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# Computing

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## WEEKLY

6-12 March 1986

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40 Rock Rd Vol 5 No 10

## Off the Hook – title details announced

TITLES have now been finalised for the Commodore 64 and Spectrum versions of *Off the Hook*, the follow-up to last year's highly successful charity compilation tape, *SoftAid*, which raised over £380,000 for the Band Aid Trust.

*Off the Hook* will comprise ten titles, donated by software companies. This time, the money will go to the Princes Trust for Drug Rehabilitation (see *Popular Computing Weekly*, January 9).

The Spectrum version will consist of *Psytron* (Beyond), *Fall Guy* (Elite), *Buggy Blast* (Firebird), *Ad Astra* (Gargoyle), *Splat* (Incentive), *Mugsy* (Melbourne House), *Kong Strikes Back* (US Gold), *Chequered Flag* (Psion), and *Blue Max* (US Gold).

For the Commodore, the tape will contain *Pitfall 2* (Activision), *Psytron* (Beyond), *Fall Guy* (Elite), *Demons of Topaz* (Firebird), *Sam Stoat Safebreaker* (Gremlin Graphics), *Kong Strikes Back* (US Gold), *Black Thunder* (Quicksilver), *Deathstar* (System 3), *Talladega* (US Gold), and *Classic Adventure* (Melbourne House).

*Off the Hook's* organiser, Rod Cousens, is determined that this time there should be as many machine versions as possible. Although Amstrad and BBC versions of *SoftAid* were planned, he was unable to reach agreement over enough titles to release a tape. "I definitely want to do versions for Amstrad, BBC and C16 owners – I've got

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*In this issue*

**COLOSSUS CHESS 4**

*25 copies to win  
in our special  
competition*

**THIS WEEK'S NEWS**

- Atari confirms new STs for show
- Spectrum 48/128 compatibility in doubt
- Commodore agrees credit terms with bankers

**INSIDE** ▶ **FOUR PAGE PULL-OUT INDEX FOR POPULAR 1985** ▶

RELEASED THIS WEEK

ZX SPECTRUM £7.95

COMMODORE 64 £7.95

AMSTRAD £8.95

# PING PONG



The officially endorsed version  
of the No.1 arcade game by

**Konami**

...the name  
of the game

Imagine Software (1984), 6 Central Street  
Manchester M2 5NS. Tel: 061-834 3939. Telex: 669977

You can almost feel the tension of the big match breaking through the screen... the expectant crowd is almost on top of you! You return the service with a **Top-spin Backhand**, then a **Forehand Back-spin**, the ball bounces high from your opponent's looping, defensive lob... **SMASH!**... a great shot opens the score... but this is only your first point! Play head to head or against the computer in this, Konami's first and best table-tennis simulation.

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482641254 DAVID COTTERILL

Updated 12/1/86

DAVID COTTERILL

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## EDITORIAL

It seems strange that this weekend's Atari Computer show should be the world's first, as its organiser Database Publications is claiming. After all, Atari is a veteran in the games machine and computer market.

Yet the games machine and XL range always had something of a cult appeal. Software was pricey, due to much of it being imported product.

The arrival of Jack Tramiel as its new head 18 months ago and his radical new philosophy has changed all that. Tramiel's charismatic quality is far more than a journalistic cliché, and his aggressive determination to bring out the products he wanted has caught the world's attention.

British companies are now writing for the new machines as never before, even though the majority are still hedging their bets and waiting for a more substantial user base.

The ST range, whether you're a Tramiel fan or not, is radical. They

are the machines which all industry pundits have said for the last two years would be produced for the consumer section of the market, and Tramiel has dared to produce them. Furthermore, he dared to do it in an aggressive fashion with a company he took with heavy debts and a staunchly 'gamesy' image.

The first 520STs released last autumn, suffered the fate of many new machines: they were fundamentally unfinished and in very limited supply. Now that that hurdle has been more or less cleared, Atari is launching low-end versions (the 520 STFM and 520 STM) and a top end model (the 1040 STF) designed to add flexibility to the series.

A variety of STs at a variety of prices (from about £450 to £1,000) should make the range more attractive. But the paradox of hardware leading software and the software companies waiting for proven sales still exists.

The ST range is not yet a mass seller - but it has deservedly captured people's imagination.

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Computer Trade Association Magazine of the Year

ABC

# Sinclair annoyed at 128 incompatibility

OWNERS of the new Spectrum 128 are discovering problems in trying to run their old 48K programs on the new machine. The two machines, it now transpires, are not quite as compatible as was first thought.

Firebird, Activision, Digital Integration and Software Projects are the offending companies. Firebird has admitted that *Elite* will not run in either 48K or 128K mode on the Spectrum 128.

The problem appears to involve an area of Ram immediately below screen memory which has been changed on the 128.

The same catch causes

trouble for Activision's *Hacker*, and Software Projects' *BC's Quest for Tires*.

*Tomahawk* is the guilty program at Digital Integration where the company says its tape-loader routine is to blame.

Melbourne House, however, has uncovered another snag. All of its games will run on the 128, but not if you have a Kempston joystick plugged into the machine. Kempston says it is aware of the problem and is investigating. In the meantime, Kempston owners will either have to use the keyboard option or invest in a new joystick.

Sinclair is understandably

annoyed about the problems and says they are caused by the software houses "making dangerous assumptions" about the operating system. However, it says the companies involved are working on fixes for the problems.

Digital Integration says it will have an upgraded version of *Tomahawk* ready in about two months, while Firebird will have *Elite* patched up within a month.

Anyone who has bought one of these products should return it to the retailer concerned for a refund, or send it direct to the software house involved.

See also Letters, page 6.

## Off the hook

◀ continued from page 1

about five Amstrad titles already. We hope to get enough to do an Atari version too."

Rod Cousens hopes to get endorsement for the tape and its aims from Pete Townshend, the ex-Who guitarist, who has spoken out publicly about the dangers of heroin addiction. "What I'm trying to do now is to get some kind of audio input on the tape from Pete Townshend," he said.

*Off the Hook*, in each of its versions, will cost £6.99. Cousens is hoping it will be launched on March 24.

However, the *Off the Hook* appeal will not end there. Cousens plans to take an *Off the Hook* stand at September's *Personal Computer World* show, to sell old software titles for the charity.

## Commodore reaches agreement with bankers

COMMODORE International's banks have reached an agreement with the troubled micro manufacturer over its credit facilities in 1986.

Commodore now has facilities of \$135 million (£93 million) up to March 1987. The agreement comes after financial losses for Commodore in the last four successive quarters. Now it has 13 months to re-establish profitability.

Commodore International's chairman, Irving Gould, said, "We have been working closely with our banking partners. In a series of recent meetings, we reviewed our forward plans including our product strategies and comprehensive cost reduction programme already in progress."

Meanwhile, it is unclear whether the comprehensive cost cutting programme, which has already involved the closure of the Corby assembly plant, will also demand further cuts at Corby, with the UK operation being slimmed down still further.

## Atari confirms launch of new STs

ATARI has now confirmed it will launch a number of new products in its ST micro range at the first ever Atari Computer show, to be held at the Novotel in Hammersmith between March 7-9.

The one megabyte Ram ST, the 1040 STF, which was launched at CES in Las Vegas in January, is to be shown in this country for the first time. The F at the end of the micro's name denotes the floppy disc drive that is built in to the cpu. In the US the 1040 costs just under \$1000, so in the UK a

price around £900 looks likely. Like the current 520ST, it will be offered with either a colour or monochrome monitor.

Two new 520 STs will also be introduced, the 520 STM and the 520 STFM. These versions will fill the £400-£500 price slot, which was to be catered for by the 260ST, until Atari announced at CES that this would not now be continued. However, a 260 ST has been produced for the German market.

The 520 STM is a 520, but

with a TV modulator port, rather than the RGB output, so that it can be used with an ordinary television. It will be sold as a stand alone unit, and not with the disc drive and monitor.

The 520 STFM also has a TV modulator, but also a floppy disc drive built in as in the 1940. It is expected to cost around £500. Exact prices are to be announced at the show.

"The 1040 STF is the machine we will be selling to specialist dealers, and the 520s will become the low end machines," explained Max Bambridge, Atari UK's general manager.

"We always said we would do a low level machine, and at the time we anticipated a 256K memory, but prices have degraded so much that we can now do 512K at the same price."

Atari will also exhibit its 20M hard disc, which is already available, albeit in very limited quantities. It will furthermore, launch a new games machine, the 7800, which will be upwardly compatible with the current 2600.

The new STs, according to Max Bambridge, will be available almost immediately, with the exception of the 520 STFM, which will follow later.

## Ex-Beyond chiefs join Nexus

BILL Delaney, formerly MD of Beyond Software, and colleague Clive Bailey have taken over new company Nexus (see *Popular Computing Weekly*, January 30).

Nexus was originally set up by programmers Paul Voysey and Tayo Olwu to supply Beyond with products.

The first product is titled *The Nexus Mission*, and will be available for the Spectrum 48K and 128, C64 and 128 and Amstrad CPCs. "We plan to bring that out at Easter, and then seven titles before April



1987," said Bill Delaney.

*Nexus* will cost £9.95 for tape versions and £11.95 on disc.

## Disc drive ready for Spectrum 128

OPUS has launched the first disc system for the Spectrum 128. It is a new version of its Discovery disc drive package.

The Discovery is a 3½ inch, 250K capacity, double density drive and interface. The device also offers parallel printer port, joystick interface and built-in power supply for both the drive and the Spectrum 128 itself.

Discovery for the Spectrum 128 will cost £149.95, the same price as the 48K Spectrum version.



More details from Opus at 55 Ormside Way, Holmehorpe Industrial Estate, Redhill, Surrey (0737 65080).

## Atari TOS now available in Rom

ATARI's TOS operating system for the 520ST has finally made its way into Rom, rather than being loaded from disc.

Machine built now should have the operating system fully integrated in the Rom. Buyers of the 520ST since the beginning of the year should have found Rom upgrade kits with their machines. Those who bought the machine in 1985 can now buy an upgrade kit for £25.

However, ST owners who bought their machines from

Silica Shop, in Sidcup, Kent, should be able to obtain their upgrades free of charge. For details of Silica Shop's scheme, ring 01-309 1111.

Others can get further information from Atari UK at Atari House, Railway Terrace, Slough, Berks (0753) 33344).

## New Activision text and graphic adventure

ACTIVISION's latest text and graphic graphic adventure is *Borrowed Time*, a Chandleresque tale of 1930's private detective Sam Harlow.

You as Sam Harlow, must prevent a murder occurring. The twist is that it is you who is likely to be murdered.

The adventure features pull-down menus and interaction between characters. It is also one of the first in Activision's range for 16-bit machines, although the first version will be on disc for the Commodore 64 and 128 at £14.99 later this month.

Versions will follow for the Atari ST, Amiga, Apple II and Macintosh.

## Football Manager kicks off again

FOOTBALL *Manager*, now four years old, is still alive and kicking.

It has recently been converted to the C16 and Plus/4, and now Addictive has developed a version for the Atari 8-bit range, at £9.95, for release this week.

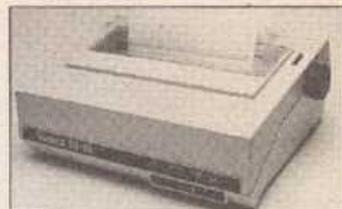
This means that *Football Manager* is now available on 11 machines, which is almost certainly a record.

## Samleco's NLQ dot-matrix printer

SAMLECO has announced a NLQ (near letter quality) dot matrix printer, available with interface cartridges for Commodore and Sinclair micros.

The DX-86 provides 80-column print-out, at speeds of 120 cps in draft mode, 65 cps in correspondence mode and 35 cps in NLQ mode. It also has facilities for condensed and double width printing.

Available now, it costs



£251.85. Details from Samleco, 9 Fairacres Industrial Estate, Dedworth Road, Windsor, Berks (0753 854717).

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Bispham, Blackpool, Lancs, FY2 0JY



## Open channels

Many thanks to G C Watson (letters, January 23) for solving the problem I had with List between Spectrum and Brother. Since writing in December I had found out (from the Microdrive manual) how to LLIST, but I prefer the flexibility of Mr/Ms Watson's version. Also it demonstrated that I can have more than one channel open at any one time, something I found rather confusing in the manual. I also found the brackets superfluous with control character numbers.

I have also modified line 279 in Tasword Basic to print in English characters. (This only means using the hash sign for the pound, CHR\$ 35.)  
279 FORMAT "b"; 6900  
:OPEN # 3; "b":LPRINT CHR\$ 27; "R"; CHR\$ 0

MS A B Wright  
31 Ashbourne Way  
Thatcham  
Newbury  
Berks

## Pure whimsy

In volume 5 number 3 you suggested that no-nem potential market ground would be opened by the new Acorn Masters series. I disagree totally; what's more I believe little or no reasoning other than pure whimsy was employed in your biased degradation of what has the potential of being a market leader.

The Acorn Masters series is without doubt the machine that has been long predicted and long awaited by many computer enthusiasts. It has, of course, been obvious that Acorn were in the process of developing a minor

## Tape offer

If you have not yet sent in your Firebird tape/Arcade Champion's Guide card with the coupons, please do so, so that it reaches us by Monday, March 31. This will enable us to process your entries more quickly.

Also, as from Wednesday, March 12, no more Micro Magic cards please. Believe it or not, there are some stragglers claiming prizes. If you still have a Micro Magic card, send it in now.

revelation.

The prices of course is, I agree, a little high but then haven't they always been. Certainly customers will inevitably be lost or rather not gained by the over all deciding factor, but as with all quality products, the proof is in the tasting and as with the late BBC B series, each savour will increase the satisfaction of the purchase success.

You are as well aware as myself that good potential in this market must be supported if it is to survive the disturbing slump. While I realise you are trying to present a critical eye for machines but wouldn't it be in your own interests if you lent a little more support when a young genius is in our midst?

M L Hartley  
Manager  
The Water Hole Factory  
751 SU  
Mount Alice  
West Falkland  
BFPO 666

## Ups and downs

I read the letter from T J Box (Vol 5, No 7) with great interest. I am presently between micros having just disposed of a C64. I have followed the ups and downs of the Enterprise since its inception three years ago.

Although it has been available now for a few months, I have not seen any books or magazines to cover this machine, nor is there any abundance of software. I would, therefore, like to ask the following questions in the hope that some of your readers might know the answers.

- 1) Where can I obtain an Enterprise?
- 2) Are there any books on the machine?
- 3) Is there a monthly magazine or users group?

B Perrier  
19 Cheviot Crescent  
Dundee

## Closed market

Regarding LW Tomlin's letter (Vol 5, No 8), the writer should look at the market the QL was initially aimed at. One can sell anything to home micro enthusiasts, especially when their parents do the buying.



"Now what are we going to call our next model?"

However, the QL was pitched at the small business user. Such a user will buy a machine for the software he/she sees it running, not from a look at the spec sheet. Furthermore, if it doesn't look as though it will work, doesn't feel as though it will work, and uses as storage medium one step up from knotted string, then I reckon the chances of it being a hit are severely limited.

Selling a few thousand that don't work effectively closes the market to you.

Paul Hardy  
Bingley  
W Yorks

## Great success

I have bought many computers, but the QL is the first for which I have paid less than a million pounds. Or, to put it another way, the first bought with my own money. Since the original machine was replaced by Sinclair in mid-1984, I have used it for 20-30 hours a week with great success.

Like other of your readers, I thought that David Kelly's remarks (Ziggurat Vol 5, No 6) were made in ignorance, but his reply (Vol 5, No 8) made it clear that he was talking about one application - games playing. I don't knock games. Your magazine wouldn't exist without them, and many move on into computing. However, to regard the QL just as a games machine is absurd, even if it can run a stronger chess program than any other machine that appears in your weekly charts.

David Kelly says that 'so-

phisticated musical handling' is an essential requirement. I don't recall this being a feature of any machine by IBM or Amdahl and it certainly is not on the QL.

If you want to play games and nothing else, the QL may not be the best buy. For other tasks it must be a front runner. The bundled software alone is worth the price of the machine.

Ken Whyld  
Caistor  
Lincoln

## Upgrade problems

On February 14 I bought a Spectrum 128. After reading the instructions, I realised it was about the same as the 48K model so I entered a few of my old games. Some worked, others did not.

I also bought a copy of *Elite*. After reading all the bad publicity the Lenslok system had had, I was astonished to find it easy to use. Unfortunately, the program crashed, despite using three different cassette players.

This morning (February 22) I purchased *Tomahawk* and rushed home, only to find that this game also refused to load.

I would like to know if Anstrad and Commodore users have experience similar problems on upgrading to 128K models, and I hope somebody will release a list of the games for the Spectrum 48K that will work on the 128.

Nick Palmer  
Middlesborough  
Cleveland

See the News Desk for more on this.

## Ink problems

With reference to your letters page (January 23), black stamp pad ink works well, but the felt transfer pad will next cause problems by matting in line with the transfer roller base. Small slits in the end of the felt with a razor helps and increased spring pressure also helps.

It is worthwhile shopping around for ribbons. I buy from Meedmore in Liverpool at £3.78 each.

B Gibson  
Stockport  
Cheshire

**EAST**

## SAI COMBAT

Set against a series of subtle backgrounds, *Sai Combat* has 8 skill levels and can be played by one or two players, with a choice of 16 moves. The combatant sprites are large and easy to control via keyboard or joystick.

Spectrum 48K £6.95

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Amstrad CPC £9.95  
Commodore 64 £9.95 tape,  
£12.95 disk

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## Spectrum maze

Walter Pooley, of Waterloo, Liverpool, writes:

**Q** I have been experimenting with generating mazes on the Spectrum, using the four compass points N,S,E,W, giving four exits from each location and moving four times to exit the maze. Would I be right in thinking there are 256 possible combinations  $4 \times 4 \times 4 \times 4$ ? Would it be possible to write a Basic program to list these combinations?

**A** If we assume that after four (correct) moves you exit the maze, then can we also assume that after four (incorrect) moves in any one direction that you hit a bound-

ary of some sort. If we can, fine, if not then you have an infinite maze!

Assuming all that, then you have a  $7 \times 7$  matrix (excluding boundaries and the exit). This gives you a total of 49 locations. If you include the boundaries then you have a  $9 \times 9$  matrix, or 81 locations. The best way of listing the actual combinations generated is to hold the maze in an array, and using a For... Next loop merely print it out after generation has taken place.

## Which computer?

K Jones, of London, writes:

**Q** My son wants a computer for his birthday and I'm not sure which one to get him. I'm hoping that you can help me make up my mind

He is 12 years old and would really only use the machine for games. I have narrowed the field down to the Amstrad CPC464, the Acorn Electron and the Commodore 64. Which one would you recommend and why?

**A** Of the three computers that you mention and for those reasons, I would go for

the Commodore 64 or the Amstrad. Simply on the basis of the huge amount of quality games software available, the Commodore would be a good choice.

The Amstrad is a good machine but does not have the depth of software that is available for the Commodore 64. Games written specifically for the CPC464 are still few and far between, although the number of conversions is growing. What the Amstrad does have is the built-in cassette deck and monitor, so there would be no TV arguments in your household.

The Electron disqualifies itself in my book, because Acorn is no longer manufacturing the machine, and there is not a vast software base in any case.

## Graphic tablet

P Robinson, of Harlow, Essex, writes:

**Q** Can you tell me where I could buy a graphics tablet for the Spectrum?

**A** Certainly. Try writing to Saga Systems Ltd, Greenhaigh, Woodham Road, Woking, Surrey GU21 4DL. (You could always try scanning the ads in *Popular*.)

## No support

G. Carter, of Leicester, writes:

**Q** I am using a BBC B at school as part of my O level computer studies course, and I want to buy a computer of my own for project work, etc. As the Electron is so cheap now, do you think I should get one?

**A** Probably not. Although it is very cheap at the moment, it is becoming increasingly hard to find, as Acorn has stopped manufacturing it, and therefore support for the machine will dwindle rather than grow.

However, if you only want to use the computer for project work related to BBC Basic and your school studies to get you through the O level course, then it's an awful lot cheaper than buying a BBC, even though the BBC B too, is getting hard to find in the shops. The catch is that after the exams, you may well still want to use your micro. The Electron's software range is not large, and it offers little in the way of cheap upgrade potential. And you may well find it difficult to sell second-hand these days.

# The Rogue Program



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Argus Press



## Special interest groups

**T**his week I'll be looking at one particular facet of independent Bulletin Boards - special interest groups, or SIGs as the jargon will have it.

A SIG is a section of a bulletin board set up for a particular subject, and it needn't be computer-oriented. You can get restaurant guides, pen pal services - and one BB even has a SIG devoted to alternate medicine. Indeed, Prestel's own home computer database, Micronet, is shortly to diversify out of the computer arena with its Sunday supplement pages, which will include music and video reviews.

SIGs generally enables users to leave messages, letters and questions to peo-

ple with the same or similar interests. This means that they can get help about a problem they have from others who may know more about that particular subject.

Many BBs have more than one SIG, for example TBBS London has 10 different SIGs, and some, like most of the ITeC boards, have no SIGs at all.

SIGs are set up by the Sysop (SYSTEM OPERATOR) of that particular board and are often 'requested' by users of the BB. For example the Vulcan Board (NBBS Marlow) had a number of SIGs and recently added an Amstrad SIG to the list because so many people had left him messages requesting one.

If your favourite board lacks a SIG that you feel it should have, then get in touch with the Sysop (either by leaving a message or going into 'chat mode') and ask for one to be set up.

But, of course, most SIGs do deal with specific computer subjects; some of the most common SIGs are: CP/M, BBC, Spectrum, modems and hacking, adventure help and the TRS-80. How did the TRS-80 get in there you may ask? Well, the TRS-80 is the computer on which many boards run, including all of the TBBS boards.

If you are unable to find the SIG section on a board then either there may be no SIG section or it may be restricted access or even just plain hard to find. If it is restricted access then have a quiet word with the SYSOP to see if your security level can be roused to allow you to use the SIGs.

The list below comprises some of the larger boards and their SIGs.

*NB* the figures in brackets indicate the band rate on that board: 3 - 300/300 band; V - 1200/75 band; D - dual band rates: both of the above.

As with all charts, lists, tables, etc, this one can only be correct at the time of writing. A BB may have added new SIGs the meantime.

This week's BB top ten has been compiled by William J Holmes of Cliffsend, Nr. Ramsgate, Kent.

Name	Baud Rate	Number
1. Bluelips	300/300	0843-32637
2. Marctel	300/300 & 1200/75	01-346-7150
3. CCCBB	300/300	0249-817077
4. Micrognome	1200/75	01-888-8894
5. Vulcan	300/300 & 1200/75	0628-46691
6. Dark Crystal	300/300 & 1200/75	01-954-9847
7. CABB	300/300 & 1200/75	01-631-3076
8. CommunTel	1200/75 demo 1	01-968-7402
9. CBBS - SW	300/300 & 1200/75	0392-53116
10. TBBS - London	300/300	01-348-9400

It's new Bulletin Boards time now: firstly CCCBB (listed in the SIG list), which stands for Calne Computer Club Bulletin Board. You can dial it on 0249-817077, and it's on 300/300 baud. It should be 24 hours a day by now but you may get a human answering the phone on the other end, if so this means the new equipment and software isn't working just yet. All you do if this happens is ask the person on the other end to put on the BB.

I'd better give a mention to the Vulcan Board, also known as NBBS-Marlow. Both names are correct but I think it prefers to be called the 'Vulcan Board'; it's both 300/300 and 1200/75 baud rates, 24 hours a day and the number is 0628-46691.

Now BBS09. This is a 'ring back Board' (first dial the number, let it ring *once* then replace the receiver. Redial and follow the normal procedure for dialling a BB). The number is 0705-736025, and I think it's 300/300 baud but I'm not sure - only way to find out is have a go at ringing it up. Its hours are 1900-2200, except Sundays when it's 1000-2200.

And the last one for this week is System 2000. Again it's a 300/300 baud board and it's open between 1900 and 0700. The phone number is 0642-486643.

**David Wallin**

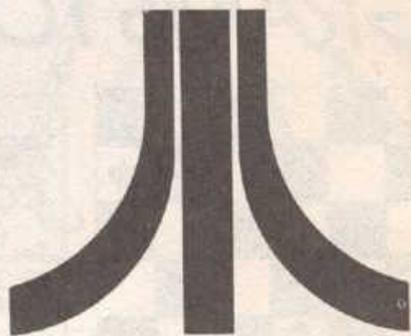
BABBS I	— Pascal, Modems, Mac, Hardware, CP/M, DOS, Sales and Wants, Guests and Adventure Clues
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Mailbox 80	— Dragon/Co-Co, IBM PC, BBC, TRS-80, Atari, Apple, Modems, CP/M, Prestel, Adventure and Radio
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Vulcan Board/ NBBS-Marlow	— Amstrad, Apple, Vulcan, MUD, BBC, Spectrum, Radio control and Adventure help

If you have any queries, tips or comments to make about any aspect of micro communications, David Wallin would love to hear from you.

Write to him at *Popular Computing Weekly* 12-13 Little Newport Street, London WC2H 7PP.

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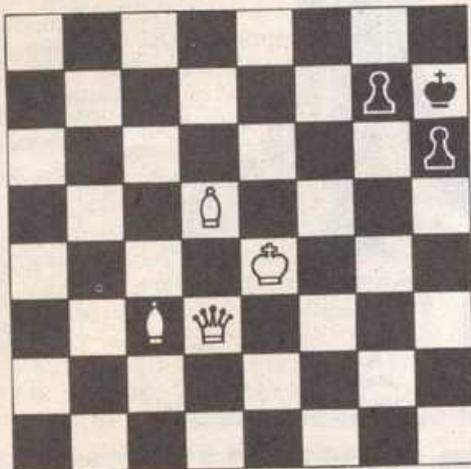
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White must move and checkmate Black in two moves

### ENTRY RULES

Entries must reach us by Monday March 31, 1986. The first 25 correct solutions selected at random will receive a prize of a copy of *Colossus Chess 4*. The judges decision is final, and normal competition rules apply.

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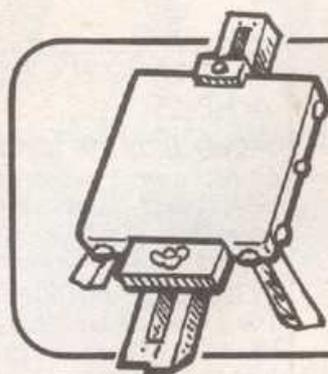
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# Code Words

## Name: Pete Cooke Tau Ceti programmer

Like lots of other programmers I began with the ZX81 which I bought mail order around six months after it was released - it went straight back because it didn't work. On the replacement ZX81, I mainly learnt Basic. I didn't get into machine code until the Spectrum came out.

I learnt machine code bit by bit, partly by just looking up op-codes in the back of the Spectrum manual and partly with the aid of Rodney Zak's book.

I think two things are important for those trying to learn machine code pro-

gramming. First it helps if the machine you're working on is fairly simple and lets you fiddle around with the processor easily - the Spectrum is good from that point of view.

Secondly you should get a good assembler from the very start, it helps enormously.

For my own programming work I use the Gens assembler on the Spectrum and the Rom-based Maxam on the Amstrad, but mostly I write my own utilities as I need them.

The people I tend to admire are those that produce high level languages and assemblers for micros - that seems to me one of the most difficult things of all to do. In that respect, I am very impressed by Hisoft, particularly its Pascal and C.

I am most proud of the shading effects I achieved in *Tau Ceti* - I developed a routine to fill a solid shape which took into account your angle towards it and the position of the sun.

My ideal program would be a sort of *Mercenary* with solid 3D graphics - a whole universe in the computer.

Name: Pete Cooke

Age: 29

Favourite Programs:

I think I play *Revs* more than anything else, though *Elite* is excellent as well. I also like *Flight Simulator 2* by Sublogic for its sheer size and breadth.

Favourite Machines:

I like them all for different reasons. I liked the ZX81 for being simple - I'd hate to try to start programming with an ST. I rate the Commodore for its sound, obviously, and I like the BBC for its graphics. On the other hand the Spectrum is a nice simple machine to use and the Amstrad is nicely documented.

Softography:

*Invincible Island*, *Urban Upstart*, *Inferno*, *Upper Gumtree* and *Ski Star 2000* for Richard Shepherd Software, then *Juggernaut* and *Tau Ceti* for CRL. I'm currently working on the enhanced disc version of Amstrad *Tau Ceti*.

Hobbies:

My main other hobby is music. I play jazz piano with some local bands. Originally that used to be my work, I was in various local bands that never got anywhere. I also like Science Fiction.



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## Up-grade kit

**Product** QRAM 256K up-grade kit **Micro QL Price** £99.95 **Supplier** Micro Peripherals, 3 Wade road, Basingstoke, Hants.

**Product** 512K up-grade kit **Micro QL Price** £89.95 **Supplier** SPEM, Via Ponchielli 26/c, 10154 Turin, Italy.

**B**oosting the QL's 128K memory is now pretty big business with several peripheral companies offering a variety of competing solutions. The latest is a sort of DIY internal Ram up-grade which leaves the QL's left-side expansion port free and avoids the various Lego-like add-ons that until now were the only alternative to fairly expensive boards combining disc interfaces and extra memory.

At the moment, two companies - Micro Peripheral and SPEM of Turin - are selling Ram up-grade kits for QL owners with the bravery to open up their computers and start playing around with the chips.

For the less bold, Silicon Express offers a third choice: you send in your computer (and a cheque for £150) and the company returns a QL internally up-graded to 512K with a six month guarantee. New buyers can purchase a 512K QL from Silicon Express for £350 with a year's guarantee.

## Repair costs

DIY enthusiasts take note: Opening the QL's case voids the Sinclair warranty so it would seem prudent to wait until the guarantee has expired before undertaking an internal up-grade. Even if the job is done perfectly, QL can be a bit temperamental and there is a real risk of unnecessary repair costs if the machine goes haywire on its own. With this in mind, the DIYers choice should - in a large part - depend upon an honest appraisal of their technical competence or the cost-effectiveness of paying for the job to be done.

Micro Peripheral's QRam is the obvious choice for the non-expert determined to go it alone. Opening the box reveals an L-shaped, 256K board fitted with 13 Ram chips and a small cabled extension.

The extension board contains 48 pins and a ribbon cable joined to the main L-shaped board with 40 connector pins at the base. There is a two page instruction sheet and diagram which is clearly written and divided into six simple steps.

The DIYer opens the QL case and removes the ZX8301 bus controller chip and the Motorola 68008 processor itself. The connector pins of the main QRam board are fitted into the sockets vacated by the ZX8301 and the small extension

board replaces the 68008. The ZX8301 and the 68008 are then reinserted into the sockets provided on the QRam boards without any need for soldering or desoldering.

The job is just about as simple as it could be. Lifting out the two QL chips is a delicate business but easy enough. Nervous types should take special care with the 68008 - it's encased in a brittle ceramic and costly to replace. Once QRam is in and the chips replaced, the fits are snug and it's only a matter of refitting the case.

The up-graded QL's total memory is now 384K but, unfortunately, that's the maximum the user can have as QRam will not work with memory add-ons utilising the computer's expansion slot. Anybody wanting more than 384K has got to look elsewhere.

## Ribbon cables

Things aren't quite as technically easy with SPEM's 512K up-grade although the price is attractive. The first thing on the three page instruction sheet (with circuit diagram) is the warning not to go ahead unless "you are an expert in hardware". After opening the QL's case, all similarity with QRam installation ends and potential buyers should take the warning very seriously.

Paying for the job to be done is an obvious alternative but, unless it's cheap enough, there is a point where one should consider just sending off the QL to Silicon Express for its up-grade and a six month warranty as well.

The SPEM kit itself consists of 16 Ram

sockets, 16 HM50256 Rams and a new PAL circuit. After opening the QL's case and disconnecting the ribbon cables and loudspeaker wires, the reset button, heatsink and microdrives are taken out in a series of (careful) steps. The QL's old 128K Ram bank is unsoldered and replaced by the sockets provided. The new Ram chips are then inserted into their respective sockets. A small modification is made to the QL's ZX8301 and the new PAL circuit is installed in a series of fairly complicated solderings. Depending upon the particular QL, other small but delicate modifications may be necessary before the up-grade is complete or fully operative.

## New circuit

The instructions aren't always as clear as they ought to be and there are a host of pitfalls waiting for the unwary and the non-expert - careless soldering, for example, can easily short-circuit the main board.

SPEM's kit offers a great deal of Ram for little money but it is probably only an option for the expert, or those non-experts enterprising enough to get the work done for them at little or no extra cost.

Internal upgrading, however, is probably the most rational approach to added QL Ram and both SPEM and Silicon Express deserve a great deal of credit for bringing their DIY packages on to the market at prices people can live with.

**Brian Beckett**

## Teletext adaptor

**Program** TTX2000 S Teletext Adaptor **Micro Spectrum Price** £99.99 **Supplier** Volex Electronics, Lissadel Street, Salford M6 6AP.

**H**oused in a standard size under-the-Spectrum black box, the TTX2000 S could easily be mistaken for a modem. But its purpose is to access Oracle and Ceefax, ITV and BBC's way of making use of spare lines in TV signals, which hold text information pages, as well as a considerable amount of advertising on the commercial channels.

## Strong signal

This lets a Spectrum and ordinary set receive them - it is not suitable for bulletin boards or communications - as well as downloading telesoftware directly into the micro.

The use of an identical power supply connector to the Spectrum's for the tuner creates an initial bad impression - a

simple slip could put 18V into your micro. You'll also need a strong signal to receive those spare lines and I found tuning incredibly difficult.

Once I had it set up I found that it created interference on normal vision, not that this mattered much because as far as I could tell there's no way of superimposing pages (eg, containing subtitles or newflashes) over broadcasts.

After all these problems I was surprised to find that the telesoftware downloaded without problem - I received a section of *The Living Body* program.

## Normal vision

However, downloading is not fast and you're limited to Channel 4 telesoftware unless a soft converter makes the BBC transmissions available too.

All in all I wasn't impressed with the products performance and see little point in investing a penny short of £100 to indulge in the delights of broadcast teletext and software when a modem and subscription to a network gives you interaction too.

**John Minson**

## Word lines

**Program** *Dr Draw Micro* Amstrad (on CP/M) **Price** £49.95 **Supplier** Digital Research, Unit 12, Fenton Way, Southfields, Basildon SS16 6SL.

**D**R Draw is from Digital Research, the author of CP/M, so the quality of this graphics package is assured from the start. You'd be right in thinking, though, that the price, pedigree and presentation of the package does not recommend itself to the mere dabbler. *Dr Draw* is rather for the business person wishing to make a sober presentation.

This is not to say that it is in any way less flexible. The building block with which your pictures will be built is the 'element': thus, a circle is an element which may be added to a square, also an element. This combination now becomes a third element.

Elements may be shrunk or magnified, moved around the screen, copied, filled - anything you like.

To help your design, grids of various sizes can be drawn on-screen (though rather slowly) and line-ends, box-corners and so on 'snapped', if required, to the nearest grid point. Free-hand drawing is hardly possible, unless the user has the patience to use very short lines to build up a free-looking picture. Several text fonts are supplied with the disc, and up to three at a time can be used in a picture.

The manual is a delight to see, and is an object lesson to others, leading the user slowly and carefully from basic techniques to a deeper look at each function: there's also comprehensive set of instructions for the Amstrad user. Once the picture is finished, it may be printed on printer or plotter, or prepared for camera if presentation slides are prepared.

This last sentence should indicate that this is a package for the serious business user - as such it is excellent.

Tony Bridge



## All things?

**Program** *Personal Assistant Micro* Amstrad CPC6128/PCW8256 **Price** £94.95 **Supplier** FMP Business Software, distributed by Screens, Main Avenue, Moor Park, Northwood, Middlesex.

**I** imagine that this suite of six loosely related programs is aimed at busy owners of small companies who are forced to do their own secretarial duties. The names of the individual modules give a hint as to their purpose: *Bankmate*, *Billmate*, *Mailmate*, *Wordmate*, *Appointment* and, yes, *Datamate*.

The manual, produced on the *Wordmate* program, promises that the programs are compatible with the Amstrad CP/M machines - but, oh dear, they are not. And there are more bugs here than in the Insect house at London Zoo.

A few examples will suffice: the label printer works fine, except that names are not printed, only salutations and addresses (you could define the first line of the address as the name of course - simple!).

The printer menu of the *Mailmate* module refuses to accept any input, thus freezing the program and forcing a power-down (and ignoring the fact that control codes are not required for the PCW printer).

The cursor keys of the PCW don't work as promised within the *Wordmate* program, while the delete keys are also non-operative, with no mention of what might replace them.

Any references to specific Amstrad keys in the manual favour the PCW, with the 6128 owner being left to guess that many of the keys must be shifted (to be fair, Fydlar tells me that there is an update sheet to the manual, but I haven't seen it yet).

On the subject of keys, the 6128 owner will find that the numeric pad is for some reason defined as an alpha pad - easily rectified from CP/M, no doubt, but an insurmountable obstacle to the naive user. Prompts within each module (for example, Y/N) are case dependent, and users believe it or not, have to set *Caps Lock* themselves: a few bytes of code would take care of that.

Another facet of this particular failing is that, in the word

processor, the user naturally doesn't want to stay in *Caps Lock* but must return to it in order to proceed with saving, loading and so on.

Despite all this, is it worth persevering with the programs? The label printer, as we've seen, is totally useless and the appointment diary is slower and less attractive than the leather-bound paper variety. *Locoscript*, as every PCW owner knows, is almost unbeatable (certainly by *Wordmate*) and free, while the 6128 user has the choice of several infinitely superior programs, all of which are at least half the price of FMP's attempt. The invoice printer is okay if you don't have a VAT calculator around the office, but you're stuck with Fydlar's layout which can't be re-designed.

Probably the best part of the whole package is the database module, with its commendably fast sort and fine routine - it also has limited integration with the word processor and the label printer.

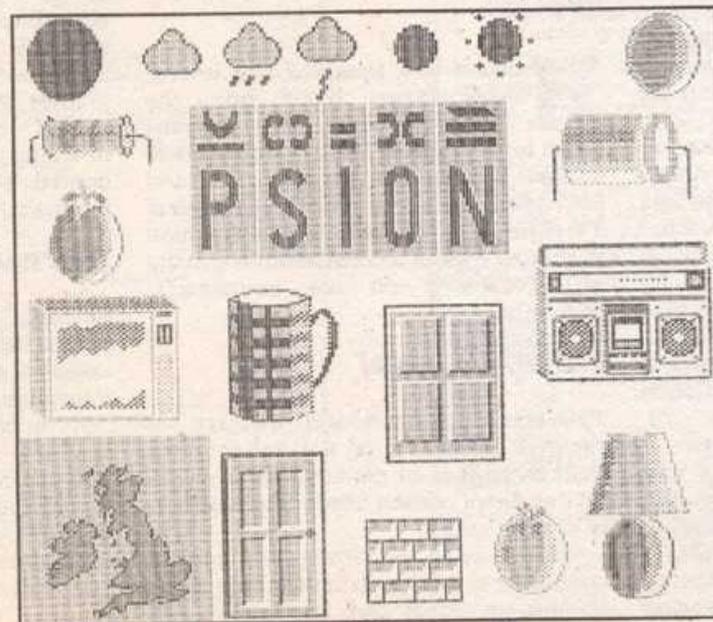
The manual starts well but gets worse. On balance not recommended.

Tony Bridge



## Quick draw

**Program** *Qdraw Micro QL* **Price** £12.95 **Supplier** Psion Psion House, Norcourt St, London W1H 1DT.



**T**here seem to be an excess of graphics packages for the QL these days, which is dominated by Talent's *GraphiQL*, so what have Psion got to overthrow Talent's number one spot?

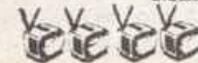
I found that the Psion pack-

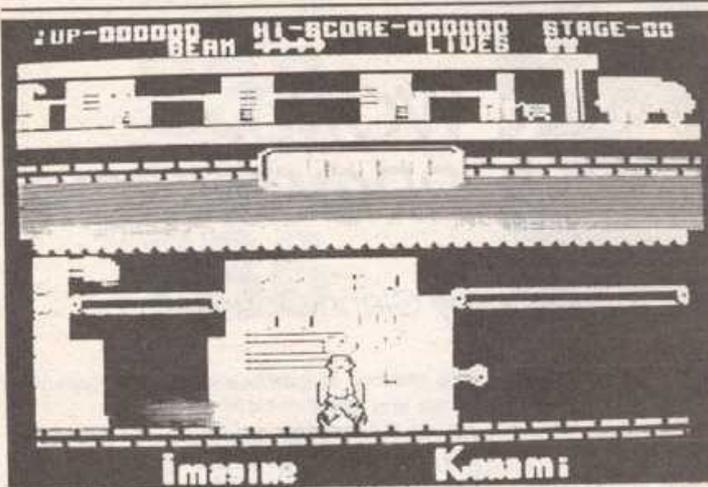
age was very easy to operate, drawing pictures in both modes. The control of the Cursor is done by using the directional keys that surround the "S" key and the F4 key is used for special commands such as lines, expand, reduce, reflect and fill.

The main bulk of the documentation of this programme is spent on defining Shapes and how to manipulate them across the screen and changing their presentation in a variety of ways. This is somewhat useful to the freehand drawer, but if you plan your pictures well there is no need for such routines.

The answer to the question 'why buy this when *GraphiQL* is around' is that the *Qdraw* is a simpler package to operate and a cheaper one to buy. It is not as powerful as Talent's. I feel though, the difference in price makes up for the loss in facilities.

Matthew Palmer





## Half baked

**Program** *Comic Bakery* Micro Commodore 64 **Price** £9.95 **Supplier** Imagine, Unit 10, The Park Way Industrial Estate, Heneage St, Birmingham B7 4LY.

**Q** uite what the connection is between racoons and a bakery

is beyond me I'm afraid, but that however is the subject of this tepid release from Imagine.

You are Joe, sole proprietor of this automated bakery whose job it is to bake as many loaves as possible before 5.00 p.m. in order to placate the hungry shoppers who are waiting in the front shop.

As Joe dutifully patrols up and down his conveyor belt,

racoons chase around switching off the machinery or eating the bread, and the only way the baker can stop them is by spraying them with of all things a stun gun (an essential tool for any aspiring baker) which sends those pesky animals to sleep for a few moments, enabling Joe to kick them out of the place. And so it goes on . . . and on and on.

On the brighter side is a gutsy soundtrack by Martin Galway, and some nice sprites of the racoons and the baker.

As this game is a Konami tie in, I suppose arcade freaks might remember it and enjoy playing their home version as this is quite a faithful reproduction, but with only two screens to play with, eventually it does get quite boring to say the least.

Dare I say it - A stale offering.

**Andy Moss**



## Boys in blue

**Program** *The Force* Micro Commodore 64 **Price** £9.95 **Supplier** Mind Games, Liberty House, 222 Regent Street, London.

**I** f this game is at all realistic, the police have the most boring job in the country.

You play the part of the new superintendent responsible for allocating manpower in four police stations, in three shifts, seven days a week.

Your working week splits into two parts. The really boring part of allocating foot patrols, Z-cars, dog handlers,

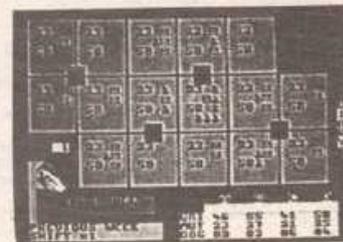
mounted police, and the special reserve - not a brand of port but a horde of Dirty Harry clones who give the citizens the willies. You do this for the three shifts, etc, etc.

Then you sit back for the incredibly boring part where you watch the week unfold. The most exciting bit is the ticker tape which tells you when a Post Office has been robbed.

The entire game is icon-driven, which is confusing and frustrating. Numbers are denoted by colour, so a dark blue policeman's hat means one bobby, a purple hat means two, and so on.

You can also call up lots of obscure crime statistics for each area, with the end result

that the game properly involves half-a-dozen screen switches just to allocate one man. The sound is pitiful too.



In short, *The Force* is mind-numbing. No chance of disturbing the peace, but Argus could be charged for loitering without intent.

**Peter Worlock**



## Bang bang!

**Program** *West Bank* Micro Amstrad **Price** £7.95 **Supplier** Gremlin Graphics, 10 Carver St., Sheffield S1 4FS.

**T** his game is so simple, yet great fun to play. It's like one of those police training exercises where cardboard cut-outs pop up and you have to dis-

tinguish between villain and bystander before firing.

*West Bank* contains some very tasty graphics which consist of mean critters like the Dalton Brothers and Jack Vicious who are hell bent on robbing the bank. There are 12 doors and as each one opens, you are confronted either with a customer or a gunman with an itchy trigger. Your job is to despatch the desperados without shooting the customers. The real prob-

lem comes when gunman is disguised as bystander.

There are quite a few extra features to enjoy, like a high noon shoot-out and a dwarf with seven hats housing either a pot of gold or a bomb!

A really entertaining game which doesn't bog you down with instructions, just lets you pull that trigger and, at the price, it's a steal!

**Andy Moss**



## Big top

**Program** *Ballyhoo* Micro Commodore 64 **Price** £33.50 **Supplier** Infocom (various independent stockists).

**E** ven the merest hint of any impending Infocom release is normally enough for most adventure purists to start salivating at the prospect of doing battle with the devious minds of the American masters of adventure. Well, the rumours have turned to fact as before me is their very latest release - *Ballyhoo*.

It's another in their mystery series following on from *Deadline* and *Suspect* and is a standard-level game. It's set in the strange circus that time forgot - now, using a circus as a plot is nothing new (remember Brian Howarth's *Circus*) but don't be misled because with the Infocom treatment in terms of atmosphere, descriptive narrative and character interaction makes for a cracking story.

The basis of the plot is this - You've just seen the Big Top show and going backstage hoping to see some of the action behind scenes you overhear a whispered conversation about the kidnapping of the owner's daughter and the lack of any leads from the hired detective. You decide to help and are plunged into a mysterious circus world where corruption is centre stage.

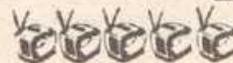
There are some great characters to meet, like Andrew Jenny half-man half woman, each side with its own personality, a number of stunts to perform, and strange dressing rooms to explore.

*Ballyhoo* also has an even better parser than before (if that's possible) and a vocabulary of over 1700 words, the most advanced system yet.

All this comes in the usual superb Infocom packaging including authentic circus tickets and an official programme to the show.

Of course it's not cheap but the best never is. If you own a disc drive go out and buy it, you won't be disappointed.

**Andy Moss**





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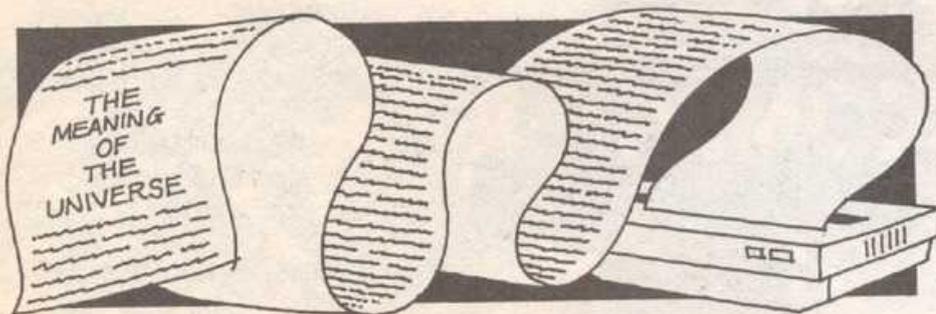
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## SPACE PROBE

by Paul Bussey

owing to the recent and future discoveries of the Voyager space probes, this program shows some of the aspects of these robot explorers. The program revolves around the formula;  $F = (G \times m_1 \times m_2) / r^2$ , where  $F$  is the gravitational force between point masses  $m_1$  and  $m_2$ , distance  $r$  apart, with  $G$  as the gravitational constant.

In this case, one body is always stationary, this being the planetary mass. The second body is your space probe which will be affected by the gravitational pull of the planet. The aim is to direct the flight path of the probe into a certain area of space represented by a vertical or horizontal line randomly placed on the edge of the screen.

At the start of the game, the initial

velocity, initial angle and y coordinate of the probe have to be input. Each division on the y axis is 25 pixels. Zero degrees is due east, negative angles giving initial flight downwards.

Each new game gives a random mass of planet, shown in proportional size on the screen. If the planet is over a certain size then a series of rings are drawn around it. At the end of the plot, an option is given for either a new game or to keep the previous set up, and try again.

### Program Notes

**50-170** - The main number crunching loop. Distance between point masses, component forces and acceleration of probe are worked out. Checks if plot goes off screen.

**200-280** - Uses point (x,y) to check if the flight path is plotted towards the line.

**500-650** - Draws planet, the destination line, the y-axis with divisions, stars and the planetary rings, if needed.

**800-870** - Uses OUT 25d,n to change the border colour with speed, where n is the required colour, when mission is accomplished. Also gives endgame options.

**1000-1500** - Initialisation. Uses array as to temporarily store input values. This is where the random position and size of the planet is defined. The whereabouts of the destination line is determined. The length of the line can be changed by altering LINE at line number 1045. Increasing the variable dt speeds up the plot, but the plot is less refined. Inputs are given a range check; the ranges being permitted and the prompts are stored in a data statement. The angle is converted to radians.

```

1000 REM ***** Mission & Gravity
1010 @ P. Bussey
1020 SUB 1000
1030 REM ***** Private probe
1040 X=0:Y=1:LET V=42:Y1
1050 T=0:G=9.81:R=2/(X^2+Y^2)
1060 IF X=1 THEN LET PHI=PI/2
1070 LET PHI=ATN ABS (Y/X)
1080 FX=FG*COS PHI:SGN X
1090 FY=FG*SIN PHI:SGN Y
1100 AX=FX/M1
1110 AY=FY/M1
1120 VX=VX+AX*DT:LET SY=FY/
1130 VY=VY+AY*DT
1140 X=X+VX*DT+(AY*.5)*DT^2
1150 Y=Y+VY*DT+(AX*.5)*DT^2
1160 SUB 200
1170 IF X>255 OR Y<0 OR
1180 Y1<X OR X1<X THEN BEEP OR
1190 PRINT AT 0,1:$(4):AT 0,0:
1200 GOTO 830
1210 X1=X:Y1=Y:DRW X,Y
1220 X1=X+X:LET Y1=Y+Y
1230 GOTO 80
1240 REM ***** Check for success
1250 AX=X.5 THEN GO TO 250
1260 FOR N=80 TO 80+LINE
1270 IF POINT (N,10)=1 THEN GO T
1280 NEXT N
1290 RETURN
1300 FOR N=C TO C+LINE
1310 IF POINT (245,N)=1 THEN GO
1320 NEXT N
1330 RETURN
1340 REM ***** Set up graphics
1350 HORIZAL X2,Y2:80
1360 AX=X.5 THEN PLOT 255,C
1370 GOTO 80
1380 PLOT 80,C:DRW LINE 0
1390 PLOT 0,0:DRW 0.175

```

```

1400 FOR N=175 TO 0 STEP -25
1410 PLOT 0,0:DRW 2,0
1420 PLOT RND*250,N: PLOT RND*25
1430 NEXT N
1440 IF RND<12 THEN GO TO 550
1450 FOR N=1 TO 3
1460 LET R=2*PI/N
1470 LET X2=RX+Y2*30:DRW 2+FX
1480 LET Y2=Y2+30:DRW -2+FX,60.25
1490 NEXT N
1500 RETURN
1510 REM ***** Mission completed?
1520 PRINT AT 0,0:$(14):AT 0,0:
1530 GOTO 2: "Mission Completed!"
1540 FOR N=1 TO 50: OUT 254,RND+
1550 NEXT N
1560 BORDER 0
1570 PRINT AT 10,0: "space for ss
1580 set up":AT 20,20: "any other ke
1590 for new set up."
1600 IF INKEY$="" THEN CLS:LET #2
1610 #2:GO SUB 1050:GO TO 50
1620 IF #2="" THEN GO TO 240
1630 RUN
1640 REM ***** Inputs & constants
1650 "line" is len of goal
1660 DIM C,PAPER 0:PAPER 0:INK 7
1670 DIM S:DIH $(4,31)
1680 LET M2=INT (RND*20)+8
1690 LET X2=INT (RND*175)+80
1700 LET Y2=INT (RND*100)+40
1710 LET LINE=50:LET AX=X-RND
1720 LET C=RND*(175-LINE)
1730 LET SUB=500
1740 LET #1=1:LET X1=10:LET #=
1750 LET DT=1
1760 REM *****
1770 FOR N=1 TO 3
1780 READ QS:PRINT AT 20,1:QS

```

```

1055 READ S,L
1060 INPUT LINE $(N)
1065 IF $(N)=$(4) THEN GO TO 1
1070
1100 IF VAL $(N)<5 OR VAL $(N)
1110 THEN GO TO 1090
1115 PRINT AT 20,1:$(4)
1120 NEXT N
1125 LET Y1=VAL $(1):LET #=(VA
1130 L $(2)*PI/180:LET V=VAL $(3)
1140 LET VX=V*COS #:LET VY=V*SI
1150 N #
1155 LET #2=#2+50
1160 PRINT AT 0,1: "Plan mass:";#
1170 #2: " Vel:";V: " At:";VAL $(12):" D
1180 EG"
1190 RETURN
1500 DATA "Y co-ord. of probe? (
0 to 175):",0.175,"Angle? (-90 to
90):",-90,90,"Initial Velocity?
(1 to 30):",1,30

```

Plan mass:1750 Vel:5 At:0 DEG



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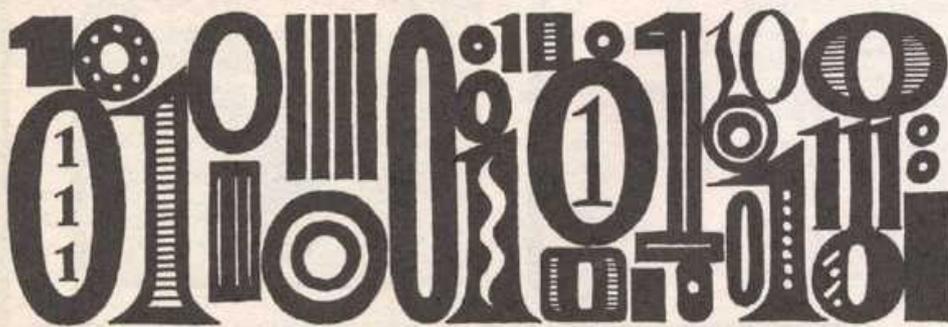
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## RANDOM NUMBERS

by Dr R K Lowry

The SuperBasic RND function is based upon one of the most effective pseudo-random number generation algorithms I have encountered and the design of calling sequence makes it a delight to use in a wide range of situations. It therefore came as a surprise to me to find that it could not be accessed from machine code without a direct call to the Rom routine which is version dependent. Many machine code programs, particularly games, require a source of pseudo random numbers so what is the solution?

There are a couple of techniques that I have seen used. The first uses the Rom. A pointer is set to the base of the Rom and the random number routine simply returns the contents of the Rom a byte or word at a time. This works on some micros but there is a problem on the QL. The object code for the 68000 contains a high proportion of zeros, due in the main to 16 or 32 bit constants, which gives any random number routine using this method a strong zero bias.

The second method is the 16-bit 'random number' at address 2802E hex. This is *not* a random number but is in fact a counter incremented by a 50 hz interrupt service routine. Thus the sequence of numbers produced increment uniformly and it is possible to get the same value several times if the random number is sampled frequently. However, this may not be important if a subfield (eg, the least significant three bits) of the random number is used and sampling is infrequent.

Another problem with this method can be speed. Consider a loop which returns a random number in the range 256 to 512. If this is entered when 2802E contains 513, the loop will hang around for about 10 minutes until a suitable value is obtained. This may of course be coded around by taking a subfield of the random number and manipulating it. However, if the true nature of this 'random number' is not appreciated, it can take a long time before you realise why your program occasionally 'hangs'.

What alternatives are there? If you require a series of positive 16-bit random numbers (ie, random numbers in the range 0 to 32767) then the formula: NEXT = (LAST\*1541 + 13849) MOD 32768 works quite well. However, the whole random number must be used and not just a subfield or the sequence of random numbers becomes extremely pre-

dictable. Likewise loops which return a random number within a specified range should be avoided.

In my opinion algorithms based upon setting a particular bit by XORing and then spinning the bits work better in the situations most commonly found in machine code programming. The assembler listing given is based upon an algorithm where a long word is shifted a single bit to the right with the most significant bit set to the result of bit two XOR bit nine. This has worked well in all but two situations.

First, the random number must not be seeded with zero or the only result possible is zero. Secondly, it is common practice to obtain a subfield of a random number by ANDing with a constant; ie, the subfield is the least significant *n* bits of the random number. If this is tested to control a program branch requiring a

smaller subfield will no longer be random. For example, consider a branch which is executed when the random number ANDed with 63 returns zero. If a random number obtained in that branch is ANDed with 15 the result will always be zero. However, this can easily be overcome by reseeding - I normally use \$2802E - or by using subfields other than the least significant *n* bits.

I hope this article illustrates some of the pitfalls awaiting QL machine code programmers who need random number generators. However, do not be too downhearted if you cannot work out which algorithm is best suited to your needs. My usual technique is to include several algorithms in a program, each as a separate subroutine, and select one of them as the 'work-horse'. In situations where the results are not what I require, I simply use one of the other algorithms.

```

RANDNO    DC.L        699678
*
* Subroutine Random
*
* 16-bit pseudo random number
* generator
*
* Output register
*
* D1.W - Random number
*
* D2/A0 Smashed
*
RANDOM     LEA         RANDNO,A0
*
* XOR bits 2 and 9
* Store result in extend bit
*
*
*           MOVE.B     3(A0),D1
*           ROXR.B     #1,D1
*           MOVE.B     2(A0),D2
*           EOR.B      D2,D1
*           ROXR.B     #2,D1
*
* Place result in MSB and rotate
* long word 1 bit to the right
*
*           ROXR.W     (A0)
*           ROXR.W     2(A0)
*
* Return LSW as random number
*
*           MOVE.W     2(A0),D1
*           RTS
*           END
    
```

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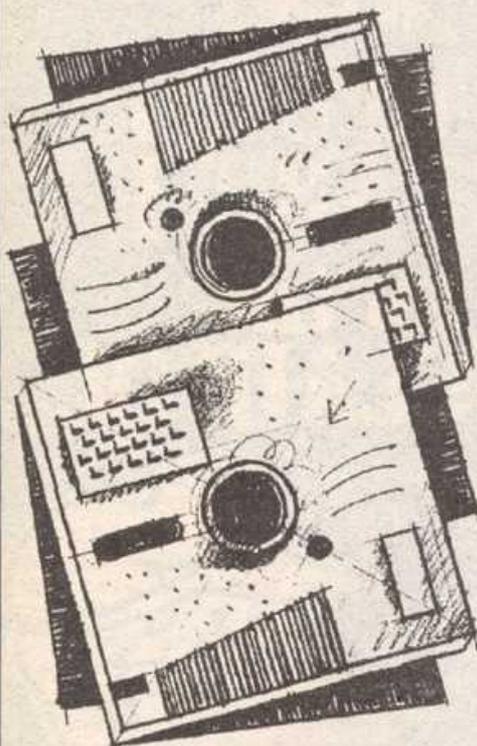
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## AUTO-RUN

by W Wako

To overcome this oversight, the following utility was written and will load and execute programs saved to disc or tape be they in Basic or machine code.

A little understanding of the Operating System is required to understand the operation of the Loader-Run Program. When the machine is switched on and has set everything up, the machine then scans the keyboard buffer as a part of the Basic interrupt sequence. Fortunately for us, those clever "Commodore People" inserted a jump vector as part of this routine. All that is required is that when loading, this vector is altered to point to the start of the Loader Routine. After the load is completed, the system is thus directed to the start of the Loader Program which in turn loads and executes the desired program, having restored the altered vector to its original value.

The Loader Program is loaded into the Ram area from \$02A7 to \$02FF, so be sure that any programs to be loaded are not loaded to this area! This Ram area is right next to the Basic vectors. So it is a

simple matter of altering the desired vector and saving all as part of the Loader-Run Program.

The utility provides some degree of error checking of the Data statements in the form of a checksum at the end of each line. If all is well, when the utility is Run there will be a slight delay whilst the machine code routines are set up. The utility will then issue a series of prompts one of which will be a request for a "File Name". This refers to the name of the program you wish to be loaded and run. You will also be asked for the "Program Name", which is the name assigned to the Loader Program.

For machine code programs you will be asked for a "Start Address". This refers to the logical start of the program, ie, the location to which to jump to for the execution of your program. Remember to terminate all your prompts with a carriage return.

On loading your Loader Program be sure to load it as a machine code program, regardless of whether the file it will load is in Basic or machine code.

The Commodore 64, unlike a lot of the other machines on the market, does not provide for a direct means of a universal load and auto run of programs.

```

5 REM *** LOAD AUTO-RUN UTILITY BY W.WAKO ***
10 POKE 52,80 :POKE 56,80 :CLR
20 PRINT "*"
30 GOSUB 2000
40 GOSUB 400
50 GOSUB 550
60 GOSUB 1000
70 SYS 32769
80 END
395 REM .....
400 REM      SET DEVICE TYPE
405 REM .....
410 PRINT
420 PRINT "SAVING TO TAPE (T) OR "
430 INPUT "SAVING TO DISC (D) " :IK16
440 IF K16(">T") AND K16(">D") THEN 420
450 IF K16(">T") THEN 490
460 POKE 679,8 :REM BOOT FROM DISC
470 POKE 32768,8 :REM SET DISC SAVE
480 RETURN
490 POKE 679,1 :REM BOOT FROM TAPE
500 POKE 32768,1 :REM SET TAPE SAVE
510 RETURN
545 REM .....
550 REM      SET FILE PARAMETERS
555 REM .....
560 PRINT
570 INPUT "FILE NAME IS " :FN#
580 FL=LEN(FN#) :IF FL>16 THEN 560
590 POKE 745,FL :IF FL=0 THEN 560
600 FOR N1=1 TO FL
610 POKE 745+N1,ASC(MID$(FN#,N1,1))
620 NEXT N1
630 PRINT
640 INPUT "BASIC FILE (Y/N) " :KI#
650 IF K16(">Y") AND K16(">N") THEN 630
660 IF K16(">N") THEN 740
670 ME#="RUN"
680 POKE 734,5 :POKE 735,13
690 FOR N1=1 TO 3
700 POKE 735+N1,ASC(MID$(ME#,N1,1))
710 NEXT N1
720 POKE 739,13
730 RETURN
740 PRINT
750 PRINT "START ADDRESS OF FILE"
760 INPUT " IS (DECIMAL) " :IAD#
770 IF LEN(IAD#)>5 THEN 740
780 GOTO 800
790 AD#="AD#+"
800 IF LEN(IAD#)<5 THEN 790
810 AD#="SYS"+AD#
820 POKE 734,10 :POKE 735,13
830 FOR N1=1 TO 8
840 POKE 735+N1,ASC(MID$(AD#,N1,1))
850 NEXT N1
860 POKE 744,13
870 RETURN
995 REM .....
1000 REM      SET PROGRAM PARAMETERS
1005 REM .....
1010 PRINT
1020 INPUT "PROGRAM NAME IS " :PN#
1030 PL=LEN(PN#)
1040 IF PL>16 THEN 1010 :IF PL=0 THEN 1010
1050 POKE 28960,PL
1060 FOR N1=1 TO PL
1070 POKE 28927+N1,ASC(MID$(PN#,N1,1))
1080 NEXT N1
1090 RETURN
1995 REM .....
2000 REM      SET UP BOOT/SAVE PROGRAMS
2005 REM .....
2010 MY=679
2020 LN=3010
2030 GOSUB 2220 :REM BOOT PROGRAM
2040 MY=32768
2050 LN=3210
2100 GOSUB 2220 :REM SAVE PROGRAM
2110 RETURN
2215 REM .....
2220 REM      SET UP ROUTINE
2225 REM .....
2230 FOR N1=1 TO 7
2240 GOSUB 2500
2250 NEXT N1
2260 RETURN
2495 REM .....
2500 REM      MACHINE CODE POKE
2505 REM .....
2510 A2=0
2520 FOR N2=1 TO 8
2530 READ A1 :A2=A2+A1
2540 POKE MY,A1
2550 MY=MY+1
2560 NEXT N2
2570 READ A1 :A2=A2+A1
2580 IF A2=0 THEN RETURN
2590 PRINT
2600 PRINT "DATA ERROR IN LINE " :LN-10
2610 END
2995 REM .....
3000 REM      BOOT DATA
3005 REM .....
3010 DATA 1,173,167,2,174,167,2,160,846
3020 DATA 1,32,186,255,173,233,2,162,1044
3030 DATA 234,160,2,32,189,255,169,0,1041
3040 DATA 162,255,160,255,32,213,255,120,1452
3050 DATA 174,222,2,134,198,202,234,169,1355
3060 DATA 223,2,157,119,2,202,16,247,968
3070 DATA 88,32,83,228,108,2,3,5,549
3195 REM .....
3200 REM      SAVE DATA
3205 REM .....
3210 DATA 8,120,169,168,141,2,3,169,780
3220 DATA 2,141,3,3,169,1,174,0,493
3230 DATA 128,160,0,32,186,255,173,32,966
3240 DATA 113,162,0,160,113,32,189,255,1024
3250 DATA 169,2,133,252,169,167,133,251,1274
3260 DATA 169,251,162,13,160,3,32,216,1006
3270 DATA 255,88,32,83,228,96,255,0,1037
    
```

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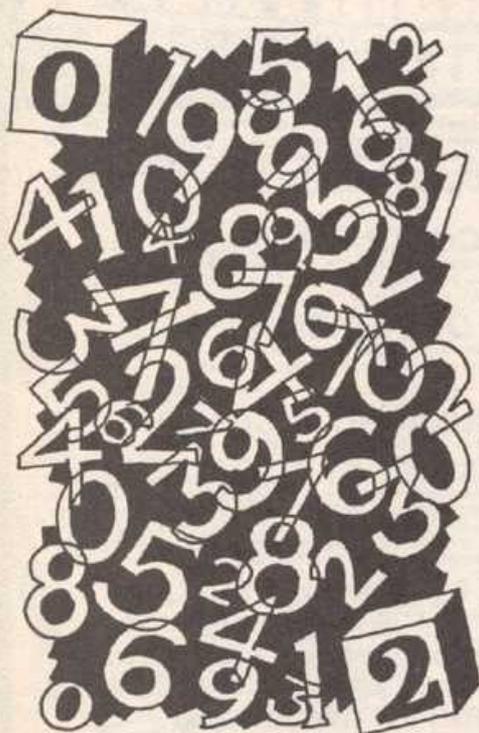
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## 3D GRAPHICS

by Wail Sabbagh



The program involves using sophisticated graphic manipulation to rotate a three dimensional pyramid on three axis and clearly demonstrates the high speed of the new Atari computer as well as its graphics.

The program should be quite easy to understand, as it is divided into several subroutines:

- Initialise:** set the arrays and variables of the program
- Background:** draws the axis in ST

**Draw:** virtual screen draws the actual pyramid

**Rotate:** updates x,y and z coordinates

GEM is turned off in this routine to speed it up.

This demonstration will prove useful for children who find it difficult to think in 3D, as well as older users who are interested in the theory behind the manipulation of 3D - plus showing off the power of the Atari ST.

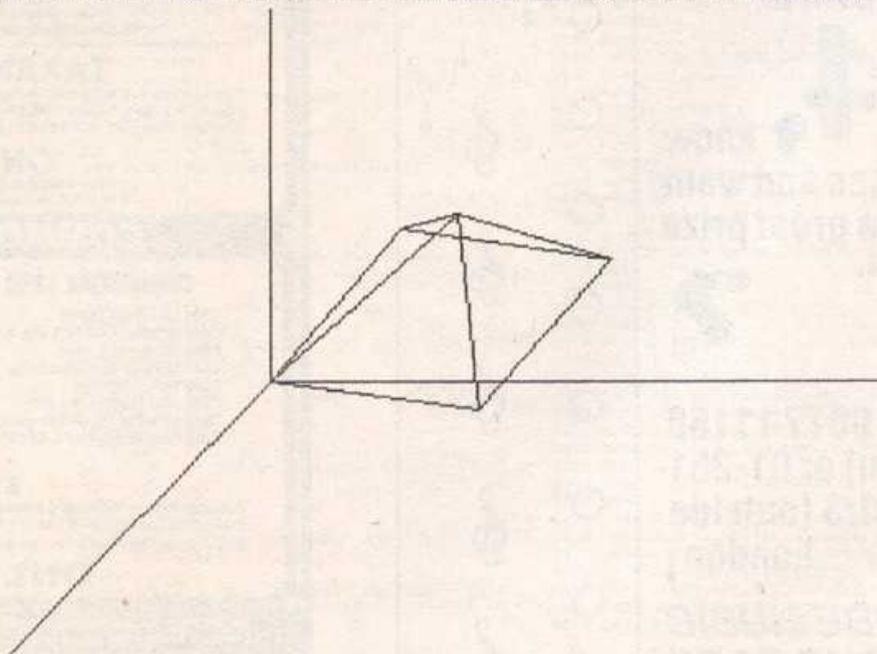
```

10 REM (C) WAIL SABBAGH 1986
20 GOSUB INTILISE:GOSUB BACKGROUND
30 DRAW:POKE GEM,0:OPENW 2:FOR X=1 TO L
40 X1=X(DR(X,1))-Z(DR(X,1))*ANG:Y1=Y(DR(X,1))-Z(DR(X,1))*ANG
50 X2=X(DR(X,2))-Z(DR(X,2))*ANG:Y2=Y(DR(X,2))-Z(DR(X,2))*ANG
60 LINEF 300+X1,180-Y1,300+X2,180-Y2
70 NEXT X:GOSUB ROTATE:GOTO DRAW
80 ROTATE:POKE GEM,1:FOR I=1 TO E:Y=Y(I):Z=Z(I)
90 YP=Y*CPHI-Z*SPHI:ZP=Y*SPHI+Z*CPHI:XP=X*CTH-ZP*STH
100 Z(I)=XP*STH+ZP*CTH:X(I)=XP*CPHI-YP*SPHI
110 Y(I)=XP*SPHI+YP*CPHI:NEXT I:RETURN
1000 INTILISE:GEM=SYSTAB+24:POKE GEM,0
1010 F=S.141593/180:ANG=COS(45*F):E=S:L=B:DIM X(E),Y(E),Z(E),DR(L,2)
1050 FOR X=1 TO E:READ X(X),Y(X),Z(X):NEXT X:FOR X=1 TO L
1060 READ DR(X,1),DR(X,2):NEXT X
1070 DATA 0,0,0,0,0,100,100,0,0,100,0,100,50,50,50
1080 DATA 1,2,1,3,3,4,2,4,5,1,3,2,5,3,4
1090 CTH=COS(-THETA):STH=SIN(-THETA):CPHI=COS(PHI):SPHI=SIN(PHI)
1100 CPSI=COS(PSI):SPSI=SIN(PSI):RETURN
2000 BACKGROUND:CLEARW 2:FULLW 2:LINEF 300,5,300,180:LINEF 300,180,6
2020 LINEF 300,180,300-180*ANG,180+180*ANG
2030 GOTOXY 0,4:PRINT "X-ROTATION "CHR*(248);F
2040 PRINT "Y-ROTATION "CHR*(248);T:PRINT "Z-ROTATION "CHR*(248);I
2050 LINEF 0,320,630,320:GOTOXY 0,19
2070 PRINT " 3D-ROUATAION "CHR*(189)"WAIL SABBAGH-1986"
2080 PRINT CHR*(14);CHR*(15)" 520ST":RESET:RETURN
    
```

Desk File Run Edit Debug

OUTPUT

X-ROTATION ° 45  
Y-ROTATION ° 90  
Z-ROTATION ° 35



3D-ROUATAION

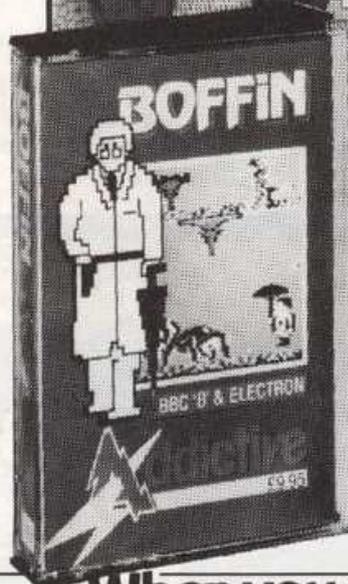
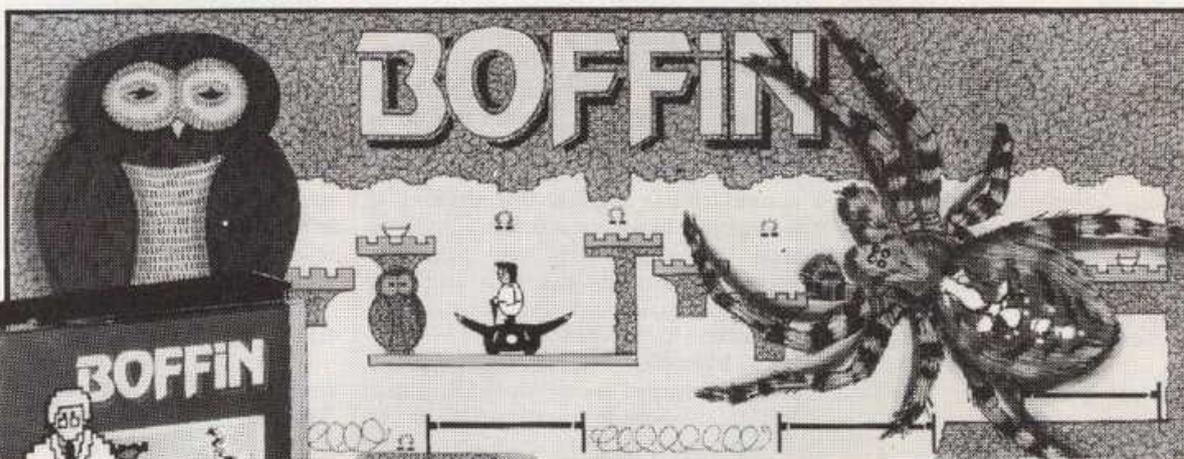
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## Recent hits

**D**espite the traditional rush to release software in time for Christmas, it seems that some of the very best games programs have been held back until now. The Commodore 64 has had some excellent pure arcade releases lately; *Uridium* from Hewson being of particular note. Ever since I saw the smooth multi-directional scrolling of *Gribbly's Day Out* I've been longing for them to use the routines for a space blast and here it is. Fast, furious and great fun. The only thing to match it is, of course, the superb *Mercenary* from Novogen and there are lots of interesting rumours about a forthcoming *Mercenary 2*. Let's hope it isn't as long appearing as the first one.

US Gold has also slipped out two of their best games to date: *Kung Fu Master* is an extremely addictive copy of the arcade game of the same name and is slightly different from other karate games in that it gives you several, very fiendish, opponents at once. *Hard Ball* is one of the best looking sports simulations I've ever seen, although a bit tricky to play. Lets hope that they make a good job of the conversions. Incidentally, BBC owners should note that US Gold is now converting some of its recent hits for that machine.

Licensing deals are of course still popular, but they seem to be settling down and actually adding something to the game other than cheesy attempts at making the sprites look like TV characters, etc. *Back To The Future* is possibly the best release to date from Electric Dreams and is an arcade adventure based on the plot of the film - different from the usual fare and with nice digitised graphics.

*Battle of the Planets* from Mikro-Gen, on the other hand, is a little disappointing - there is some of the smoothest and fastest 3D vector graphics yet seen and it's a good shoot up, but it lacks in plot and some of the enemy ships look like Rowenta steam irons.

Ever since the release of *Knight Lore* there have been loads of games using a similar 3D design and the whole thing has started to get a little boring. To date, only *Sweevo's World* and *Rasputin* have made any attempt at improving on the

atmosphere and plot of the games. All that has changed now, with *Movie from Imagine*, a game set in the world of a 1940's Philip Marlowe detective story that is a superb complement to the 3D design.

An original story line and some nice touches such as speech bubbles have breathed new life into the Spectrum - don't miss it.

Anyway, enough of the games news for this week and on with the tips. Here's a couple of little bugs that I've picked up on the Amstrad version of *Bruce Lee*. First off, if you move to the right on to the third screen and go to the bottom right level, beneath the big hippo, by pressing the down key you will jump several screens and reappear at a much later stage in the game, missing out on some rather sticky problems.

Secondly if on the opening screen you select the option of one player against an opponent rather than against the computer, you will find that you start with nine lives rather than the usual three. The next trick is to get to the screen that has an object like a huge double Chinese lantern. Collecting this will normally give you an extra life, but if you can do it without losing one of your nine on the way you will be rewarded with a magnificent 99 lives.

I have managed to complete the game, although it needed nearly all of these lives - has anyone got a reliable system

another ankh symbol on the wall and some skeletons will appear. Match the two symbols before they get you and they will be stopped.

The symbol will change and fall off the wall - take it. You will find a different room with the changed symbol on the wall. Match it with the ankh and skeletons appear, match it with the new symbol and the magic is switched off and the one on the wall changes into a crown symbol and falls to the ground. Take this and find another crown symbol to match it to reveal the exit.

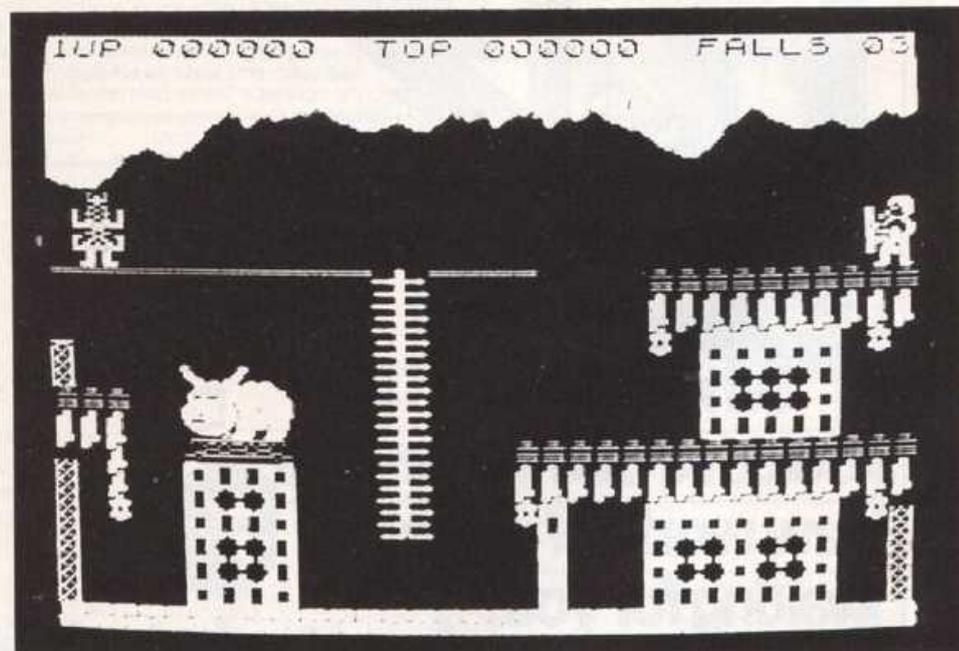
The cursed key is useful here to unlock many of the doors. Whilst you are looking around beware of invisible snakes that become visible if you touch them.

Use *Heal* if they bite or use *Mantle* to protect against all magic and poisons.

Find the small blue key and use it to unlock two blue chests. Take the spells and a door key. Open the door to the third wraith room with this. *Bane* and wraiths. Use the same key at the other end. Keep *Bane* on and search the tombs for spells. Search with the crown symbol to get the crown but avoid the hand that will fall down.

Take the crown to the anvil to destroy it.

Now place the crystal of antithought on the anvil so that it can absorb the magic. You get the message, 'Now gem can tame five legged Morag's Bane'.



Bruce Lee from US Gold

for getting through the screen that has four levels of moving platforms (you will know the one I mean, if you've got that far)?

Now we are going to return to the demon cursed depths of *Dragonorc*, to find out what has happened to poor old Maroc (this is just like *Eastenders*).

We left him underground in the cursed crypt clutching a cursed key and an ankh symbol. Find the room with

Take the gem to the cursed crypt and take the hand with it. Leave the gem.

We're on the last stage now - proceed to Wyemwood which is where the evil Morag can be found at last, guarded by an evil creature that she has summoned to her side and also lots of handy elvish cannon fodder for you to use. Unfortunately that is where we are going to leave you to sweat it out for yet another week.

# Tony Bridge's Adventure Corner



## In vogue

**W**hy should record buyers have all the fun when it comes to collections? We adventurers too should be able to buy tapes of several well-selected examples – and indeed, this sort of compilation tape seems to be enjoying a vogue at the moment. I hope that it continues, because, as you'll see, there are some good collections around at the moment.

Last week, we saw a pack of reasonable adventures at a reasonable price: this week, a couple more.

Pimania, after a short rest, has returned, I'm glad to say, in the form of *10 Packs*. I've seen volume three, and I imagine that it is in much the same vein as the others; that is, several arcade games together with a couple of text adventures.

In this case, the arcade games are pretty dire: in fact, ZX81ers would laugh with barely-disguised pity, although there is at least one (*Crazy Castles*) that might persuade the player to postpone more mundane amusement such as kicking the dog.

Buried amongst the dross, however, are the two adventures. *The Royal Adventure of a Common Frog* by Terry Braverman is wacky indeed. It's "rescue the princess" time again, but this time, instead of starting out on your white charger with trusty sword in hand, you begin the adventure sitting on your little lily-pad.

Yes, you're the frog, of course, which means that you are amphibious and can happily swim down from the pad to start your quest.

The layout is standard *Quill'd* stuff, white text on blue paper, although the

adventure is *Illustr'd*, so many of the locations have associated pictures: actually, not far from the start, you'll come across a maze, and the fact that the program draws pictures only in previously unvisited locations should help you here.

Quite a large number of locations to be visited, however, and enough to keep the player going for some while. The puzzles are quite entertaining, particularly as you will eventually be transformed from a frog to – gasp – a full-grown human (well, a prince anyway).

The second adventure on the tape is an old favourite of mine, *Here be Tygers*, from Bob Franklin. One of the few *Quill'd* adventures with absolutely no sign of a spelling blunder! It's a beautifully-written adventure, at the start of which you find your toe stuck up the tap in your suite in the Penge Hilton. Just another Saturday night really!

There are several introductory screens full of instructions, during which

*Tygers* is a warped sense of humour, a pair of jeans and a tin ear: this last requisite comes in handy when in contact with the singing obstetrician, Dr Hank Wangford. A sweatshirt emblazoned with his picture is present in the first location, don't ask me what purpose it fulfills in the game, just get it and wear it! Now you know about as much as I do – just play and enjoy, but a warning: this game will pollute your computer and damage your tender little ego!

Artic has also recently issued a compilation tape, but in this case, the tape contains two arcade games on the first side, with on the second side, two adventures, *Curse of the Seven Faces* and *Robin Hood*. I've raved over *Seven Faces* before, so I won't go into detail here, but suffice to say that it is an extraordinarily good text game, with lots of tough puzzles and plenty of humour. One day, this adventure will get the fame it deserves.

*Robin Hood* is *Quill'd* and *Illustr'd*,

with a spindly character set which is rather difficult to read sometimes. Quick death greets you at many turnings, but play is very quick and you'll soon work out where not to go. The occasional odd spellings don't, however, detract from the fact that there are lots of objects, treasures and locations (nicely illustrated) waiting to be explored and taken, and it is fairly easy to find the purpose of keys and other artefacts.



St Bride's School

you learn that "Certain Parties" (again) need a volunteer... ah, you've just volunteered. For what? Well, it's a case for saving the universe again, starting on planet Gekko 4: the Certain Parties are the eponymous Tygers of Gekko 4.

After translating the instructions, which are written in ancient Sumerian, you'll know that all you have to do to solve this adventure is to, among other things, rescue the 19th iridescent owl from the flaming pit, spoken the spell of Oblivion from the lexicon of the Undead, bored the weregerbil to death, read the small print, rescued the droid's peanut butter – well, you get the picture, and after that, things start to get difficult!

The essential things in tackling

Although there is a bit too much of the "You see nothing special" kind of response, the adventure is satisfying to play for beginners, who will find plenty to do before becoming completely stuck: and for the expert, *Robin Hood* is a pleasant way to spend a few hours.

Finally, at last I don't have to suffer alone in reading Sensible News Releases from that seat of lunacy, I mean learning, St Bride's School. *The St Bride's Swashbuckler* will be packed to bursting with, they say, news of forthcoming games, articles about adventures and arcade games, comics and so on. What's more, teacher is offering the first issue free to anyone who sends two stamps to cover postage, to: Swashbuckler Offer, St Bride's School, Burtonport, County Donegal, Ireland.

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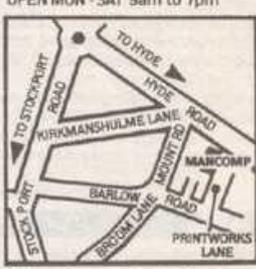
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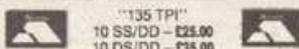
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**BACK** by popular demand! The Nut-Hacker Suite will still find lives pokes and let you alter messages and graphics in Spectrum Games. A snip at £4. Cheques to P M Brannigan, 11 Morningside View, Liverpool L11 1BB.

**SPECTRUM** and **AMSTRAD** Software Library. Free membership. Latest titles. To join write to: Software Specialists, 7 Gallowhill, Croeff, Perthshire, PH7 3HF.

**SELLING** Spectrum Software Valhalla £4. Lord of the Rings, £10.50, Hobbit £6, Knight Lore £6, Sabre Wulf £4, Alien £4, Starion £3, Formula One £2.50, Cyclone £2.50. Phone: 0625 877936 (evenings).

## MAGAZINES



### DRAGON USER

To make the most of your Dragon you need **Dragon User** — the independent magazine for Dragon owners. To make sure that you receive a copy of Dragon User regularly subscribe direct to us. A year's subscription costs £14 for 12 issues (overseas rates available on application). Send a cheque or postal order made payable to Dragon User, and accompanied by your name and address, to Dragon User, Subscription Department, Oakfield House, Perrymount Road, Haywards Heath, Sussex RH16 3DH.

PL30

# COMPUTERSWAP

**SPECTRUM** Plus. £75. VTX 5000 modem unused £40. Currah Micro Speech £20. Kempston Pro interface and joystick £15. Telephone: 01-543 2347 after 7pm (SW London)

**BBC B**, 400K, 40/80 track disk drive, Acorn DFS, leads, AMX Mouse, + £200 worth software including Elite, Zalaga, Roms including Beebcalc, 10 disks, £600 ono. Tel: Guildford 38560. Buyer collects.

**COMMODORE 1541** disk drive, unused, unwanted xmas present, only £109, yes only £109 for a brand new 1541. Save £90. Phone: Mick Turner 021-440-4603 (Day) or 021-449-7545 (Day) or 021-449-7545 evenings or weekend.

**CBM 84** cassette recorder, disc drive, joysticks, lots of software, magazines etc. £250 ono. Tel: Phil (0336) 2404. Also wanted Jupiter Ace in working order.

**AMSTRAD CPC 6128** with Colour Monitor for sale. As new with manual, CP/M2.2, and DR Logo disks. 11 spare disks. £299 cash (no offers). Contact John at Week-end on Southampton (0703) 766181.

**CBM 64** + 2CN + £200 worth of software + mags, etc. Must sell before 16th March. Phone Nick on 0233 74385 - £150 ono.

**ATARI** Assembler Editor £15.00. Microsoft Basic Disc version £20.00 Book your Atari computer £12.00. Computer Wars, Submarine Commander, Solo Flight £5.00 each. Ring Rochdale 0706 351066.

**SPECTRUM** +, T.V., VTX5000 Modem, Printer, Recorder, Joystick and Interface, Amplifier, Spec Drum Synthesizer, Currah Speech, ribbon connector, extra keyboard, £135 of software, magazines, all boxed - £270 ono. Telephone: Warwick 491585.

**SPECTRUM** plus B7W TV, Quickshot M00, Kempston interface, 24 games. Costs new £370, bargain £180 (one year old) v.g.c. Must sell. Phone: Bromsgrove (0527) 32649 (after 5pm) ask for Alan.

**CBM 128**, 1570 disc drive, Datasette, joystick, boxed, 2 months old, guaranteed. Disc and cassette software and leads. Worth £550. Sell £400. Phone: Dave 01-319 2248. After 6pm.

**SINCLAIR QL** together with Metacomco assembler, chess and books only £140. Phone: Milton Keynes (0908) 76650 evenings.

**WANTED** QL software; UCSD Pascal. Also, has anyone designed an Epm programmer/copier for the QL, suitable for home construction? Information on either please contact Steve on 01-654 3891 (weekend/evenings).

**AT-HOME** Station. Sinclair QL, unused, with Ver2.3 applications. Complete communications (Databases, Prestel, BBCs) using WS2000, Q-Connect. Offers for complete system or separated. Will swap for double drives with RAM.

**MANNESMANN** Tally MT80 Dot Matrix Printer with centronics interface for use with many different computers including BBC (leads for ORIC and Amstrad included) £175. Telephone: Chard (04606) 5036.

**SPECTRUM 48k**, Microdrive, Interface 1, Joystick Interface: Specrom utility, plus 13 programmes including Lord of the Rings, Match Day, Yie Ar Kung Fu, and Barry McGuilgans World Champion Boxing £225. Phone: Iris 01-699 7279.

**SPECTRUM** Plus 48k Interface One, Microdrive, Spectrum, Joystick Interface, approx sixty games all in excellent condition. All for £225. Phone: Ian on 0703 782662.

cluding Microdrive, Interface 1, Cartridges, Tasword II and Masterfile, two microdrive books and printer lead, all manuals and leads excellent condition £50 ono. Tel: 0509 508864 after 6pm.

**QL**, mint condition, over £100 of books and software suited to the 68000 programmer: Metacomco Assembler, Advanced User Guide, 68000 books, etc. All for £199 ono. Tel: 0395 266193 evenings.

**C64** cassette software originals. Many top titles inc: Hypersports Entombed. Must sell hence £3 each. SAE for list. Paul Brady, 27 Wykeham Street, Scarborough, North Yorkshire YO12 7SA.

**EPSON FX100** F/T printer, £295 ono. Supercalc3 for Apricot, £95 ono. BCPL ROM for BBC, £45 ono. Six Acornsoft business packages, £45 ono. Toolworks C/80 compiler, £35 ono. Pascal ROM, £35 ono. Tel: Nottingham (0602) 262498.

**AMSTRAD CPC464**, Colour Monitor £300 of software, joystick, etc. £400 ono. Phone: Jeff, 01-654 0556.

**FOR** sale QL, Modem, Colour Monitor, s/ware spare disks etc. Hardly used, cost £600 will sell £400 or swap for BBC, Modem, Monitor with cash added. Tel: Shayne 01-402 3287.

**FOR** sale AGF Joystick Interface II for ZX Spectrum £5, 48k Spectrum software, 12 games and utilities £20. Phone Dave on Greenhithe 844629 evenings.

**DRAGON 37** Computer Joystick and over 30 games including Shock Trooper and Tuxtaphosition £80 ono. Phone: Staines 56463 evenings.

**AMSTRAD CPC464** + green screen, modulator, lots of software including Lord of the Rings. Also joystick, disc drive with interface and discs. Price negotiable. Phone: 381-4650 (Fulham).

**AMSTRAD CPC 464** Colour monitor 6 months old, hardly used. Many games, software manual cassette. Case £190. Rugby (0788) 817029 evens.

**AMSTRAD QC 464** plus colour monitor plus speech syn. (dik) plus software plus joystick, books plus basic Part I £250. Tel: 01-946 9941 Wandsworth.

**AMSTRAD 6128**, G?S modulator, spare discs, games, magazines, joystick, 2 tape recorders £385 ono. Also Spectrum software, 90 originals, QU4 etc. All for £140 or will split/Also mags + books £50.

**ATARI** Midi Interface and software by Digicom, software will play A.M.S. songs through Midi, Interface will connect Atari to any Midi musical instrument. Cost £60, sell £40 Basiidon 284771.

**FOR** sale ZX Interface 1, two microdrives, thirteen cartridges, Tasword 2, Ohnicalc 2, profile 2 and Melbourne House microdrive book. All for £95. Phone: Dave on Greenhithe 844629 evenings.

**BLACK** Fire Mountain, Quilled Adventure for 48k Spectrum, £4.00 or £3.00 if supplying own tape. Peter Ruddick, Tree Tops, Anewood Road, Sands, High Wycombe, Bucks, HP12 4DD.

**WANTED** BBC 'B' any condition, working or not. Will swap for Spectrum 48k incl Camen c.g. Elite or pay cash. Phone: Phone: 0495 248226 ask for Lee.

**SPECTRUM** with Interface 1, Kempston Joystick £200 worth of software (games and business), numerous manuals. All for £150, ring 02774 58476 (Essex area) after 6 pm or weekends.

**BROTHER** HR5 printer (Centronics Interface) with power supply, paper and lead for Amstrad Micro £90. Tel: 0245 460180.

# Charts

## Amstrad

1	(4)	Yie Ar Kung Fu	(Imagine)	£7.95
2	(1)	Elite	(Firebird)	£14.95
3	(-)	Sky Fox	(Ariolasoft)	£9.95
4	(-)	Finders Keepers	(Mastertronic)	£1.99
5	(2)	Hypersports	(Imagine)	£9.95
6	(-)	Nonterraqueous	(Mastertronic)	£1.99
7	(7)	Who Dares Wins 2	(Alligata)	£8.95
8	(6)	Caves of Doom	(Mastertronic)	£1.99
9	(10)	Spellbound	(Mastertronic)	£2.99
10	(8)	One Man and his Droid	(Mastertronic)	£1.99

## Atari

1	(3)	One Man And His Droid	(Mastertronic)	£1.99
2	(2)	Action Biker	(Mastertronic)	£1.99
3	(5)	Chumera	(Firebird)	£3.95
4	(7)	Goonies	(US Gold)	£9.95
5	(1)	Gighter Pilot	(Digital Integration)	£9.95
6	(4)	Smash Hits 4	(English)	£9.95
7	(10)	Spy vs Spy	(Databyte)	£9.95
8	(-)	King Of The Ring	(Gremlin In Graphics)	£9.95
9	(9)	Spy Vs Spy	(Beyond)	£9.95
10	(-)	Electra Glide	(Activision)	£8.95

## BBC

1	(1)	Yie Ar Kung Fu	(Imagine)	£9.95
2	(5)	Strike Force Harrier	(Mirrorsoft)	£9.95
3	(2)	Way of the Exploding Fist	(Melbourne House)	£9.95
4	(8)	Repton 2	(Superior)	£9.95
5	(-)	Phantom Combat	(Doctorsoft)	£9.95
6	(4)	Citadel	(Superior)	£9.95
7	(-)	Fleet Street Editor	(Mirrorsoft)	£9.95
8	(6)	Speech	(Superior)	£9.95
9	(-)	Combat Lynx	(Durell)	£9.95
10	(5)	Computer Hits (10)	(Beau Jolly)	£9.95

## Commodore 64

1	(1)	Yie Ar Kung Fu	(Imagine)	£8.95
2	(1)	Kung Fu Master	(US Gold)	£9.95
3	(2)	Eidolon	(Activision)	£14.95
4	(3)	Rock 'N' Wrestle	(Melbourne House)	£9.95
5	(-)	Lord of the Rings	(Melbourne House)	£15.95
6	(4)	Desert Fox	(US Gold)	£9.95
7	(8)	Mercenary	(Novagen)	£9.95
8	(7)	Kane	(Mastertronic)	£1.99
9	(-)	Koronis Rift	(Activision)	£9.95
10	(-)	Last V8	(Mastertronic)	£2.99

## Spectrum

1	(1)	Movie	(Imagine)	£7.95
2	(7)	Commando	(Elite)	£7.95
3	(2)	Winter Games	(Epyx/US Gold)	£7.95
4	(-)	Rambo	(Ocean)	£7.95
5	(8)	Yie Ar Kung Fu	(Imagine)	£7.95
6	(4)	Barry McGuigan World Champions	(Activision)	£7.99
7	(6)	Hypersports	(Imagine)	£9.95
8	(-)	Devils Crown	(Mastertronic)	£1.99
9	(-)	Gunfright	(Ultimate)	£9.95
10	(2)	Spellbound	(Mastertronic)	£2.99

All figures compiled by Gallup/Microscope

## Top Twenty

1	(1)	Yie Ar Kung Fu	(Various)	Imagine
2	(2)	Formula One Simulator	(Various)	Mastertronic
3	(-)	One Man and his Droid	Mastertronic	Mastertronic
4	(3)	Kung Fu Master	(C64)	US Gold
5	(5)	Movie	(Spectrum)	Imagine
6	(4)	Hypersports	(Various)	Imagine
7	(11)	Finders Keepers	(Various)	Mastertronic
8	(12)	BMX Racers	(Spectrum/C16/C64)	Mastertronic
9	(18)	Action Biker	(Various)	Mastertronic
10	(10)	Winter Games	(Spectrum/C64/Amstrad)	Epyx/US Gold
11	(13)	Commando	(Spectrum/C64)	Elite
12	(-)	Kambo	(Spectrum/C64)	Ocean
13	(7)	Lord of the Rings	(Various)	Melbourne House
14	(6)	Elite	(Various)	Acornsoft/Firebird
15	(8)	Eidolon	(C64/Atari)	Activision
16	(20)	Big Mac	(C64/C16)	Mastertronic
17	(-)	Barry McGuigan World Champions	(Various)	Activision
18	(-)	Rockman	(Various)	Mastertronic
19	(9)	Computer Hits 10	(Various)	Beau Jolly
20	(15)	Spellbound	(Spectrum/Amstrad)	Mastertronic

Figures compiled by Gallup/Microscope

## Readers' Chart No 64

1	(2)	Elite	(Spectrum/C64/BBC/Amstrad)	Firebird/Acornsoft
2	(1)	Commando	(Spectrum/C64/C16)	Elite
3	(4)	Lord of the Rings	(Spectrum/C64/Amstrad)	Melbourne House
4	(-)	Yie Ar Kung Fu	(Spectrum/C64/Amstrad/BBC/MSX)	Imagine
5	(3)	Winter Games	(Spectrum/C64)	Epyx/US Gold
6	(-)	Movie	(Spectrum)	Imagine
7	(7)	Way of the Exploding Fist	(Various)	Melbourne House
8	(-)	Tomahawk	(Spectrum)	Digital Integration
9	(-)	Kung Fu Master	(C64)	US Gold
10	(8)	Rambo	(Spectrum/C64)	Ocean

Winning Phrase No 64: "Amstrad Elite: no go", from Mark Lumley of Morden in Surrey, who wins.

## Now voting on week 66 - £25 to win

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

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

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

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

Voting for Week 66 closes at 2pm on Wednesday March 12, 1986. 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 66
Address .....	1 .....
.....	2 .....
.....	3 .....
My phrase is: .....	

# New Releases

## STUNNING

Lurking behind the rather naff cover of *Contraction* is an inventive platform and ladders game with some of the most stunningly detailed graphics ever seen on the Amstrad. Perhaps not all that surprising really since it is converted from an excellent BBC game which also featured fine graphics.

The game plays in hi-res mode and features a plot totally designed to encourage loony animation as it's chock full of wackyness as it is of alliterations (poisonous plants, bouncing bombs, pumping pistons, jiving jelly-fish - that sort of thing.)

Does anyone really need to know about the plot? You have to collect some objects, step on things and dodge whatsits, you being a terminally mad professor (isn't everyone). Nevertheless, no matter what other bounce and jump games you own, *Contraction* is another necessary



addition. Not only are the graphics superb but the 11 screens are so fiendishly planned that the game provides a challenge equal to that of the original Miner game. Highly recommended.

**Program** *Contraction*  
**Price** £7.95  
**Micro** Amstrad  
**Supplier** Audiogenic  
 PO Box 88  
 Reading  
 Berks

## TRIPLE SCORE

Great news for QL owners with another one of those rare packages that actually uses some of the power of the machine and this forms a mandatory purchase (even for those currently only using their QL for business).

Computer *Scrabble* has been around for a while and I still find the original Spectrum version one of my most frequently loaded titles. The QL version is certainly the finest so far with extra features and a larger dictionary.

Unlike other versions, the board on the QL edition is large enough (filling around two thirds of the screen) to incorporate information on double letter triple word score positions (by letters rather than square colours). The rack, displayed in the bottom of the screen, is large with a nicely designed, authentic looking, character set.

Every option you could possibly want is present; playing against the computer, skill level, speed levels, save game, even a timer for two

Pick of the week

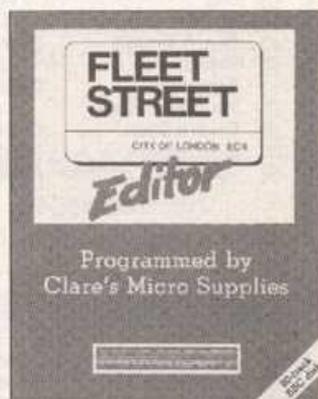
Sticking my neck out I will predict that, in the long run, programs like *Fleet Street Editor*, will be of more practical use to more home users than a thousand home budget or spreadsheet programs. What *Fleet Street Editor* allows you to do, with a few restrictions on this version, is design a printed page. What a wordprocessor does for words, *Fleet Street Editor* does for words and pictures.

Who needs it? Small businessmen who can knock out customised ads/rate cards, people holding functions like fairs and jumble sales, clubs with a use for newsheets and booklets (computer clubs and adventure clubs spring immediately to mind), school magazines, freelance writers wanting a customised logo or heading, etc, etc.

You require a BBC B, disc drive and a dot matrix printer. It is relatively simple to configure the program for your particular set-up from within the program. As with all commands, the main options required are selected via icons - a number of printers are already listed if yours is not.

A library of graphics is held on a separate disc, there are a large number of predefined shapes and logos covering everything

## THE PRINTED



from elaborate illuminated manuscript style letters to a digitised Margaret Thatcher. These shapes may be 'pulled in' from the library by marking them out with a cursor driven box; they can be used in virtually any size and stored for use in the final make-up.

An alternative to using the graphics layout is to design your own shapes using a straightforward, but completely acceptable 'artists designer' package built into the package. This provides (again via icons) the usual draw, fill, expand/reduce, facilities, and again the graphic is saved for later use.

Actual layout of the page occurs via panels, this is the major restriction in the program. You must work in terms of a series of page subdivisions called panels - you have a choice of either eight (four down each

## This Week

Program	Type	Micro	Price	Supplier	Ark Pandora	Arc	Commodore 64	£9.95	Rino
The Rocky Horror Show	Arc	Amstrad	£14.95	CRL	Hotline Quiz	Ed	Commodore 64	£9.95	Chalk Soft
Swift Spreadsheet	Ut	BBC	£29.95	Audiogenic	Iwo Jima	S	Commodore 64	£7.95	PSS
Micro Maestro	Ed	BBC B	£14.99	Mupados	Cut and Paste	Ut	Commodore 64	£24.95	Ariolasoft
(Conc.1 pch)					Graphic Adventure	Ut	Commodore 64	£22.95	Incentive
Micro Maestro	Ed	BBC B	£14.99	Mupados	Creator				
(keyboards)					Homepak	Ut	Commodore 64	£34.95	Ariolasoft
Mr Men Magic	ED	BBC B	£9.95	Mirrorsoft	Movie Maker	Ut	Commodore 64	£16.95	Ariolasoft
Storymaker					New Consultant	Ut	Commodore 64	£44.95	Ariolasoft
Mini Office 2	Ut	BBC B	£14.95	Database	New Paperclip	Ut	Commodore 64	£44.95	Ariolasoft
New Consultant	Ut	Commodore 128	£59.95	Ariolasoft	Swift Spreadsheet	Ut	Commodore 64	£24.95	Audiogenic
The Berks Trilogy	Arc	Commodore 16	£6.95	CRL	Elektra Glide	Arc	Commodore 64	£9.95	English
Borrowed Time	Ad	Commodore 64	£14.95	Activision	Ace	Arc	Plus 4	£10.95	Cascade Games
Dr Who + Mines of Terror	Ad	Commodore 64	£11.95	Micro Power	Computer Scrabble	S	QL	£14.95	Leisure Genius
					Advanced Swords	Ad	Spectrum	£14.95	PSS
					+ Sorcery				

## PAGE

half of an A4 sized sheet) or four (four running right across the page) or a combination. The construction of each panel is a matter of manoeuvring the graphic to the correct place and typing text in around it. The program automatically arranges the text.

Once each panel with text has been constructed, it is possible to look at the completed page in a slightly schematic form.

There are obviously a great many more procedures and subtitles including using wordprocessor files from other sources (like *View*) and a variety of body text styles. The manual includes an extensive general feature on the whole business of publishing - sections on litho printing and photocopying; nothing, though, about moving to Wapping...

This BBC package is the 'baby' of the Fleet Street range and suffers slightly from memory limitations, despite the extensive use of discs. Nevertheless, it is a very useful and user friendly package.

**Program** *Fleet St Editor*  
**Price** £39.95  
**Micro** BBC B  
**Supplier** Mirrorsoft  
 Headington Hill  
 Hall  
 Oxford  
 OX3 0BW

minutes to go, tournament rules, etc. I played the computer at a middling level and found the responses easily fast enough and intelligent enough to give me more than a run for my money (well, actually I lost). Things started badly with oozing on a double word and continued with the outrageous (but legal) toeline on a triple.

An excellent program, and astonishingly enough it costs no more on microdrive for the QL than the Spectrum original cost on tape - £14.95. For a program of this quality, that is very cheap indeed. It doesn't matter if you don't like games - pretend it's an educational tool for improving your vocabulary (perhaps it is) and hide it among the spreadsheets.



**Program** *QL Scrabble*  
**Price** £14.95  
**Micro** QL  
**Supplier** Leisure Genius  
 3 Montague Row,  
 London  
 W1H 1AB

## VISUAL PROBLEM

In the past year or so Bubble Bus has become one of the more highly regarded independent (ie, not part of US Gold) software houses with releases like *Wizards Lair* and *Starquake*.

Latest from the company is an Amstrad game called *Deathsville*. It is an arcade adventure game closely moulded on *Sorcery* with detailed multi-coloured graphics and complicated plot. I think the game lacks some of the professional finish in *Sorcery* and is a little rough around the edges.

Whilst *Deathsville* features woods and caves, boiling cauldrons and oak doors all drawn in multi-coloured detail, the graphic design makes it sometimes a little difficult to see what is what. Another visual problem is the central figure, he lacks any substance or solidity - this is definitely a mistake, since the other characters don't have this problem.

Although the controls have been reduced to up, down, left, right, pick up, drop, there are, nevertheless, a large number of complex puzzles in the game.

For addicts of this style of adventure, *Deathsville* has much to offer, otherwise you may remain unconvinced.

**Program** *Deathsville*  
**Price** £7.95  
**Micro** Amstrad  
**Supplier** Bubble Bus  
 87 High Street  
 Tonbridge  
 Kent

## CORRUPTED

Microdeal have leapt into the Atari ST market with a number of disc utilities packaged in smart, shiny, silver plastic folders. *Disk Help* is a sort of mini Disc Doctor in that it helps you recover, to some extent, corrupted programs.

There are essentially two different kinds of damage that may occur to a disc - magnetic, where the disc is physically OK but data has been corrupted, or physical, where the disc itself is damaged.

Whatever the problem the program will take a damaged disc and rewrite it byte by byte on to a fresh disc, filling in any missing data with X's. At this stage you should be able to load and correct the new version of the file.

The programs contain a couple of other utilities as well - format (without returning to desktop) and a special format that does not erase existing data since it saves it first, formats the disc and then rewrites it to the fresh disc. One final useful feature - discs formatted under this system may be used even if there is an error somewhere on the disc.

Quite a useful utility then, easy to use for the beginner and suitable for use with both single and double-sided discs and drives.

**Program** *Disk Help*  
**Price** £29.95  
**Micro** Atari ST  
**Supplier** Microdeal  
 PO Box 68  
 St Austell  
 Cornwall

## This Week

**Activision**, 15 Harley House, Marylebone Road, London NW1, 01-486 7588. **Ariolasoft**, 68 Long Acre, Covent Garden, London WC2, 01-836 3411. **Audiogenic**, 39 Sutton Industrial Park, London Road, Reading, Berks 1AZ, 0734 664646. **CRL**, CRL House, 9 Kings Yard, Carpenter's Road, London E15 2HD, 01-533 2918. **Cascade Games**, 1-3 Haywra Crescent, Harrogate, North Yorkshire HG1 5Dg, 0423 504526. **Chalk Soft**, PO Box 49 Spalding, Lincs PE 11 1 NZ, 0775 69518. **Database**, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY, 061 456 8383. **English** 50 Newton Street 5, Piccadilly, Manchester. **Incentive**, 54 London

Street, Reading RG1 4SQ, 0734 591678. **Leisure Genius**, 3 Montagu Row, London W1H 1AB, 01-935 4622. **Micro Power**, Northwood House, Worth St, Leeds LS7 2AA, 0532 434006. **Mirrorsoft**, Mirror Group, Holborn Circus, London EC1P 1DQ, 01-353 0246. **Mupados**, Unit 11, Llambled Ind Est, Tregaron P.d, Lampeter, David SA48 8LT. **PSS**, 452 Stoney Stanton Road, Coventry CV6 5DG, 0203 667556. **Rino**, 1 Orange Street, Sheffield 4DW, 0742 755796. **System Three**, Davis House, 29 Hatton Gardens, London EC1N 8DA. **Tasman**, Springfield House, Hyde Terrace, Leeds LS2 9LN, 0532 438301.



## Chat lines

**D**o you remember the ad for business computers that emphasised their networking capabilities, and ended with the slogan, 'We should be talking to each other'? It struck me at the time that the slogan is at odds with the image of the computer hobbyist as a solitary being, staying up to the early hours either playing or programming games. Has the computer led to increasingly isolated individuals, I mused?

Then, more recently, I was given a tour of Micronet 800, the home computer user's database on Prestel, and as I shown the various facets of the network it became clear that far from being a lonely and introverted activity, computing has great and radical potential for bringing people together. So if what I say about electronic publishing refers specifically to Micronet, I hope the other networks will forgive me - the implications apply to them all, from the largest to the smallest bulletin board.

Put aside the downloading of games, the multi-player adventures and the competitions, and look instead at the chat lines. Here, for only 40 pence per hour, off peak, anybody with a computer can 'talk' to other computer users anywhere in the country in CB emulation style - that's to say that there's time to read a message then it clears for the next one. Nothing so radical in that, except that you've no idea who you're talking to - there is nothing physical to create preconceptions about a person.

Then there are the specialist areas of these open forums. Want to discuss politics? There's an area for you. What if

you're gay? Micronet's most used section is their gay chatline, and though computers and affairs of the heart may seem strange partners, it makes a lot of sense, providing an opportunity to talk for those who dare not or will not come out.

Perhaps the most exciting possibility though is for the disabled. Somebody who is house-bound, for whatever reason, can suddenly find themselves part of a widespread social net, providing they can use a keyboard, and they can be sure that there won't be any adverse reactions to their disability because nobody need know. On a bulletin board, everyone is equal.

By now I was extremely excited by the possibilities of the networks. Then a doubt set in. Could people expect this idyllic state of free speech to last forever? Certainly Micronet won't censor communications. The only way to get thrown off the network is to raise the wrath of so many people that they start to complain. But free and open exchange can be a frightening thing for governments and the networks allow not only for chat-lines but also publishing. Using the Gallery pages, subscribers can write and illustrate their own electronic magazines, to be read by any other subscribers. And those magazines can contain whatever views they want.

Now I wouldn't want to suggest that our present government is censorship happy (after all, we don't even have film censors any more - while tightening up and extending their powers they made the C stand for Classification) but one day an MP looking for a cause to woo the voters will seize upon so much subversive free speech and pounce.

Bulletin boards and networks still have something of an air of mystery, an arcane area for the boffins of computing, which is sad. With the very reasonably priced modems available and highly reasonable subscription charges there's no reason why many more people shouldn't be taking advantage of the opportunity to log on and spread ideas. Yes - we should be talking to each other!

**John Minson**

## Puzzle No 198

'Flickafree Rentavision' the television rentals firm has just come to the end of a three week sales campaign, which has resulted in a record number of new installations. Over this three week period a total of 96 TV sets have been installed, and each week was an improvement on the previous week.

When the figures for each week came to be analysed it was noted that the difference in sales between the first and second weeks, multiplied by the difference in sales between the second and third weeks, came to the actual number of sales during the first week.

How many sales were made during the third week?

## Solution to Puzzle No 193

The dates of birth were: Simon's father 3:8:1924, Simon's mother 8:5:1929, Simon 31:7:1961, Simon's cousin 2:8:1961, Simon's sister 4:7:1969.

```
100 DIM E(22)
110 RESTORE
120 FOR N=1 TO 22
130 READ E(N)
140 NEXT
150 LET C=19
160 FOR M=1 TO 22
170 YEAR=C*100+E(N)
180 FOR H=1 TO 12
190 FOR D=1 TO 31
200 LET D#STR#(D)
210 LET M#STR#(M)
220 LET Y#STR#(YEAR)
230 LET Z#C#M#Y#
240 LET Z=VAL(Z#)
250 LET Q#SOR(Z):LET Q=INT(Q+.5)
260 IF Q#2 THEN PRINT Q#;"M#";"Y#"
270 NEXT C
280 NEXT M
290 NEXT H
300 NEXT D
310 DATA 09,01,04,05,16,21,24,25
320 DATA 29,36,41,44,49,56,61,64
330 DATA 59,76,81,84,89,96
```

It is fairly well known that square numbers can only end with the digits 0, 1, 4, 5, 6, or 9. Not so well known is the fact that if the final two digits are taken these can only be one of 22 possible two-digit termini. These are the values used in the DATA statements, and which are used in Line 80 to generate the year values in the range 1900 to 1996.

The program generates all dates having 31 days and 12 months for each of these years, and tests the resulting figure to determine if it is a perfect square. Any found are printed out.

## Winner of Puzzle No 193

The winner is I A Scott of Darlington, County Durham, who will be receiving £10.

## Rules

The closing date for Puzzle 198 is April 2.

## The Hackers



# ANIROG

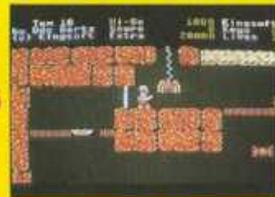
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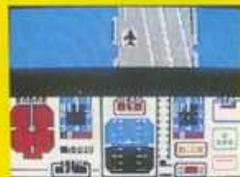
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