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# Computing

## WEEKLY

with Home Computing Weekly

20-26 February 1986

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Vol 5 No 8

## Sinclair plans for CP/M

THIS WEEK'S NEWS

SIR Clive Sinclair appears to have finally turned his back on microdrives, Sinclair Research's own controversial data storage system.

He confirmed at the launch of the Spectrum 128 last week (see *Popular Computing Weekly*, February 13, and inside story) that Sinclair Research was actively planning to introduce a disc drive for the Spectrum 128. This would open up the possibility of implementing CP/M with the machine, as Amstrad has al-

ready done with its CPC and PCW machines, and Commodore with the introduction of the Z80 second processor in

128. When asked if the Spectrum-

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**ATARI ST SERIES**  
Final instalment:  
graphics and sound  
see p20



Brand-new - Mastertronic's Knight Tyme for Spectrum 128

● More Spectrum 128 packages

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- MUD - it's arrived at last
- Commodore reports more losses - \$50m in the red...
- ... but Amstrad's profits grow and grow

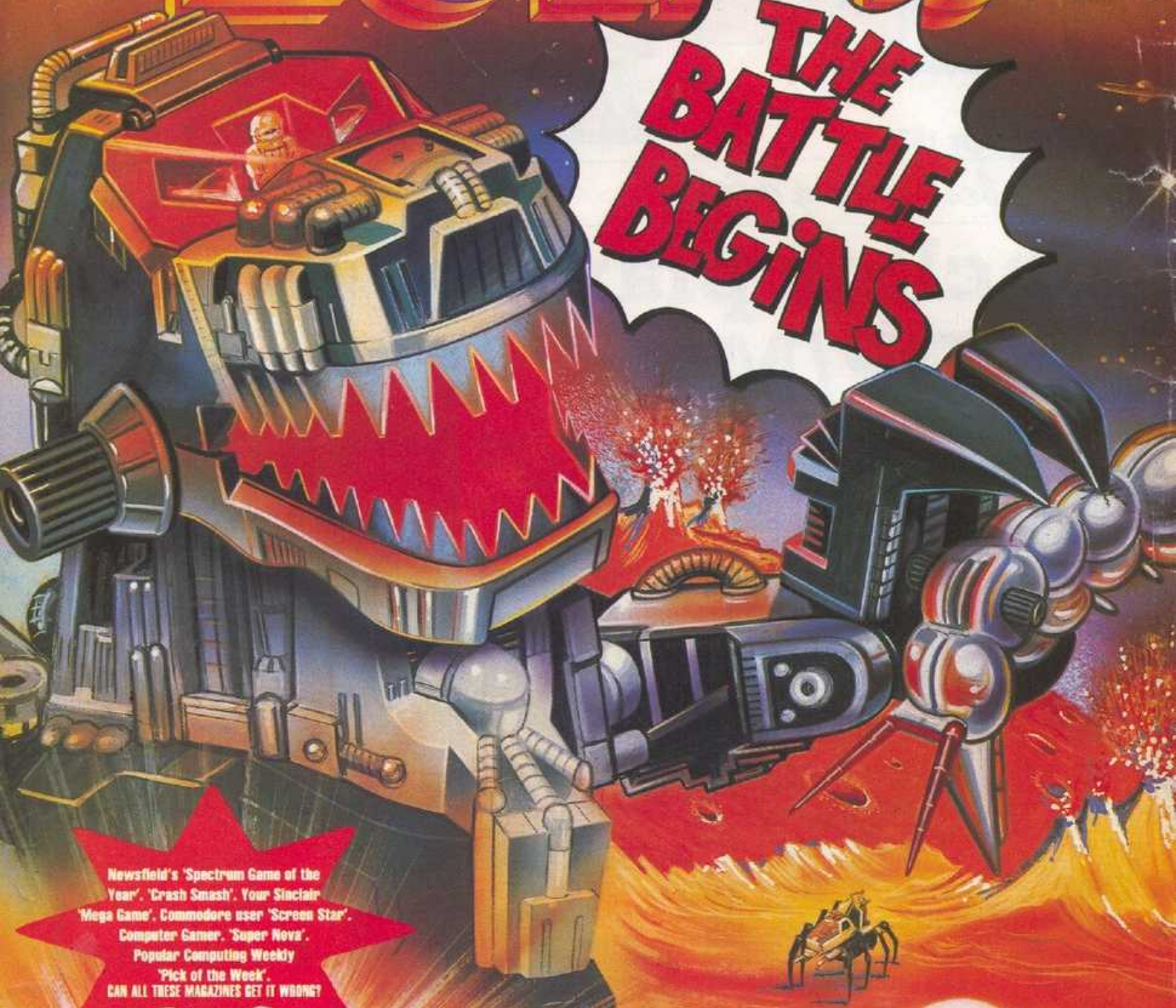
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# ZOIDS

## THE BATTLE BEGINS



Newsfield's 'Spectrum Game of the Year', 'Crash Smash', Your Sinclair 'Mega Game', Commodore user 'Screen Star', Computer Gamer, 'Super Nova', Popular Computing Weekly 'Pick of the Week', CAN ALL THESE MAGAZINES GET IT WRONG?

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TOMY



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## EDITORIAL

**I**t is ironic that both Commodore and Amstrad have both announced so very different financial results at the same time - presenting diametrically opposite faces of the microcomputer industry.

At a time when Commodore continues to record losses and the question marks remain over the future of the American company, when Sinclair is still relying on its agreements with its creditors and bankers, when Acorn has retreated from the home market to scientific and educational pockets, Amstrad continues to confound the popular notion that the small computer industry either is in a steep decline, or 'died' at some point during 1985.

It is worthwhile to note too, that much of Amstrad's dramatically increased profits appear to be due to a machine that breaks no new ground technologically, but is priced attractively and packaged exactly right: the PCW 8256, of course.

Worthwhile, because Commodore has two potential contributors to

a turnaround in its fortunes - the Amiga and the C128 and 128D, although the last is only available in Europe. The Amiga is technologically ground-breaking to the hilt, but its price, while realistic, is not astonishing in the Amstrad sense of the word, and the packaging, in Europe at any rate, has still to be decided. The 128s on the other hand, or, at least, the disc version, offer far more of the mix of proven technology, comprehensive packaging and affordable pricing.

Sinclair has certainly heeded the Amstrad success story. Indeed Bill Jeffrey, Sinclair's chief executive, said at the Spectrum 128 launch that he was impressed by Amstrad's performance on the strength of CP/M. The Spectrum 128 should shortly have a disc drive to go with it, and with that all the potential to implement CP/M. It is relying on its compatibility and familiarity to help Sinclair return to profitability. Any 'quantum leap', whether in the form of a 'no compromise' portable or a radical new machine with a nodding reference to the QL, will not now appear until profitability has been restored.

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Computer Trade Association Magazine of the Year



## Amstrad's profits soar – thanks to PCW 8256

AMSTRAD continues its computing success with the announcement of astonishingly high profits for the six months up to December 31, 1985.

Pre-tax profits stand at £71.54m – nearly three times that of the previous six months. This figure is also £7m more than Amstrad's £20.2m profit for the whole of 1984-85.

The PCW 8256 accounted for 21% of the company's total sales during the six months, despite the fact that it was first available three months into the six month period.

Over half of Amstrad's turnover (which was £128.31m in the six months to December) comes from overseas. City predictions state that as much as 65% of turnover will come from abroad for the full year, and forecasts of profits of £50m are now being made for 1985-86.

Alan Sugar, Amstrad's chairman, has a 50.4% holding in Amstrad. The latest results mean that his paper fortune has gone up to £188m.

## Sound of music at Spectrum 128 launch

OVER 30 software companies demonstrated software for the Spectrum 128 at last week's launch in London (see *Popular Computing Weekly*, February 13). And although very little of the software written specifically for the machine is now available, the 128 itself is – and should be in the shops now.

Two software titles definitely available are Ocean's *Neverending Story* and Daley Thompson's *Supertest* – these are bundled with the machine and included in its £179.99 price tag.

Most of the products shown at the launch were listed in the last week's *Popular Computing Weekly*, but there have been some additions to the catalogue.

## Sinclair plans for CP/M

◀ continued from page 1  
compatible portable micro – known as Pandora – would also offer the CP/M operating system, Sir Clive replied, "Pandora could just be a CP/M machine". This implies that the portable will probably now contain a built-in disc

Ram Electronics is bringing out a Centronics interface and serial communications cable specifically for the 128, while



XRI Systems plans to be the first to offer packages to take advantage of the 128's MIDI capabilities. Its Micon MIDI

drive, or drives, rather than the mooted built-in microdrives.

A company spokesman further commented that the support of microdrives for the Spectrum 128 would not be discontinued.

Sir Clive also said that the company is dedicated to Spectrum technology in the long term, despite market re-

search predictions that the days of the 8-bit machine are numbered. "Spectrum technology will most certainly be around in 1987. We will have Pandora out later this year, and plans beyond that on the same line," he said.

Also musically, HCCS has produced a voice editor for the 128, which can be used with the company's echo synthesiser and amplifier. HCCS is at 28 Hitchin Street, Biggleswade (0767 318844).

However, despite the failure of the QL to sell to the mass market, Sir Clive said that Sinclair was not abandoning the development of 16-bit machines. "We will see that both 16-bit and 8-bit technology will run together."

Plans for a successor to the QL, based on the 68008 processor, but substituting disc drives for the built-in microdrives, are apparently still being pursued at Sinclair Research, but it is now unlikely that a new QL machine will be launched this year.

On the subject of Sinclair's financial position, Sir Clive said that the current agreement with creditors was due for review at the end of March. "There is no question that we cannot reach a satisfactory conclusion," he said. He added that Sinclair's total debt was now "quite low", and that the company had paid over half of the £15m debt off.

Sinclair Research hopes to have paid off all debts by the autumn, and to announce a profit for the year beginning April 1, 1986. However, additional capital investment in the company would still be a bonus.

# Commodore loses \$50m over Christmas

COMMODORE has reported a quarterly financial loss for the fourth consecutive time with the announcement that the company's deficit for the three months up to December 31, 1985 was \$53.2m (about £38m).

Its sales were marginally up on the corresponding pe-

riod the previous year – \$339.2m (£242m) as against \$338.7m (£241m). Then, however, the company showed a \$3m profit.

This time, pre-tax profits were \$1.05m (£750,000), but the costs of closing both the Corby assembly plant and a semi-conductor plant in Cali-

fornia accounted for \$22m (£15m) of the loss.

Commodore still claims that it expects to reach a satisfactory agreement with its bankers, and is predicting an earnings recovery this year, having taken steps to reduce costs.

The company has now lost \$92.4m (£66m) in the first six months of the current financial year, around four-fifths of the \$114m (£90m) it lost for the whole of the previous year.

● Commodore UK has undergone some personnel changes – general manager Nick Bessey has moved to head up Commodore Electronics, and Chris Kaday, after just six months with the company, is now acting general manager.

## Wallow in MUD – at last

BRITISH Telecom's much-delayed implementation of MUD, the multi-player adventure game, should finally be available next week.

"MUD is going out of beta test and going live on February 24th," said Trevor Havelock of BT's New Information Services division.

"We have set up a 'Mud

line' where anyone who wants a Mudpack, which gives them their identity code and instructions, can ring up to order one."

The Mudpack which costs £20, includes three hours of playing time. After that the charge is £2 per hour.

The Mudline number for Mudpacks is 01-606 1173.



## Alidin brings out oscilloscope

AN oscilloscope add-on has been developed for the Spectrum by Hampshire company Alidin.

The Alidin Scope package

## QL Comms cut

TANDATA'S communications package for the Sinclair QL, QL Comms, has been reduced in price by £60. The three modules Q-Connect, Q-Mod and Q-Call, will now sell for £129.95, as a single pack.

Tandata can be contacted at Albert Road North, Malvern, Worcs (06845 68421).

## Three for the Spectrum 128 Domark enlarges the screen

THE Spectrum 128 Eureka monitor's most distinctive feature is that it displays programs without the black border around the display, so that games screens fill the whole of the screen.

However, it also features a sound booster to amplify

comprises a hardware module which plugs into the Spectrum's expansion port, and software on tape or microdrive.

The module has three signal input connectors, the TV screen displays the continuously updated waveform, while the keyboard takes the place of the knobs and dials usually found on an oscilloscope.

The hardware costs £49.95, the software £24.95. Details from Alidin, 39 Kingsclere Road, Overton, Hampshire (0256 770488).

sound before putting it out through the monitor, and the monitor itself powers the computer through the edge connector, so that one less plug is needed. It can also switch between a medium resolution colour screen to a green screen facility.

## Saga chops Elite

SAGA Systems is to reduce the price of its top-of-the-range Saga 3 Elite keyboard for the Spectrum. Originally brought out at £79.95 last autumn, the Elite now costs £69.95.

Saga is also claiming full compatibility with the new Spectrum 128 for all its Spectrum keyboards: the Emperor, Plus, and Elite.

Further details from Saga Systems, 2 Eve Road, Woking, Surrey (04862 22977).



The Eureka monitor will be available from Domark next month. A price has not yet been fixed but Domark hopes it will be under £250, and also plans versions compatible with Commodore, Acorn and Atari machines.

## Spectrum acquires more mice

NIDD Valley, whose Slomo game speed controller attracted much attention last year, will be producing two mice for the Spectrum range – including the 128.

The Digimouse provides digital pulse output, and two interfaces will be available for it – one a low cost, basic facility interface, the other designed for the more professional user, with a centronics interface and direct interfacing to Nidd Valley's programmable keypad.

The second pointer, the Anamouse, uses analogue input, and is designed for the serious user, with three independently programmable buttons and Z axis control.

The Digimouse and Anamouse devices each cost £34.95, Digimouse's low-cost interface £14.95, the professional interface £34.95 and the Anamouse interface £14.95.

Details from Nidd Valley at Stepping Stones House, Thistle Hill, Knaresborough, N. Yorks (0423) 864488.

## Commodore announces new holiday promotion

MORE promotional packages for the Commodore 64 and 128 have been announced by Commodore UK, with a chance this time of gaining a discount on your summer holiday. This new offer follows on from a similar holiday offer Commodore ran last year.

Each package containing either the 64, 128, 1570 or

1541 disc drives or any Commodore monitor will contain five £50 vouchers, which can be redeemed against the price of a selection of package holidays. However, some



## Teletext adaptor

VOLEX Electronics has brought out a teletext adaptor for the Spectrum. The unit gives the user access to all teletext broadcasts in the UK, and a telesoftware downloading facility.

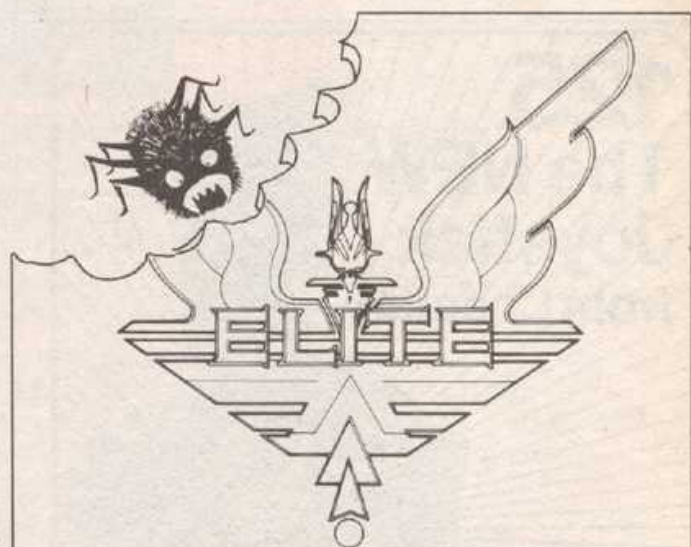
The package comprises the adaptor unit, Prom-based software, and a separate power supply unit.

It is available now and costs £99.99 from Volex at Lissadel Street, Salford M6 6AP.

tour operators may not take all five of the vouchers for a single holiday.

Commodore is continuing to sell the 64 as a compendium for £199.99, but the word 'Christmas' has been dropped and a new box designed.

The voucher offer is available from all Commodore outlets, and vouchers can be used up to October 1987.



## IMPORTANT Message for Amstrad Elite users

The first batch of Firebird's Amstrad version of Elite contains a bug which may make the game unplayable – the correct version has the name METROPOLITAN.

If you have bought the game and have encountered this problem please return the cassette **only** (i.e. not the box or instructions), together with your **name** and **address** to the address below and you will receive your new cassette by return of post together with a £2 voucher redeemable through our mailorder department for any of Firebird's products.



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## QL Values

I write in reply to Ziggurat (Vol 5 No 6) and David Kelly's apparent total lack of knowledge concerning the QL and other MC68000 machines. Graphics handling on the QL is incredibly simple. Over 40 display routines are included as part of the QDOS operating system (which are called by SuperBasic instructions) and as such are available directly to assembly language. Also the amount of memory required to hold the display is 32K, exactly the same as for the Atari ST Series.

The QL is far from slow. The basic benchmarks for the machine only cover extremely small programs which tend to be efficient in most micros. However, for larger, more useful programs, the QL is the only micro not to slow down to a snail's pace but instead run at full speed due to intelligent variable handling techniques.

David Kelly implies that the QL is not particularly strong, or pleasant to use, in the field of programming. Why then does the machine possess ar-

guably the best and most structured basic of any home micro? Also which other home micro can boast a supply of 100% industry standard versions of C, Pascal, BCPL, Lisp, Fortran 77 and other popular languages?

The QL has its faults, its sound is inferior to that of the Commodore 64 and it could do with an improved keyboard. 'Media values' do play a large part in the success of a computer in a very competitive and prestige conscious market, but the abundance of articles written about the QL by people with no experience of the machine give little chance of its real virtues becoming apparent.

D J Parrott  
61 Warrington Road  
Dagenham  
Essex

David Kelly replies: The 'media values' now demanded of a new home are quite specific. Hi res multi-colour graphics which can be easily animated and sophisticated music handling are essential requirements and the QL just does not deliver.

Despite its 16-bit proces-

sor, structured Basic and fast mathematical manipulation, no quantum leap is observed where it matters - on-screen.

In media value terms, even the Spectrum 128 beats it hands down.

## Values QL

I would like to add more to the letter in Vol 5, No 6, by LW Tomlin. I ordered my QL in February 1984 and took delivery in July of that year. I dare say that Sir Clive, being enthusiastic about his creation, did try to rush the product on to the market and it was not without its faults and drawbacks. But it is easy to be wise after the event.

I have at present the latest machine, which is a pleasure to use and extremely reliable. I have also purchased the latest business software that comes free with all new machines and find it hard to fault. On request, I was also sent the Manual and User Guide, now issued with all new QL's and find it to be extremely accurate, easy to follow and a very interesting experience for the beginner

who has no knowledge of programming. What was wrong with the QL, is no longer true; the continuous development of peripheral manufacturers to design additional hardware etc, and Software houses to write programs for all types of operations should give the potential purchaser confidence that the QL is now a capable, reliable and deserving machine.

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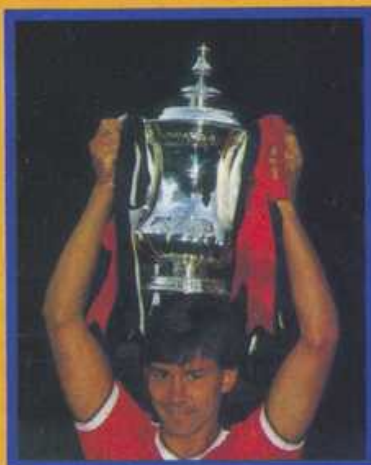
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## Gandalf meets Aphrodite

Graham Taylor enters the world of MicroGnome, the privately-run database

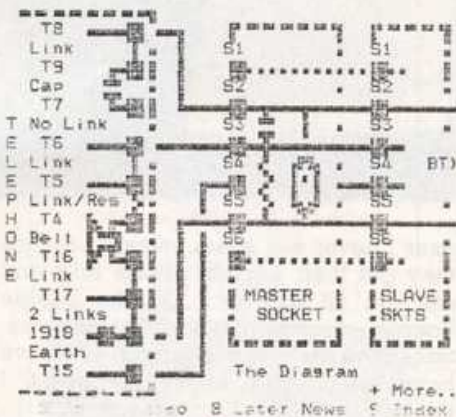
**T**hough bearded and jovial, Glyn Phillips lacks either a pointed hat or a green tunic. He is not a gnome. He is, however, now the sole controller/organiser/manipulator/censor and instigator of a remarkable independent database called MicroGnome. It is his voice that resides in the messages that appear at the bottom of the Gnome pages, his electronic will that sends casual gnome browsers into obscure and uncharted sections of the database.

MicroGnome is, if not unique in this country, certainly special – a privately run database with hundreds of pages and plenty of characters. It contrasts with the big name systems in much the same way as pirate radio stations do with Radio One. It offers a surprisingly wide range of features from a political comment board, to a role playing game, to technical tips, news and reviews and, inevitably, babble boards where addicts have strange conversations on everything from blowing Eproms to the meaning of *Stairway to Heaven*.

Glyn Phillips runs MicroGnome from two rooms in a house in north London. Although it is based around BBC Bs, the system is surprisingly complicated. Several BBC computers are linked on an Econet system, some of which are used by Glyn to actually interact with and alter the system, while others have monitoring functions. Chugging away on the ground floor is an SJ Research file server attached to two twin disc drives which form most of MicroGnome itself.

telephone lines into the system, ie, only two people may be gnoming at the same time. "British Telecom is supposed to be putting in five more lines but it's been two more weeks for several months now," explained Glyn.

Despite the fact that many of those who try to contact MicroGnome will get an engaged tone, the signs are that the system is fairly popular – it gets around 800 calls a week spread through most of the day (things do tend to calm down between 2am and 10am when even database users need to sleep).



However, it is only very recently that Glyn has decided to start charging for the system. For £1.50 a month, you get a password that lets you on to parts of the system excluded to others and for 50p(!) you can rent your own frame, editing it to your own satisfaction. Buy several pages and you can build up your own mini-database under the pointed hat of MicroGnome itself.

The plea for subscriptions is only being moderately successful (18 at the last count) and the future of the whole Gnomnic empire is in doubt. "I'm prepared to make no money on the system but unless I can get, say 50, subscriptions over three months the system will be closed down, mainly because I'll have to move house and I don't see me being able to set it up again elsewhere." Gnomes everywhere take note.

"I find it strange that people are prepared to spend a small fortune on telephone charges but won't pay a small subscription," Glyn added.

But where does MicroGnome come from? Why does anybody want to devote so much effort and expertise to losing money so that other people can have a good time?

The history of MicroGnome is complicated. It was begun by a group of people collectively known as Soft Machinery of which Glyn was a member. Under that banner, MicroGnome was inaugurated on February 7, 1985. It wasn't and isn't

entirely altruistic.

MicroGnome is a sort of continuous demo of Glyn's work. What began as a commercial software package for the BBC from Communitel intended for people to get a 'feel' of developing and using databases has been slowly changed and adapted (soon to be adapted still further) into a very powerful system indeed. Glyn's work is the development and installation of private viewdata systems and MicroGnome is his portfolio.

"Probably the most difficult aspect of running any database is the routing – working out exactly what pages lead to and from one another. I have developed a system within MicroGnome that does that for you. If I insert a page under a certain heading, the program itself will automatically annotate all other relevant pages so that it becomes integrated into the system." Glyn illustrated the process with a short news piece concerning *Popular's* visit to Gnome control – it was impressive to see the system whizzing through various pages adding details of the new news page throughout the system.

Whatever the various financial considerations involved in running a database like MicroGnome, there is one other factor to be taken into account – it's enormously good fun. Whenever anyone links with MicroGnome, they type in their name and then look through the system. At the same time in MicroGnome control a BBC monitor says something like, "Gandalf browsing," or, "Fred editing" if Fred is actually writing a message to the system. Over a couple of hours different names arrive, leave, write messages, browse all monitored by the system.

The system is not passive. If he wishes, Glyn can take control and send messages to a user which appear as 'blipverts' – short lines of text at the bottom of the screen. More than that he can shunt the hapless victim off the whatever section of the database he chooses. The megalomaniac possibilities are endless but it has to be said that Glyn is generally very restrained in his use of the facility. The most common reason is one of censorship: "I won't let just anything go onto the system – I don't necessarily mind swearing as such, since it's a



Goblin David West made the mistake of asking us if we knew how to convert an old-style GPO telephone system into a glittering BT installation with plug-in extensions! So here it comes, The Gnomer's Guide to Rap Rod Rewirings:

First of all, you need The Diagram – for this you must press +..

When you've jotted down The Diagram, read The Notes that follow – for those you must press + again..

+ More..  
2 Communicado 8 Later News 9 Index



# Communications

question of context, but we do get people who just want to waste their time writing a stream of filth".

In a few cases, people have actually been bounced off the system as soon as they've tried to log on. "There's one guy who's an out and out racist of the most overt sort. I let him on for a while in the interests of freedom of speech and getting some reaction but he's got so over the top recently I bounce him off if I come across him."

Aside from racists, there is another strange phenomenon to be found among the babbleboards of MicroGnome: "A lot of the users pretend to be women," explained Glyn. "I think they do it to wind up other (almost exclusively male) users. Conversations develop between them where one side doesn't know that the other side isn't female - if things start getting too excessive I stop it."

The curious case of the the telephone transvestites brings us on to a general discussion of the curious character of MicroGnome users. What sort of people are they? Several of them are called Gandalf which is confusing, though Glyn says he can usually tell which Gandalf is which, Aphrodite is probably a guy in disguise and Richard Day is an ecology fan who does some nice designs. It's hard to say what these and the other users have in common. They tend to be adolescents though, with interests in wargames, science fiction, music and computers. Many have BBCs, some have Spectrums (you can always tell them because of the dodgy punctuation, according to Glyn) and not a few have QLS or are using a system at work clandestinely.

Glyn has some other observations. "You get some people who come in to the system, and spend hours on some elaborate design of their name using multi-coloured graphics - those are the

ones I never see again, mainly because they get their horrific phone bills and are put off forever." On the Babble Boards, surprisingly, serious conversations develop between people who have never met. "The anonymity helps, I think."

"I must say it'd be nice if more women did use the system, I think we get a lot of people with very similar interests at the moment, and persuading more women to use MicroGnome would be one way of opening up the range of subjects discussed." That said, the current crop of MicroGnome features is fairly diverse even if the most popular ones are the same on databases all over the country.



Glyn Phillips

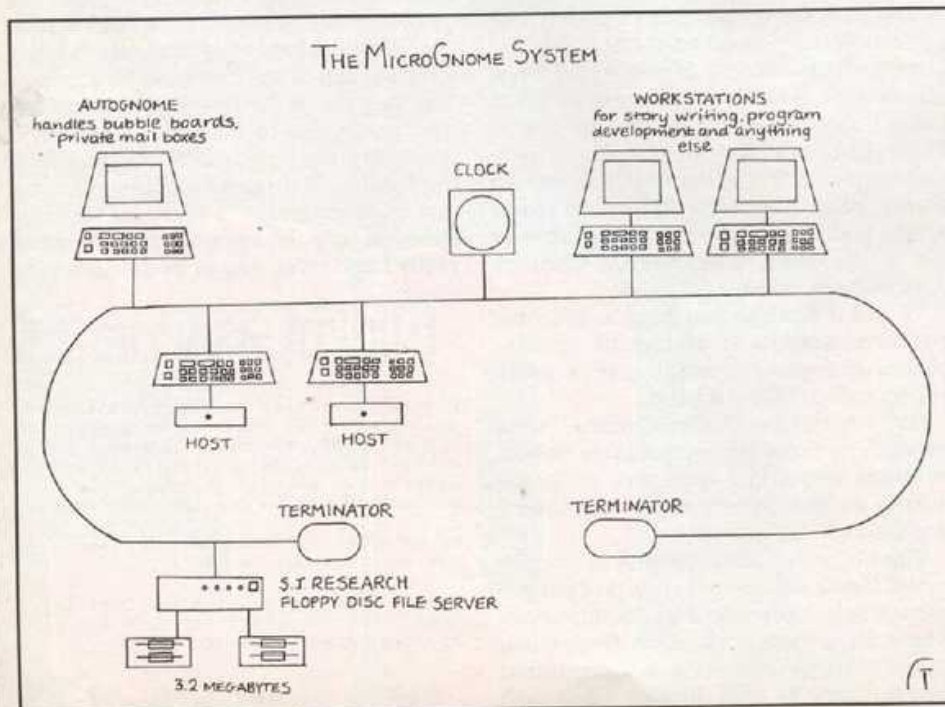
"The most popular features are the bulletin boards which function like loads of message slots." Several popular sections are run by other people who have pages of MicroGnome all to themselves. One of these is a role playing game run by Thanatos (not his real name, methinks). "The idea is to amass points and it involves working as a team with other players, but I don't really understand it," admitted Glyn. I couldn't understand it either but any role game that features spells entitled, "Oh, there it is!" or "Oh, go away!" is all right in my book.

Another key section is the technoboard where Glyn or other users try to answer questions placed there by desperate computer owners - (see the illustration on page 9 for the extraordinarily detailed answer to one question).

Added to that is news (MicroGnome had coverage of the BBC Master series before anyone else when pages of technical details were sent to the system 'live' from the launch actually using a Master BBC), a special Political Babble Board, and, of course, telesoftware.

And there is more, but not enough space, alas, to begin to come to grips with the mysterious Uncle Jim and the Gnome Rangers (a sort of ongoing send up of *Blue Peter*) and the strange story of "The Mystery of Batty Grange". Suffice to say that MicroGnome does more or less everything the 'real' databases do, with a good deal more spirit and humour, it currently fills over one and a half megabytes of disc space and could fill more, if people wanted it and BT finally manages to put in Glyn's telephone lines.

If you have a modem give it a try and, if you like it, don't forget to take out a subscription.





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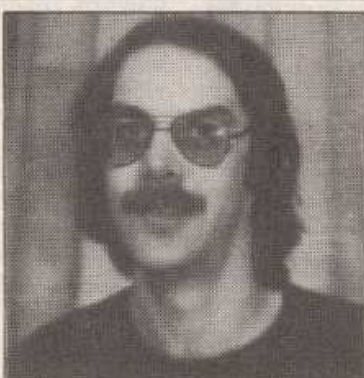
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## Package

**Program** *Costa Capers Micro* Spectrum **Price** £7.95 **Supplier** Firebird Software, Wellington House, Upper St Martin's Lane, London WC2H 9DL.

**W**elcome to Wish You Were On Holiday 86. This week we've asked Ted Blewitt to go on holiday in Spain.

Ted's holiday started well with an unusual loading sequence, the instructions appearing screen by screen as the tape prepared for warmer climes. Suitably Hispanic music played once the plane... sorry, micro was loaded, but Ted's problems began.

"It seemed my luggage had gone astray. In fact it had a life of its own and I had to run all over the place getting it back. I've had to buy most things again, and being short of cash I needed a credit card first."

Ted obviously isn't alone in facing these problems. Some adventurers who went to *Terrormolinos* faced exactly the same plot last year! But of course these tests are physical as well as the mental, as anybody who's worked as a Technician like Ted will know. Changing things in one screen may alter things in another, and some objects can't be obtained until other tasks have been completed.

Luckily Ted had good weather - almost too good, in fact, as he was forced to consume cans of lager to ward off dehydration and give him Dutch courage to complete certain otherwise impossible feats. And as day turned to night, Ted's holiday flew by and the 10th of August completion date approached.

Not much of a rest for Ted then and definitely hard work, but we can't help thinking a holiday isn't for everyone. It's best suited to those who want something similar every year and don't mind persisting with a tried and true formula.

For ourselves we thought it rather too much like work in the Chip Factory and that it Costa bit too much.

John Minson



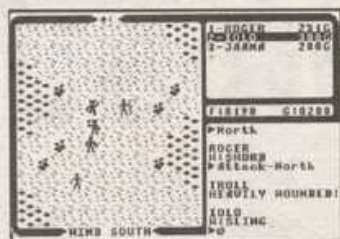
## Strategy

**Program** *Ultima IV, Quest of the Avatar Micro* CBM64/Atari + Disc Drive **Price** £66.00 approx **Supplier** Origin System, 340 Harvey Rd, Manchester, N.H. 03103 USA (Import)

**I** must admit, even though I am very keen on adventures, I have never had any leaning towards Role Playing Games, until now. *Ultima IV* is without a shadow of doubt the ultimate RP strategy game. Never has a game held my attention like this one does; it is a masterpiece of programming.

On first 'booting' the disc you are shown various options, such as Create new character, Journey onwards

(from previous play) etc. Your character is determined by answering questions put to you by an old gypsy and the computer then decides



which one of the eight characters you are most suited to be. The players range from Bards and Magis, to Paladins and Tinkers, all possessing different personalities and fighting ability.

Your quest is to learn the true qualities of life, ie, Honesty, Compassion, Valour, Justice, etc; this can only be

## Two timer

**Program** *Brian/Survival Micro* Spectrum **Price** £2.99 **Supplier** Central Solutions, 500 Chesham House, 180 Regent St, London W1R 5FA.

**T**his is a release from a new budget software house Central Solution and offers a couple of *Quilled* adventures on one cassette.

The first, *Brian the Bold*, is set in the time of knights and damsels in distress and is the familiar tale of peasant boy given opportunity to rescue

King's daughter and become hero.

The second game, *Survival*, places you in the role of new MI5 agent, Gary Gullible (surely they could have thought of a better name?) who has to recover the standard set of stolen documents; you know the ones, they are stolen in so many other adventures that they must be a bit tatty by now!

These adventures follow a mainly linear pattern - solve problem, continue on to next location, etc, and are fairly lacking in atmosphere and descriptive detail.

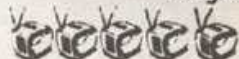
The puzzles are not so

done by exploring the 'Land of Britannia' and by interaction with people you will meet.

Weapons, armour and food can also be purchased from these towns, along with magical potions and other necessary items. All kind of strange beings will try to put an end to your exploits. Two-headed Ettins will throw boulders at you, rogues will rob you and don't make camp for the night in some strange forest.

*Ultima IV* comes complete with a large map of Britannia plus two thick books, informing you all about the world and its inhabitants. I think the price will put off a lot of possible buyers; however, in saying that, if you only buy one game this year, make it this one.

Roger Garrett



## Disc edit

**Program** *The Knife Micro*: Any Amstrad CP/M **Price** £12.95 **Supplier** Hisoft 180 High Street North, Dunstable, Beds LU6 1AT

**T**he Knife is a disc sector editor for Amstrad 3" discs and as such it is competing with a range of similar programs that have recently appeared. While not extortionate. Hisoft's offering is not the cheapest you could buy and, unlike some others, it does not offer other disc utilities in the same package, but it does have some features that make it attractive.

First of all it is powerful, but friendly. There are, in fact, two programs supplied that do two slightly different jobs and between them you should find the correct level of flexibility and ease of use to suit you. The editing control you are given over the disc is the equal of any I have seen; it is extremely easy to get to the desired sectors, tracks and files to make your changes, and it includes special options such as string or byte-sequence searches.

Secondly, since it runs under CP/M rather than Amstrad, it will also work on the PCW 8256 computers, and is quite cheap for a program on this machine.

Thirdly, it comes supplied

with the invariably excellent Hisoft documentation. In this case you are given a full beginner's course on the way CP/M (and hence Amstrad) disc directories and formats work.

I have in the past had hours of work saved by utilities such as this and really every serious user should have one 'just in case'. While for absolute novices, I would probably recommend *Pride's Oddjob* for features such as menu driven Unerasing of files, anyone who wants more control over their discs would do well to try *The Knife*.

Tony Kendle





## First words

**Program** *Wordplay Micro*  
BBC B **Price** £12.95 **Supplier**  
BBC Soft, 35 Marylebone High  
Street, London W1M 4AA

**T**he single most useful piece of software for any micro is a wordprocessor. It makes sense therefore for children to learn about them as soon as possible. *Wordplay* is intended to make this fun.

You write on a screen where each function key calls upon an animated animal character to work on the text.

Each has a rhyming mnemonic to help you remember what it does. If you call for Elephant Eve to justify your text, for example, she walks up the page and tugs each line until it fits from edge to edge.

Storing the text is simplified to avoid confusions and there is even a spelling checker. Text is printed out (an adult section allows an expert to adapt the program to suit most printers) in large print on an A4 page. The idea is to offer a fun way to learn all about wordprocessing.

Sadly it fails. It ends up as a complicated wordprocessor where the "whistles and bells" just add to confusion

and time-wasting rather than helping, and in the tape version loading is painfully slow. Most wicked of all it requires Basic 2 and does not say so anywhere on the packaging or in the otherwise comprehensive booklet. It is obviously aimed at schools where many BBC micros were bought with Basic 1 and have not been updated. That means they cannot save or load texts, use the spelling-checker or even succeed in changing the display colours! Good idea, bad implementation. Not recommended.

**Dave Watterson**



## Head case

**Program** *Groovy Garden Micro* Commodore 64 **Price** £1.99 **Supplier** Central Solutions, 500 Chesham House, 150 Regent St, London W1R 5FD.

**I**f software has taken huge leaps forward in the last two years, then with this game it takes giant steps backwards.

Mastertronic and Firebird

have shown that there is quality software in budget games, it's just a question of selection. If Central Solutions want to be taken seriously, they have to do a lot better than this rank awful game. The plot, what there is of it concerns you as a gardener protecting your four pigmy pines from an assortment of nasties ranging from bugs to empty dustbins, which you can despatch with your spray gun.

The game is, would you believe, a direct clone of *Space Invaders* and has ten

screens which get progressively more boring as the game goes on. The only saving grace is the use of colour which is bright and attractive. Your pneumatic spray gun can be replenished by a visit to the garden shed where Mr Potty is busy with his mower, and then you...

Stop! I can't take any more of this torture. Let me return to sanity and load up something else.

**Andy Moss**



## Serious stuff

**Program** *Pro-Fortran-77 Micro* QL **Price** £99.95 **Supplier** Prospero Software, 190 Castelnau, London SW13 9DH.

**P**rosporo Software's stand looked a bit out of place at this year's first ZX Microfair. While the visiting hordes sorted through countless games and varied peripherals, Prospero was promoting its QL Fortran-77 package and - after talking with the company's spokesman - I couldn't escape the feeling that they saw serious Sinclair users as an endangered species.

For QL owners who are interested in heavy duty number-crunching (and there must be some out there somewhere), Prospero's package offers the first full QL implementation of the ANSI X3.9-1978 standard for Fortran

(TDI's QL Fortran-77 is a near sub-set) with some useful added features. For example, there is an *Include* statement for calling upon commonly used or user-designed files of program sequences during compiling and the ability to use hexadecimal constants where ever an integer constant is allowed.

The (Sinclair approved) package comes on three microdrives and one Eprom cartridge. The microdrives may be easily duplicated or (with some added effort) transferred to disc and contain the run-time library, (GST) linker, compile-time error set and Fortran compiler programs. Also included are programs for adopting default devices and stack sizes to user requirements. The cartridge contains a "resident library" of machine-coded Fortran routines essential to most programs and is capable of multi-tasking operations. Call statements may be used to invoke

sub-routines written in assembly language to make up for any shortfalls in Fortran's capabilities to meet a user's particular requirements from program to program. The new GST macro assembler sold by Sinclair is apparently quite suitable.

While I haven't had a chance to try any large programs yet, *Pro-Fortran-77* works very efficiently with smaller test runs and looks to be an excellent product for those wishing to put this admittedly specialist language on their QLs. If there is any obvious drawback, it's that the package requires at least 80k of Ram and the user is not going to be able to do much without an expanded QL. But, if the ZX Microfair is anything to go by, there will be a minority appeal in any event. Within this market, however, *Pro-Fortran-77* demands some serious consideration.

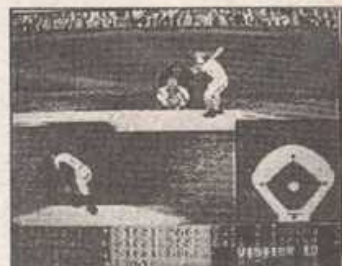
**Brian Beckett**



## Swing bat

**Program** *Hardball Micro*  
Commodore 64 **Price** £9.95  
**Supplier** US Gold, Unit 10,  
Parkway Industrial Estate,  
Leneage Street, Birmingham.

**S**o here's the rub - Baseball, that good clean all-American game actually evolved from English Rounders in the late 1800's, and after weaning us Brits on grid iron



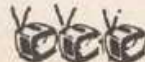
football, we are now to be shown the merits of the sport that made Babe Ruth famous.

This game has graphics which have to be seen to be believed and animation, especially on the batting screen, the best I've seen on the 64. But, are good graphics enough? No sir. A potentially superb simulation is let down by a set of dire instructions which assume you are familiar with typical Baseball terms like 'stealing', 'bunting' and 'double play' which, I would have thought, your average Britisher wouldn't have a clue about.

The batting screen gives a realistic view from behind the pitchers mound and once your pitching choice has been selected watch him wind up and throw - it's a real treat. Once the batsman has hit the ball, the screen changes to the field and the ball is picked up by the nearest fielder and thrown back to a choice of the four bases. If there is a lot of action on screen, the ball comes back at a ridiculously slow speed which is a let down.

*Hardball* is the best simulation of the sport I've seen so far but having said that, there is still a need for improved presentation and explanation in order to appeal the potential fans this side of the pond.

**Andy Moss**





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## Yankee connection

Peter Worlock dials up some American databases

In Britain, communications is still very much the poor relation of computer-related activities. Although the last year has seen a steady development of interest among UK micro users, we're still lagging a long way behind our American counterparts.

The purpose of this article is not to make British communicators green with envy, nor to blow the trumpet for American enterprise. It is simply a look at what is available in the US, based on the idea that what happens now in America is likely to happen soon in Britain.



One of the main drawbacks to the spread of communications fever in this country is cost. Over and above the cost of the computer, modem and software, are the costs of using the telephone. Even at cheap rates, this can be a considerable expense as it's easy to lose track of time when you're exploring new regions of an on-line database, or chatting to other users.

In the US, however, local phone calls are free, and since it's possible to log on to the major databases through local terminals, the cost of US communications is much lower.

Furthermore, the US has considerably more in the way of things to do with your communications system. At the lowest level, just as in this country, are the private bulletin boards, often run by computer hobbyists and aimed at similar users. However, demand for these services in the US is so high that many of them have now started charging subscription rates to cut down on the number of users!

### Commercial systems

Here the US really leads. Whereas Britain features one service - Prestel - the US has several, most of them bigger and arguably better.

The two best-known are The Source and CompuServe. CompuServe is the

biggest with more than 250,000 subscribers. In addition to the usual features such as news, special interest groups and teleshopping, CompuServe has several multi-user games including the enormous *MegaWars III* the CB simulator service which features 72 channels allowing hundreds of users to talk on-line, a complete encyclopaedia at your fingertips, and specialised services such as weather briefings and radar maps for light aircraft pilots.

A new feature allows science fiction fans to read chapters from as-yet-unreleased books. You can even dump them to your printer to reduce on-line charges.

The Source offers similar services, but in a more serious vein. Following these two come a host of more recent services. Some are news-based, such as Delphi and Dow Jones News Retrieval. One of the more interesting is American People/Link which has opened its pages to special interest groups, Apple groups, etc, but APL has special sections for sports enthusiasts, aviators, and health fanatics.

One of the most interesting developments in US communications is the gradual move towards faster transmission speeds. In the UK most bulletin boards operate at 300 bits per second, while Prestel uses a 1200/75 system which means that the Prestel computer transmits at 1200 bits per second, but your computer talks back at only 75 baud - which makes features like the CB simula-

tors and chatlines a little tedious.

In America, however, many commercial systems are now offering full 1200/1200 rates, and an increasing number feature 2400/2400 facilities. Not only does this make interactive communication easier, it reduces costs since you can send and receive information eight times faster than with a 300/300 set-up. This allows you to make more use of one of the great features of US databases - the vast amount of very high quality, public-domain software which you can download to your own system for use later.

These superfast modems now cost as little as \$500 (about £350) while capable 300/300 modems are down to around the £40 mark.

### US subscription

UK users who think they might get their money's worth from any of these services have the possibility of subscribing and it might not cost as much as you think. The key to low-cost trans-Atlantic comms is called packet-switched networking. This will allow you to hook up to American databases for the cost of the call to your local PSS terminal. Charges after that are based on the amount of information transmitted (the number of packets) and on-line charges to the service itself. You can get into PSS by subscribing to services such as Telecom Gold, and subscriptions to something like CompuServe can be obtained in the normal way, either by sending a money order, or by using a credit card.

Details on CompuServe can be obtained from PO Box 20212, Columbus, Ohio, USA OH43220, and The Source from 1616 Anderson Road, McLean, Virginia USA VA22102.





## Communications

**Hardware** Skywave Multiport Interface/Skycom Rom/Voyager 7 Modem **Micro** Any Amstrad CPC **Price** £160.95 all inclusive. The modem alone costs £91.95. The cheapest interface package is multiport + Prism 2000 modem £99.95. Other modems available. **Supplier** Modem House or Skywave.

**T**his communication package for the Amstrad CPCs consists of Modem House's Voyager 7, connected via the RS232 port of Skywave Software's Multiport interface and controlled by Skycom software supplied in Rom form. Different combinations are possible - the interface can be bought individually if you already have a modem, and vice versa - so it is worth looking at the parts individually.

A comms package can also be supplied for the PCW 8256 using the Voyager, but not the multiport.

There are much cheaper packages available if you are just interested in Micronet, Prestel or playing MUD. Skycom is aimed at those who want something a little more ambitious or unusual from their micro and who know that the extra is worth paying for.

plugs, so people with older phone systems may have problems. It does, however, give you the potential advantages of auto dialling. It is made special in this particular package by a small extra board that also gives you the facilities of auto-answering supported by the Skycom interface.

The only real criticism is that the dial on the front, by which you select the different transmit and receive modes, is so confusingly labelled that they may as well not have bothered. It is also not yet fully approved, a familiar story of red tape and backlogs.

For 95% of applications the modem will meet all your needs. Certain American Bulletin Boards use 2400 baud rates which work better across the Atlantic than others, but it's a specialist thing and if you can afford those phone bills, you can afford a bigger modem.

### Multiport

The Multiport interface is a well made, solid, three way port. You are supplied with a standard RS232 D plug useable for all serial interfacing, printing, etc. Software to redirect the print output from the standard parallel port to the RS232 is promised. Something of a bonus, and perhaps unnecessary if you are just interested in communications, is a 24 way parallel port that is said to be 'quasi BBC User Port compatible'. What this means is that for various chip reasons it is only

well but looks a bit awkward.

The serial port can be set to transmit or receive baud rates between 9600 and 75, in a series of seven common combinations. You can also set parity, duplex, stop bits, etc. For most comms uses the appropriate combinations are available as menu options and you don't have to worry about setting them yourself.

### Skycom

The Rom software and manual supplied for this article were just provisional. The first 'complete' version should be available in a few weeks, but Skywave says that it will be producing upgrades and improvements.

The existing package is nice, the equal of much that is around, with a Prestel mode, a Terminal mode (for bulletin boards with 80 column scrolling text) and a Telecom Gold mode. Telesoftware downloading is supported.

Although it comes on Rom, you will need a support disc or tape file to hold the phone numbers for auto-dialling, etc. The free memory is used as a buffer for holding characters that you have received, or wish to transmit. You can save the entire buffer, or individual Prestel pages, to disc, edit them, or even re-transmit them.

However, more interesting than all this are all the extra features that are coming in the software upgrade; features that plug some gaps but are also likely to raise Skycom well above the more usual comms packages.

We are promised an auto log on facility and more file transfer options for user to user communication. There will be a format for connecting to the Open University computer and also something that is described as a 'simplified' IBM 3270 format. You will be able to connect to a new 80 column viewdata system called Casper, which will apparently give you access to Yellow Pages amongst other things. There will hopefully be a feature for downloading of CP/M software from Bulletin Boards.

These must represent a tremendous attraction for some specialised or business users and should guarantee Skycom considerable sales.

An auto answer system will also be included whereby people who dial will be shown a text file held on disc, as well as possibly being invited to enter a reply - a sort of text based answerphone or very simple Bulletin Board. A further Rom is also promised providing extensive software for running a proper Bulletin Board system from your own home, and Skywave promise that this, too, will contain some powerful features.

Skywave is planning to set up a Bulletin Board in its own office, but they have already paid for their own page on Prestel (£25886) called Skyclub which gives information for all users of Skycom - a level of customer support that they are justifiably proud of.

**Tony Kendle**



Voyager 7 plus interface

### Voyager

The Voyager 7 is a reasonably sturdy, well built, modem. All common permutations on 75/300/1200 baud rates are offered, including reverse Prestel, as well as a test mode which connects the input with the output to communicate with yourself. It is mains powered and has a row of six LEDs along the front so that you know what is going on at any one time.

It connects directly into a phone socket, using one of those weird Telecom

possible to make the first 20 pins truly compatible. It will no doubt make the connection of most BBC peripherals feasible, if not instantaneous, and Skywave does have plans for using it.

The final port is the obligatory through connector for disc drive or other peripherals. Inside the multiport are two Rom sockets, but by the time the full Skycom software has been finished both will be used up. The board fits snugly with the 464, but an extension has to be fitted if you have a 664 or 6128. It works



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## David Wallin returns with a series on communications

**T**his week sees the start of a new regular feature in *Popular* – on communications.

Following my Bulletin Board feature in the December 12 issue, I'm back, and I'll be giving you all the latest news about BBs, modems and all that kind of thing.

### Modems

There are probably many people who would like a modem and maybe have some Christmas money left.

There are now so many modems around that one is almost spoilt for choice. The table below should help you work out which modem will do the job you want.

**Key Type:** W – Hardwired modem. A – Acoustic coupler.

**Speeds:** D – Full duplex. If no D then half duplex.

**Other symbols:** \* – As standard on modem. O – Available at an extra cost.

The question of BABT approval on modems is an important one, and one that confuses many people. Put simply, if a green sticker is not given to a modem or any other piece of telephone equipment, for that matter, then you should not fit the item to your phone lines. You risk being disconnected if you do and you may damage your other phones. If there is a green sticker, then all is well.

The personal ratings in the table are obviously only a guide, and only you can decide which one would suit you. However, in my opinion the Demon modem



Graphics from Compunet by Bob Stevenson

is probably the best under £100 for any computer, except the BBC, where Le Modem is one of the best, as it comes with software on Rom.

The VTX 5000 is good for a Spectrum owner to start (as indeed I did). If you can afford it, the WS 2000 is the best all round device.

### Modem features

#### Auto Dial

With a modem which has no Auto Dial, to phone a Bulletin Board or any modem service you have to use a telephone to dial and then listen for the carrier tone before proceeding (details in the Bulletin Board feature, *Popular Computing Weekly*, December 12). With an Auto Dial modem this is done automatically. You just tell the computer the phone number and it will do the rest.

#### Auto Answer

The modem and computer will 'listen' in

on your phone line and if another modem dials your number it will answer the phone and upload/download data from the call modem (like a telex) or do whatever the software tells it to.

#### Auto Baud Rate Scan

When the modem receives some data it will analyse it and decide what baud rate the data is being sent at and then set itself to be compatible with the other modem. A Bulletin Board which works on more than one speed, eg, Basildon ITeC 1200/75 & 300/300, will use baud rate scanning to select the speed of your modem so it is compatible with your modem.

#### Ans/Orig

When two modems are communicating at the same speed, ie, 300/300 rather than 1200/75 particularly if in full duplex then it is better if one is set to *ans* (answer) and the other to *orig* (originate).

#### Hardwired/Acoustic

A hardwired modem plugs directly into a BT phone socket in a wall and then the phone will usually be plugged into the modem. An acoustic modem is different – the phone is plugged into the wall socket as usual.

The modem is connected to the expansion/serial port on the micro as with any modem. The modem has two suction caps – one for the phone's mouthpiece and one for the phone's earpiece.

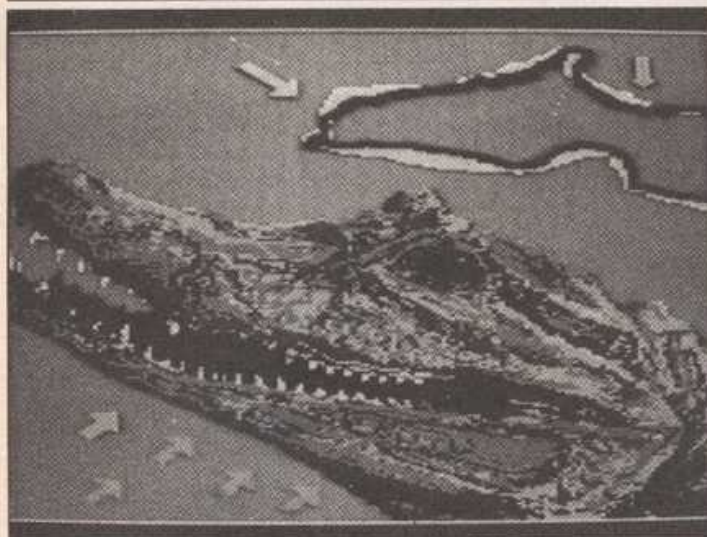
The earpiece of the phone is connected to its cap and so is the mouthpiece. This forms a direct link for the sound to follow straight into the modem. Due to the shape of the caps some acoustic modems only work with the older round ended phones.

The table is only a guide and the actual prices may differ by even up to £20 or more depending on the time of year and shop in which it is purchased. The features listed for each modem are believed to be correct at the time of press.

Model	Price	300/300	1200/75	12/12	Other	AD	AA	Supplier
Modem kit	£50	*						Maplin 0702-554155
Modem 1000	£50		*					Modem House 0392-69295
VTX 5000	£70	*		*				Modem House 0392-69295
Demon	£72	*	*	*	*	*	*	Walkbury Consultants 0733-235187
Minimodem	£75	*						Answercall 01-657 1133
Buzzbox	£80	*			*			Da Com System 0908-675511
Le MODEM	£89	*	*	*	*	*	*	Watford Electronics 0923-37774
64 Multimodem	£99	*	*		*	*	*	Miracle Technology 0473-216141
Compunet modem	£100		*					Compunet 01-637 0942
TM 110	£114	E	*	E	E	E	E	Tandata 06845-68421
Intermover	£115	*			*		*	Modular Tech 0869-253361
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Prospekt	£144	*	*	*	*			Interlekt 0734-589551
Chip Chat	£149	*	*	*	*		*	Digisolve 0977-513141
WS2000	£149	*	*	*	*			Miracle Technology 0473-216141
Amstrad Modem	£175	*	*	*	*	*	*	KDS Electronics 04853-2076
KN300	£180	*						K&N Electronics 0628-22447
QL Comms	£220		*			*		Tandata 06845-68421

Note: 12/12 denotes 1200/1200 baud; Other indicates more baud-rate and protocol options; E indicates option at extra cost.





Graphics by Hugh Riley (left) and Bob Stevenson (right), taken from Compunet

## Speeds

Usually written as, for example, 1200/75, this indicates the receive/transmit speed of the modem in bits per second, or baud. There is another way of writing this speed: by a V number. V numbers refer to CCITT standards. If a modem complies to these standards then it can be advertised as, for example, V22 instead of 1200/1200 baud. I don't usually use V numbers because they require you to learn them and you can easily get them muddled up. However, for those

them muddled up. However, for those who are not easily muddled, here is a chart showing what V numbers are what baud rates.

CCITT V number	Baud rate
V21	300/300
V22	1200/1200
V22bis	2400/2400
V23	Viewdata Speed

Viewdata speed is 1200/75 or 75/1200 (reverse viewdata) or both.

Another problem with writing the CCITT way is that it doesn't tell you if it is

full or half duplex.

As you may have guessed, other similar numbers can refer to auto dial/answer, etc, but these are not so important and are not included.

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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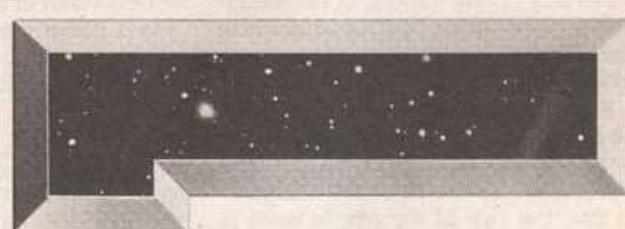
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## Seeing is believing

David Lawrence and Mark England conclude our series with a look at the ST's graphics and sound capabilities.

### The Graphics Display

At its simplest level, the monochrome display, the ST divides its screen up into 640\*400 pixels and records the state of each pixel in the form of a single bit within a 32K area at the top of memory, so that each 16 bit word in memory will represent 16 pixels on the screen.

When we turn to the lower resolution modes of which the ST is capable, the situation becomes more complex because, one of the purposes of the lower resolution modes is also to allow the ST to define different "planes" on the screen so that it is almost as if either 2 or 4 different designs for the same screen display are being held in the memory at the same time.

The reason for this is colour. While one "bit" in memory corresponds to one pixel on the screen there is clearly no possibility of distinguishing between pixels on the basis of colour - a pixel is either off or it is on. Of course that in itself gives two possible colours, according to what the foreground and background are defined to be. In order to decide on more than two colours it is necessary to be able to record more than one item of information about each pixel. In fact the ST allows, in its "multi-plane" modes, either four or 16 items of information to be stored about each pixel.

In 2 plane mode, the data for each plane occupies half the full display memory and in 4 plane mode each plane occupies one quarter. In order to accomplish this, the size of the pixels used in defining the screen is increased so that in 2 plane mode, each pixel is twice the length vertically of a pixel in high resolution mode. In 4 plane mode each pixel is twice the size of a high resolution pixel in both height and width. The result is that the screen can be covered in fewer pixels and less memory is required to remember which pixels are on or off.

To minimise the amount of scurrying around the memory which the ST has to do when creating a display composed of more than one plane, the information for the separate planes is interwoven so that the data for a particular screen position on one plane is next to the data for the same screen position on another plane.

### The Video Shift Register

It is all very well saying that the memory is arranged in this way or that to achieve the necessary 1, 2 or 4 planes, but how is this data transformed into a display? Part of the answer is the work of the "video shift register" which can take display data from memory in the multi-plane modes and re-arrange it into colour

information about individual pixels. In this way, although there are fewer pixels, each one has more information about it sent out from the display memory.

### The Colour Palette

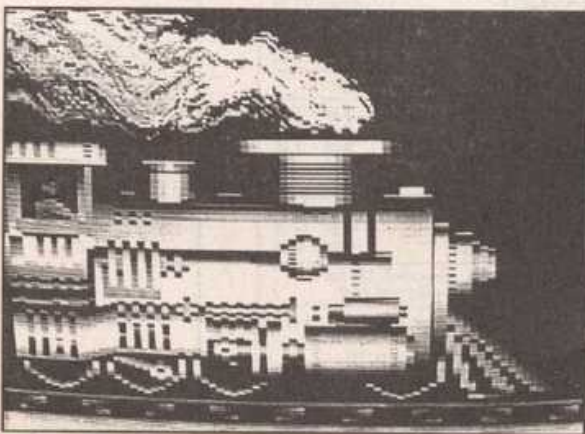
The final link in the chain that leads to the creation of colour is the colour palette. We have already seen how the display memory and the video shift register can be combined to produce pixels which can either be in one of four states (in 2 plane mode) or in one of 16 states (in 4 plane mode). The usefulness of these numbers is that the ST possesses a set of 16 registers which can be used to allocate a different colour to each of the 16 values that a single pixel can take.

Each of the 16 registers has nine usable bits, three for each of the colours red, green and blue. What this means is that any one register can specify a colour made up of one of eight shades of red, one of eight shades of green and one of eight shades of blue - a total of 512 possible colours, though some will in effect be identical. Whichever colour is specified by colour register one will be the colour of every pixel whose combined planes produce a value of one for it.

In 4 plane mode, all of the 16 colour registers can be used, but in 2 plane mode only the first four colour registers have any effect.

### Complex graphics

In all of this there is no reference to the way in which the ST can create and move complex shapes around the screen at such speed. The reason for this is that these abilities are an aspect of the Digital Research Gem system which is described in a separate article. Even so, the quality of what the user sees on the screen depends as much on the ST's hardware as it does on Gem and there is no doubt that in the graphics system of the ST the Gem system has met its match.



### The Audio system

The last few years have seen an explosion of interest in the subject of the electronic generation of music. Musicians of even 10 years ago would probably find it difficult to believe the extent to which popular music of all kinds has been transformed by electronic techniques to the extent one or two musicians can today produce combinations of sound which would once have required half an orchestra.

While at the top end of the market it is possible to pay many thousands of pounds for equipment to synthesize sound electronically, it is often not recognised that many of these systems are based on standard, inexpensive and widely available chips. While a system like the ST is clearly not going to be able to rival super-synthesizers in quality it is nevertheless based on a very capable sound chip produced by General Instruments and rejoicing in the name AY-3-8910. Using the full abilities of a synthesizer is seldom a simple matter, if only because understanding the nature of sound itself is seldom a simple matter, but if you care to make the effort it is quite possible to produce an astonishing range of effects.

In addition to the on-board sound capabilities of the ST, Atari have built into the ST the Midi interface which has become the industry standard for communication between electronic instruments and so the ST is capable of controlling a wide range of devices.

### The Sound Generator

The Programmable Sound Generator chip is the device used by the ST to produce, through an external speaker like that of the monitor, all the sounds of which the system is capable, from the full score of a piece of classical music to a single key-click. The PSG has the capability to produce tones with a frequency anywhere in the capability to produce tones with a frequency anywhere in the range of 30 hertz (30 cycles per second) up to 125 kilohertz (125,000 cycles per second) or, to put it another way, from some of the lowest recognisable tones to above the range of hearing.

Each single note which the ST produces is the work of the PSG alone, relieving the main system of the need to be constantly checking that a particular note has been played for the correct amount of time of whether the "shape" of the note has to be altered as it progresses in order to create the correct "envelope". The main-system plays a part, however, in that the PSG has to be supplied with the notes it is to play, in order, together with information about their length, shape and so on. The PSG is capable of dealing



## ST Series

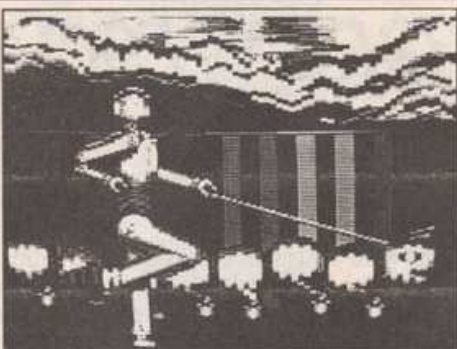
with instructions for three separate "voices" at the same time, that is to say it can play three completely separate sequences of notes, thus allowing harmonies to be created.

The work of outputting the resulting notes to the external speaker is also performed by the PSG.

The PSG has a variety of internal registers which are used to control its activities in each of the three voices. The most important registers are the tone generators, which produce a wave with a square shape of varying frequency. A separate noise generator provides a more random wave form. A mixer control register allows the outputs of the tone generators and noise generator to be mixed together.

The amplitude, or volume, of a tone is controlled by the amplitude registers. The amplitude of a particular tone can either be set to a constant level or the note can be given a shape, or "envelope" using the envelope generator registers in conjunction with the amplitude registers.

The question of note envelopes is quite a complex one which cannot be discussed in detail here but briefly, the distinctive sound of any particular instrument is a matter of the combination of the shape of the sound wave it produces (or the combination of different shaped waves), together with the envelope of



the note – the way in which its amplitude rises and falls over its duration.

Instruments with sharp or "twangy" sounds tend to produce notes which rise from nothing very quickly and then die away quickly.

Slightly softer sounding instruments may produce notes which rise more slowly but linger longer.

### The Midi Interface

The ST comes equipped with the Midi interface, an acronym which stands for Musical Instrument Digital Interface. The basis of the standard is agreed form of "serial communication" (see the later section on the RS232 port) at a rate of 31250 bits per second. Midi is simple, almost crude in its connections, requiring two channels – Midi In and Midi Out – with a third channel called Midi Thru

which allows data to pass along the channel provided by the other two, bypassing the piece of equipment fitted with the interface.

On the ST the Midi interface is controlled by another Motorola developed chip, the MC68850, which is a communications chip.

The object of Midi is to allow any two electronic instruments which conform to the standard to swap information and instructions about what they are doing and what they expect other pieces of equipment to do.

Midi is an ideal standard for a micro-computer in that it is relatively simple to implement and requires only a 5-pin DIN plug to connect up equipment which can then be controlled by the micro.

Within certain limits, the Midi interface allows the user to communicate with up to 16 different pieces of equipment to produce complex synchronised effects or complete compositions – but do be sure, before you rush out and spend more on a set of equipment than on the ST itself, that you have the software to deal with the equipment.

There are differences between the ways manufacturers implement the Midi control codes and mistakes can be expensive. This is not simple, and an area for specialist advice but you can be sure that if all else is well, the ST won't hold you back.

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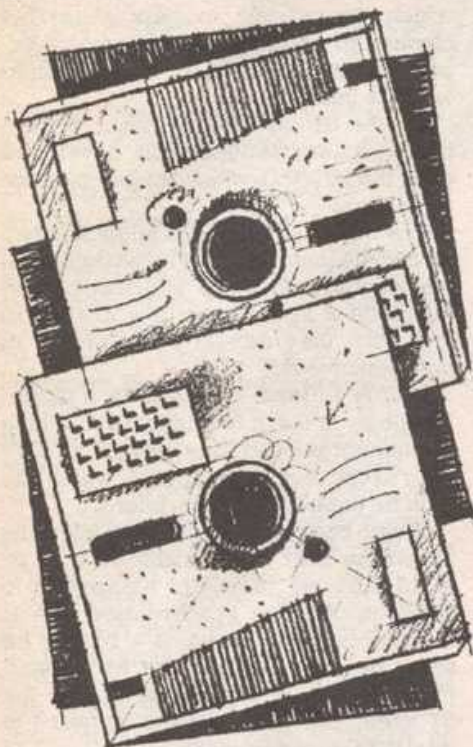
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# GREAT ESCAPE

by G Mayhew



The object of the game is to guide the Software (on disc) through the inside of your '64, to escape at the right hand side of the screen. Guide the disc using the joystick in port 2.

This is not easy though, several hazards are facing you. They are some of the microchips in the C64; these include SID, VIC, 6510 etc. The disc can only be corrupted (ie, collide with the chips) three times, so care must be taken. If three errors occur the game is over. If the disc is guided out, then the disc returns to the start, and the game increases in speed until it is impossible to escape! The number of errors and discs that have been freed, is displayed on the screen in the panel on the right.

## Memory map

\$3000 - \$C069 ..... Character set  
\$C000 - \$C74A ..... M/C and screen data

The M/C and screen data can be broken down into further sections.

\$C000 - \$C069 ..... IRQ interrupt  
\$C06D - \$C0A1 ..... Download screen  
\$C0A3 - \$C1BA ..... Main Game play  
\$C1BC - \$C1F3 ..... End of game  
\$C1F4 - \$C202 ..... Download sprite  
\$C204 - \$C244 ..... Sprite data  
\$C246 - \$C647 ..... Screen data  
\$C648 - \$C74A ..... Character colours

When the program is *Run* (after saving) the data will be poked into memory, and then the next part loaded. The program checks whether you are using disc or tape.

Part two of the data next week

```
100 FOR AD=12288 TO 14336:READ D:T=T+D
110 POKE AD,D:NEXT AD
120 IF T<69134 THEN PRINT "DATA ERROR":END
130 :
140 PRINT "73"
150 AS=CHR$(34):PRINT "LOAD"AS:"TAS.PT2"AS:"";PEEK(186):POKE198,2
160 POKE631,19:POKE632,131:NEW
170 :
500 DATA 189,126,231,219,219,231,126,189,56,124,238,254,238,238
501 DATA 238,0,252,238,238,252,238,238,252,0,124,238,224,224,224
502 DATA 238,124,0,252,238,238,238,238,238,252,0,254,238,224,249
503 DATA 224,238,254,0,254,238,224,248,224,224,224,0,124,238,224
504 DATA 238,238,238,124,0,238,238,238,254,238,238,238,0,254,56
505 DATA 56,56,56,56,254,0,126,28,28,28,28,252,0,230,238,252
506 DATA 248,252,238,238,0,224,224,224,224,224,238,254,0,198,238
507 DATA 254,254,238,238,238,0,206,238,254,254,254,238,238,0,124
508 DATA 238,238,238,238,238,124,0,252,238,238,252,224,224,224,0
509 DATA 124,238,238,238,238,124,14,0,252,238,238,254,252,238,238
510 DATA 0,124,238,224,124,14,238,124,0,254,56,56,56,56,56,0
511 DATA 238,238,238,238,238,254,124,0,238,238,238,238,238,124,56
512 DATA 0,238,238,238,238,254,238,198,0,238,238,124,56,124,238
513 DATA 238,0,238,238,238,124,56,56,56,0,254,14,28,56,112,224,254
514 DATA 0,255,0,0,0,0,0,0,192,192,192,192,192,192,192,192,0,0
515 DATA 0,0,0,0,0,255,3,3,3,3,3,3,3,255,192,192,192,192,192,192
516 DATA 192,0,0,0,0,0,0,0,7,15,15,28,8,96,96,0,192,192,192,192
517 DATA 192,192,192,255,3,3,3,3,3,3,3,255,255,3,3,3,3,3,3,0,0
518 DATA 0,0,0,0,0,60,102,60,56,102,60,63,0,28,28,56,0,0,0
519 DATA 0,28,56,112,112,112,56,28,0,56,28,14,14,14,28,56,0,60,66
520 DATA 153,161,161,153,66,60,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
521 DATA 0,0,126,126,0,0,0,0,0,0,0,24,60,24,0,0,0,0,0,0,0,0,124
522 DATA 254,238,238,238,254,124,0,28,60,124,28,28,126,126,0,124
523 DATA 238,14,28,56,254,254,0,124,238,14,28,14,238,124,0,224,224
524 DATA 224,224,236,254,12,0,254,254,224,252,14,254,252,0,124,238
525 DATA 224,252,238,254,124,0,254,238,14,28,56,56,56,0,124,238
526 DATA 238,124,238,238,124,0,124,238,238,126,14,238,124,0,0,0
527 DATA 56,56,0,56,56,0,0,0,112,112,0,112,112,224,0,0,0,0,0,0
528 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,62,127,183,14,28,0,28
529 DATA 28,0,0,0,0,0,0,0,0,0,15,127,127,15,0,0,0,0,240,254,254
530 DATA 240,0,0,0,24,24,24,60,60,60,31,31,127,31,31,127,31,31
531 DATA 248,248,254,248,248,254,248,248,255,255,255,255,255,255
532 DATA 255,255,0,0,0,0,0,0,0,0,108,108,255,255,255,255,255,0
533 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
534 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
535 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
536 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
537 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
538 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
```

```
539 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
540 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
541 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
542 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,60,60,60,24,24
543 DATA 24,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
544 DATA 0,0,0,0,0,0,0,0,255,255,255,255,255,108,108,0,0,0,0,0,0
545 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
546 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
547 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
548 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
549 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
550 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
551 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
552 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
553 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
554 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
555 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
556 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
557 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,126
558 DATA 126,126,126,126,126,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
559 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
560 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
561 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
562 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
563 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
564 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
565 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
566 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
567 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
568 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
569 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
570 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
571 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
572 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
573 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
574 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
575 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
576 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
577 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
578 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
579 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
580 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
581 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
582 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
583 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
584 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
585 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,95
```



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## CRYPTO

by James Tallett

**T**his program is really written for the younger user who wants to send and receive 'secret' messages, but can be used by anyone where prying eyes are not wanted.

When loaded the menu will be displayed giving you the option of encrypting text or decrypting a previously encrypted text. When encrypting you will be given the choice of saving your encrypted text to tape and/or printer, and when decrypting you can enter your encrypted code via the keyboard or direct from tape. Your decrypted text will then appear on screen with the option of printing the decrypted text to printer or rerunning the program. In either case at the start you will be asked

for a code number; this can be any number between 1 and 9999 inclusive. It is imperative that the same number is used for decryption as encryption or else you will finish up with nonsense or at the worst an "integer out of range" error message. Your code number is not included on the tape saved code or printout of the encrypted code for obvious reasons, but you could obviously write a list of code numbers with a friend to be used on certain source dates.

The program works by using the code number as a seed for Randomise which will cause each random number to be picked in a set sequence starting at a certain place set by the function (see Chapter 11 of the Spectrum manual). So

when encrypting, the code number of each character of the text is added to the next (pseudo) random number in the sequence multiplied by the code number. When decrypting, the reverse is the case as the encrypted code is taken away from the random number. The result of this is that even keywords and graphics characters can be encrypted and decrypted.

The program is about 8K long so if you do not fancy typing it all in you can get a copy on tape by sending £2 to me at Watersay, Kyltra, Fort Augustus, Inverness-shire, PH32 4BY. If anyone is interested I also have a ZX81 (16K) version but it does not have the facility of saving and loading the code to/from tape.

```

10 REM **INITIALISATION**
11
20 POKE 23609,50: REM Keyboard
beep
25 POKE 23658,0: REM caps lock
off
30 LET tapesave=300
35 LET tapeload=350
40 LET rerun=400
50 LET keyboard=500
55 LET codee=530
58 LET codee2=530
60 LET codeno=600
65 LET lprint=660
70 LET txtinpt=700
75 LET decrypt=750
80 LET encrypt=800
90 LET savcode=900
100 BORDER 1: POKE 23693,15: CL
S
110 LET a$="*****
***** SPECTRUM CRY
PTOGRAPH *****
*****"
120
200 REM **MENU**
201
205 PRINT a$
208 PRINT TAB 11;"**MENU**"
210 PRINT "Enter: "
215 PRINT #1; INK 5;"
A TALLETT 1985"
220 GO SUB keyboard
230 GO SUB (1000 AND b$="1")+ (2
000 AND b$="2"): GO TO 200
299
300 REM **tapesave** (save encry
pted code to tape)
301
310 BEEP .1,35: POKE 23658,0: I
NPUT "What title? ";e$

```

```

320 SAVE e$ DATA e()
330 PRINT #1;"REWIND & REPLAY T
O VERIFY - If fails then GOT
O 300."
335 VERIFY e$ DATA e()
340 PRINT #1;E$;" o/k, any key
to continue."
350 PAUSE 0: BEEP .1,35: RETURN

359
360 REM **tapeload** (load encry
pted code from tape)
361
365 BEEP .1,35: POKE 23658,0: I
NPUT "What title? ";e$
367 PRINT #0;"Start tape.": REM
flash text.
370 LOAD e$ DATA e()
380 PRINT #1;E$;" o/k, any key
to continue."
390 PAUSE 0: BEEP .1,35: RETURN

399
400 REM **rerun** (RERUN PROG?)
401
410 BEEP .1,35: PRINT #1;"RERUN
! are you sure? Y or N "
420 IF INKEY$(">") THEN GO TO 42
0
430 POKE 23658,8: REM caps lock
440 IF INKEY$="N" THEN BEEP .1,
35: POKE 23658,0: RETURN
450 IF INKEY$="Y" THEN BEEP .1,
35: RUN
460 GO TO 430
499
500 REM **keyboard** (read keybo
ard for menu routing.)
501
505 DIM b$(1): LET b$=INKEY$
510 IF b$="" OR b$=" " THEN GO
TO 500
520 RETURN
529

```



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```

530 REM ***CODES*** (changes ds to
    e recognising spaces as delimit
    e)
531 DIM e(LEN ds)
532 LET k=1
533 FOR l=1 TO LEN ds
534   IF ds(l)="" THEN GO SUB co
535   GO TO 565
536   LET h=h$+ds(l)
537   NEXT l
538   GO SUB code2
539   LET e(1)=1
540   RETURN
541 REM ***CODES2*** (set e to va
542   lues)
543 LET k=1
544 LET e(1)=1
545 LET h$=""
546 RETURN
547 REM ***CODES3*** (input code n
548   u)
549 INPUT "Enter code number?"
550 IF LEN c$=1 OR LEN c$=4 THE
551   N 0
552   FOR i=1 TO LEN c$: IF CODE
553     c$(i) OR CODE c$(i) THEN G
554     O TO 510
555   NEXT i
556   VAL c$(1 OR VAL c$)9999
557   GO TO 510
558   PRINT AT 3,17: "Code no.":
559   $
560   RETURN
561 REM ***CODES4*** (print decry
562   message)
563 PRINT AT 4,0: "Decrypted"
564   $
565   FOR l=1 TO
566     LEN h$
567     PRINT NEXT l
568   RETURN
569 REM ***CODES5*** (text input)
570 PRINT "Don't say '9999'!"
571 INPUT ds
572 RETURN
573 REM ***CODES6*** (decrypt co
574   de)
575 CLS: BEEP .1,35: PRINT AT
576   4,0: "Decrypted"
577   $
578   DIM s(1+LEN ds)
579   LET s(1)=LEN ds
580   RANDOMIZE VAL s
581   FOR l=1 TO LEN ds
582     LET e(l)=CODE ds(l)+1+INT
583     (RND*VAL s)
584     NEXT l
585     FOR l=1 TO LEN ds: PRINT e(
586       l+1):
587     NEXT l
588     PRINT
589     RETURN
590   $
591   REM ***CODES7*** (encrypt te
592     xt)
593   CLS: BEEP .1,35: CLS: PRINT AT
594     4,0: "Encrypted"
595     $
596     DIM s(1+LEN ds)
597     LET s(1)=LEN ds
598     RANDOMIZE VAL s
599     FOR l=1 TO LEN ds
600       LET e(l)=CODE ds(l)+1+INT
601       (RND*VAL s)
602       NEXT l
603       FOR l=1 TO LEN ds: PRINT e(
604         l+1):
605       NEXT l
606       PRINT
607       RETURN
608   $
609   REM ***CODES8*** (saving code
610     )
611   CLS: BEEP .1,35: CLS: PRINT AT
612     4,0: "Save"
613     $
614   DIM s(1+LEN ds)
615   LET s(1)=LEN ds
616   RANDOMIZE VAL s
617   FOR l=1 TO LEN ds
618     LET e(l)=CODE ds(l)+1+INT
619     (RND*VAL s)
620     NEXT l
621     FOR l=1 TO LEN ds: PRINT e(
622       l+1):
623     NEXT l
624     PRINT
625     RETURN
626   $
627   REM ***CODES9*** (print decry
628     message)
629   PRINT AT 4,0: "Decrypted"
630   $
631   FOR l=1 TO
632     LEN h$
633     PRINT NEXT l
634   RETURN
635 REM ***CODES10*** (text input)
636 PRINT "Don't say '9999'!"
637 INPUT ds
638 RETURN
639 REM ***CODES11*** (decrypt co
640   de)
641 CLS: BEEP .1,35: PRINT AT
642   4,0: "Decrypted"
643   $
644   DIM s(1+LEN ds)
645   LET s(1)=LEN ds
646   RANDOMIZE VAL s
647   FOR l=1 TO LEN ds
648     LET e(l)=CODE ds(l)+1+INT
649     (RND*VAL s)
650     NEXT l
651     FOR l=1 TO LEN ds: PRINT e(
652       l+1):
653     NEXT l
654     PRINT
655     RETURN
656   $
657   REM ***CODES12*** (encrypt te
658     xt)
659   CLS: BEEP .1,35: CLS: PRINT AT
660     4,0: "Encrypted"
661     $
662     DIM s(1+LEN ds)
663     LET s(1)=LEN ds
664     RANDOMIZE VAL s
665     FOR l=1 TO LEN ds
666       LET e(l)=CODE ds(l)+1+INT
667       (RND*VAL s)
668       NEXT l
669       FOR l=1 TO LEN ds: PRINT e(
670         l+1):
671       NEXT l
672       PRINT
673       RETURN
674   $
675   REM ***CODES13*** (saving code
676     )
677   CLS: BEEP .1,35: CLS: PRINT AT
678     4,0: "Save"
679     $
680   DIM s(1+LEN ds)
681   LET s(1)=LEN ds
682   RANDOMIZE VAL s
683   FOR l=1 TO LEN ds
684     LET e(l)=CODE ds(l)+1+INT
685     (RND*VAL s)
686     NEXT l
687     FOR l=1 TO LEN ds: PRINT e(
688       l+1):
689     NEXT l
690     PRINT
691     RETURN
692   $
693   REM ***CODES14*** (print decry
694     message)
695   PRINT AT 4,0: "Decrypted"
696   $
697   FOR l=1 TO
698     LEN h$
699     PRINT NEXT l
700   RETURN
701 REM ***CODES15*** (text input)
702 PRINT "Don't say '9999'!"
703 INPUT ds
704 RETURN
705 REM ***CODES16*** (decrypt co
706   de)
707 CLS: BEEP .1,35: PRINT AT
708   4,0: "Decrypted"
709   $
710   DIM s(1+LEN ds)
711   LET s(1)=LEN ds
712   RANDOMIZE VAL s
713   FOR l=1 TO LEN ds
714     LET e(l)=CODE ds(l)+1+INT
715     (RND*VAL s)
716     NEXT l
717     FOR l=1 TO LEN ds: PRINT e(
718       l+1):
719     NEXT l
720     PRINT
721     RETURN
722   $
723   REM ***CODES17*** (encrypt te
724     xt)
725   CLS: BEEP .1,35: CLS: PRINT AT
726     4,0: "Encrypted"
727     $
728     DIM s(1+LEN ds)
729     LET s(1)=LEN ds
730     RANDOMIZE VAL s
731     FOR l=1 TO LEN ds
732       LET e(l)=CODE ds(l)+1+INT
733       (RND*VAL s)
734       NEXT l
735       FOR l=1 TO LEN ds: PRINT e(
736         l+1):
737       NEXT l
738       PRINT
739       RETURN
740   $
741   REM ***CODES18*** (saving code
742     )
743   CLS: BEEP .1,35: CLS: PRINT AT
744     4,0: "Save"
745     $
746   DIM s(1+LEN ds)
747   LET s(1)=LEN ds
748   RANDOMIZE VAL s
749   FOR l=1 TO LEN ds
750     LET e(l)=CODE ds(l)+1+INT
751     (RND*VAL s)
752     NEXT l
753     FOR l=1 TO LEN ds: PRINT e(
754       l+1):
755     NEXT l
756     PRINT
757     RETURN
758   $
759   REM ***CODES19*** (print decry
760     message)
761   PRINT AT 4,0: "Decrypted"
762   $
763   FOR l=1 TO
764     LEN h$
765     PRINT NEXT l
766   RETURN
767 REM ***CODES20*** (text input)
768 PRINT "Don't say '9999'!"
769 INPUT ds
770 RETURN
771 REM ***CODES21*** (decrypt co
772   de)
773 CLS: BEEP .1,35: PRINT AT
774   4,0: "Decrypted"
775   $
776   DIM s(1+LEN ds)
777   LET s(1)=LEN ds
778   RANDOMIZE VAL s
779   FOR l=1 TO LEN ds
780     LET e(l)=CODE ds(l)+1+INT
781     (RND*VAL s)
782     NEXT l
783     FOR l=1 TO LEN ds: PRINT e(
784       l+1):
785     NEXT l
786     PRINT
787     RETURN
788   $
789   REM ***CODES22*** (encrypt te
790     xt)
791   CLS: BEEP .1,35: CLS: PRINT AT
792     4,0: "Encrypted"
793     $
794     DIM s(1+LEN ds)
795     LET s(1)=LEN ds
796     RANDOMIZE VAL s
797     FOR l=1 TO LEN ds
798       LET e(l)=CODE ds(l)+1+INT
799       (RND*VAL s)
800       NEXT l
801       FOR l=1 TO LEN ds: PRINT e(
802         l+1):
803       NEXT l
804       PRINT
805       RETURN
806   $
807   REM ***CODES23*** (saving code
808     )
809   CLS: BEEP .1,35: CLS: PRINT AT
810     4,0: "Save"
811     $
812   DIM s(1+LEN ds)
813   LET s(1)=LEN ds
814   RANDOMIZE VAL s
815   FOR l=1 TO LEN ds
816     LET e(l)=CODE ds(l)+1+INT
817     (RND*VAL s)
818     NEXT l
819     FOR l=1 TO LEN ds: PRINT e(
820       l+1):
821     NEXT l
822     PRINT
823     RETURN
824   $
825   REM ***CODES24*** (print decry
826     message)
827   PRINT AT 4,0: "Decrypted"
828   $
829   FOR l=1 TO
830     LEN h$
831     PRINT NEXT l
832   RETURN
833 REM ***CODES25*** (text input)
834 PRINT "Don't say '9999'!"
835 INPUT ds
836 RETURN
837 REM ***CODES26*** (decrypt co
838   de)
839 CLS: BEEP .1,35: PRINT AT
840   4,0: "Decrypted"
841   $
842   DIM s(1+LEN ds)
843   LET s(1)=LEN ds
844   RANDOMIZE VAL s
845   FOR l=1 TO LEN ds
846     LET e(l)=CODE ds(l)+1+INT
847     (RND*VAL s)
848     NEXT l
849     FOR l=1 TO LEN ds: PRINT e(
850       l+1):
851     NEXT l
852     PRINT
853     RETURN
854   $
855   REM ***CODES27*** (encrypt te
856     xt)
857   CLS: BEEP .1,35: CLS: PRINT AT
858     4,0: "Encrypted"
859     $
860     DIM s(1+LEN ds)
861     LET s(1)=LEN ds
862     RANDOMIZE VAL s
863     FOR l=1 TO LEN ds
864       LET e(l)=CODE ds(l)+1+INT
865       (RND*VAL s)
866       NEXT l
867       FOR l=1 TO LEN ds: PRINT e(
868         l+1):
869       NEXT l
870       PRINT
871       RETURN
872   $
873   REM ***CODES28*** (saving code
874     )
875   CLS: BEEP .1,35: CLS: PRINT AT
876     4,0: "Save"
877     $
878   DIM s(1+LEN ds)
879   LET s(1)=LEN ds
880   RANDOMIZE VAL s
881   FOR l=1 TO LEN ds
882     LET e(l)=CODE ds(l)+1+INT
883     (RND*VAL s)
884     NEXT l
885     FOR l=1 TO LEN ds: PRINT e(
886       l+1):
887     NEXT l
888     PRINT
889     RETURN
890   $
891   REM ***CODES29*** (print decry
892     message)
893   PRINT AT 4,0: "Decrypted"
894   $
895   FOR l=1 TO
896     LEN h$
897     PRINT NEXT l
898   RETURN
899 REM ***CODES30*** (text input)
900 PRINT "Don't say '9999'!"
901 INPUT ds
902 RETURN
903 REM ***CODES31*** (decrypt co
904   de)
905 CLS: BEEP .1,35: PRINT AT
906   4,0: "Decrypted"
907   $
908   DIM s(1+LEN ds)
909   LET s(1)=LEN ds
910   RANDOMIZE VAL s
911   FOR l=1 TO LEN ds
912     LET e(l)=CODE ds(l)+1+INT
913     (RND*VAL s)
914     NEXT l
915     FOR l=1 TO LEN ds: PRINT e(
916       l+1):
917     NEXT l
918     PRINT
919     RETURN
920   $
921   REM ***CODES32*** (encrypt te
922     xt)
923   CLS: BEEP .1,35: CLS: PRINT AT
924     4,0: "Encrypted"
925     $
926     DIM s(1+LEN ds)
927     LET s(1)=LEN ds
928     RANDOMIZE VAL s
929     FOR l=1 TO LEN ds
930       LET e(l)=CODE ds(l)+1+INT
931       (RND*VAL s)
932       NEXT l
933       FOR l=1 TO LEN ds: PRINT e(
934         l+1):
935       NEXT l
936       PRINT
937       RETURN
938   $
939   REM ***CODES33*** (saving code
940     )
941   CLS: BEEP .1,35: CLS: PRINT AT
942     4,0: "Save"
943     $
944   DIM s(1+LEN ds)
945   LET s(1)=LEN ds
946   RANDOMIZE VAL s
947   FOR l=1 TO LEN ds
948     LET e(l)=CODE ds(l)+1+INT
949     (RND*VAL s)
950     NEXT l
951     FOR l=1 TO LEN ds: PRINT e(
952       l+1):
953     NEXT l
954     PRINT
955     RETURN
956   $
957   REM ***CODES34*** (print decry
958     message)
959   PRINT AT 4,0: "Decrypted"
960   $
961   FOR l=1 TO
962     LEN h$
963     PRINT NEXT l
964   RETURN
965 REM ***CODES35*** (text input)
966 PRINT "Don't say '9999'!"
967 INPUT ds
968 RETURN
969 REM ***CODES36*** (decrypt co
970   de)
971 CLS: BEEP .1,35: PRINT AT
972   4,0: "Decrypted"
973   $
974   DIM s(1+LEN ds)
975   LET s(1)=LEN ds
976   RANDOMIZE VAL s
977   FOR l=1 TO LEN ds
978     LET e(l)=CODE ds(l)+1+INT
979     (RND*VAL s)
980     NEXT l
981     FOR l=1 TO LEN ds: PRINT e(
982       l+1):
983     NEXT l
984     PRINT
985     RETURN
986   $
987   REM ***CODES37*** (encrypt te
988     xt)
989   CLS: BEEP .1,35: CLS: PRINT AT
990     4,0: "Encrypted"
991     $
992     DIM s(1+LEN ds)
993     LET s(1)=LEN ds
994     RANDOMIZE VAL s
995     FOR l=1 TO LEN ds
996       LET e(l)=CODE ds(l)+1+INT
997       (RND*VAL s)
998       NEXT l
999       FOR l=1 TO LEN ds: PRINT e(
1000         l+1):
1001       NEXT l
1002       PRINT
1003       RETURN
1004   $
1005   REM ***CODES38*** (saving code
1006     )
1007   CLS: BEEP .1,35: CLS: PRINT AT
1008     4,0: "Save"
1009     $
1010   DIM s(1+LEN ds)
1011   LET s(1)=LEN ds
1012   RANDOMIZE VAL s
1013   FOR l=1 TO LEN ds
1014     LET e(l)=CODE ds(l)+1+INT
1015     (RND*VAL s)
1016     NEXT l
1017     FOR l=1 TO LEN ds: PRINT e(
1018       l+1):
1019     NEXT l
1020     PRINT
1021     RETURN
1022   $
1023   REM ***CODES39*** (print decry
1024     message)
1025   PRINT AT 4,0: "Decrypted"
1026   $
1027   FOR l=1 TO
1028     LEN h$
1029     PRINT NEXT l
1030   RETURN
1031 REM ***CODES40*** (text input)
1032 PRINT "Don't say '9999'!"
1033 INPUT ds
1034 RETURN
1035 REM ***CODES41*** (decrypt co
1036   de)
1037 CLS: BEEP .1,35: PRINT AT
1038   4,0: "Decrypted"
1039   $
1040   DIM s(1+LEN ds)
1041   LET s(1)=LEN ds
1042   RANDOMIZE VAL s
1043   FOR l=1 TO LEN ds
1044     LET e(l)=CODE ds(l)+1+INT
1045     (RND*VAL s)
1046     NEXT l
1047     FOR l=1 TO LEN ds: PRINT e(
1048       l+1):
1049     NEXT l
1050     PRINT
1051     RETURN
1052   $
1053   REM ***CODES42*** (encrypt te
1054     xt)
1055   CLS: BEEP .1,35: CLS: PRINT AT
1056     4,0: "Encrypted"
1057     $
1058     DIM s(1+LEN ds)
1059     LET s(1)=LEN ds
1060     RANDOMIZE VAL s
1061     FOR l=1 TO LEN ds
1062       LET e(l)=CODE ds(l)+1+INT
1063       (RND*VAL s)
1064       NEXT l
1065       FOR l=1 TO LEN ds: PRINT e(
1066         l+1):
1067       NEXT l
1068       PRINT
1069       RETURN
1070   $
1071   REM ***CODES43*** (saving code
1072     )
1073   CLS: BEEP .1,35: CLS: PRINT AT
1074     4,0: "Save"
1075     $
1076   DIM s(1+LEN ds)
1077   LET s(1)=LEN ds
1078   RANDOMIZE VAL s
1079   FOR l=1 TO LEN ds
1080     LET e(l)=CODE ds(l)+1+INT
1081     (RND*VAL s)
1082     NEXT l
1083     FOR l=1 TO LEN ds: PRINT e(
1084       l+1):
1085     NEXT l
1086     PRINT
1087     RETURN
1088   $
1089   REM ***CODES44*** (print decry
1090     message)
1091   PRINT AT 4,0: "Decrypted"
1092   $
1093   FOR l=1 TO
1094     LEN h$
1095     PRINT NEXT l
1096   RETURN
1097 REM ***CODES45*** (text input)
1098 PRINT "Don't say '9999'!"
1099 INPUT ds
1100 RETURN
1101 REM ***CODES46*** (decrypt co
1102   de)
1103 CLS: BEEP .1,35: PRINT AT
1104   4,0: "Decrypted"
1105   $
1106   DIM s(1+LEN ds)
1107   LET s(1)=LEN ds
1108   RANDOMIZE VAL s
1109   FOR l=1 TO LEN ds
1110     LET e(l)=CODE ds(l)+1+INT
1111     (RND*VAL s)
1112     NEXT l
1113     FOR l=1 TO LEN ds: PRINT e(
1114       l+1):
1115     NEXT l
1116     PRINT
1117     RETURN
1118   $
1119   REM ***CODES47*** (encrypt te
1120     xt)
1121   CLS: BEEP .1,35: CLS: PRINT AT
1122     4,0: "Encrypted"
1123     $
1124     DIM s(1+LEN ds)
1125     LET s(1)=LEN ds
1126     RANDOMIZE VAL s
1127     FOR l=1 TO LEN ds
1128       LET e(l)=CODE ds(l)+1+INT
1129       (RND*VAL s)
1130       NEXT l
1131       FOR l=1 TO LEN ds: PRINT e(
1132         l+1):
1133       NEXT l
1134       PRINT
1135       RETURN
1136   $
1137   REM ***CODES48*** (saving code
1138     )
1139   CLS: BEEP .1,35: CLS: PRINT AT
1140     4,0: "Save"
1141     $
1142   DIM s(1+LEN ds)
1143   LET s(1)=LEN ds
1144   RANDOMIZE VAL s
1145   FOR l=1 TO LEN ds
1146     LET e(l)=CODE ds(l)+1+INT
1147     (RND*VAL s)
1148     NEXT l
1149     FOR l=1 TO LEN ds: PRINT e(
1150       l+1):
1151     NEXT l
1152     PRINT
1153     RETURN
1154   $
1155   REM ***CODES49*** (print decry
1156     message)
1157   PRINT AT 4,0: "Decrypted"
1158   $
1159   FOR l=1 TO
1160     LEN h$
1161     PRINT NEXT l
1162   RETURN
1163 REM ***CODES50*** (text input)
1164 PRINT "Don't say '9999'!"
1165 INPUT ds
1166 RETURN
1167 REM ***CODES51*** (decrypt co
1168   de)
1169 CLS: BEEP .1,35: PRINT AT
1170   4,0: "Decrypted"
1171   $
1172   DIM s(1+LEN ds)
1173   LET s(1)=LEN ds
1174   RANDOMIZE VAL s
1175   FOR l=1 TO LEN ds
1176     LET e(l)=CODE ds(l)+1+INT
1177     (RND*VAL s)
1178     NEXT l
1179     FOR l=1 TO LEN ds: PRINT e(
1180       l+1):
1181     NEXT l
1182     PRINT
1183     RETURN
1184   $
1185   REM ***CODES52*** (encrypt te
1186     xt)
1187   CLS: BEEP .1,35: CLS: PRINT AT
1188     4,0: "Encrypted"
1189     $
1190     DIM s(1+LEN ds)
1191     LET s(1)=LEN ds
1192     RANDOMIZE VAL s
1193     FOR l=1 TO LEN ds
1194       LET e(l)=CODE ds(l)+1+INT
1195       (RND*VAL s)
1196       NEXT l
1197       FOR l=1 TO LEN ds: PRINT e(
1198         l+1):
1199       NEXT l
1200       PRINT
1201       RETURN
1202   $
1203   REM ***CODES53*** (saving code
1204     )
1205   CLS: BEEP .1,35: CLS: PRINT AT
1206     4,0: "Save"
1207     $
1208   DIM s(1+LEN ds)
1209   LET s(1)=LEN ds
1210   RANDOMIZE VAL s
1211   FOR l=1 TO LEN ds
1212     LET e(l)=CODE ds(l)+1+INT
1213     (RND*VAL s)
1214     NEXT l
1215     FOR l=1 TO LEN ds: PRINT e(
1216       l+1):
1217     NEXT l
1218     PRINT
1219     RETURN
1220   $
1221   REM ***CODES54*** (print decry
1222     message)
1223   PRINT AT 4,0: "Decrypted"
1224   $
1225   FOR l=1 TO
1226     LEN h$
1227     PRINT NEXT l
1228   RETURN
1229 REM ***CODES55*** (text input)
1230 PRINT "Don't say '9999'!"
1231 INPUT ds
1232 RETURN
1233 REM ***CODES56*** (decrypt co
1234   de)
1235 CLS: BEEP .1,35: PRINT AT
1236   4,0: "Decrypted"
1237   $
1238   DIM s(1+LEN ds)
1239   LET s(1)=LEN ds
1240   RANDOMIZE VAL s
1241   FOR l=1 TO LEN ds
1242     LET e(l)=CODE ds(l)+1+INT
1243     (RND*VAL s)
1244     NEXT l
1245     FOR l=1 TO LEN ds: PRINT e(
1246       l+1):
1247     NEXT l
1248     PRINT
1249     RETURN
1250   $
1251   REM ***CODES57*** (encrypt te
1252     xt)
1253   CLS: BEEP .1,35: CLS: PRINT AT
1254     4,0: "Encrypted"
1255     $
1256     DIM s(1+LEN ds)
1257     LET s(1)=LEN ds
1258     RANDOMIZE VAL s
1259     FOR l=1 TO LEN ds
1260       LET e(l)=CODE ds(l)+1+INT
1261       (RND*VAL s)
1262       NEXT l
1263       FOR l=1 TO LEN ds: PRINT e(
1264         l+1):
1265       NEXT l
1266       PRINT
1267       RETURN
1268   $
1269   REM ***CODES58*** (saving code
1270     )
1271   CLS: BEEP .1,35: CLS: PRINT AT
1272     4,0: "Save"
1273     $
1274   DIM s(1+LEN ds)
1275   LET s(1)=LEN ds
1276   RANDOMIZE VAL s
1277   FOR l=1 TO LEN ds
1278     LET e(l)=CODE ds(l)+1+INT
1279     (RND*VAL s)
1280     NEXT l
1281     FOR l=1 TO LEN ds: PRINT e(
1282       l+1):
1283     NEXT l
1284     PRINT
1285     RETURN
1286   $
1287   REM ***CODES59*** (print decry
1288     message)
1289   PRINT AT 4,0: "Decrypted"
1290   $
1291   FOR l=1 TO
1292     LEN h$
1293     PRINT NEXT l
1294   RETURN
1295 REM ***CODES60*** (text input)
1296 PRINT "Don't say '9999'!"
1297 INPUT ds
1298 RETURN
1299 REM ***CODES61*** (decrypt co
1300   de)
1301 CLS: BEEP .1,35: PRINT AT
1302   4,0: "Decrypted"
1303   $
1304   DIM s(1+LEN ds)
1305   LET s(1)=LEN ds
1306   RANDOMIZE VAL s
1307   FOR l=1 TO LEN ds
1308     LET e(l)=CODE ds(l)+1+INT
1309     (RND*VAL s)
1310     NEXT l
1311     FOR l=1 TO LEN ds: PRINT e(
1312       l+1):
1313     NEXT l
1314     PRINT
1315     RETURN
1316   $
1317   REM ***CODES62*** (encrypt te
1318     xt)
1319   CLS: BEEP .1,35: CLS: PRINT AT
1320     4,0: "Encrypted"
1321     $
1322     DIM s(1+LEN ds)
1323     LET s(1)=LEN ds
1324     RANDOMIZE VAL s
1325     FOR l=1 TO LEN ds
1326       LET e(l)=CODE ds(l)+1+INT
1327       (RND*VAL s)
1328       NEXT l
1329       FOR l=1 TO LEN ds: PRINT e(
1330         l+1):
1331       NEXT l
1332       PRINT
1333       RETURN
1334   $
1335   REM ***CODES63*** (saving code
1336     )
1337   CLS: BEEP .1,35: CLS: PRINT AT
1338     4,0: "Save"
1339     $
1340   DIM s(1+LEN ds)
1341   LET s(1)=LEN ds
1342   RANDOMIZE VAL s
1343   FOR l=1 TO LEN ds
1344     LET e(l)=CODE ds(l)+1+INT
1345     (RND*VAL s)
1346     NEXT l
1347     FOR l=1 TO LEN ds: PRINT e(
1348       l+1):
1349     NEXT l
1350     PRINT
1351     RETURN
1352   $
1353   REM ***CODES64*** (print decry
1354     message)
1355   PRINT AT 4,0: "Decrypted"
1356   $
1357   FOR l=1 TO
1358     LEN h$
1359     PRINT NEXT l
1360   RETURN
1361 REM ***CODES65*** (text input)
1362 PRINT "Don't say '9999'!"
1363 INPUT ds
1364 RETURN
1365 REM ***CODES66*** (decrypt co
1366   de)
1367 CLS: BEEP .1,35: PRINT AT
1368   4,0: "Decrypted"
1369   $
1370   DIM s(1+LEN ds)
1371   LET s(1)=LEN ds
1372   RANDOMIZE VAL s
1373   FOR l=1 TO LEN ds
1374     LET e(l)=CODE ds(l)+1+INT
1375     (RND*VAL s)
1376     NEXT l
1377     FOR l=1 TO LEN ds: PRINT e(
1378       l+1):
1379     NEXT l
1380     PRINT
1381     RETURN
1382   $
1383   REM ***CODES67*** (encrypt te
1384     xt)
1385   CLS: BEEP .1,35: CLS: PRINT AT
1386     4,0: "Encrypted"
1387     $
1388     DIM s(1+LEN ds)
1389     LET s(1)=LEN ds
1390     RANDOMIZE VAL s
1391     FOR l=1 TO LEN ds
1392       LET e(l)=CODE ds(l)+1+INT
1393       (RND*VAL s)
1394       NEXT l
1395       FOR l=1 TO LEN ds: PRINT e(
1396         l+1):
1397       NEXT l
1398       PRINT
1399       RETURN
1400   $
1401   REM ***CODES68*** (saving code
1402     )
1403   CLS: BEEP .1,35: CLS: PRINT AT
1404     4,0: "Save"
1405     $
1406   DIM s(1+LEN ds)
1407   LET s(1)=LEN ds
1408   RANDOMIZE VAL s
1409   FOR l=1 TO LEN ds
1410     LET e(l)=CODE ds(l)+1+INT
1411     (RND*VAL s)
1412     NEXT l
1413     FOR l=1 TO LEN ds: PRINT e(
1414       l+1):
1415     NEXT l
1416     PRINT
1417     RETURN
1418   $
1419   REM ***CODES69*** (print decry
1420     message)
1421   PRINT AT 4,0: "Decrypted"
1422   $
1423   FOR l=1 TO
1424     LEN h$
1425     PRINT NEXT l
1426   RETURN
1427 REM ***CODES70*** (text input)
1428 PRINT "Don't say '9999'!"
1429 INPUT ds
1430 RETURN
1431 REM ***CODES71*** (decrypt co
1432   de)
1433 CLS: BEEP .1,35: PRINT AT
1434   4,0: "Decrypted"
1435   $
1436   DIM s(1+LEN ds)
1437   LET s(1)=LEN ds
1438   RANDOMIZE VAL s
1439   FOR l=1 TO LEN ds
1440     LET e(l)=CODE ds(l)+1+INT
1441     (RND*VAL s)
1442     NEXT l
1443     FOR l=1 TO LEN ds: PRINT e(
1444       l+1):
1445     NEXT l
1446     PRINT
1447     RETURN
1448   $
1449   REM ***CODES72*** (encrypt te
1450     xt)
1451   CLS: BEEP .1,35: CLS: PRINT AT
1452     4,0: "Encrypted"
1453     $
1454     DIM s(1+LEN ds)
1455     LET s(1)=LEN ds
1456     RANDOMIZE VAL s
1457     FOR l=1 TO LEN ds
1458       LET e(l)=CODE ds(l)+1+INT
1459       (RND*VAL s)
1460       NEXT l
1461       FOR l=1 TO LEN ds: PRINT e(
1462         l+1):
1463       NEXT l
1464       PRINT
1465       RETURN
1466   $
1467   REM ***CODES73*** (saving code
1468     )
1469   CLS: BEEP .1,35: CLS: PRINT AT
1470     4,0: "Save"
1471     $
1472   DIM s(1+LEN ds)
1473   LET s(1)=LEN ds
1474   RANDOMIZE VAL s
1475   FOR l=1 TO LEN ds
1476     LET e(l)=CODE ds(l)+1+INT
1477     (RND*VAL s)
1478     NEXT l
1479     FOR l=1 TO LEN ds: PRINT e(
1480       l+1):
1481     NEXT l
1482     PRINT
1483     RETURN
1484   $
1485   REM ***CODES74*** (print decry
1486     message)
1487   PRINT AT 4,0: "Decrypted"
1488   $
1489   FOR l=1 TO
1490     LEN h$
1491     PRINT NEXT l
1492   RETURN
1493 REM ***CODES75*** (text input)
1494 PRINT "Don't say '9999'!"
1495 INPUT ds
1496 RETURN
1497 REM ***CODES76*** (decrypt co
1498   de)
1499 CLS: BEEP .1,35: PRINT AT
1500   4,0: "Decrypted"
1501   $
1502   DIM s(1+LEN ds)
1503   LET s(1)=LEN ds
1504   RANDOMIZE VAL s
1505   FOR l=1 TO LEN ds
1506     LET e(l)=CODE ds(l)+1+INT
1507     (RND*VAL s)
1508     NEXT l
1509     FOR l=1 TO LEN ds: PRINT e(
1510       l+1):
1511     NEXT l
1512     PRINT
1513     RETURN
1514   $
1515   REM ***CODES77*** (encrypt te
1516     xt)
1517   CLS: BEEP .1,35: CLS: PRINT AT
1518     4,0: "Encrypted"
1519     $
1520     DIM s(1+LEN ds)
1521     LET s(1)=LEN ds
1522     RANDOMIZE VAL s
1523     FOR l=1 TO LEN ds
1524       LET e(l)=CODE ds(l)+1+INT
1525       (RND*VAL s)
1526       NEXT l
1527       FOR l=1 TO LEN ds: PRINT e(
1528         l+1):
1529       NEXT l
1530       PRINT
1531       RETURN
1532   $
1533   REM ***CODES78*** (saving code
1534     )
1535   CLS: BEEP .1,35: CLS: PRINT AT
1536     4,0: "Save"
1537     $
1538   DIM s(1+LEN ds)
1539   LET s(1)=LEN ds
1540   RANDOMIZE VAL s
1541   FOR l=1 TO LEN ds
1542     LET e(l)=CODE ds(l)+1+INT
1543     (RND*VAL s)
1544     NEXT l
1545     FOR l=1 TO LEN ds: PRINT e(
1546       l+1):
1547     NEXT l
1548     PRINT
1549     RETURN
1550   $
1551   REM ***CODES79*** (print decry
1552     message)
1553   PRINT AT 4,0: "Decrypted"
1554   $
1555   FOR l=1 TO
1556     LEN h$
1557     PRINT NEXT l
1558   RETURN
1559 REM ***CODES80*** (text input)
1560 PRINT "Don't say '9999'!"
1561 INPUT ds
1562 RETURN
1563 REM ***CODES81*** (decrypt co
1564   de)
1565 CLS: BEEP .1,35: PRINT AT
1566   4,0: "Decrypted"
1567   $
1568   DIM s(1+LEN ds)
1569   LET s(1)=LEN ds
1570   RANDOMIZE VAL s
1571   FOR l=1 TO LEN ds
1572     LET e(l)=CODE ds(l)+1+INT
1573     (RND*VAL s)
1574     NEXT l
1575     FOR l=1 TO LEN ds: PRINT e(
1576       l+1):
1577     NEXT l
1578     PRINT
1579     RETURN
1580   $
1581   REM ***CODES82*** (encrypt te
1582     xt)
1583   CLS: BEEP .1,35: CLS: PRINT AT
1584     4,0: "Encrypted"
1585     $
1586     DIM s(1+LEN ds)
1587     LET s(1)=LEN ds
1588     RANDOMIZE VAL s
1589     FOR l=1 TO LEN ds
1590       LET e(l)=CODE ds(l)+1+INT
1591       (RND*VAL s)
1592       NEXT l
1593       FOR l=1 TO LEN ds: PRINT e(
1594         l+1):
1595       NEXT l
1596       PRINT
1597       RETURN
1598   $
1599   REM ***CODES83*** (saving code
1600     )
1601   CLS: BEEP .1,35: CLS: PRINT AT
1602     4,0: "Save"
1603     $
1604   DIM s(1+LEN ds)
1605   LET s(1)=LEN ds
1606   RANDOMIZE VAL s
1607   FOR l=1 TO LEN ds
1608     LET e(l)=CODE ds(l)+1+INT
1609     (RND*VAL s)
1610     NEXT l
1611     FOR l=1 TO LEN ds: PRINT e(
1612       l+1):
1613     NEXT l
1614     PRINT
1615     RETURN
1616   $
1617   REM ***CODES84*** (print decry
1618     message)
1619   PRINT AT 4,0: "Decrypted"
1620   $
1621   FOR l=1 TO
1622     LEN h$
1623     PRINT NEXT l
1624   RETURN
1625 REM ***CODES85*** (text input)
1626 PRINT "Don't say '9999'!"
1627 INPUT ds
1628 RETURN
1629 REM ***CODES86*** (decrypt co
1630   de)
1631 CLS: BEEP .1,35: PRINT AT
1632   4,0: "Decrypted"
1633   $
1634   DIM s(1+LEN ds)
1635   LET s(1)=LEN ds
1636   RANDOMIZE VAL s
1637   FOR l=1 TO LEN ds
1638     LET e(l)=CODE ds(l)+1+
```



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```

3DC0 : F01118A58369C185, 3FO
3DC8 : 83A5846900858488, 3A8
3DD0 : 4CBE19A58369C185, 3E0
3DE0 : A5846900858488, 47C
3DE8 : 7920D118A5738A18, 33D
3DEB : 89088573808C1118, 27E
3DFO : A900A000991218C8, 2D4
3DF8 : C016D0F8AC111860, 3D3
3E00 : 6C1118C000F035C0, 35A
3E08 : 01F03C0033F043C0, 3E3
3E10 : 24F94AC000F01C0, 404
3E18 : 06F063C000F074C0, 444
3E20 : 08F018C009F00C00, 393
3E28 : 0AF00B00C0F044AC, 3B1
3E30 : 1118604CB31A4CBE, 2AC
3E38 : 1A4CAB1AA479A873, 35E
3E40 : 8E12188C131880A4, 273
3E48 : 79A6798A1C188C1D18, 29C
3E50 : 1880A479A8738E18, 352
3E58 : 188C171880A479A8, 2F8
3E60 : 738E18188C191860, 24E
3E68 : A479A8738E1A188C, 382
3E70 : 1B1880A479A8738E, 357
3E78 : 28188C271880A479, 286
3E80 : A4738E1C188C1D18, 27E
3E88 : 24F94AC000F01C0, 404
3E90 : 06F063C000F074C0, 444
3E98 : 08F018C009F00C00, 393
3EAO : 2C18A87D8E2D1860, 29A
3EAB : A479A8738E20188C, 388
3EBO : 211880A479A8738E, 35D
3EB8 : 22188C271880A479, 286
3ECO : A6738E1C188C2518, 2AC
3EC8 : A4738E2C2818A87D8E, 36D
3ED0 : 291880222222222E, 157
3ED8 : 8E8E8E8E8E8E8E8E, 497
3EE0 : E822E2E2E2E2E2E2, 50F
3EE8 : 2222E2E2E2E2E2E2, 29D
3EFO : 2222E2E2E2E2E2E2, 4D0
3EF8 : E8E8E8E8E8E8E8E8, 758
3F00 : E222222222222212, 1C0
3F08 : E252E2E212E2E2E2, 5CC
3F10 : 52E2E212B2E2E2E2, 4CC
3F18 : 222222222222222E, 15C
3F20 : 1EE212E21E1E122E, 1C8
3F28 : E2E2E2E2E2E2E2E2, 39C
3F30 : 222222222222222E, 11C
3F38 : E8E8E8E8E8E8E8E8, 48A
3F40 : 22E211E2E2E21212, 2DF
3F48 : 222222222222222E, 1D0
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## WORD PROCESSOR

by Glenn Counsell

**T**here must be many computer owners like myself who, whilst very interested in the idea of a wordprocessor, have never felt like forking out the £20+ needed to buy a decent one.

This program for the Amstrad 464 with/without DD1, Amstrad 664 and Amstrad 6128 to be published over the next few weeks, is a fully fledged 'what

you see is what you get' wordprocessor that compares favourably with many on the market.

Despite being written in Basic, it has many of the complicated features (search-and-replace, block transfer . . .) found only in the best commercially available ones and should give the user a valid first entry into the field.

More listing and the beginning of

the functions description next week, but if your fingers can't stand so much button pushing so early in the year then copies of the program can be obtained from G. Counsell, 216a Banbury Rd, Oxford for £7.00 (disc) or £3.00 (tape).

Please state also whether you require the version of the program to work on disc or tape.

```

10 ON BREAK GOSUB 5600
20 MODE 2
30 BORDER 0:INK 1,26:INK 0,0:PEN 1:PAPER 0:PEN 3,
0:PAPER 3,1
40 cplr=tlb:prfg=0:pjfg=0:difg=0:btfg=0:infq=0
50 DIM keyv(255,2)
60 WINDOW 4,6,13,1,1:WINDOW 5,27,32,1,1
70 WINDOW 6,40,80,1,1:WINDOW 7,1,30,2,2
80 DATA 06,01,11,70,66,21,60,66,cd,77,6c,32,60,66,
c9
90 MEMORY 6A640
100 FOR i=6A651 TO 6A65F:READ a$:POKE i,VAL("&"*a$
):NEXT i
110 PRINT "text width or file name ? "
120 a$=0:GOSUB 5400:a$=1
130 q=VAL(q$)
140 IF STR$(q)="" THEN 190
150 LOCATE 1,1:GOSUB 5430
160 IF PEEK(6A660)=22 THEN 180
170 LOCATE 27,1:PRINT CHR$(122);:GOTO 120
180 GOSUB 2590:GOTO 230
190 IF q>3 AND q<79 THEN 210
200 CLS:GOTO 110
210 zdie=INT(24000/q)
220 DIM z$(zdie)
230 i=INT((80-q)/2):r=80-1:WINDOW 2,1,r,3,25
240 FOR i=1 TO 31:keyv(i,0)=i:NEXT i
250 FOR i=32 TO 255:keyv(i,0)=31:NEXT i
260 CLS:PEN 2,0:PAPER 2,1:CLS 2
270 IF STR$(VAL(q$))="" THEN 310
280 pl=tlb
290 IF tlb>23 THEN pl=23
300 FOR h=1 TO pl:PRINT2,z$(h):NEXT h
310 DATA 240,241,242,243,13,127,19,16,12,6,10,4,20
,3,5,9,16,246,247,244,245,248,249,14
320 FOR i=1 TO 24:READ a:keyv(a,0)=2:keyv(a,1)=i
:NEXT i
330 cplr=tlb+1
340 PRINT "line # text length"
350 CLS 4:PRINT 4,tlb:CLS 5:PRINT 5,tlb
360 LOCATE 2,cplr,cplr:PRINT2,CHR$(95);
370 a$=INKEY$
380 IF a$="" THEN 370
390 ON keyv(ASC(a$),0) GOTO 370,400,430
400 tlb=infq+(atlb-atlb)
410 ON keyv(ASC(a$),1) GOSUB 850,1150,1470,1630,1
760,1910,2080,2210,2340,2700,3150,3660,3960,3960,4
460,4500,2700,1470,1630,850,1150,4880,5110,5350
420 GOTO 370
430 tlb=infq+(atlb-atlb)
440 GOSUB 460
450 GOTO 370
460 IF LEN(z$(tlb))+1 THEN 530
470 IF cplr<>LEN(z$(tlb))+1 THEN 770
480 LOCATE 2,cplr,cplr:PRINT2,a$;
490 z$(tlb)=z$(tlb)+a$
500 cplr=cplr+1
510 LOCATE 2,cplr,cplr:PRINT2,CHR$(95);
520 RETURN
530 IF tlb=tlb AND cplr=LEN(z$(tlb))+1 THEN 550
540 SOUND 1,60,3,12:SOUND 1,60,1,0:RETURN
550 IF tlb=zdie THEN 540
560 z$(tlb)=z$(tlb)+a$
570 FOR i=LEN(z$(tlb)) TO 2 STEP -1:IF MID$(z$(tlb),
i,1)="" THEN a10
580 NEXT i
590 z$(tlb)=LEFT$(z$(tlb),LEN(z$(tlb))-1)
600 RETURN
610 cplr=i+1
620 LOCATE 2,cplr,cplr
630 WINDOW 3,cplr,r,cplr+2,cplr+2:CLS 3
640 IF cplr>23 THEN 670
650 LOCATE 2,r,25:PRINT2

```

```

660 GOTO 680
670 cplr=cplr+1
680 cplr=tlb+1:tlb=tlb+1
690 LOCATE 2,cplr,cplr
700 ps=RIGHT$(z$(tlb-1),LEN(z$(tlb-1))-1)
710 PRINT2,ps;
720 cplr=LEN(ps)+1
730 z$(tlb)=ps+z$(tlb-1):LEFT$(z$(tlb-1),i-1)
740 LOCATE 2,cplr,cplr:PRINT2,CHR$(95);
750 CLS 4:PRINT4,tlb+tlb:CLS 5:PRINT5,tlb
760 RETURN
770 LOCATE 2,cplr,cplr
780 ps=RIGHT$(z$(tlb),LEN(z$(tlb))-cplr+1)
790 PRINT2,ps;
800 z$(tlb)=LEFT$(z$(tlb),cplr-1)+a$+ps
810 cplr=cplr+1
820 LOCATE 2,cplr,cplr:PEN 2,1:PAPER 2,0
830 PRINT2,LEFT$(ps,i):PEN 2,0:PAPER 2,1
840 RETURN
850 ufg=0
860 IF ASC(a$)=244 THEN ufg=40
870 IF cplr=1 AND tlb=ufg+infq*(n-2) THEN 1030
880 IF tlb=infq*(n-2) THEN 1040
890 IF cplr=1 THEN 1070
900 IF cplr=LEN(z$(tlb))+1 THEN 930
910 LOCATE 2,cplr,cplr:PRINT2,MID$(z$(tlb),cplr,1
);
920 GOTO 940
930 LOCATE 2,cplr,cplr:PRINT2," "
940 IF ASC(a$)<244 THEN 980
950 tlb=tlb+1:tlb=cplr+1
960 IF tlb=infq*(n-2) THEN tlb=ufg+infq*(n-2)
970 cplr=cplr+tlb+tlb:GOTO 990
980 cplr=cplr+tlb+tlb+1
990 cplr=LEN(z$(tlb))+1
1000 LOCATE 2,cplr,cplr:PRINT2,CHR$(95);
1010 CLS 4:PRINT4,tlb+tlb
1020 RETURN
1030 IF tlb=ufg+infq*(n-2) THEN 1050
1040 SOUND 1,60,3,12:SOUND 1,60,1,0:RETURN
1050 tlb=ufg+infq*(n-2)
1060 GOTO 1080
1070 tlb=tlb-ufg
1080 LOCATE 2,1,1
1090 FOR i=tlb TO tlb+21:PRINT2,z$(i);CHR$(18):NEXT
i
1100 PRINT2,z$(tlb+22);CHR$(18);
1110 cplr=LEN(z$(tlb))+1
1120 LOCATE 2,cplr,cplr:PRINT2,CHR$(95);
1130 CLS 4:PRINT4,tlb+tlb
1140 RETURN
1150 lfg=0
1160 IF ASC(a$)=245 THEN lfg=40
1170 IF cplr=23 AND tlb=tlb-lfg THEN 1340
1180 IF cplr=23 THEN 1380
1190 IF tlb=tlb THEN 1210
1200 SOUND 1,60,3,12:SOUND 1,60,1,0:RETURN
1210 IF cplr=LEN(z$(tlb))+1 THEN 1240
1220 LOCATE 2,cplr,cplr:PRINT2,MID$(z$(tlb),cplr,1
);
1230 GOTO 1290
1240 LOCATE 2,cplr,cplr:PRINT2," "
1250 IF ASC(a$)<245 THEN 1270
1260 tlb=tlb+tlb+tlb-cplr+23
1270 IF tlb=tlb THEN tlb=tlb
1280 cplr=cplr+tlb+tlb+tlb:GOTO 1300
1290 cplr=cplr+tlb+tlb+1
1300 cplr=LEN(z$(tlb))+1
1310 LOCATE 2,cplr,cplr:PRINT2,CHR$(95);
1320 CLS 4:PRINT4,tlb+tlb
1330 RETURN
1340 IF tlb=tlb THEN 1360
1350 SOUND 1,60,3,12:SOUND 1,60,1,0:RETURN

```

```

1360 tlb=tlb-22
1370 GOTO 1390
1380 tlb=tlb-12+lfg
1390 LOCATE 2,1,1
1400 FOR i=tlb TO tlb+21:PRINT2,z$(i);CHR$(18):NEXT
i
1410 PRINT2,z$(tlb+22);CHR$(18);
1420 tlb=tlb+22:cplr=23
1430 cplr=LEN(z$(tlb))+1
1440 LOCATE 2,cplr,cplr:PRINT2,CHR$(95);
1450 CLS 4:PRINT4,tlb+tlb
1460 RETURN
1470 IF cplr<>1 THEN 1490
1480 SOUND 1,60,3,12:SOUND 1,60,1,0:RETURN
1490 IF cplr<>LEN(z$(tlb))+1 THEN 1570
1500 LOCATE 2,cplr,cplr:PRINT2," "
1510 IF ASC(a$)<246 THEN 1530
1520 cplr=1:GOTO 1540
1530 cplr=cplr-1
1540 PEN 2,1:PAPER 2,0:LOCATE 2,cplr,cplr
1550 PRINT2,MID$(z$(tlb),cplr,1):PEN 2,0:PAPER 2,1
1560 RETURN
1570 LOCATE 2,cplr,cplr:PRINT2,MID$(z$(tlb),cplr,1
):PEN 2,1:PAPER 2,0
1580 IF ASC(a$)<246 THEN 1600
1590 cplr=1:GOTO 1610
1600 cplr=cplr-1
1610 LOCATE 2,cplr,cplr:PRINT2,MID$(z$(tlb),cplr,1
):PEN 2,0:PAPER 2,1
1620 RETURN
1630 IF cplr<>LEN(z$(tlb))+1 THEN 1650
1640 SOUND 1,60,3,12:SOUND 1,60,1,0:RETURN
1650 IF cplr<>LEN(z$(tlb))+1 THEN 1700
1660 LOCATE 2,cplr,cplr:PRINT2,MID$(z$(tlb),cplr,1
);
1670 cplr=cplr+1
1680 LOCATE 2,cplr,cplr:PRINT2,CHR$(95);
1690 RETURN
1700 LOCATE 2,cplr,cplr:PRINT2,MID$(z$(tlb),cplr,1
):PEN 2,1:PAPER 2,0
1710 IF ASC(a$)<247 THEN 1730
1720 cplr=LEN(z$(tlb))+1:PEN 2,0:PAPER 2,1:GOTO 1
680
1730 cplr=cplr+1
1740 LOCATE 2,cplr,cplr:PRINT2,MID$(z$(tlb),cplr,1
):PEN 2,0:PAPER 2,1
1750 RETURN
1760 IF tlb=tlb THEN 1780
1770 SOUND 1,60,3,12:SOUND 1,60,1,0:RETURN
1780 IF tlb=zdie THEN 1770
1790 IF cplr=LEN(z$(tlb))+1 THEN 1820
1800 LOCATE 2,cplr,cplr:PRINT2,MID$(z$(tlb),cplr,1
);
1810 GOTO 1830
1820 LOCATE 2,cplr,cplr:PRINT2," "
1830 IF cplr>23 THEN 1860
1840 LOCATE 2,r,25:PRINT2
1850 GOTO 1870
1860 cplr=cplr+1
1870 cplr=tlb+tlb+tlb+tlb+1
1880 LOCATE 2,cplr,cplr:PRINT2,CHR$(95);
1890 CLS 4:PRINT4,tlb+tlb:CLS 5:PRINT5,tlb
1900 RETURN
1910 IF cplr<>1 THEN 1930
1920 SOUND 1,60,3,12:SOUND 1,60,1,0:RETURN
1930 IF cplr<>LEN(z$(tlb))+1 THEN 1990
1940 z$(tlb)=LEFT$(z$(tlb),LEN(z$(tlb))-1)
1950 LOCATE 2,cplr,cplr:PRINT2," "
1960 cplr=cplr-1
1970 LOCATE 2,cplr,cplr:PRINT2,CHR$(95);
1980 RETURN

```



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## Demon spell

Some people have written about the *Fairlight* hacking routine that we printed a few weeks ago. This listing was produced from a working copy tape and there is nothing wrong with it; the problem is that there are two different copies of *Fairlight* doing the rounds so you may have the wrong sort.

Chris Allen, who prepared the routine for us, has kindly offered that if anyone who still has problems will write to him with a SAE and a tape, he will try to sort it out. Chris's address has appeared more than once in the column, but anyone who hasn't got it can write care of me.

Now then Melbourne House's queer, but enjoyable *Rock 'N' Wrestle* is deservedly riding high in the charts. Here is a small tip for the game from Chris Eastwood of Witney. All you need to do is kick the other wrestler and, on the early stages at least, he won't move or do anything. Keep doing this until he runs out of energy and then just throw him.

Chris has also found some useful bugs in some other popular Commodore games. On the CBM version of *Ultimate's Underwulde*, start the game and go left into the dead end. Stand under the clock's left pendulum and jump upward. You will bounce sideways up past the clock and through the roof to level 14. If it doesn't work the first time, try it again as it is very useful for skipping about 25 screens.

On *Ultimate's Outlaws* after you have shot one of the outlaws in the street, continue to shoot the flashing '200' and you will find that the amount of outlaws you need to kill is decreased every time you hit it.

Paul Miller has provided us with another excellent routine (above) for the Spectrum version of *Raid Over Moscow*.

Now we can return to the complete *Dragonator* solution - with thanks to Hewson for supplying not only the tips, but also one of the most complex and enjoyable games available.

### Ruins of Cantii

We left you in the ruins of Cantii just after you have found the crown symbol in the chest. You must now try and get out with this. Beware of the axe and fireball room

```
5 REM Raid Over Moscow Pokes
10 CLEAR 65535:POKE 65535,195
20 FOR A=45043 TO 45081:READ B:POKE A,B:
NEXT A
30 PRINT AT 9,6;"Play tape from start"
40 RANDOMIZE USR 45075
50 MERGE **:LOAD **
99 REM
```

#### MACHINE CODE DATA

```
100 DATA 245,229,58,239,95,254
110 DATA 63,32,15,237,86,237,71
120 DATA 33,107,107,34,230,96
130 DATA 62,62,50,217,96,62,147
140 DATA 50,212,96,195,58,0,62
150 DATA 59,237,71,237,94,201
```

When the game has loaded, it will return to Basic you then enter your poke (See Below), and then to run the game enter,

RANDOMIZE USR 32768

POKE 46512,182	
POKE 30414,182	Infinite Lives
POKE 37473,174	
POKE 37474,157	Bypass Hanger Screen
POKE 40299,182	
POKE 43364,182	
POKE 46507,182	
POKE 49130,182	
POKE 43369,182	Infinite planes during attack run

and use *Slow* and *Unseen* if necessary.

Search the tomb with the crown symbol and you should find another stone and the message 'When four are gone

in to go to Hellsmouth. Bring the torch here.

This is inhabited by 'nervous but deadly' yellow imps that have the habit of firing at you and running off. Use *Warrior* to get them and use *Wall* to protect against their missiles. This place is also inhabited by bats, killed by missiles, and snakes, killed with a torch.

Find the axe to smash the eggs, avoid or kill the snakes and take the chest key. Find the chest and open it to get the crown symbol.

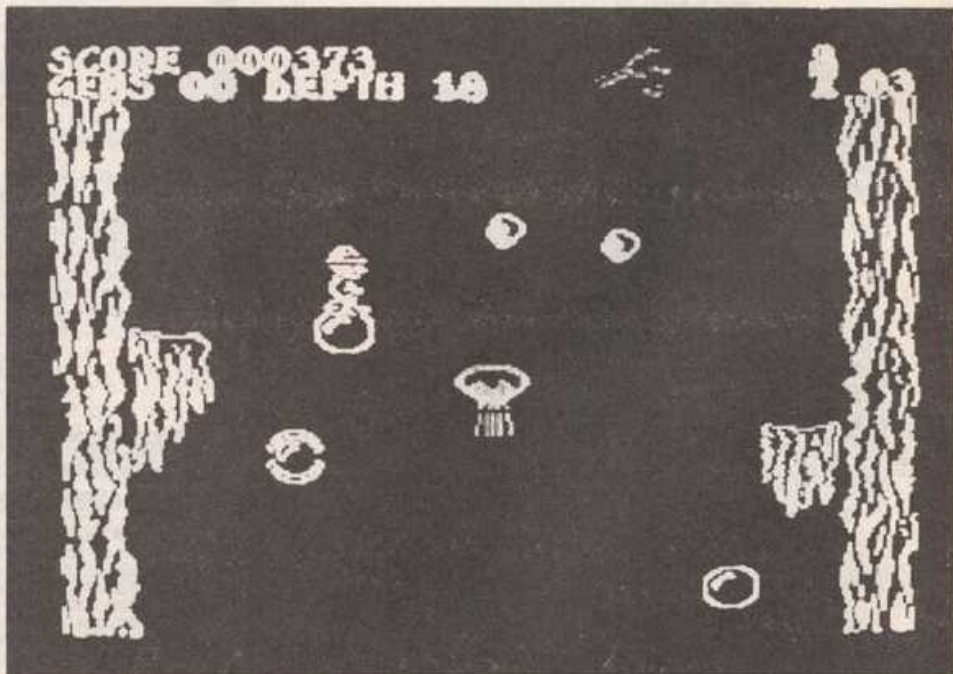
Place the symbol on the cursed key, avoiding the balls of red fire. *Unseen* or *Slow* will help here.

Use the key to unlock the door. Fire the *Demon* spell when you see the demon (this is what the message 'Set a thief . . . ' means, ie, use like to deal with like). Take the crown. Kill the eyes with *Bane*. Put crown symbol on stone to leave or use *Return*. Put the third crown on the anvil to destroy it.

### The Cursed Crypt

The next area to explore is largely uninhabited woods but there is a goblin patrol that has found a chest. Use *Mantle* to protect yourself from demon missiles. Kill the demon with *Missile*.

First find the rabbit. Place it down the hole to get the key. Go back to the circle. Take the other path. Find the chest and open it with the key. Take the *Ankh* symbol. Go back and get the rabbit



*Underwulde* from *Ultimate*

smite anvil with stone' ie, use the crystal of antithought when the four crowns are destroyed. Use the two S symbols to reveal the exit or use the *Return* spell. Go to Halgar's anvil and place the crown on it.

Search the leaves for the *Bane* gem. Take the bird and you get the message 'Set a thief . . . '. Search the stump for a coin. Put the coin in the water and jump

again. Find the single hole. Put the rabbit down it and avoid the snake. Take the spell from the hole.

Take the rabbit to the carrots to reveal the flagstone. Use the *Ankh* to move the stone and go down, taking the cursed key and the symbol. The torch will again be useful. The underground is inhabited by wraiths, use *Bane* on them. More next week.



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# Tony Bridge's Adventure Corner



## Beatlemania

One, two, three, four, can I have a little more/Five, six, seven, eight, nine, ten, I love you. And we all love The Beatles, right? Well, you may be a little too young to remember the days when all that mattered was the latest Beatle record, or how Ringo was cutting his hair, or how high Paul's heels were this week. But back in '65 or so, these nuggets of information were essential to anyone who wanted to retain their credibility. What is the relevance of all this, I hear you ask. Well, *Beatle Quest*, from Number 9 Software, available as a text adventure for some months now on the Commodore, has been recently released with added graphics for the Spectrum.

## Esoteric

In the '60s, which one or two of you may remember, every single line of a Beatles song and every album cover was pored over by self-respecting fans searching for esoteric clues. There were those who claimed to have discovered that Paul McCartney was dead (the number plate on the Beetle - geddit? - was 28IF, meaning, of course, that Paul would have been 28 that year if he had lived) while others claimed to have heard strange prophecies in the run-off groove of Sergeant Pepper.

Charles Manson took it all one step further when he listened to songs like *Helter-Skelter* ("Look out 'cos here she comes") and *Piggies* ("What they need's a damn good whacking"): he went out and whacked Sharon Tate and several other innocent bystanders.

Oh, that the home computing was big and *The Quill* available, back then! Garry Marsh, the author of *Beatle Quest*, would have surely been right there with the rest of us Beatle fans, bringing our favourite lyrics to life: as it is, *The Quill* has come a few years too late, but there is still of course a vast army of Beatle maniacs (like myself) who are prepared to invest in anything that might recapture for a moment those great days of the late '60s.

Garry is a great student of Beatledom, particularly the lyrics of their songs. *The*

*Quest*, first of a trilogy, contains many esoteric references to the songs, and much of the scenario of the adventure follows the storyline of the songs mentioned. Obviously then, a dedicated fan will catch many references that others might miss, and so probably gain a better insight into the game than a beginner in Beatle lore. For example, the dreaded 'Quill-kill' comes into play in the first few moves.

## Bed-sit

The first location allows plenty of exploration, and there are several useful objects to be found here. But, venture outside the door of the Bed-sit and you have a certain number of moves before Maxwell's Silver Hammer comes down upon your head and you're done for. You just have enough time, though, to get upstairs, go in to the bathroom, and find that the window looks to have been recently opened. Aha! *She Came in Through the Bathroom Window* springs immediately to mind, doesn't it? Well, listen to *Abbey Road* and the second line of the song will give you a pretty strong clue as to how to escape Maxwell's 'orrible 'ammer. Never mind if you don't actually know the song, you'll find the solution to this particular problem if you just apply the adventurer's code and search thoroughly.

And so go most of the problems - a Beatle lover's insight will make the whole thing more pleasurable, but the game can certainly be worked through by anyone using just the usual amount of thought (you'll even come across the obligatory herring, though this one is very useful).

In fact, just about every location contains some such memory-stirring device: in the market-place, as you will have guessed, you'll find a barrow, marked 'Desmond and Molly Jones'. That's a more easily recognisable reference to *Ob-la-di, Ob-la-da*, and may thus afford some sort of clue if you remember the lyric to that song.

But to start at the beginning... as keeper of The Archives, a treasure-house of all the remnants of Earth's history, residing for some reason on Space Station 9 in the year 2953. Your needs are catered for by the supreme machine, Sel-Taeb 4. Becoming fascinated by the ancient stories of the 'Four

Kings of Emi' and their battle with 'Their Satanic Majesties', you feed all known data into the memory banks of the pleasure-dome, where dreams become reality - even the dream of time-travel...

So it is that you find yourself transported back to that small bed-sit circa 1969. Across the room is 'a girl, just 17, and the way she looked was just beyond compare'. Or course, I immediately tried dancing with her (after all, how could I dance with another?) - nothing doing. Then I tried holding her hand (aha, I thought, a double reference here; 'I held her hand in mine' from the same song, as well, *I Wanna Hold Your Hand*) but still nothing. The only response unfortunately, is elicited by doing something naughty, in which case, you're dead!

## Puzzle

One of the songs that will come in particularly handy, bearing in mind the enlightened age of the late '60s is *Lucy in the Sky with Diamonds*.

You'll have a chance to sit in the train with plasticine porters with looking glass ties and be transported via a certain substance (found near the start) to a boat on a river with tangerine trees and marmalade skies. There's also a nice little puzzle involving those 'flowers that grow so incredibly high' in an amusing pastiche of the well-known Level 9 problem.

*Beatle Quest* is *Quill'd*, *Patch'd*, *Illustrat'd* and very well written for the Spectrum and Commodore on one tape. The character set is attractively legible, and the Ramsave feature is welcome. Not only do the problems and descriptions drip with Beatle references, but so do the responses: 'I don't understand' becomes instead 'Goo goo g'joob' and 'Help' of course gets the reply (obviously) 'You'll get by with a little help from your friends'.

Beatle fans, get this one at all costs - it's the official version, as Garry Marsh has obtained permission from ATV Music to use the lyrics.

**Game** *Beatle Quest* **Supplier**  
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# Charts

## Amstrad

1	(-) Elite	(Firebird)	£14.95
2	(2) Formula One Simulator	(Mastertronic)	£1.99
3	(9) Hypersports	(Imagine)	£8.95
4	(5) Yie Ar Kung Fu	(Imagine)	£7.95
5	(-) Tornado Low Level	(Vortex)	£8.95
6	(-) One Man And His Dog	(Mastertronic)	£1.99
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## Atari

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6	(4) Eidolon	(Activision)	£14.95
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9	(-) King Of The Ring	(Gremlin Graphics)	£9.95
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## BBC

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5	(5) Strike Force Harrier	(Mirrorsoft)	£9.95
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All figures compiled by Gallup/Microscope

## Top Twenty

1	(1) Kung Fu Master (C64)	US Gold
2	(16) Elite (Spectrum/C64/BBC/Amstrad)	Acornsoft/Firebird
3	(-) Eidolon (C64/Atari)	Activision
4	(2) Yie Ar Kung Fu (Various)	Imagine
5	(7) Formula One Simulator (Various)	Mastertronic
6	(13) Hypersports (Various)	Imagine
7	(-) Movie (Spectrum)	Imagine
8	(18) Barry McGuigan (Spectrum/C64/Amstrad)	Activision
9	(4) Rock 'n' Wrestle (C64)	Melbourne House
10	(3) Winter Games (Spectrum/C64/Amstrad)	Epyx/US Gold
11	(9) Action Biker (Spectrum/C64/C16/Amstrad)	Mastertronic
12	(12) Finders Keepers (Spectrum/C64/Amstrad/MSX)	Mastertronic
13	(-) Big Mac (C64/C16)	Mastertronic
14	(5) Commando (Spectrum/C64)	Elite
15	(6) BMX Racers (Spectrum/C64/C16)	Mastertronic
16	(14) Spellbound (Spectrum/Amstrad)	Mastertronic
17	(10) They Sold A Million (Spectrum/C64/Amstrad)	Hit Squad
18	(8) Rambo (Spectrum/C64)	Ocean
19	(17) Rockman (Spectrum/C64/C16/Vic 20)	Mastertronic
20	(-) Vegas Jackpot (Spectrum/C64/C16/Vic 20/Dragon)	Mastertronic

Figures compiled by Gallup/Microscope

## Readers' Chart No 62

1	(1) Commando (Spectrum/C64)	Elite
2	(2) Elite (Spectrum/C64/BBC)	Firebird/Acornsoft
3	(3) Winter Games (Spectrum/C64)	Epyx/US Gold
4	(5) Lord of the Rings (Spectrum/Amstrad)	Melbourne House
5	(6) Rambo (Spectrum/C64)	Ocean
6	(7) They Sold a Million (Spectrum/C64)	Hit Squad
7	(-) Way of the Exploding Fist (various)	Melbourne House
8	(-) Tomahawk (Spectrum)	Digital Integration
9	(8) Saboteur (Spectrum)	Mastertronic
10	(10) Swords and Sorcery (Spectrum)	PSS

Winning Phrase No 62: "CES! - get down to LA, man", from Laurence Scottford of Eastbourne in Sussex, who wins £25. An honourable mention to Mark Lumley of Morden, Surrey, for "Let me win one Amiga".

## Now voting on week 64 - £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 64 closes at 2pm on Wednesday February 26, 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 64
Address .....	1.....
.....	2.....
.....	3.....
My phrase is: .....	



# New Releases

## QUIZZED

*Play your Cards Right* is a fairly naff TV quiz game in which a medium sized audience repeats certain phrases of Bruce Forsyth's. It has now been converted into a computer game and now you can presumably shout at your computer instead of Bruce - I know I did.

The game involves answering questions all based on guessing what percentage of the country said they would do want, eg, 'We asked ten thousand air hostesses whether they had ever eaten chocolate biscuits on duty.' You have to guess the actual number that said 'Yes' more exactly than the computer (though quite how this section is supposed to work I know not, since the computer must have all the right answers).

Based on right answers, you then get to guess whether the next card in a sequence is

higher or lower than the previous one. This then leads on to the 'Super Game' in which you answer more questions on screen and in the time I spent with it no questions were repeated, so I guess there must be quite a few stored in memory.

This would be a perfect budget game - there isn't anything clever about the programming, but it works quite well and however sneeringly, most of the office was playing it. The reason for the price tag is, I suppose, the big name tie-in, but I'm afraid that doesn't really justify it.

**Program** *Play your Cards Right*

**Price** £7.95

**Micro** Spectrum

**Supplier** Britannia Software  
Unit M28  
Cardiff Workshops  
Cardiff CF1 5EB

## WHAT MORE?

CRL is justifiably proud of *Tau Ceti* - its 3D line graphics were mixed with excellent gameplay to produce a near classic game. *Tau Ceti* is now available on the Amstrad and is as good as ever - maybe better.

The idea of the game is to battle your way across a planet's surface searching for pieces of cooling rod which must be assembled and then used to destroy a reactor gone AWOL. Sundry considerations include finding fuel, repairing damages and collecting missiles.

The screen is divided into

Pick of the week

## BRAIN DAMAGE

*Sweevo's Whirled* is not spelt incorrectly, for this is the high powered 128 version of *Sweevo's World*, itself the Marx brothers version of *Alien 8*.

*Sweevo's Whirled* takes the original *Sweevo* game and brings the number of rooms up to 250 which is enough to ensure continuous brain damage for months on end. The rest of the game is unchanged, as *Sweevo* armed only with a parachute, explores one of the strangest planets in the universe and is troubled by, among other things, a very nasty little girl.

On the 128 the game retains, obviously, its excellent, edge-on 3D graphics, but adds to this a fairly decent soundtrack using the brand new (well several years old actually) AY sound chip at the heart of the new machine.

If and when you buy your 128, then this ought to be one of your first purchases.



And what's even better, it doesn't cost any more than the original.

**Program** *Sweevo's Whirled!*

**Price** £7.95

**Micro** Spectrum 128

**Supplier** Gargoyle Games  
74 King Street  
Dudley  
West Midlands



several sections - the cockpit view has the clever graphics, other sections provide damage reports etc. The 3D scrolling is very neat indeed, nice and smooth, and there is much imagination in the graphic design of the planet. I particularly liked the flashing obelisks (a well known 60's band) and the pyramids.

You get a plot that sustains

## This Week

Program	Type	Micro	Price	Supplier	Program	Type	Micro	Price	Supplier
Attack of Killer Tomatoes	Arc	Amstrad	£7.95	Global Software	Kung-Fu Master	Arc	Commodore 64	£9.95(T)	US Gold
Mini Office II	Ut	Amstrad	£19.95(D)	Database Software	Kung-Fu Master	Arc	Commodore 64	£14.95(D)	US Gold
CBasic Compiler	Ut	Amstrad (CP/M)	£49.95	Digital Research	Sizzlers Vol 1	Arc	Commodore 64	£9.95(T)	Gremlin Graphics
Dr Draw	Ut	Amstrad (CP/M)	£49.95	Digital Research	Sizzlers Vol 1	Arc	Commodore 64	£14.95(D)	Gremlin Graphics
Dr Graph	Ut	Amstrad (CP/M)	£49.95	Digital Research	Hotline Quiz	S	Commodore 64	£12.95(D)	Chalksoft
Dr Draw	Ut	Amstrad (CP/M)	£49.95	Digital Research	Cad-64	Ut	Commodore 64	£14.95(T)	Orpheus
Pascal MT	Ut	Amstrad (CP/M)	£49.95	Digital Research	Cad-64	Ut	Commodore 64	£18.95(T)	Orpheus
Mini Office II	Ut	Amstrad/BBC B	£14.95(T)	Database Software	Hotline Quiz	S	Commodore 64	£9.95(T)	Chalksoft
Lattice C Compiler	Ut	Atari 520ST	£99.95	Metacomo	Fourmost Adventures	Adv	Spectrum	£7.95	Global Software
MCC Pascal	Ut	Atari 520ST	£89.95	Metacomo	Attack of Killer Tomatoes	Arc	Spectrum	£7.95	Global Software
Macro Assembler	Ut	Atari 520ST	£49.95	Metacomo	Skyfox	Arc	Spectrum	£8.95	Arillasoft
Hotline Quiz	S	BBC B	£14.25	Chalksoft	Smashes Vol 1	Arc	Spectrum	£9.95	Gremlin Graphics
Mini Office II	Ut	BBC B	£16.95(D)	Database Software	Hotline Quiz	S	Spectrum	£9.95	Chalksoft
Commando	Arc	Commodore 16	£7.95	Elite	3 Weeks in Paradise	Arc	Spectrum 128	£10.95	Milko Gen
					Fairlight I	Arc	Spectrum 128	£9.95	The Edge
					Lode Runner	Arc	Spectrum 128	£9.95	Software Projects



## New Releases

the interest for what may be many hours of play, whizz-bang state of the art graphics, and lots and lots of things to blow to bits. I ask you; what more do you need?

**Program** *Tau Ceti*  
**Price** £8.95  
**Micro** *Amstrad (CPCs)*  
**Supplier** *CRL*  
9 Kings Yard  
London E15

### GEOMETRICAL

*Rasputin* is one of Firebird's Hot range of games - programs whose quality justifies a conventional rather than budget price tag. The game is available on Spectrum and Amstrad as well, but only on the Commodore does it have the massed balalaikas of Prague as played by Rob Hubbard. This is an important element.

*Rasputin* is a strange game, the basic plot is simple enough; jump on some things, stab other things and

collect things. What's odd is the sheer look of the game and its extraordinary difficulty. Whilst the former can be counted as a virtue, the latter nearly did for me the first few times I tried to play it.

Despite the name there is nothing that makes the game look particularly Russian. Its playing world is one of geometrical shapes - blocks and cubes - with medieval flourishes, like castle gates and towers and a wide variety of totally strange creatures most of which are unpleasant. Full marks for imagination. Full marks, too, for programming technique; the game features excellent animation combined with an unusual use of 3D perspective to give the whole thing a faintly Escher-like look.

The problem is the game is so difficult that it is quite possible you will never see its myriad screens, difficult not only in the dodging and timing sense but also in the "what the hell is going on anyway" sense. It's a game

that is crying out for every cheat poke under the sun and will doubtless get them, but I can't help thinking that the game shouldn't require that sort of desperate help two minutes after loading.

If you want a really challenging game this is it, if you get frustrated easily all the wonderful graphics in the world won't help you with *Rasputin*.

**Program** *Rasputin*  
**Price** £7.95  
**Micro** *Commodore 64*  
**Supplier** *Firebird*  
Wellington House  
Upper St Martins  
Lane

### POWERFUL

*Amsdoc* is a powerful utility program to generate annotated expanded listings for purposes of explanation and clarification. It would be ideal for schools using Amstrads or home users developing complex programs in Basic.

The *Amsdoc* utility takes your Basic program and analyses it in various ways. It then produces a new version of the listing which may be dumped to printer or screen. The program is designed to highlight key elements, such as the logical flow or subroutines and loops and the use of variables.

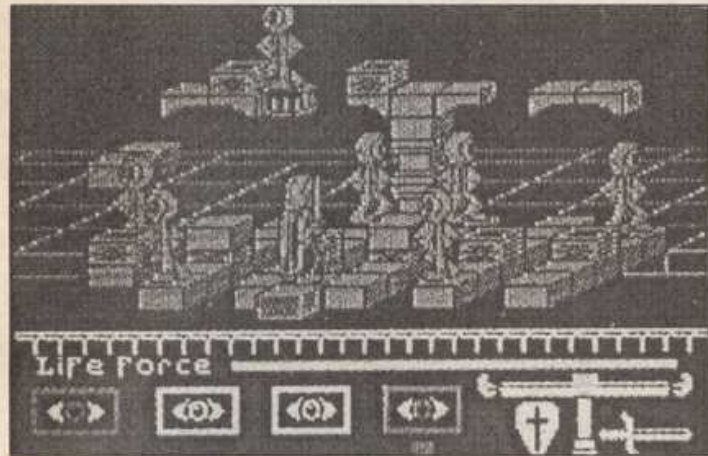
Though there are many formats or annotation available within *Amsdoc*, all are essentially concerned with showing the program logic (or lack of it). For example, the *Flow List* option takes your raw

program and produces a flowchart with each instruction in its logical order, ie, with *Gotos* and *Gosubs* paired with their respective destinations and the level of subroutine clearly marked. Variables are also listed with the lines in which they occur.

There are also options to give you automatic simplification of variable names to save memory as well as dumping the reformatted listings to back up rather than printer, which, amongst other things, lets you print out several copies.

*Amsdoc* is an incredibly powerful program, I haven't seen anything to compare with it on any other micro, but it is not flawless. The main problem is with the manual which, though detailed, (some of it is in the form of a disc file) offers little compromise to the more casually interested. Very experienced programmers should have little problem with it, but if, as the manufacturer says, the program is to have educational use they should avoid leaping into such phrases as "object program", "absolute break" and even "program output medium" where simpler forms are available. Nevertheless, for serious Basic programmers, highly recommended.

**Program** *Amsdoc*  
**Price** £12.95  
**Micro** *Amstrad*  
**Supplier** *Session*  
Developments  
12 Falmouth Road  
Congleton  
Cheshire



## This Week

Artisyl	Ut	Spectrum 128	£12.95	Softechnics
Tasword 128	Ut	Spectrum 128	£19.95	Tasman Software
Writer	Ut	Spectrum 128	£17.95	Softechnics

**Key:** Ad - adventure    S - strategy-simulation  
Arc - arcade    Ut - Utility

Ed - education

**Ariolasoft**, Asphelte House, Palace St, London W1.  
**Chalksoft**, 37 Willowsea Road, Worcester, WR3 7QP, 0905 55192. **Database Software**, Europa House, 68 Chester Road, Hazel Grove, Stockport, 061-456 8383. **Digital Research**, Unit 1, Station Road, Hungerford, Berks, 0488

84587. **Elite**, 55 Bradford Street, Walsall WS1 3QD 0922 611215. **Global Software**, PO Box 67, London SW11 1BS, 01-228 1380. **Gremlin Graphics**, Alpha House, 10 Carver Street, Sheffield S1 4FS, 0742 753423. **Metacomco**, 26 Portland Square, Bristol BS2 8RZ, 0272 428781. **Mikro Gen**, The Broadway, Bracknell, Berks, 0344 427317. **Orpheus**, The Smithy, Unit 1, Church Farm, Hatley, Beds SG19 3HA. **Softechnics**, 12/13 Henrietta Street, Covent Garden, London WC2E 8HL, 01-240 1422. **Software Projects**, Bearbrand Complex, Allerton Road, Woolton, Liverpool. **Tasman Software**, Springfield House, Hyde Terrace, Leeds LS2 9LN. **The Edge**, 31 Maiden Lane, Covent Garden, London WC2E 8HL, 01-240 1422. **US Gold**, Unit 10, The Parkway Ind Centre, Heneage Street, Birmingham B7 4LY, 021 359 3020.





## Aroma of bias

**W**as I the only person to feel slightly glummer after reading that recent news article in *Popular Computing Weekly*, January 23?

It celebrated a breezy entrepreneur called Gary Kildall, whose latest achievement is to have put *Grolier's American Encyclopaedia* onto a 12-inch video disc. Each video frame holds a page of text, and the whole ingenious thing allows owners of interactive video disc players to flick to any page, subject or cross-reference at will.

It sounds a large and serious operation – the disc apparently offers 160M of encyclopaedic information. So why do I feel vaguely but decidedly hostile to the enterprise?

Well, I've never much liked encyclopaedias. It's something to do with the way those large glum volumes have pretensions to know everything. The bigger the encyclopaedia, the more smugly it seems to declare, "All human knowledge is within. Look no further. These are the facts."

Whereas the truth is, that if there is any subject that you genuinely know a good deal about, and you look it up in even the grandest and most prestigious encyclopaedia, the odds are massively in favour of your finding the relevant article either biased, incomplete, outdated, or subtly misleading.

Look up a high-technology subject like computing in an encyclopaedia, and you'll find a pleasant little nostalgia item,

probably full of interesting facts about punched cards. Fair enough? Can any book be more up-to-date than its day of publication? But when you consider the time that it takes for an encyclopaedia to be put together, you'll realise that this section was probably out of date even before the book was published.

Look up any political or literary subject, and you'll probably find some useful hard facts. But don't be surprised if there's also a just-perceptible aroma of bias – probably towards whatever ideas were fashionable orthodoxy a few years ago. I'm not complaining about bias. I enjoy bias, especially when it's flamboyantly declared. Every interesting piece of writing gets its piquancy from the author's point of view. Encyclopaedias, though, pretend that this isn't so. They make claims to objectivity, and disguise their bias as the voice of authority.

And now Mr Kildall has put his encyclopaedia on video disc. A gleaming 12-inch disc, laser-readable, and covered with hard transparent laminate.

If you find something you disagree with in a Ram database, you can find a way to alter it. If you dislike the tone or judgments of a book, you can at least scribble a rude comment in the margin.

But each tiny flaw lurking in *Grolier's* encyclopaedia (and I'm sure the flaws aren't too many, and that it's a good product – by encyclopaedia standards) is going to be given new permanency on disc. Because it's a Rom disc, it can't be changed.

If we don't look out, this type of knowledge-dispenser could become a standard fixture of our lives – it sounds so efficient, so easy to use, and so reassuring for those who like their information pre-processed and unchallenged.

Now is the time to insist, not exactly on a government health warning, but at least a flashing message at the top of every page: "NB: This information was collected and presented by human beings. They are reasonably expert in their subjects, but do not know everything. There could well be an error or mis-statement somewhere on this page."

**George Simmers**

## Puzzle No 196

If I were to take a single penny and place it on the table, I could place a further six pennies in a ring around it each touching the first. With a further 12 pennies I could arrange a second ring around the first, and by continuing in this manner, adding in turn 24, 36, coins and so on, I can construct a regular compact hexagonal figure.

For example, if I had £1.69 (in pennies), I would have my centre penny surrounded by seven outer rings. Curiously, these same pennies could also be rearranged to form a square of coins with 13 coins along each edge.

If I now had £327.61, I would be able to make a larger hexagonal pattern with 104 rings, or I could rearrange the coins into a square pattern with 181 coins along each edge.

Given unlimited funds, how much would I need before I could next arrange my hexagonal array into a square one?

## Solution to Puzzle 191

The pile of pennies contained exactly £901. The problem involves finding a triangular number which is an exact multiple of 100 and is the largest possible without exceeding 100000. Triangular numbers are those in the series 1, 3, 6, 10, 15, etc. That is, those formed from the expression  $1 + 2 + 3 + 4 + 5 \dots$ . Only numbers that are triangular will form an exact triangular arrangement as described.

```
10 LET T=0
20 LET L=1
30 LET T=T+L
40 IF T/100=INT(T/100) THEN PRINT T,L
50 IF T>100000 THEN STOP
60 LET L=L+1
70 GOTO 30
```

In the program, variable T is the total triangular number, and variable L is the number of coins in each successive line. Each time that the total (T) is an exact multiple of 100 the value is printed out until the value of (T) exceeds 100000.

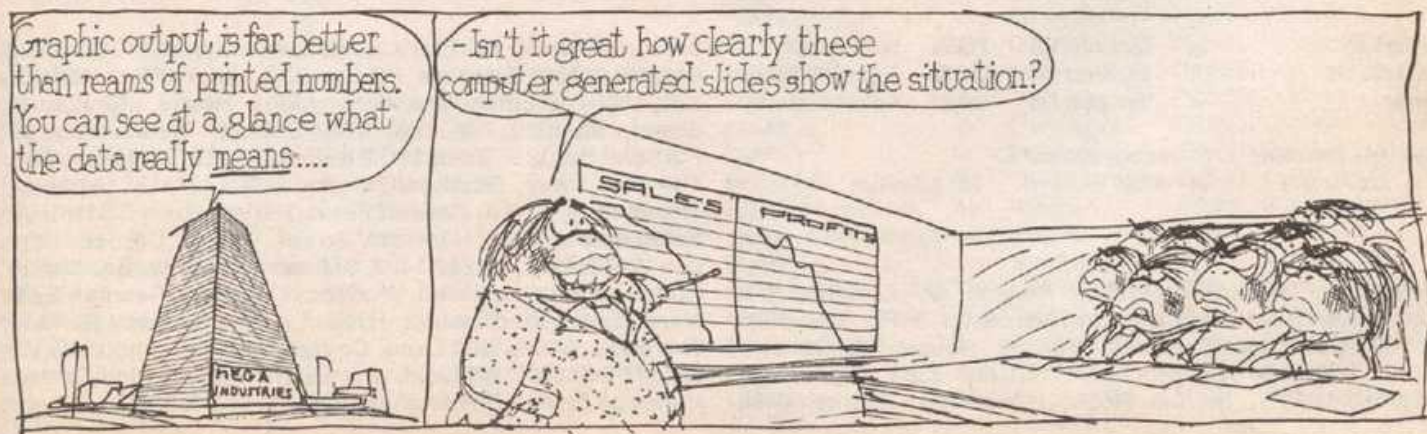
## Winner of Puzzle No 191

The winner is Alan Hodson of Brook Drive, Astley, Manchester, who will be receiving £10.

## Rules

The closing date for puzzle 196 is March 19.

## The Hackers





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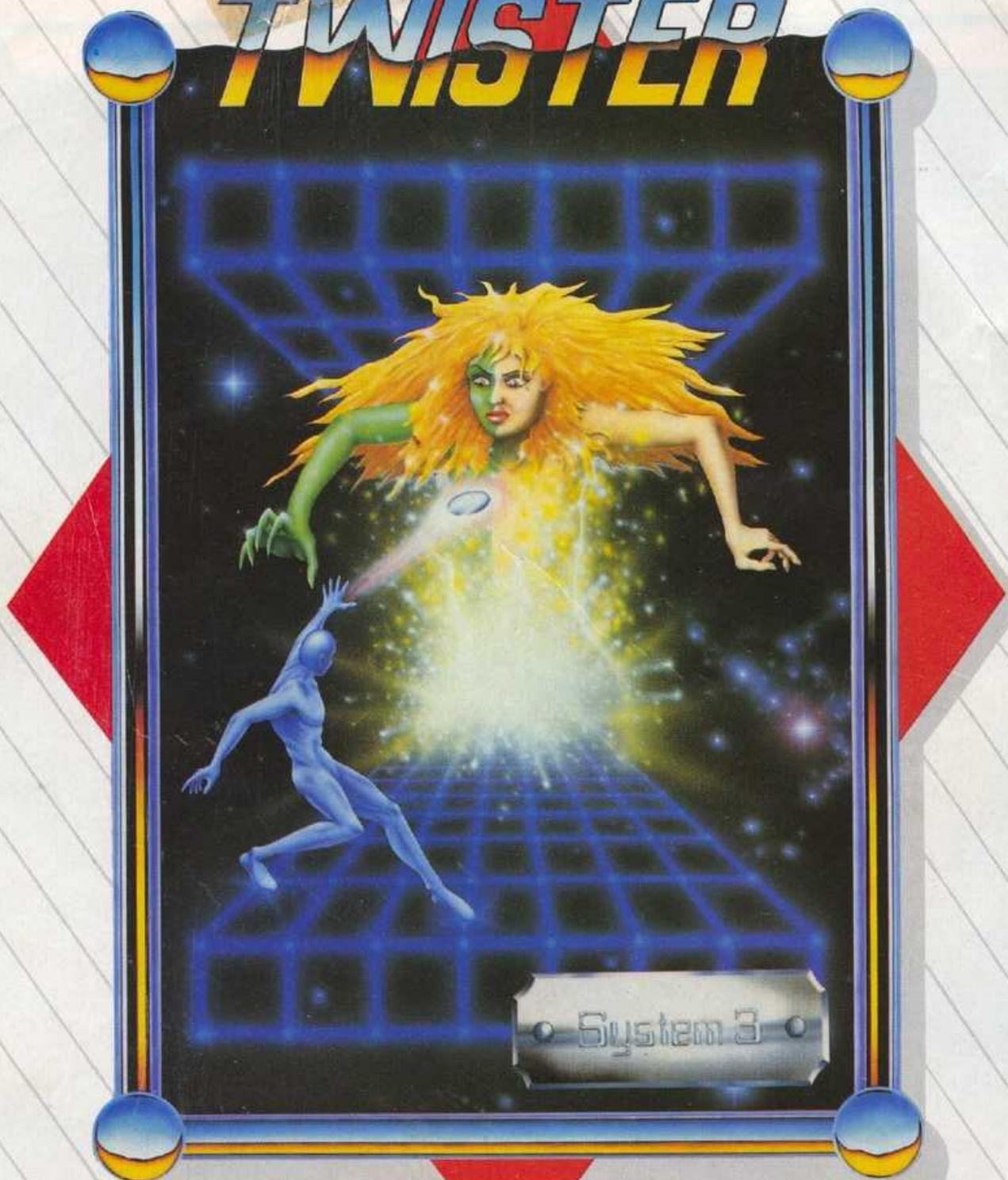
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