15060 PRINT:PRINT"When used with Disc Drive,
Frequent use should be made of the 'SAVE DATA
' - OPTION 7 on the main Menu.

15070 GOSUB 300:RETURN

20000 ch=0:RESTORE 1170:FOR i=0 TO 11:READ mo
\$(i):NEXT:GOTO 2000:REM ** goto this line to
restart if the program is broken **

30000 SPEED WRITE 1:SAVE "BANK":GOSUB 9000:60
TO 20000:REM *** AUTOSAVE ***

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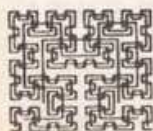
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Header

on Spectrum

This machine code routine, for Interface 1 owners, adds an extra command to ZX Basic, using the shadow system variable *Vector*. The new command **D*, will give details on any microdrive file, in a similar way to cassette 'header reader' programs. The command takes the format: **D.x;s;s...* where *x* is the drive number

(optional – leave out *.x* and 1 is assumed), and *s* is either (a) a channel specifier (eg #4) or (b) a filename. For example, the command might read: **d.1;"prog";"test"#4;"prog2"*.

The details printed are, for a *Print* file, only that it is a *Print* file; for any other file (Basic, Bytes or Array), file length and start address, for a Basic program, the program length and auto-start line, and for a variable array, the array name.

To enter the program, either use an

assembler or type in the hexloader, enter *FOOO* as start and *F220* as the finish, and type in the bytes from the hex listing. You may type in up to eight bytes in each input (do not separate with spaces), but leave out the checksums until you are asked for them, after every eighth byte.

Then save the code: type, *Save *"m";1;"*D code" Code 61440,552*. To set up the new command: *Poke 23735,0:Poke 23736,240*.

```
1 DEF FN B(A$)=CODE A$-48-7*(A$>"9")
2 DEF FN H(A$)=FN B(A$(1))*16+FN B(A$(2))
3 DEF FN B$(A)=CHR$(A+48+7*(A>9))
4 DEF FN H$(A)=FN B$(INT (A/16))+FN B$(A-16*INT (A/16))
5 POKE 23658;8:REM CAPS LOCK ON
10 INPUT "START?";LINE A$:LET START=FN H(A$)*256+FN H(A$(3 TO))
15 INPUT "FINISH?";LINE A$:LET FINISH=FN H(A$)*256+FN H(A$(3 TO))
20 FOR A=START TO FINISH STEP 8
25 PRINT FN H$(INT (A/256));FN H$(A-256*INT (A/256));
30 LET C=0
40 INPUT LINE A$:LET A$=A$+" "
50 FOR G=0 TO 7:IF A$(1)=" " THEN INPUT LINE A$:LET A$=A$+" "
60 LET Z=FN H(A$):LET A$=A$(3 TO):POKE A+G,Z:PRINT " ";FN H$(Z);:LET C=C+Z
70 NEXT G:INPUT "CHECKSUM:";LINE A$:IF FN H(A$)<>C-256*INT (C/256) THEN PRINT "CHECKSUM INCORRECT":GO TO 25
80 PRINT: NEXT A
```

The Music Box



Use of noise

A letter from Martin Unsworth of Hampshire comments that the Music Composer program for the Amstrad came as something of a disappointment. I've had an opportunity to play around with this Kuma package and, reluctantly, I'm forced to agree with Martin. The program is fundamentally flawed.

The most obvious failing is

the program's inability to deal with more than one sound channel or voice. The so-called 'mixer' section of the program is therefore a misnomer – while it enables separate monophonic sequences to be strung together end on end, there is no facility for creating a polyphonic sequence.

As Martin Unsworth notes, the program barely 'scratches the surface of the Amstrad's music making capabilities'. Apart from the lack of multiple voices, there are no facilities for enveloping or the use of noise. That said, the program's existing features are impressively implemented – clear and easy to use with graphics almost the match of those on the old Atari Music Composer package. A useful introduction to computer music for the Amstrad owner.

Martin Unsworth writes that he would 'be very interested to hear of any more comprehensive software packages that are in the pipeline'. Well, so would I... so if there's anyone from Amstrad out there, drop me a line.

Talking of which, Kenneth Davidson of Fife has written a letter to be passed on to an earlier correspondent, D Tatam, also the proud owner of a CPC64. Kenneth says that he's writing an envelope shaper/sequencer 'to take up to 200 notes on each channel' – which sounds interesting. He's also got a Datel Sound Sampler for the Spectrum, but notes that he's had to rewrite the software. I wonder if anybody else has had problems with the Datel software, because this is not the first such comment I've received.

The rest of the letter deals with other matters which, in-

cidentally, reveal – as did the recent *Popular* competition – that the level of involvement among those of our readers interested in computer music is very high.

I'll be getting round to the competition entries in due course. For now, I'll just say that they were of a generally high standard and it's very nice to hear the evidence of so much micro-musical talent.

Gary Herman

The Music Box is a weekly column with news, reviews and readers comments on all aspects of micros and music.

Any readers with experience of computer music making or companies with new product news are invited to write to drop a line explaining what they're doing to: Gary Herman, The Music Box, 12-13 Little Newport Street, London WC2R 3LD.

HEX FOR MICRODRIVE 'HEADER READER', WITH CHECKSUMS

F000	FE	5C	C2	F0	01	D7	20	00	=04	F110	F1	CD	2B	2D	CD	E3	2D	3A	=2D
F008	F6	20	FE	64	20	F4	3E	02	=CC	F118	AA	F1	A7	20	36	3E	02	11	=E9
F010	32	B3	F1	D7	20	00	FE	2E	=F9	F120	D5	F1	CD	0A	0C	ED	4B	AD	=8E
F018	28	07	DF	28	20	3E	01	18	=AD	F128	F1	CD	2B	2D	CD	E3	2D	11	=04
F020	0C	D7	20	00	D7	82	1C	DF	=57	F130	D5	F1	3E	03	CD	0A	0C	ED	=D7
F028	28	13	D7	14	23	4F	06	00	=9E	F138	4B	AB	F1	03	78	B1	0B	28	=46
F030	ED	43	D6	5C	18	07	D7	8C	=E4	F140	08	CD	2B	2D	CD	E3	2D	18	=22
F038	1C	DF	C4	62	F0	D7	18	00	=00	F148	20	11	D5	F1	3E	06	CD	0A	=12
F040	FE	3B	20	18	D7	20	00	FE	=66	F150	0C	18	16	FE	03	28	12	11	=86
F048	23	20	EB	D7	20	00	D7	82	=7E	F158	D5	F1	3E	05	CD	0A	0C	3A	=26
F050	1C	DF	28	E9	D7	14	23	32	=4C	F160	AD	F1	D6	40	CB	7F	20	08	=26
F058	B3	F1	18	E1	CD	B7	05	C3	=E9	F168	D7	3E	0D	D7	FB	E1	D9	C9	=77
F060	C1	05	D7	F1	2B	21	0A	00	=E4	F170	D6	40	D7	3E	24	18	ED	AF	=03
F068	A7	ED	42	DA	4C	06	ED	43	=32	F178	CF	21	FB	DD	E5	3A	B3	F1	=8B
F070	DA	5C	ED	53	DC	5C	D7	7A	=FF	F180	CD	01	16	11	D5	F1	3E	04	=FD
F078	F0	C9	D9	E5	D9	CF	22	DD	=1E	F188	CD	0A	0C	DD	E1	DD	E5	CD	=30
F080	CB	18	46	28	0A	AF	CF	21	=FA	F190	98	F1	DD	E1	CF	2C	18	D1	=2B
F088	CF	2C	FB	D9	E1	D9	C9	DD	=2F	F198	DD	E5	D1	21	0E	00	19	EB	=C6
F090	22	51	5C	E1	DD	CB	43	56	=F1	F1A0	01	0A	00	CD	3C	20	3E	0D	=7F
F098	CA	77	F1	CD	E6	15	32	AA	=D6	F1A8	D7	C9	00	00	00	00	00	00	=A0
F0A0	F1	CD	E6	15	32	AF	F1	CD	=58	F1B0	00	00	00	00	80	50	72	6F	=B1
F0A8	E6	15	32	B0	F1	CD	E6	15	=96	F1B8	67	72	61	6D	3A	A0	23	41	=E5
F0B0	32	B1	F1	CD	E6	15	32	B2	=80	F1C0	72	72	61	79	3A	A0	24	41	=FD
F0B8	F1	CD	E6	15	32	AD	F1	CD	=56	F1C8	72	72	61	79	3A	A0	42	79	=53
F0C0	E6	15	32	AE	F1	CD	E6	15	=94	F1D0	74	65	73	3A	A0	80	4C	65	=57
F0C8	32	AB	F1	CD	E6	15	32	AC	=74	F1D8	6E	67	74	68	3A	A0	0D	53	=EB
F0D0	F1	AF	CF	21	FB	DD	E5	3A	=87	F1E0	61	76	65	64	20	66	72	6F	=07
F0D8	B3	F1	CD	01	16	3E	0D	D7	=AA	F1E8	6D	3A	A0	0D	50	72	6F	67	=EC
F0E0	11	B4	F1	3A	AA	F1	CD	0A	=62	F1F0	72	61	6D	20	6C	65	6E	67	=06
F0E8	0C	DD	E1	DD	E5	CD	98	F1	=E2	F1F8	74	68	3A	A0	0D	41	75	74	=ED
F0F0	DD	E1	CF	2C	11	D5	F1	AF	=3F	F200	6F	2D	73	74	61	72	74	3A	=04
F0F8	CD	0A	0C	ED	4B	AF	F1	CD	=88	F208	A0	0D	50	52	49	4E	54	20	=5A
F100	2B	2D	CD	E3	2D	3E	01	11	=85	F210	66	69	6C	65	3A	A0	0D	41	=C8
F108	D5	F1	CD	0A	0C	ED	4B	B1	=92	F218	72	72	61	79	20	6E	61	6D	=1A
										F220	65	3A	A0	4E	6F	6E	65	A0	=6F

Header
by P Rhodes

Book Ends



Book *Com-
puter's Commo-
dore Collection*
(Vols 1 & 2)
Price £10.95 Mi-
cro Vic & C64
Supplier Holt
Saunders, 1 St
Anne's Road,
Eastbourne, East
Sussex BN21
3UN.

and graphics, utilities, pro-
gramming aids, applications,
and there are some novel and
ambitious projects, such as a
Chess program and a French
translator (Vol 2) and a Data
Handling Workshop (Vol 1).

Presentation is excellent -
clear print and spiral
bindings, with lavish appen-
dices and even indexes! The
only drawback is the price,
which is compounded by
most programs having ver-
sions for both micros, effec-
tively halving the space.
However, Commodore own-
ers often have to pay dearly
and Volume Two could be
worthwhile.

John Minson



Book *Learning
Forth*
Price £17.80
Micro
Any **Supplier**
John Wiley and
Sons Limited,
Baffins Lane,
Chichester,
West Sussex
PO19 1UD.

presumably educationally
sound as it reinforces every
point before the reader can
continue.

However, it does rather re-
semble the rote learning of
primary schools, though the
payroll program developed
over the last chapters is far
from juvenile.

Another possible problem
is insufficient discussion of
the language's various dia-
lects, though the book is well
appendixed and indexed. It's
an attractive volume which
even breaks the back of stack
handling quite painlessly, if
you don't mind the drill
aspect.

John Minson

Listings collections usu-
ally totally
underwhelm me, but
these two volumes, from
America's respected *Com-
puter!* magazine, stand clear of
the mass.

Instead of concentrating on
plodding Basic arcade games
they cover basic education, sound

This introduction to
Forth is described as a
self teaching guide,
which means that every para-
graph is followed by a
question.

Q. What is a self teaching
guide?

A. Very much like this.
It's a novel approach and



Headed up

This week we are continuing with details on how to get pokes in past Spectrum turbo loaders. At the top of the page you will find a short listing from Paul Miller of Hednesford which is a very useful utility indeed. It allows you to produce a new header for any Spectrum program to prevent it from auto-running. I advise you all to keep hold of this routine because we will probably refer to it many times over the next few weeks for various games.

Simply follow the prompts to produce your new header, then run the program, insert the original game and save the new header onto a blank tape. You should then reset the computer by typing **RANDOMISE USR 0**.

Now follow these steps to get the desired effects for *Underwulde* and *Knightlore*:

Underwulde - type **CLEAR 40000:LOAD ""** Play the new header, followed by the original tape which has been wound past its own header. When the OK message appears stop the tape. Type **POKE 24791, 251: POKE 24792, 207: RANDOMISE USR 24740**. Ignore the error message that appears and type **NEW**. Then from 62421 onwards poke the following numbers: for infinite lives 62, 0, 50, 240, 231, 50, 244, 231, 195, 242, 103; or to stay immortal after finding a gem 62, 0, 50, 153, 148, 50, 154, 148, 195, 242, 103; or to make weapons appear in the same place each game 62, 0, 50, 199, 232, 195, 242, 103; or for no enemy in game 62, 201, 50, 219, 175, 195, 242, 103. Finally, **RANDOMISE USR 62374** to start the main code loading.

Knightlore - type **CLEAR 40000:LOAD ""** as above. When OK appears **POKE 24745, 251: POKE 24754, 251: POKE 24792, 207: POKE 24793, 193: RANDOMISE USR 24744**. Ignore error, **NEW** and you can enter your

routines at address 62425 onwards. However, since there are a lot of things to do on this game, it will probably be simplest if you just type **POKE 62425, 251: POKE 62422, 201: RANDOMISE USR 62374**. This will load in the main block of code and dump you back into Basic.

Once this is done, **POKE 53567, 0** will give you infinite lives, **POKE 50084, 201** will stop metamorphosis, **POKE 50206, 0** will give indefinite days or **POKE 49759, n** where n is the number of objects to be collected. If you also **POKE 54562, 195: POKE 54563, 108: POKE 54564, 175** it will allow you to restart a game by pressing the pause key which is useful if you have infinite lives. **RANDOMISE USR 24832** will start the game.

However, if you want to see something really special enter this following short routine: **FOR N = 26796 TO 26813: INPUT A: POKE N,A: NEXT N** (enter) then enter these numbers in turn - 7 154 162 155 163 156 165 157 165 64 220 29 2 74 146 5 77 149. Room location J16 (on your map of Vol 4 issue 4) will have been redesigned! If you want to redesign room G14 enter the above routine again, but change the values of N to 26274 - 26289 and type these numbers 171 155 156 163 164 31 19 20 43 44 75 76 115 116 24 76. For room K4 let N = 26822 - 26842 and type 2 18 21 42 1 195 196 0 45 43 82 85 106 109 104 34 59 11 12 75 76.

This information is the result of some brilliant work by Neal Goodwin and Tony Jones of Wrexham. Neal cracked *Knightlore's* loader using a routine similar to that

```
10 REM TO COPY HEADER BLOCKS
   OF PROGRAMS SO THAT THEY
   DO NOT AUTO-RUN
20 FOR A=60000 TO 60025
30 READ B: POKE A,B
40 NEXT A
50 CLS : PRINT AT 1,1: "INSERT O
   RIGINAL GAME AND PRESS PLAY
60 RANDOMISE USR 60000 : REM TO
   LOAD HEADER
70 PRINT AT 10,1: "HEADER LOADED
   "
80 POKE 32014,128
90 PAUSE 200

100 CLS : PRINT AT 1,1: "INSERT
   BLANK TAPE TO COPY HEADER ONTO"
110 PRINT AT 21,1: "START TAPE A
   ND PRESS ANY KEY"
120 IF INKEY$="" THEN GOTO 120
130 RANDOMISE USR 60014 : REM TO
   SAVE NEW HEADER
140 PRINT AT 10,1: "NEW HEADER S
   AVED"
150 STOP
1000 DATA 221,33,0,125,17,17,0,6
      2,0,55,205,86,5,201
1010 DATA 221,33,0,125,17,17,0,1
      75,205,194,4,201
```

above. Tony found that by poking low addresses he could change room layout and together they unravelled the way that the program works. The rooms are stored from address 25176 onwards. Each one is of variable length - the room description is first followed by the room number, codes that control exits, colours, size of screen, etc, and finally the code 255 after which the data starts for the next room. These last numbers can crash the game if changed or wiped out so you must be careful. Peek the code from 25176 on and look for the room numbers which start at 1 and increase by one for each room.

To understand how the layouts work and design your own rooms, imagine the screen is like a chess board split into 64 squares numbered from 0 to 63. Square 0 is at the corner on the far left half way up the screen and they continue from 0 to 7 down the lower left hand edge to the bottom middle corner. The next row runs parallel to this numbered 8 to 15. The final row goes from

top middle corner to the corner at the far right of the screen numbered 56 to 63. On top of this chessboard are 3 more - each level is represented by adding 64 to the one below.

Each object is represented by these figures: 0 solid block; 24 jungle block; 168 collapsing block; 128 mobile block; 40 impaler; 32 gargoyle; 48 chest; 56 table; 208 portcullis top to bottom; 216 portcullis bottom to top; 200 magic spell; 184 roving ball; 72 ghost; 104 knight; 64 opposite direction knight; 16 bouncing ball; 176 exploding block; 152 falling spike. 111 and 121 are codes for moving blocks, but slow the game down and are best avoided. To each object number you must add 1 for every extra one you want, then follow it by the locations you want them printed; eg, 59 (4 tables - 56 + 3) 19 20 35 36 (print them at squares 19, 20, 35, and 36).

Don't worry if it sounds complicated - follow our examples through and you will soon get the hang of it.

Tony Kendle

We are searching for the top UK computer games player - the best there is!

The very best of Britain's game players will get to fight it out on a number of top secret new games - scheduled for release in the autumn.

Here's how it works

Study the table below and look at the column for the machine you have - these are the games you'll need to master. Send your high scores in on the form below, making sure that your scores are authenticated by a responsible individual signing the form. Any score achieved using technical short-cuts - such as infinite lives Pokes - will not be accepted.

Between now and September Tony Kendle will be keeping you up to date on the *Arcade Avenue* page with just who has the scores to beat. Then, in September, the top three scorers on each machine will battle it out for a place in the final and the chance to be the first to play our 'top secret' games.

	Commodore	BBC	Spectrum	Amstrad
Game 1	Suicide Express	Elite	Technician Ted	Sorcery
Game 2	Beach Head	Jet Pac	3D Star Strike	Splat!
Game 3	Shoot the Rapids	Chuckie Egg	Cyclone	Manic Miner

Game Wizard Entry Form

Micro

Game 1 score:

Game 2 score:

Game 3 score:

Name

Address

.....

.....

Your signature

Witness's signature

.....

Tony Bridge's Adventure Corner



Adventure-racers

Looking back to last week's Corner, where I mentioned The Adventurer's Club, I see that I overlooked the address and phone number – a day in the stocks is obviously called for! Contact the club at: 64c Menelik Road, London NW2 3RH (tel. 01-794 1261).

During the life of the Corner, there have been several games that have caught the imagination of the 'adventure-racers' – those who race to try to complete an adventure before anyone else. *The Hobbit*, with its percentage score was a favourite (remember the *Hobbit* Hall of Fame), and the *Lords of Midnight* series also brought forth a lot of 'I got there first' mail.

Now, we have another, *Shadowfire*. Two letters landed on my desk, from players who both claimed to be first in completing Beyond's new program.

Unfortunately, P Strowger finished the game on Tuesday, 30 April.

Although he was kind enough to send me a tape proving his achievement together with several invaluable tips, I'm afraid that Steve Ford wrote to me to say that he finished on Sunday, 28 April.

Steve is a little disappointed by the final congratulations – in fact, just one word, and that's it! 'But,' he says, 'this pales into insignificance when you realise just how great the game is. I consider it an honour to be able to play such adventures and Beyond deserve to be made the Gods of Adventuring (yes, even before Infocom!)' Strong words, Steve, but I admit that Beyond have done an awful lot to bring adventures to a wider audience, and they deserve every success.

The Grand Elf received another letter, written the 2nd of May, from Harry Wright of Preston. He didn't claim to be the first to finish *Shadowfire*, and didn't complain about the small congrats, but nevertheless, he has finished, and has passed on a few tips, for this program and *Valkyrie 17*, from Ramjam.

In *Valkyrie 17*: to get the Diamond 35,11 and to finish the game (there's a good hint for you!) 31,20,1,17.

Further to our discussion of *Zkul*, the QL adventure from Talent, Jeff Tope writes to me from Exeter University with some observations about the program – and yes, Jeff, I'd love to see the map you have made. Among other things, he says: 'When in the North side of the Centre Chamber, try 34,7. In the Toobee location, 26,14. I'm sure that Jeff won't mind me giving out his address, for those QL adventurers who may be stuck in *Zkul* (you will, of course, include a SSAE): Room L410, Cornwall House, St Germans Road, Exeter University, Exeter EX4 6TG.

Earlier this week I mentioned *The Hobbit*, but the name doesn't often crop up nowadays.

Of course, new adventurers are coming along all the time and discovering the delights of this classic program and it isn't easy to know where to go for advice, apart from combing the back copies of *Popular* and the Corner. Melbourne House themselves have published a book of hints (by David Elkan, at £3.95), as has Duckworth (The Old Piano Factory, 43 Gloucester Crescent, London NW1), in their *Adventurer's Companion*, by the disgustingly prolific Gerrard Brothers.

However, Mark Carleton of Dublin has obviously not read either of those books, or (shock, horror) been paying attention to the Corner: 'I have got to Gollum but when I talk to him, I always get strangled from behind. I am also stuck at the Black River, how do I get into the boat? The best thing to do with, Gollum is 24,4,5! If you decide to have a go you must be sure of your replies – if the little blighter follows you, then you may 22,5,19,15,12,27. To get the boat, 28,10,18. Then 37 and 23,30,16. At the other side you must, of course 23,8.

Nigel Hurl is having trouble in – guess where – the Goblin's Dungeon, the stumbling block for many of us adventurers.

Take heed of the clue, Nigel, and enlist the help of a friend. Wait around for Thorin of Gandalf to arrive, and then say 25,9 – now you can say 36,2. After this, what you do depends on who you have called on for help. Another adventure which is troubling Nigel, is Phipps' *Pharaoh's Tomb*, one of the earliest for the Spectrum. To get out of the ice cavern, you need to melt the ice somehow. You will have need of the candle from the storeroom, and the matches. The matches, however, have an unfortunate habit of bursting into flames, when you go through the fire room. You must, therefore, carry something which will temporarily nullify the effects of the heat – 25, 29, 6 is the solution, but you must leave the matches near the front entrance and return for them later properly equipped. You'll find that Death Tunnel will lead you back to the entrance – but you will be killed *on sight* (hint, hint). As for the maze, here is the route through, from death row 21, 3, 3, 33, 21, 21. Soon after leaving the Maze, you'll come across a closed door (this is the source of the 'rumbling noise' that you will have heard if you pulled that lever in the control room) the door only stays open for a limited amount of moves, so map the route carefully. It's a good adventure, with some tough problems, the only problem being the painfully slow drawing of the 1983-vintage pictures.

Andy MacGregor, a hapless refugee from *MicroAdventurer*, has completed a huge number of adventures, including titles from Level 9, Interceptor, Artic, Phipp, Quicksilver's *Velnor Lair* and others too numerous to mention. He offers help to anyone stuck in these – but he needs help in *Witches Cauldron* (how to get past the Dragon and how to get through the fire to get the pencil), and also in *The Sandman Cometh* (how to get the gun which is chained to the counter). I can't help here, so maybe another reader can enlighten Andy – and, in the case of *Sandman* if anyone can supply a map or solution, I would be grateful. Andy MacGregor, 12 Douro Close, Baughurst, Basingstoke, Hants RG26 5PG.

1 TO 2 WINDOW 3 WEST 4 ANSWER 5 HIM 6 ICE 7 TASSOC 8 OUT 9 ME 10 ROPE 11 PEDESTAL 12 SHORT 13 NORTH 14 TWICE 15 THE 16 BOAT 17 BARMAN 18 ACROSS 19 WITH 20 DIAMOND 21 SOUTH 22 KILL 23 CLIMB 24 DON'T 25 CARRY 26 DIG 27 SWORD 28 THROW 29 THE 30 INTO 32 GIVE 32 YOUR 33 EAST 34 SAYING 35 SHAKE 36 OPEN 37 PULL 38 RIDDLES

Adventure Helpline

Going bananas? If you are stuck in an Adventure with nowhere to turn do not despair – help is at hand.

Fill in the coupon, explaining your prob-

lem, send it to us, and a fellow adventurer may be able to help.

Remember – the system only works if those adventurers who have solved the puzzles get in touch. Every week is Save An Adventurer Today (SAAT) week!

Adventure..... on (Micro)
 Problem.....
 Name.....
 Address.....

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So, if you have an Adventure you want reviewed, or if you are stuck in an Adventure you cannot progress any further write to: Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

Peek & Poke



Comma change

Ian Boulton of Bristol, writes:

Q I have a Dk'tronics keyboard for my Spectrum and I need to enter lots of data. The separate numeric keypad is very handy, but its value is spoilt by having to shift to get a comma. Is it possible without much fuss to redefine the full stop on the numerics pad to a comma as a temporary measure?

A The best way of achieving what you require is to redefine the character set in Ram (in a similar way to that used for user defined graphics). All you need to do is to change the positions of the comma and full stop in the new character set. That will give you the effect you require. If you are using commercial software you will unfortunately still have a problem in getting the software to pick up your new character set. It is not possible to redefine the character set in any way that is 'permanent', ie, not overrideable by a commercial program.

Range of values

J Cunningham of Glasgow, writes:

Q The QL manual states that Val is not required in Superbasic, and while it is possible to enter:

`x=5 : x$=x*x : Print x$` (answer 25), there is no way that I can find of inputting a range of x values, Inputting a function and then calculating the set of y values within a loop in order to plot a graph. Would you please help?

A Well, this is not actually Superbasic, but it works.

```
10 Print 'Define function' :  
Print 'What is highest power  
of x?'  
20 Input p : Dim c(p+1)  
40 For i=p to 0 Step -1  
50 Print 'Input constant for  
x^'+i  
60 Input c(i+1) : Next i  
70 Print 'Input no. of entries  
required' : Input e : Dim  
y(e) : Dim x(e) : For i=1 to e  
80 Print 'Input value for x' :  
Input x(i) : Let v=0  
90 For j=0 to p  
100 Let v=v+(c(j+1)*  
(x(i)^j))  
110 Next j : Let y(i)=v : Next  
i  
120 For i=1 to e : Print 'Value  
of x = 'x(i);' value of y =  
'y(i)  
130 Next i
```

Book help

Peter Baillie of West Lothian, writes:

Q Can you help me in obtaining a book called *The Jupiter Ace*? I have had no luck in obtaining it anywhere... please, please help!

A Two addresses to try: Mine Of Information Ltd, 1 Francis Avenue, St. Albans AL3 6BL, or John L Noyce, Publisher & Information Consultant, PO Box 450, Brighton BN1 8GR.

Illegal line number

Dave Hood, Newcastle-upon-Tyne, writes:

Q Whilst examining the introductory basic loader on a piece of commercial software, I was mystified to find what should have been an illegal and unallowable line number. As you know the Spectrum allows line numbers between 0 and 9999. The line in question was numbered :243 (the colon was part of the number). Not only does this break the syntax rules, but after typing in the line 9999 Rem, I was surprised to find that :243 was still the last line in the listing. This line could be edited, but could not be

entered. Obviously I am most curious to know how the offending line number could have been entered and accepted in the first place, I would also like to know how this illegal number can be removed from the program altogether.

A As you rightly point out :243 is an invalid line number on the Spectrum, and cannot therefore be entered directly. You are incorrect, however, in stating that the Spectrum allows line zero. It does not! Lines with strange numbers like zero or :243 can only be entered with normal numbers (set to place them in the correct position in the program), and then Poked with their new (uneditable) value. In order to change this line number it is only necessary to find out at which memory location it is stored, and Poke that address (well addresses actually) with the value that you desire (preferably numeric). The line can then be edited in the normal way (or even deleted). This practice of changing line numbers (particularly to zero) is quite commonplace in commercial and home written software, although usually the number chosen is not quite so unusual!

One last point, the line number is not syntax checked when the line is executed, only when it is entered or edited. That is why you get no problems when running such programs.

Detection method

Simon O'Neill of Hornchurch, Essex, writes:

Q I have been programming my Spectrum in Basic and have come across the following question; when a user defined character is displayed on the screen is it possible to determine whereabouts it is? I know that you cannot use Screen\$ so I wondered

if there were any other methods.

A The actual method of detecting a UDG on the screen is... use Screen\$. I know what you are going to say, that that does not work, well...

If you use `Poke 23606, 88`: `Poke 23607, 254` and then `If Screen$(x,y) = Chr$(z) Then`...

You will be able to detect UDG's in the same way as any other character.

X and y are the coordinates of the character position you are interested in. Z is the Udg that you wish to test for (the first udg is Chr\$(32)). After carrying out the Udg testing you will need to reset the character set pointer that was moved by the earlier Pokes (that is what enables the Screen\$ to work).

This is done by `Poke 23606, 0`: `Poke 23607, 60`

Compatible printer

Jeff Rogers of Warley, writes:

Q I am soon going to purchase a printer for my Spectrum to help with letter writing, etc. There is one I have in mind: the Brother EP-22.

I am told that this has an RS-232C interface that is compatible with the Spectrum. I would be grateful for your help.

A There is no problem in using the EP-22 printer with the Spectrum. It does indeed possess an RS232 interface which allows you to connect it to a Spectrum, when you have obtained the Spectrum RS232 interface (from Sinclair).

This is obtainable from most branches of Smiths, Boots and the other retail outlets for Sinclair products. You should not experience any problems in obtaining the right sort of connections for the printer cable from a good computer shop.

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PL32

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With Comcon joystick interface, Currah micro speech, books, cassette recorder, lots of software, including: Alien-8, Knight Lore, etc. Worth £250, sell for £120 ono.

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PL376

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Free readers entries to buy or sell a computer.
Ring 01-437 4343 and give us the details.

Acorns for Sale

ACORN Electron boxed, 6 months guarantee with cassette recorder, joystick interface, dustcover and £140 of good software, also lots of Electron mags. Everything only £250 ono. Tel: Steve, Birmingham (021) 523 0452.

Tel: Upton on Severn (06846) 2838.

GOOD QUALITY BBC software for sale, inc. Microdrive games. Originals only. Tel: 341680, after 6pm.

FOR SALE BBC B software, Star Warp, Rubble Trouble, BMX On Moon, Winged Warlords, Uncle Claude, Felix in Factory, Mr Wiz, Jet Power Jack, Mined Out, Cosmic Kidnap, all originals, £4 each or £35 the lot.

ELECTRON software £3 each, wide choice, eg Missile Control, Chuckie Egg, Kamikaze, 100 programs, Java Star, Empire, Killer Gorilla, Felix Factory, Cybertron Mission, Turbo Compiler, Alien Drop-Out. Tel: 0502 83967.

BBC B OS 1.2 48K switchable Teac Drive 16 sideways Rom. Voltmaze joystick, Wordwise-View, Disc Doctor, lots of software, books and mags, £550. Tel: 01-993 2572 (W. London).

Ataris for Sale

ATARI SOFTWARE for sale or exchange for another computer and/or hardware. Eg printers. Also Oric 1 48k for sale at £60 ono. Tel: B'ham (021) 747 3618, after 6pm.

ATARI 800XL, games disc and demo programs £95 ono. Tel: 0753 21754 after 6pm. Ask for Ken.

ATARI Keep your high scores for all your computer games on a disk. Name of game, score, date, scorers' initials, witnesses initials, etc. £5.00 on disk, incl P&P. Tel: 0992 22234.

ATARI 48k Ram board wanted to suit Atari 400 or non-working Atari 800 for spares. Will swap Roms, Software, Joystick and/or cash. Tel: Steve 061 766 2159, after 7pm please.

FOR SALE Atari VCS and five cartridges (Pacman, River Raid, Pitfall, Robot Tank, Enduro) and joysticks, £70 or will swap for Interface 1 and micro-drive. Tel: 0733 237663, after 3pm.

Commodores for Sale

VIC 20 cartridge for sale £15 each. Super Expander, Prog. Aid cartridge, machine code monitor also motherboard for sale £11 (4 slot). Tel: Torquay (0803) 36979.

CBM 64 software Commodore Music Maker + keyboard, Raid Over Moscow, Raid On Bungelingbay, Suicide Express, Give My Regards To Broadstreet, and eleven more originals. Price new £155 +, want £85. Tel: (0382) 78556.

CBM 64 s/w inc: Fighter Pilot, Ultisynth, Vulcan Patrol 2, International Soccer, Manic Miner, Beach Head. Offers. Tel: Al. Risely 709 (originals only).

CBM Pet computer. Built in v.d.u., 32K model with C2N unit and dual drive 3040 discs. Also manuals and software etc. Perfect order. £295! (Swap for BBC B considered). (0244) 675717.

CBM 64 + C2N + joystick + around £300 software + many books, some mags, 1 month guarantee. £230. CBM1541 disc drive with loads of excellent disc software inc. Summer Games + Flight Simulator Two. Cost £380 +. Only £190. 01-863 5113 (Deepak).

AMAZING bargains for CBM 64. Intro to Basic Part One, only £8 (disc and tape) (r.r.p. £14.95). Also VIC-20 Arcadia £2.50, Fatty Henry £2.50, Xeno II £3.50. Quick, Mike 0558 822509.

VIC 20 16K switchable ZX printer interface. Plenty of software, Intro Basic 1, cust cover, books, mags, etc. £110 or swap for Spectrum hardware interface and joystick, microdrive, keyboard etc. Tel: 0253 868314 (Cleveleys).

CBM 64 + C2N data recorder + CBM modem + joystick + £100 of s/w. Guaranteed. £300. Tel: 051-924 1572.

CBM 64 software for sale. Koala Painter only £10. Also Mikro Assembler only £8 & Gas Kit 64 only £4. Offers not be missed. Tel: 021-742 6334.

VIC 20 3k expansion pack + C2N cassette + Basic to Part One, Snooker and Duck Shoot games just £75 ono. Tel: 01-633 7548 8am-4pm.

CBM 64 and 1541 disc drive + software (inc. Summer Games, Impossible Mission etc). Swap for Amstrad CPC 464 with colour monitor. Contact 35 Birkirk, Digmoor, Skelmersdale, Merseyside (Local).

VIC 20 plus C2N recorder plus 8K Ram plus Sanyo 12" green monitor plus books and manual. £150 the lot. Phone Mick. 01-828 2333 ext. 249 between 9 and 5pm.

CBM 64 software, Pastfinder (Activision) £8, Legend of Knucker Hole (English Software) £6, Tazz (Bubble Bus) £4, Strike Force (Bubble Bus) £4, Raid Over Moscow £5. Telephone Andrew Frinton (02556) 2451.

CBM 64 C2N two joysticks and paddles, books and many mags, software worth £150. Worth over £520, sell for £270. Tel: (0742) 613846 after 4pm ask for Paul (Sheffield).

CBM 64 software 22 titles. Includes Ghostbusters, Summer Games, Zaxxon, Decathlon, Loco, Toy Bizarre, Beach Head, Trollie Wallie. All at 50% or £70 the lot. Tel: Scarborough (0723) 371485 after 6pm.

VIC 20 C2N cassette 16K switchable joystick, games, inc. Cloud Burst, Boat Race, The Count, Jupiterland, + cartridges + maths program. £60. Tel: Ripley 0773 48007.

VIC 20 starter pack. 16K switchable Ram pack, joystick, games and mags. £70. Ring Southend 0702 540452. Also swap 6 x 3 snooker table with pool balls and cues for Spectrum.

COMMODORE Vic 20 plus cassette plus £100 games and lots of books plus joystick. Good condition. £130 o.n.o. Tel: Houghton le Spring 841676 after 6pm.

VIC 20 + C2N, £55, GP100 printer £95, motherboard £15, 16K Ram pack £20, Speech synthesiser £20, super expander, Vicman Programmers Aid £15 each, 11 books £28. Cost £870 new, sell £270 or split. Tel: Reading 302131.

VIC 20 3/8/16K Ram pack £25 no offers. Also 20 Vic games for sale £25 including perils of Willy Mega Vault, Chariot Race, Snooker and Skyhawk. Will split software. Hornchurch 45284.

COMMODORE SX-64 portable (includes disc drive and colour monitor) also 1520 plotter, £500 original software and accessories. CBM 64 compatible. As new. £650 o.n.o. (for quick sale). Tel: (0392) 54188 (8pm-9pm) Weds + Thurs.

COMMODORE MP5801 printer, boxed and guaranteed complete with paper, easy script word processor, games, and high-res screen dump software. Bargain at only £190 o.n.o. Phone Mike on 0624 26820.

COMMODORE 64 software for sale. Tales of Arabian Nights, Monty Mole, Chiller, Kokotoni Wilf, Strontium Dog (all originals). £20 the lot of £4 each.

COMMODORE 64 for sale with C2N Kemston, Quickshot, £90 worth of games, dust cover, books plus more extras. Over £300 altogether sell for £150 o.n.o. Phone Rick on W'Boro (0933) 677113.

VIC 20 + C2N cassette recorder, Introduction to Basic Part 1, joystick, 5 cartridges, 100 games, 10 magazines, all boxed. As good as new. Sell for £175. Telephone Dewsbury 450851.

CBM 64 C2N MPS 801 Printer plus £100 worth of s/w, books and mags going for £350 o.n.o. Try me. Ask for Tony 902 6392.

CBM 64 Easy Script on disc. Brand new, never used £25 only. Also Return to Eden on CBM 64 cassette £4. Phone 061 301 4043 after 6pm.

CBM 64 + C2N £100, 1541 drive (just serviced) £100, MPS 801 printer £150, 1701 monitor £150, Easy Script £15, M/ code Tutor £7, Int. Soccer £7. Other software. Offers for system (0291) 420923.

CBM 64 software to swap or sell, Hulk, Cliff Hanger, Eureka!, Blue Thunder, over 20 original titles. Tel: 051 327 2155, after 6pm, ask for Neil.

CBM 64 approximately £250 of Commodore software, will swap for Guild or similar acoustic guitar, or reel to reel multitrack tape recorder. Steve, 2 Ashover Street, Stretford, Manchester M32 0HG.

COMMODORE 8032 plus 8050 double disc drive + 4023 printer. Superscript word processor, adventure games, cables etc. £1500 ono. Tel: Border (Hants) 4261.

CBM64 software Turtle Graphics II, Hesware cartridge £12. Panoramah Hi-Res Graphics Designer (cass.) £8. Tel: Wigan (0942) 212662.

CBM64 + C2N — Disk Drive + 2 joysticks + £365 worth of original disk and cassette games software including Shamus I and II, Necromancer, Zork I, Suspended + Books, magazines etc, excellent condition, £400. Tel: 04215 61157, after 4pm.

COMMODORE 64, C2N cassette recorder, Quickshot II joystick, all boxed and in mint condition, hardly used, £155. Tel: 0472 885294.

CBM/PET software for sale, Petsoft, Petpack, original cassettes, games, educational, etc. Almost £100 worth! accept £30. Could post if required. Tel: Chester 675717.

CURRAH Speech 64 for CBM64 in 'as new' condition, boxed with manual £15 ono. Tel: 07404 289 and ask for Garry.

COMMODORE 64, Dragonworld by Trillion, sell £12. Tel: Bristol 649 441.

COMMODORE 64 + C2N cassette deck + joystick + programmers reference guide and over £75 worth of original s/w £200 ono. Tel: 092681 4279.

VIC 20 16k Rampack, 2 joysticks, printer with large amount of paper, 23 games, manuals, books, £195 ono. Tel: Gerrards Cross 882419.

COMMODORE 64 computer, 1541 disk drive, C2N cassette, 1011A RS232 adaptor (for Epson or Modem), joystick, Commodore Macro Assembler software, £295. Tel: 01-451 0520.

Dragon

DRAGON 32 software tapes: Talking Android Attack, Cosmic Zap, Kingdom. Cartridges: Personal Finance, Polaris and Skiing. £30 the lot or split. Dragon joystick £3. Tandy CGP 115 printer £50. Ring to haggle 0709 52834 eves.

DRAGON 32 Seikosha GP 100 A about £300 books magazines plus computer desk. £250 or offers or swap for Spectrum 48 and printer. Tel: Carl 0706 359370 after 5.30.

DRAGON 32 + 1 joystick with faulty keyboard, 2 books, over £100 of s/w, inc. Donkey King etc. Still boxed. Sell for around £100 or swap for interface I an microdrive. Tel: 01-272 2573 after 5pm.

IKON ultra drive for dragon. Only three months old, with seven cassettes and cassette box. £50. Tel: 0202 692633 after 6pm.

DRAGON 32, tape recorder, s/w + Epson M880 F/T type 3 Dot matrix printer, inc: cables, books etc. £200 o.n.o. Tel: (0634) 45831 after 8pm.

DRAGON 64 disk drive plus OS-9 and software including Stylograph and RMS. All with manuals £300 ono. Tel: Brian Tongue, Tenbury Wells (Worcs) 0584 810015.

TWO Dragon 32s (will split) for sale plus the best software. Also wanted: Alldream cartridge, Superchoc cartridge etc. And Tandy/Dragon machine code converter, lan. 37 Harehills Ave, Leeds LS8 4EX.

DRAGON 32, plus light pen + printer, all books and manuals. All leads, 30 original games + cassette, £300. Tel: Caterham 40867.

SWAP Vic 20 + 32k, C2N cassette + £150 of original s/w for Electron with cassette + games. Or sell £250 ono. Tel: Basildon 410741.

AMSTRAD CPC464 with colour monitor. Six months old, very good condition, inc manual, software, plus leads. Price £300 ono. Derek Arnold, 15 Ennersdale Road, Colleshill, Birmingham B46 1EP. Tel: 0675 62984.

TEXAS TI99/4A large selection of Modules, cassettes, speech synthesizer, magazines, etc. 041-887 8264 or SAE for list. Stewart, 5 Main Road, Paisley PA1 2TG.

AMSTRAD original software: War Zone, Software Star, Football Manager, American Football, Hunter Killer, Viking Word Processor: £4.80 each inclusive of postage. C. Klokakis, 47 Fernbank Avenue, Sudbury Hill, Wembley, Middlesex HA0 2TT.

BARGAIN two 8" disc drives with case and PSU. £90. Also Ventex TRW data point console (not working). £20. Tel: 01-881 1237.

AMSTRAD CPC 464, colour monitor, plus £30 of s/w + guide (worth £20). Excellent condition. Still under guarantee. £295 no offers. Tel: 0634 71651 after 5pm.

IBM 5251, terminal, the planner with suspected fault. Offers to McPherson. Tel: 057 67653.

TELETEXT adaptor for BBC. £140, 6502 second processor. £160. Tel: 01-459 3194.

AMSTRAD CPC 464, colour, cover, joystick £270. S. Brooks, Preston B33333 ext. 29 (Day).

UNUSED Hewlett Pakard 105B 8088 processor 256K Ram (710K/Byte) 3½ inch twin dos. Touch screen control, printer, s/w, manuals etc. £15000 or offers. Private sale only. Tel: 0256 53355 ext 6 or (0252) 520222.

SHARP MZ80A 48K, built in monitor & cassette, Hisoft Pascal, Kuma Basic Compiler, all manuals & s/w. Dust cover. Excellent condition. £250 o.n.o. Tel: Staplehurst (Kent) w/e or eves. 892391.

VTX5000 Prestel/Micronet interface for the Sinclair Spectrum, with Prestel application form and Prestel directory. Excellent as new condition in original packaging. Only £40. Tel: Horley 771876 evenings. Will post.

DEMON multi-baud modem for sale. Only six weeks old. For use on BBC + disc system. Software on Rom. Tape software for tape system. 300/300, 1900/75 baud. Only £75. 0373 826925.

AMSTRAD CPC464 colour, 6 months old complete with joystick plus £100 worth of software. All for £300. Tel: 0532 524755.

ORIC Atmos 48K with manual, leads, demo tape, some s/w. £50. Southport 25167.

TI99/4A joystick interface £2.50. Blast, Zero Zap, Hunt the Wumpus £6.50 each. Oldies but goodies, 1 and 2 Adventureland £3.50 each. Phone 0232 623001. 32 Glenshesk Park, Dunmurry, Belfast BT17 9BA.

LOTS of hardware, software and books for Spectrum. Reasonable prices. Phone (0467) 42429 and ask for Nick.

AMSTRAD s/w. Kong 2, Pyjamarama, Sourcery, Millionaire, Dark Star, 3D Starstrike, Oh! Mummy, B.C.2, D.T.'s Decathlon. All originals. Phone Steve (0703) 767580 or write to 377 Winchester Road, Bassett, Soton SO1 7DJ.

AMSTRAD originals: Tasword 464 (tape) £12.50, Micropen database (disc) £35. Both with manuals. Phone Marc any time on 01-961 5886.

MEMOTECH MTX 500, speaker, £25 worth of magazines, 4 books, £80 software, two joysticks. Worth over £350 in total. Offers to Phil Grossman. Tel: 684738 or swap with Electron with joysticks.

QL, Quill, Easel, Abacus, Archie, latest updated 100% machine code version. Unused Pyon s/w + relevant documentation. £5 each or £18 the lot. Tel: Bordon 4030 (eves.).

EASY SCRIPT for Commodore 64. Used only once. £30 o.n.o. Also wanted, old Vic 20 type C2N. Bristol 649441.

AMSTRAD DMP1 dot matrix printer hardly used. £130. 01-502 2681 after 6.30pm.

BROTHER HR-5 (RS232) printer, with mains adaptor. £130. Also Kempston joystick interface £5. Tel: Glasgow (041) 959 6125 ask for Gregor.

AMSTRAD (green) perfect condition, as new, with boxes and eight months guarantee. Plus Tasword, arcade and adventure games, typing tutor, utilities and book. Worth £300. Bargain at £200. Tel: 01-693 5293.

AMSTRAD CPC 464 (green) £189. DMP-1 printer. £149. MPI colour modulator. £15. Sell complete for £390. All mint. Kingston Blount (0844) 53289.

PRISM VTX 3000 modem for Spectrum with on-line handbook, user to user software and magazines. £37 o.n.o. Phone 0482 491749 between 6-8.30 or write to L. Whatmough, 247 Victoria Avenue, Princess Avenue, Hull HU5 3EB.

TI-99 computer. Game modules and educational. Very good condition. Only £30 o.n.o. plus many books. Phone 01-550 4336.

QL updated version of: Abacus, Archive, Easel, & Quill. Include documentation, all original on microdrives. Would cost £15 each new. Highest offer secures. Please phone Ray on 021-429 2312 after 5pm.

TI99/4A module extended basic £45. Also Dow 4 Gazelle flight simulator £10 with manuals. Tel: 0245 265549.

PSION Organiser pocket computer, inc. Mathspack + manuals. Hardly used. Good condition. Tel: James on Southampton 225393 after 6pm.

AMSTRAD CPC 464 with colour monitor. Mint condition. Only a few months old. Some software. Only £290. Tel: 061-881 3651 ask for Tony.

AMSTRAD green screen + modulator & £100 of s/w. Nearest £210 or will separate. Mr Arken. Tel: 0782 45431 9-5pm.

AMSTRAD user wishes to find a pen-friend, home or abroad. Please write to Mark Walmsley, 34 Bank Lane, Intack, Blackburn, Lancashire, England BB1 2AX.

ORIC Atmos 48K less than one month old but I'm now emigrating to USA and it won't work over there hence bargain price. £59. Phone Greg, Brighton (0273) 600070.

SHARP MZ80K 48K computer b/w, built in monitor and cassette unit. Some software. £110. Sord M5 and some software. £35. Swap involving Texas peripherals considered. 0408 75036.

QL version 2 Psion programs for sale. Quill, Easel, Abacus, and Archive with documentation. All unused. £30 o.n.o. Tel: York (0904) 729184.

96K Lynx and disc drive with printer interface and software. £250 o.n.o. Tel: (0524) 415436 evenings only.

SOFTWARE for sale. For Amstrad CPC 464. All originals, Detective, Star Commando, Steve Davis Snooker and Roland In Time. £5 each p&p included. 01-928 9221.

CUMANA 40 track disc drive, leads, manuals, formatting disc, integral power supply. Suitable for BBC. £75. Tel: (0272) 684740.

CASIO MC45 electronic keyboard G.C. 8 rhythms, 8 sounds, Cibrato 2nd sustain. Selling for £55 inc. an adaptor. Tel: (061) 790 9053 after 5pm.

SEIKOSHA GP 100A printer, compatible, parallel interface £100. Tel: Biggen Hill (0959) 74133. (Oregon s/w + books).

VETREX computer games system, monitor, joystick & 4 cartridge games £35. Tel: Burth Heath 51121.

UNOPENED Level 1 Econet software and printer server. Half price. Tel: Mendlesham 7130.

AMSTRAD CPC464 with colour monitor £250. Excellent condition. Also two games two programming books, keyboard cover and blank tapes for £35. All above for £275. Tel: 0283 37734.

ORIC 48k plus Oric printer with spares plus various software (arcade and adventure games, word processor, assembler). All boxed with manuals. Great value at £100 the lot. Tel: 0462 730067.

AMSTRAD CPC 464 colour complete with joystick software and books. Excellent condition, £280. Tel: Ashford (Middx) 53468.

PRISM VTX 5000 Modem (for Spectrum) complete with connector, etc. Hardly used. £40. Tel: 01-806 4044.

ZX Printer + 4 roms, £15.00; DK-Tronics Character Board (ZX81) £12.50; Zon-X Programmable Sound Generator (Amp/Spkr) 81-Spec £12.50; Gianmire Realtime Clock-Cal I/O Board ZX-81 £15; Microtutor 6502 PSU, TV/Cass leads, £40. McKenzie, Preston 864599.

ORIC Atmos 48k under makers guarantee with technical software including unique five equation curve fitting, transient vibrations, spreadsheet, analysis, etc. Also books £85 ono. Tel: 0785 52189 evenings.

AMSTRAD, colour monitor, 2 joysticks, several books, mags, £400 or original s/w. Swap for BBC or CBM 64 with disc drive. Tel: 0900 65614, Kleth (daytime).

MODEMS, prisms 75/1200, Acoustic, £15. Maplin 30/300 direct connect. Built into phone £30. BBC joysticks £5. Tel: 01-958 6228, Peter Knight.

CBM 64 801 Printer with paper, £125. Tel: 01-837 0987.

NEWBRAIN Ad, 40/80 columns with latest Rom. This excellent micro for sale at only £125. O/S software manual £15. Tel: Farnborough (0252) 540633.

SONY MSX computer with 4 game cartridges won in local radio competition, £200 ono. Tel: Wrexham 753238.

PAIR of self centering BBC joysticks and seven discs, three of which have games on them, Meteors, Planetoids and Arcadians. Sell separately or the lot for £25. Tel: 051 327 2155.

EPSON MX82 printer with stack Centronics and software for Comm 64 £125 ono. Tel: 051 933 3988 anytime ask for Dave. Can deliver (free box of paper).

KEMPSTON joystick and interface for sale, only £17.50. Cambridge joystick, tape and interface, only £22.75. Tel: 01-348 3924 and ask for Graham.

BROTHER EP-22 printer/typewriter, RS-232 battery or mains (adaptor inc). Thermal or ordinary paper, £80. Tel: Blackpool (0253) 38395, carriage extra.

STONECHIP programmable joystick interface to sell for £15 or will swap for ZX printer + paper. Tel: 0287 32561 (after 3.30pm on weekdays).

BROTHER HR5 printer (RS232), 8 months old, power supply and manual £100. Tel: 01-221 7072.

FOR SALE Rotronics Wafadrive with 3 Waifas + Word Processor £80 or swap for A4 width printer, must be in good condition. Tel: Wigan 36284 or write Tommy, 127 Spring Street, Wigan.

AMSTRAD CPC464, 3 months old, little used, includes colour monitor. Quick sale £300 ono. Tel: 902 2788, after 9pm, Mon to Fri. Ask for Amrat.

JUPITER ACE 64k, Fuller keyboard, manual and leads, quick sale only £45 ono. VGC. Tel: Reading (0734) 483753 evenings.

8 GAMES for sale: inc World Series Baseball, Daley Thompson's Decathlon, Air Wolf, Snooker, £4 each or £20 the lot. Original games only. Tel: Sheerness 664009.

CENTRONICS Printer Plotter 4½ rolls, 4 colours, cables for Oric, Acorn, Beeb etc. boxed £80. Oric Atmos 48k complete with s/w, manuals + mags, boxed, £60. Tel: Cambridge 240127.

FOR SALE TI994A cartridge, Car Wars, £5.50. Contact Mr Wingfield, 41 Towan Ave, Fishermead, Milton Keynes MK6

DISCS A box of 10 unused 3m discs, double sided, double density, 96TPI Bargain at £10. Tel: 0733 237663 after 3pm.

COMPUTER SWAP

Computer Swap entries are limited to 30 words. Either fill in the accompanying form and send to Computer Swap, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD or telephone 01-437 4343.

All software offered through computer swap must be in original condition and for private sale only.

It cannot be swapped.
Warning: It is illegal to advertise pirated software

COMPUTER SWAP

Please write your copy in capital letters on the lines below.

Name

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CBM64 C2N cassette and joystick also £120 of best software including Impossible Mission, Ghostbusters, Beach Head and many others also over 100 magazines cost £450 sell £250. Tel: 0744 33341 (St. Helens).

EASYFILE for Commodore 64, as new with manuals. Sell for £25 ono. Tel: 0909 477189.

CBM + FOUR, cassette deck, joystick £100 original games, games book, £190. Tel: 01-624 2520 (day).

CBM 64 compunet Modem, 4 months old, £75. Tel: 01-540 5778.

VIC 20 computer, matching cassette recorder, 32k rampack, super expander, joystick, cartridges, cassettes, books, value £340. Sell for £170 ono. Tel: Hitchin 55902.

CBM 64, 1520 printer plotter, 1541 disc drive, dataset, Simon's Basic, Easy Script, Books, s/w (all originals), sell £400 ono. Tel: 01-907 9572.

For Sale

SONY MSX HIT BIT MICRO. Over £60 of software value, £350. Sell for £200. Tel: 05827 69152.

EPSON HX20 with 16K expansion Ram, micro cassette drive and printer, 2 games cassette and spare rolls of paper, £350 ono. Tel: Mr Harris 01-855 6407 or 0304 813156.

ORIC ATMOS 48K, some software, £60. Tel: Southport (0704) 25167.

ORIC ATMOS 48K plus over £100 of software and books. All only 3 months old offers invited (no splitting). Ray. Tel: Leeds 406331.

FOR SALE issues 1-24 of the Home computer course worth £20 but sell for £8. Fast sale wanted. Stevyn. Tel: sheerness 664009.

SINCLAIR ZX81 16K RAM pack (boxed) £10 ono. Tel: Bolder 372943.

AMSTRAD CPC464 and colour monitor plus 4 games and other cassettes, plus mags. £260. Tel: 061-681 9776 between 5 and 7pm and ask for Derek.

BBC B + SOFTWARE, leads and manuals and speech synthesiser + 48K Spectrum, S/W and manuals, 50/60 mags, £50 worth of BBC books, £450 the lot. Rajmeh. Tel: 01-553 3571.

AMSTRAD CPC 464 GAMES. Roland on the Ropes, Hunchback. Brand new, both £4.50 each. Send name, address and money to: M. Sultan, 109 Cranham Drive, Warndon, Worcester WR4 9PQ.

AMSTRAD GAMES: Jewels of Babylon, Roland in Caves, Manic Miner, either swap or sell. Sorcery wanted! Please contact Richard on Ramsbottom (070682) 2025.

FOR SALE Currah speech complete with demo cassette, boxed, hardly used. Price: only £17. M. Davies. Tel: Heywood 624970 after 5pm.

SINCLAIR QL. Recent model £250 Alphacom 81 printer plus parallel interface for the Acorn computer £90 the two. Tel: Banbury 51097.

AMSTRAD CPC464 with colour monitor includes software (sorcery, Hobbit etc), and joystick, £300. Tel: Lingfield (0342) 834705 after 5pm. (Surrey).

AMSTRAD 464 colour computer and DDI disc drive, with software, books, joystick, DK Troins speech unit. Worth over £600 accept £450. Mark. Tel: 010947 8195 Wandsworth, London.

CALCULATOR Casio FX451 with 98 scientific and logic functions including Hex, decimal, binary functions. Never used, hence as new condition, only £12. Tel: 0325 312417.

AMSTRAD ORIGINALS for sale: Battie for Miway, £6.50; Detective; S. D. Snooker, Blagger, Star commando, £5 each. Tel: 010928 4221 ask for Michael.

KOALA PAD. Also the last one swap for C64 hardware peripherals or intelligent software considered equivalent value. Tel: 0248 353346.

FOR SALE: £86 worth of software including Tir Na Nog and The Quill for £30. Write to T. Williams, 91 Brittain Drive, Grantham, Lincs NG31 9JZ.

ADVENTURERS! Valhalla and the Hobbit: The classic Spectrum adventures. Originals, complete with manuals, etc. £12 for both. Offers to: A. Wiseman, 68A Mayfield road, Hartford, Huntingdon, Cambs PE18 7NJ.

AMSTRAD SOFTWARE: Manic Miner, Blagger, Codename Mat, and Roland in The Caves. (all originals) £4 each. Tel: 059-588 394 after six.

AMSTRAD CPC464 with colour monitor + s/w, £230. Tel: 0702 334593.

ORIC ATMOS 48K. Four years' guarantee plus £170 worth of books plus two games free. Accept £45 for the lot. Joe. Tel: 01-579 2535 (London).

AMSTRAD DOT MATRIX PRINTER unused with guarantee, £140. Tel: 0454 772653 (Bristol area).

SHARP MZ700, integral tape recorder, speech synthesiser. Over £150 software including: Pascal, Forth, machine code, Basic compiler, utilities, adventures, games, also several books, £220 ono. Tel: Bedford 857345 evenings weekend.

SINCLAIR QL, six months old, £310. Jonathan. Tel: 0744 51797.

SINCLAIR QL FOR SALE: used once only. Latest S/W and 4 blank cartridges, £330 ono. Brian. Tel: 01-692 4690.

AMSTRAD COLOUR B/W. Boxed, perfect, full guarantee. Tasword logo, Dev-pack, Manic, Sorcery, Football Manager, American Football, Adventures, offers. Aall originals worth over £500, sell £300 ono Tel: 01-586 5959 ex 3002 9-5pm.

AMSTRAD CPC464 green screen, 6 months old, perfect condition, TV modulator, joystick manual, 11in software tapes, £195 complete. Richard. Tel: Wokingham 0734 780992.

AMSTRAD CPC464, colour, perfect condition with Tasword, Hisoft assembler and selection of games. Upgrading to 16 bit business machine, so all available for £290. Tel: 0428 712652 (Headley, Hants).

AMSTRAD ORIGINALS, return to Eden, £5. Gilligans Gold, £4 as new. Also Cheethah Speech Synth for Spectrum, £10 as new. Tel: 0630 57129 after 5pm.

CHESS COMPUTER cost £35, accept £12.50. Amber dot matrix printer, cost £110, accept £40 (lead available for CPC464) Manic Miner for Amstrad: £3 all in excellent condition. Tel: (0902) 725762.

AMSTRAD SOFTWARE and books including Snooker, Blagger, Hunchback, etc. All originals. Games and educational, 16 titles at 40% original cost. Tel: 0255 614523.

SHARP MZ80K plus software, £130 ono, CGLM5 plus FALC plus printer cable, £50 ono. M. P. Voising. Tel: 0480 75036.

AMSTRAD CPC464 + green screen monitor + disc drive including C/PM and utilities on disc. Worth £450, sell for £300. Very good condition. Tel: 01-806 78614 after 5pm (London).

QL PSION UPGRADES (Vers. 2.00) of Quill, Abacus, Archive and Easel. Unwanted spare set new and unused. Will sell complete only £30 (Sinclair price £50). Tel: (0865) 65164.

AMSTRAD MONOCHROME MONITOR. As new, with boxes and eight months' guarantee. Plus Tasword, Arcade and Adventure games, typing tutor, utilities and book. Unwanted present, worth £300, accept £200. Tel: 01-693 5293.

AMSTRAD CPC464 only 4 months old with green screen monitor. Excellent condition + S/W + mags, £180. Tel: Lichfield 54766.

DK TRONICS CHARACTER ROM on PCB for ZX81 computer. Full instructions included. Will post recorded delivery if required. Accept £7.50! Tel: (0244) 875717.

FOR SALE: Currah Speech (inc book and tape), £18. Also Valkyrie 17 (micro drive compatible), £7.50. Also wanted 16K Ram pack for ZX81 will pay £10. Tel: 0968 73705 after 7pm and ask for Julian.

CHEETAH SWEET TALKER FOR SALE. £15, boxed with instructions and demo tape, hardly used. For 48K Spectrum or Spectrum Plus. Tel: 01-906 1587.

PANASONIC CASSETTE tape recorder, mains/battery, suitable for computer, £10 in leather case or swap WHY for any Amstrad bits. Cash either way. Tel: 593 8522.

PRINTER DATA DYNAMICS 390, RS232, 110 Baud. £45 ono. Tel: Grays Thurrock (0375) 31076.

INTERFACE TWO FOR SALE. Sell for £12.50. Christopher. Tel: (0284) 60724.

AMSTRAD CPC464 colour BASIC/Firmware books. Six games, Joystick, dust covers. Cost over £450, first £300 secures. Tel: Guiseley (0943) 78778 or Leeds (0532) 506156. Delivery within 50 miles of Leeds.

Wanted

SWAP VIC20 for any other computer, tape deck, 20 games, joystick, 17 books. Tel: 01-599 8726 Steve after 4pm.

SWAP 48K Spectrum cassette, Interface joystick, lots of games, for cast iron weights, barbell and dumb-bell set. 061-653 3732 or sell sell £150.

WANTED printer I/O Box, s/ware, manuals etc for Sharp MZ80K. Phone/write 63 Sprineboig Road, Glasgow. 041-774 2009.

LYNX 96K. Swap my very own programs for yours. Some 48K versions also available. Every contact welcome as I am a lonely Swiss Lynx user. Michel Meregnani, Poudrières 59, 2006 Neuchâtel, Switzerland.

SWAP 1 Chrome Super Tuff Burner, Sky Way's wheels plus £30 cash for Spectrum 48K with leads and tape recorder. Cardiff 752689.

FIGARO 64 wanted to buy. CBM 64 version. Tel: 01-387 5312.

WANTED quality s/w for CBM 64, Spectrum + BBC all offers considered. Bulk purchase if possible. Tel: 01-892 6575 after 5pm.

COMMODORE VIC20 owner requires photo copying of instructions for Commodore programmes and cartridge. Payment £5 + costs of postage and photo copying. Private bag 0061, Gabrone, Botswana.

WANTED - Wico joystick Tel: 051-733 0090 after 4pm.

WANTED - 64K MSX computer with 2 tape recorders. Must be Hitachi or Toshiba. Swap for CBM 64 with tape recorder + s/w. Tel: 0782 24552.

SWAP my Acorn Electron + original s/w for Spectrum Plus and s/w for CBM 64 + data recorder, must be working order. Derek 0632 551480.

ESPECIALLY needed, Atari soft, Thorn EMI, Apple Panic, 40 colour card. Tel: Stevenage 0438 811634 after 7pm.

SPECTRUM 48K wanted will pay £35. Tel: 0977 511205 after 6pm ask for Melvyn.

EXCHANGE Oric I and/or Dragon 32K for Atari compatible hardware and/or software or swap both for CBM 64. Phone B'ham (021) 747 3618 ask for Nigel.

WANTED 48K ZX Spectrum not issue one in working order any reasonable offer considered. Tel: (0462) 893804 after 5pm (Tom).

SWAP Spectrum - brand new + keyboard, joystick, tape recorder, 16 best s/w for CBM 64 + data recorder or sell cash. Tel: Paregh (0895) 35874 after 4.30pm.

ADVENTURE

HELPLINE

Fantasia Diamond on Amstrad. How do you cross the river and/or open the manhole? P J Long, 3 Victoria Place, Bedminster, Bristol BS3.

Jewels of Babylon on Amstrad. Help! I am weaponless! Where is the spear and the gun? How do you get past the octopus and the crocodile? Andrew Walton, Finlow Hill Cottage, Over Alderley, Macclesfield, Cheshire SK10.

Super Spy on Spectrum. Where do you go to and what do you get from London? Brian Stubbs, 27 Ayresome Terrace, Roundhay, Leeds 8, W Yorks.

Valkyrie 17 on Commodore 64. How do you use the aqualung and shaving foam, and get into the schloss? Liz O'Brian, 2 Bridle Path, Madeley, nr Crewe, Cheshire CW3 9EL.

Gremlins on Spectrum. How do you kill the gremlin in the bedroom to get the flashlight? I have the sword, the camera, gas bottle, ladder, remote control and Gizmo. Symon Kendie, 80 Tower Street, Trefores, Pontypridd, Mid Glamorgan, S Wales.

Valhalla on Commodore 64. I can't find Ofnir. K. Stirk, PO Box 5529 Jeddah, Saudia Arabia.

Classic Adventure on Amstrad. Stuck! I have 14 items (including the pyramid) but I can't find any more rooms or treasures. Linda Wright, 18 Longfield Gardens, Tring, Herts.

Castle Quest on BBC B. Where is the aqualung. A Hodson, Rishworth Avenue, Rugeley, Staffs WS15 2ER (Tel 77862).

Planet of Death on ZX81. I don't know how to kill the green man. Bryan Peacock, 23 Taylor Street, Consett, Co Durham.

Quest on Spectrum. How do you enter the castle? Nicholas Mansbridge, 29 Appleby Close, Selwyn Estate, Highams Park, London E4.

Forest at Worlds End on Amstrad. I cannot progress from Smiths Forge. I do not know where to go and need help! Jonathon Smyth, 9 Jubilee Place, Lisburn, Co Durham, Northern Ireland (Tel Lisburn 79309).

Witches Cauldron on Spectrum. I changed into an ape, opened the cupboard but am now stuck in the hall of mirrors. Stephen Erorwein, 29 West Avenue, Walthamstow, London E17.

Temples of Vran on Spectrum. How do I get down the cliff? Carl Brennan, 4 Lyndale Grove, Lostock Hall, Preston, Lancs, PR5 5XX.

Ring of Power on Commodore 64. How do I get past the lift attendant? I can't find any gold coins. J E Barber, 138 Oak Tree Lane, Selly Oak, Birmingham B29.

Se-Kaa of Assiah on Spectrum. How do I get the rod of light? how do I open doors? Carl Brennan, 4 Lyndale Grove, Lostock Hall, Preston, Lancs.

Time Lords on Amstrad. In Zone 3 how do I get past the Bronto? Also, how do I get past the cave men in that zone? Peter V Degiorio, 28 Grenfell Street, St Julians, Malta.

Strangers Aural Quest on Spectrum. Where is the third part of the ear and how do I get it? Also, how do I get the fourth part. Dave Morris, 55 Hawthorn Street, Wilmslow, Cheshire.

Spiderman on Sp0c0r. I can't defeat the mysterio or electro and I can't get the bio-gem. Neil Parsons, 158 Brindle Road, Bamber Bridge, Preston, Lancs.

Erik the Viking on Spectrum. What use are the spectacles? John Rundle, 24 Western Road, Aldershot, Hants.

CONFUZION
BY
INCENTIVE
£6.95

- Vic 20**
- (1) R.I.P. (Mastertronic)
 - (2) Rockman (Mastertronic)
 - (3) Doodlebug (Mastertronic)
 - (4) Space Scramble (Mastertronic)
 - (5) Mickey the Brick (Firebird)
 - (6) Snake Bite (Firebird)
 - (7) Sub Hunt (Mastertronic)
 - (8) Psycho Shopper (Mastertronic)
 - (9) New York Blitz (Mastertronic)
 - (10) Phantom Attack (Mastertronic)
- (Compiled by Websters Software)

- Commodore 64**
- (2) Rolands Rat Race (Ocean)
 - (4) Everyone's a Wally (Mikro-Gen)
 - (1) Grog's Revenge (US Gold)
 - (3) Bounty Bob (US Gold)
 - (6) Master of the Lamps (Activision)
 - (-) Gates of Dawn (Virgin)
 - (7) Airwolf (Elite)
 - (8) BMX Racers (Mastertronic)
 - (10) Booty (Firebird)
 - (9) Chiller (Mastertronic)
- (Compiled by Websters Software)

- Spectrum**
- (2) Confuzion (Incentive)
 - (1) Booty (Firebird)
 - (4) Airwolf (Elite)
 - (6) Bruce Lee (US Gold)
 - (5) Raid over Moscow (US Gold)
 - (3) Cyron (Firebird)
 - (8) Starion (Melbourne House)
 - (7) Finders Keepers (Mastertronic)
 - (-) Moon Cresta (Incentive)
 - (-) Wizard Warrior (Mastertronic)
- (Compiled by Websters Software)

- BBC B**
- (1) Elite (Acornsoft)
 - (-) Wizardore (Imagine)
 - (-) Ultron (CSM)
 - (2) Snooker (Acornsoft)
 - (6) Castle Quest (Micropower)
 - (-) Elite (Disc) (Acornsoft)
 - (-) Challenger (Mastertronic)
 - (3) Mini Office (Database Pub)
 - (5) Duck (Firebird)
 - (-) Mr 'EE' (Micropower)
- (Compiled by Websters Software)

- Atari**
- (5) Smash Hits 1 (English)
 - (3) Spitfire Ace (US Gold)
 - (4) Mr Do (US Gold)
 - (1) Bruce Lee (US Gold)
 - (6) Fort Apocalypse (US Gold)
 - (9) Attack of Mutant Camels (Llamasoft)
 - (8) Smash Hits 2 (English)
 - (-) F18/Strike Eagle (US Gold)
 - (2) Blue Max (US Gold)
 - (-) Zaxxon (US Gold)
- (Compiled by Websters Software)

- C.16**
- (5) Vegas Jackpot (Mastertronic)
 - (-) Exorcist (CBM)
 - (7) Classic Adventure (Melbourne House)
 - (-) Games Tape 2 (Melbourne House)
 - (6) Scramble (Anirog)
 - (-) Games Tape 1 (Melbourne House)
 - (-) Stellar War/Blitz (CBM)
 - (-) Crazy Golf (CBM)
 - (4) Williamsburg Adv (Microdeal)
 - (1) Wizard & Princess (Melbourne House)
- (Compiled by Websters Software)

- Electron**
- (2) Mini Office (Database Pub)
 - (1) Football Manager (Addictive)
 - (-) Elite (Acornsoft)
 - (6) Classic Adventure (Melbourne House)
 - (10) Overdrive (Superior Soft)
 - (5) Chuckie Egg (A&F)
 - (7) The Hacker (Firebird)
 - (-) Bird Strike (Firebird)
 - (3) Ghoul (Micropower)
 - (7) Dare Devil Dennis (Visions)
- (Compiled by Websters Software)

- Amstrad**
- (2) Fighter Pilot (Digital Intergration)
 - (-) Decathlon (Ocean)
 - (-) Sir Lancelot (Melbourne House)
 - (-) Combat Lynx (Durrell)
 - (-) Fruity Frank (Kuma)
 - (1) Sorcery (Virgin)
 - (7) Dark Star (Design Design)
 - (-) Snooker (S. Davies) (CDS)
 - (-) Confuzion (Incentive)
 - (3) Jet Set Willy (Software Projects)
- (Compiled by Websters Software)

Event	Dates	Venue	Admission	Organisers
Computer Show	May 28th 10.30am - 7.00pm	Saracens Hall 18 Swindon Rd Cheltenham	50p	C.J.S. Ltd Northleach 809
6th Commodore Computer Show	June 7-8 10.00am - 6.00pm June 9 10.00am - 5.00pm	Novotel London W6	£2.00 adults £1.50 children	D + CS Marketing Ltd 01-630 8165
Microfair	June 22 10.00am - 6.00pm	New Horticultural Hall Greycoat St London SW1	£1.50 adults £1.00 children	Mike Johnson 01-801 9172
Third Official Acorn User Exhibition	July 25 Trade: 10.00am - 1.00pm July 26 - 28	Barbican Centre London EC2	£3 adults £3 children	Computer Marketplace (Exhibitions) Ltd 01-630 1612

Readers' Chart No 25

			Various Artists
1	(1)	Soft Aid (Spectrum/C64)	Mikro-Gen
2	= (2)	Everyone's a Wally (Spectrum/C64)	Ultimate
	= (3)	Alien 8 (Spectrum)	Ultimate
4	(4)	Knight Lore (Spectrum/BBC/Amstrad)	Virgin
5	(8)	Sorcery (C64/Amstrad)	US Gold
6	(7)	Bruce Lee (Spectrum/C64)	Ocean
7	(5)	Match Day (Spectrum)	Gargoyle
8	(6)	Tir Na Nog (Spectrum/C64)	Mastertronic
9	(10)	Finders Keepers (Spectrum/Amstrad)	Incentive
10	(-)	Confuzion (Spectrum/Amstrad)	

Winning phrase No 25: "Everton lose 8 nil" from Paul Drage of Forest Gate, London E7, who receives £25. Others who came close were "Only stew live eels on a Friday" from T. Burdis of London SW14, "SS fail to Alien 8 VE day Ron" from Jeff Peires of London WC1, "Tears on VE day" from Donaldson of Dunblane, Perthshire, "Sally only ever dines at 8" from Simon Kitchen of Doncaster and "I nee- a f-w ad-i-onal let-ers" from Iain Gibson of Clydebank.

Now voting on week 27 - £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 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 27 closes at 2pm on Wednesday May 29 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 27
Address	1
.....	2
.....	3
My phrase is:	

New Releases

UNPLEASANT

You couldn't, in all honesty, say that New Generation's latest Commodore 64 game is all that original.

Amazon Warrior is basically *Aztec Forest*, the US game licensed by Audiogenic in this country.

The task is to kill your way through the jungle to a ruined temple where all sorts of unpleasant things await you. Being an uncivilised native your only weapon is a blow-pipe which has to be reloaded after each blow - this takes time and leaves you at the mercy of various unpleasant jungle creatures that want to eat you.

And so on. Basically that's it - load quickly and be accurate in your use of blowpipe.

Points in the game's favour are some nicely atmospheric Tony Crowtherish backgrounds and some excellent music. Not a vital purchase though.

Program *Amazon Warrior*
Price £7.95
Micro Commodore 64
Supplier New Generation
The Brooklands
Sunnybank
Lyncombe Vale
Dorset

REASONABLE

If you think of *Charlie and the Chocolate Factory*, not as anything dramatically wonderful or original, but as five reasonable arcade games for £9.95 it's rather good.

This package is loosely related to the famous book by Roald Dahl and for £9.95 you get a copy of the book thrown in. There are four single-



screen games of various kinds, *Augustus Gloop* is a sort of sliding-block puzzle, *Veruca Salt* is a dodge game as is *Violet Beauregarde* and *Mike Reavee* is a platform/collect game.

There is a multi-screen *Miner*-style affair on the other side of the tape where you try to get through the machines of the chocolate factory and collect six golden keys.

Not as good as *Miner*, but it's OK and is a reasonable way of getting a number of competent arcade games very cheaply.

Program *Charlie and the Chocolate Factory*
Price £9.95
Micro Spectrum
Supplier Hill MacGibbon
8 Grafton Street
London W1X 3LA

MAGAZINE

There are still a few magazines on tape around although generally they don't seem to be doing all that well. One of the best is published

by Infinite Software, who also do a number of machine code utilities and similar programs for the Spectrum.

The magazine is simply called the *Microsoft Magazine* and whilst the packaging isn't all that staggering, the actual tape is very well presented. There is much use of machine code routines for large letters, clever scrolls, fades, cuts and colour changes - it looks good.

On Vol 2 No 2 there is a nicely done, if simple, bio-rhythm program, a crossword, two games, sections on Basic and machine code, reviews, letters and a section on cheating on games.

At £2.99 it's expensive if you simply compare it section for section with a magazine but then that's not the point - it does things no magazine could do and it does them pretty well.

For me, it's probably an expensive luxury but if you want a Spectrum tape magazine this is certainly the best I've seen.

Program *Microsoft Magazine*
Price £2.99
Micro Spectrum
Supplier Infinite Software
73 Alcester Road
Moseley
Birmingham 13

FREE THROW

International Soccer for the Commodore 64 is still a lot of people's favourite computer game ever.

Those big sprites and authentic playing styles still haven't been surpassed.

Now two years later Com-

modore offers the follow up: *International Basketball*. Although the number of players and playing area are considerably reduced when compared to *Soccer*, the graphics are even better, finely detailed with accurate running and jumping styles (actually there's something about the jump - a certain heaviness - that makes it look faintly funny but personally I love it).

The playing system is the same as *International Soccer*. The nearest figure to the ball is highlighted and once selected comes under joystick control. Fire initiates a jump for the basket.

The players run at different speeds according to what they are doing: chasing, dribbling, etc, and the computer automatically sets up free shots or throw-ins as required.

An excellent game, although in this country maybe basketball isn't as glamorous as football and sales may be correspondingly less.

There's one particularly bizarre fact though. *International Soccer* was on cartridge for nearly £20. This game is better and on cassette for a staggeringly low £5.99.

All the more reason to go out and buy it immediately. Since Commodore seem to pick their prices out of a hat it might be £15 or more tomorrow.

Program *International Basketball*
Price £5.99
Micro Commodore 64
Supplier Commodore
Hunter Road
Weldon North
Industrial Estate
Corby
Northants

This Week

Program	Type	Micro	Price	Supplier	Intro Geography	Ed	BBC B	£20.00	BBC Publication
Warlord	Adv	Amstrad	£6.95	Interceptor	M/C for Beginners	Ed	BBC B	£8.95	Dream Soft
Mr Freeze	Arc	Amstrad	£2.50	Firebird	Revs	S	BBC B	£14.95	Acornsoft
Short's Fuse	Arc	Amstrad	£2.50	Amstrad	Profile	Ut	BBC B	£12.00	Clares Micro
Subsunk	Arc	Amstrad	£2.50	Firebird	Jewels of Babylon	Adv	Commodore 64	£7.00	Interceptor
Super Pipeline	Arc	Amstrad	£8.90	Task Set	Chicken Chase	Arc	Commodore 64	£2.50	Firebird
The Wild Bunch	Arc	Amstrad	£2.50	Firebird	Circus Circus	Arc	Commodore 64	£2.50	Firebird
Contraption	Arc	BBC B	£8.95	Icon Software	Estra	Arc	Commodore 64	£2.50	Firebird
Microcosm	Arc	BBC B	£2.50	Firebird	International B/Ball	Arc	Commodore 64	£5.99	Commodore
Mr Freeze	Arc	BBC B	£2.50	Firebird	Subsunk	Arc	Commodore 64	£2.50	Firebird
Flip	Arc	BBC B	£7.95	Icon Software	The Helm	Arc	Commodore 64	£2.50	Firebird

New Releases

BOUNCERS

Dambusters is US Gold's summer biggy.

Their sure-fire number one that's getting all the promotion money spent on it. It even has the benefit of riding the back of a certain amount of post VE Day gung-ho patriotism. And, it is going to sell by the truck load.

Dambusters is more than a flight simulation and more than a dogfight blast 'em down game. Instead it's as realistic a presentation of the actual raid on those nasty German dams as anyone could hope for on, to begin with, the Commodore 64.

The actual aircraft is divided into various sections, cockpit, bomb bay, tail gunner, front gunner etc. Each has its own detailed screen display toggled by single-key presses. The graphics are full of detail - not just the necessary instruments but also the bolts, shadows and correct perspective are featured.

In previous flight simulations different keys have been assigned to different controls f=flaps, b=brakes etc, meaning either to remember or some sort of keyboard overlay.

In *Dambusters* offer a far more elegant and easier solution - a dot which you shift from control to control on the screen until you have the one you want, then set keys for either more and less of whatever control it is.

The screen displays not only instrument readings but also the world outside. Backgrounds are generally fairly simple but the 3D works well.

Considerably more spec-

tacular are the barrage balloons and ME109s you'll meet along the way - these grow in size as they approach to give the illusion of distance.

So you have to pilot this plane dodging the might of the German airforce, flak and searchlights that will mark you out if you don't avoid the beam - that would be enough in itself. Except that the whole point is to reach the dam and drop your bouncing bomb at the right moment to blow it to bits. Dropping the bomb requires as much skill as flying the plane.

Dambusters is a simulation with everything and it's first class. The only problem is the constant one with accurate simulations - it might be too difficult for the average player.

Program *Dambusters*

Price £14.95 (disc)
£9.95 (cassette)

Micro Commodore 64

Supplier US Gold
Unit 10
The Parkway
Industrial Centre
Heneage St
Birmingham

PRE-PAYED

The *Transact* book-keeping system is another independent piece of QL software. It is happening but too little too late?

Anyway, *Transact* is good, a book keeping system which allows 100 accounts to be filled under ten section headings including, bank, cash, debtor, creditor and VAT controls.

Other accounts features include two accounts just for accrual and prepayment ad-

justments, 90 other account headings can be adjusted. Balances can be fully up-dated using balances and section totals.

Transaction files simulate manual books of prime entry sales, purchases, bank and petty cash transactions. VAT is worked out automatically and the whole thing is done in



authentic double entry. The screen display is neat and clear. Putting in silly amounts, dates, etc, doesn't crash it - in short it is idiot proofed.

You do need to understand accounting though. I don't.

Program *Transact*

Price £34.95

Micro QL

Supplier Dialog Software
20 New Row
London WC2N 4LA

STANDARD

If this is what Kissin' Kousins do, no wonder God invented glandular fever.

Perhaps I'm being overly down on this game - after all, it's not its fault I decided to load it into the brand, spar-

kling new Atari 130XE that appeared in our office last week.

Nor is it its fault that soon afterwards five discs full of the latest American Atari software also happened to turn up.

What I'm trying to say is - I didn't like it, in fact, I hated it.

Graphically it just didn't come anyway near even the worst of the US Atari games. Colourful it may be, but artistic - or even attractive items under the heading of - it isn't.

As for gameplay, it's all jump and shoot, avoiding the dustbins, walking over the geraniums when in flower, dodging the kangaroo... fairly standard stuff, in other words.

Program *Kissin' Kousins*

Price £6.95

Micro Atari

Supplier English Software
3rd Floor
1 North Parade
Parsonage
Gardens
Manchester
M60 1BX

GRUESOME

Pete 'n' Barry is an impersonation of *Atic Atac* that isn't as good but does only cost £4.95. It may also be the most gruesome game you've ever seen.

The plot involves you as a policeman PC Plod (inventive eh?) trying to rescue a female reporter (ah, those poor helpless women) who is held captive by a bunch of weirdos in a building of 1090 rooms.

These are square with doors that open and shut and large numbers of sprites that can be attacked with your truncheon.

This Week

<i>Dambusters</i>	Arc	Commodore 64	£9.95	US Gold
<i>Crystals of Carus</i>	Adv	Commodore 64	£7.00	Interceptor
<i>Bird Strike</i>	Arc	Electron	£2.50	Firebird
<i>Caveman</i>	Arc	Electron	£7.95	Icon Software
<i>The Hacker</i>	Arc	Electron	£2.50	Firebird
<i>E.V.A.</i>	Arc	QL	£10.95	Westway
<i>QL Zapper</i>	Arc	QL	£14.95	Eidersoft
<i>The Helm</i>	Ad	Spectrum	£2.50	Firebird
<i>Don't Panic</i>	Arc	Spectrum	£2.50	Firebird
<i>Warlord</i>	Adv	Spectrum	£5.50	Interceptor
<i>Arabian Nights</i>	Arc	Spectrum	£5.00	Interceptor

<i>Don't Buy This</i>	Arc	Spectrum	£2.50	Firebird
<i>Fahrenheit 3000</i>	Arc	Spectrum	£2.50	Firebird
<i>Frankenstein 2000</i>	Arc	Spectrum	£6.95	Icon Software
<i>Helicopter</i>	Arc	Spectrum	£2.50	Firebird
<i>Short's Fuse</i>	Arc	Spectrum	£2.50	Firebird
<i>Super Pipeline II</i>	Arc	Spectrum	£7.95	Task Set
<i>Subsunk</i>	Adv	Spectrum	£2.50	Firebird

Key: Ad - adventure. S - strategy-simulation
Arc - arcade. Ut - Utility
Ed - education.

Pick of
the week

New Releases

SPEED KING

At this, late, stage in its history the BBC B is finally getting some decent software.

After the magnificent *Elite* we now have another winner - *Revs*.

This is a racing car simulation in which you drive around the circuit of Silverstone battling it out in an authentic 3D representation of the track. There are options to practice the course alone and the manual gives you vital clues on getting around the track.

The point about *Revs* when compared to something like *Pole Position* which superficially looks the same is that you really have to drive the car. This means that there are a number of keys to control the car brake, throttle, gears up, gears down, steer left, steer right, and more.

At the beginning, for example, the car sits there motionless until you realise you have to start it. The advantage of having such a realistic simulation is that you can do things like drive off the track and not necessarily be destroyed. The disadvantage is that you have to invest a lot of effort into the game before it really starts paying dividends.

Graphically it is excellent, backgrounds are kept pretty simple so the scrolling is smooth and effective, the in-



strumentation graphics are detailed enough for you to read the current values. The whole car handling, track structure and race details are so accurate that you can even alter things like the front wing and rear wing angles - the track is represented down to correct gradients and dips. It feels like driving a real racing car and as such must be one of the best simulations ever.

You'll need a lot of practice though.

Program *Revs*

Price £14.95 (Tape)

Micro BBC

Supplier Acornsoft
Betjeman House
104 Hills Road
Cambridge

Some of the rooms may only be entered if you have found certain objects, eg, the video to go with video machine. And here and there you must replenish your en-

ergy which sinks as you are battered by nasties.

To rescue the reporter you must find the various parts of a doll which when assembled may be used as a trade in for

the reporter. These are littered around with various rooms, as are pools of blood and gore and dead bodies. If you fail in your mission a hand comes down and rips your head off - no compromise in this game.

It's quite good fun but is the programming technology of over a year ago, colour clashes and all.

Personally I'd rate it as good value at a budget £2.50 sort of price, at £4.95 I still don't think it's cheap enough to get more than a hmmm, well.

Program *Pete 'n' Barry*

Price £4.95

Micro Spectrum

Supplier Impact Software
2 New Street
Cullompton
Devon EX15 1HA

ALIGN AWAY

Interceptor were the first to show just how impressive graphics on the Amstrad could be.

Now they have done more

for the machine in the form of the *Azimuth Adjustment Kit* which sounds boring but isn't.

The problem with the Amstrad is that the tape deck, whilst reasonably reliable, is an integral part of the whole unit.

Tape machines are fairly prone to getting out of alignment - this problem, whilst not major, is enough to prevent tapes from loading.

Ordinarily this would mean that nothing could be done but return the whole machine for repair. Interceptor have changed all that with one of the most practical utilities I've ever seen.

The *Azimuth Adjustment Kit* is a program that lets you set your tape deck heads perfectly (they can be adjusted using a simple screwdriver which is provided.) It's child play and could save you a vast amount of misery and irritation.

You even get an OKish game on the back with which to check your new found perfectly adjusted Amstrad.

Program *Azimuth*

Adjustment Kit

Price £8.99

Micro Amstrad

Supplier Interceptor Micro's
Lindon House
The Green
Tadley

Compiled by Graham Taylor



New Releases is designed to let people know what software is coming on the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

This Week

Acornsoft, Betjeman House, 104 Hills Rd, Cambridge CB2 1LQ, 0223 316039. **Amstrad**, 169 Kings Road, Brentwood, Essex. **BBC Publication**, PO Box 234, 144-152 Bermondsey Street, London SE1 3TH. **Clares Micro**, 98 Middlewich Road, Rudheath, Northwich, Cheshire. **Commodore**, 1 Hunters Road, Weldon North Industrial Est. Weldon, Corby NN17 1QY. **Dream Soft**, PO Box 64, Basingstoke, RG21 2LB. **Eidersoft**, Hall Farm, North Ockendon,

Upminster, Essex. 01-478 1291. **Firebird**, Wellington House, Upper St Martins Lane, London, WC2H 9DL. **Icon Software**, 65 High Street, Gosforth, Tyne & Wear. **Interceptor Micro's**, Lindon House, The Green, Tadley, Hampshire. **Task Set**, 13 High Street, Bridlington, YO16 4PR, 0262 673798. **US Gold** Unit 10, The Parkway Ind Centre, Heneage Street, Birmingham B7. 021-359 3020. **Westway**, 24 Preston Road, Lytham, Lancashire, FY8 5AA.



Correcting errors

Errors benefit us because they lead us to study what happened, to understand what went wrong, and, through understanding, to fix it.

Seymour Papert, **Mindstorms**

There is an old proverb which says: "To err is human, to forgive is divine".

Think, however, how often we have been taught that mistakes are bad, and if one makes a mistake it should be obliterated, or ignored, and never examined. The other old proverb ("We learn from our mistakes") is largely ignored.

When I was taught mathematics at secondary school, my 'A' level teacher made me write everything in the one book, so that - if a mistake was made, and I realized there was a mistake - a mistake was simply crossed out. By my admission of the error, and by leaving the error legible, but corrected, she could see the ways in which I had tried to solve the problem. She did not believe in instant perfection.

I was lucky, in that my teacher was enlightened enough to realize that it was possible to learn from one's mistakes. Just as importantly, she was sufficiently positive in that conviction to try to encourage learning from mistakes. I learnt a good deal about the strategy of solving problems from that teacher, in addition to the tactics of problem solving beloved of maths teachers.

Nowadays in schools, one of the essential ingredients of any school bag is the bottle of

white obliterating fluid, once used only by typists.

Any mistake is immediately painted over: that the piece of work is an intellectual shambles seems to be irrelevant.

In the dim past the equivalent to the white fluid was the bleach used to sanitize babies' feeding bottles.

I remember my teacher's outrage at the use of such a deception. Interestingly the most consistent manipulator of the bleach bottle was one of the most mundane and unimaginative of my fellows. To learn from one's mistakes was rather too esoteric a point for him to grasp.

The mindless concern of the mindless with the (unconvincing) pretence of perfection even sullies examinations.

Looking round the assembled collection of students scribbling away, one sees desks with writing instruments, sweets, drinks, and bottles of correction fluid. Purely from observation, there seems to be a strong correlation between lack of imagination and use of the white balm.

Some examinees are so concerned with not appearing to have erred that - during the examination - they will stop, paint out the mistake, let the paint dry, and then make their corrections.

A line through the words, and then something written (neatly) above, is as acceptable, and certainly a much quicker way in an examination - where time is taken to be at a premium.

I know I do talk a lot about Logo but it is always useful to look at other approaches to problems - and Basic is by no means perfect.

Logo is interesting because it is a computer language which accepts that errors will be made, and which has been designed to help the user to learn from those errors.

If a person is to learn from the mistakes that he or she made, then the information provided to that person - if and when mistakes are made - should be as constructively helpful as possible.

The emphasis on constructive help is important in Logo, because one hopes that, in time, the errors will become fewer and the topics tackled will be more demanding.

It does not help in the slightest to be told you are wrong - you also need to know why.

Boris Allan

Figured out

Puzzle No 159

Jake and Hank are two old-timers who live next to one another on Peartree Boulevard.

Jake is very keen at figuring and he found that the product of their two addresses could be said to equal 'PEARTREE'. For example, if the street numbers were 7933 and 7934 (they differ by just one) then the product would be 62940422. If this is compared with the word PEARTREE it can be seen that like digits correspond to like letters.

PEARTREE
62940422

However, in the case of Jake and Hank, all the digits in their addresses are also to be found in the product, which is not the case in the example given (there is no 7 or 3 in the product). What are their addresses.

Solution to Puzzle No 154

The number of steps needed in each case is: 1980-8, 1981-3, 1982-15, 1983-5, 1984-14, 1985-7, 1986-?, 1987-1, 1988-11, 1989-10, 1990-20.

```
10 INPUT N
20 LET Z=N:LET T=1:LET C=0
30 GOSUB 90
40 LET C=C+1
50 PRINT C,T
60 IF T=1 THEN GOTO 140
70 LET Z=T:LET T=1
80 GOTO 30
90 LET K=SQR(Z):LET K=VAL(STR$(K))
100 FOR F=2 TO K
110 IF Z/F=INT(Z/F) THEN LET T=T+Z/F:LET T=T+(Z/(Z/F))
120 NEXT F
130 RETURN
140 PRINT:PRINT N;" RESOLVES IN ";C;" STEPS"
150 GOTO 10
```

Note that the number 1987 being prime reduces in only one step, and that the value 1986 appears to increase without limit. There is also the possibility that the sums of divisors might eventually, after many stages, reduce to the original value (1986). In this case the process would be repeated endlessly. The program calculates the sum of all the aliquot divisors, continuing until the value of 1 is reached.

Winners of Puzzle 154

The winner is James Lucy of Great Totham, Maldon, Essex, CM9 8DF, who receives £10.

Rules

The closing date for Puzzle No 159 is June 19.

The Hackers



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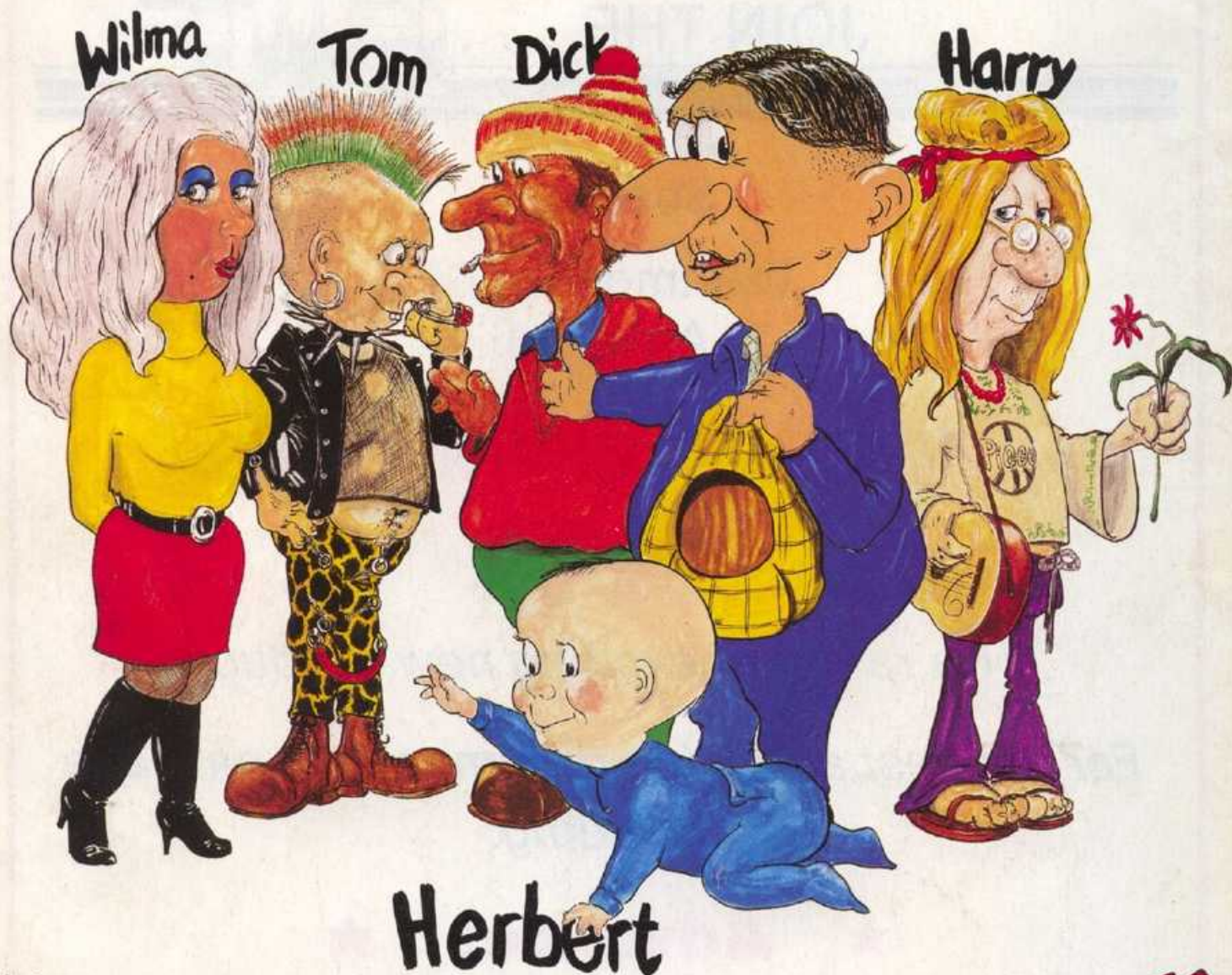
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