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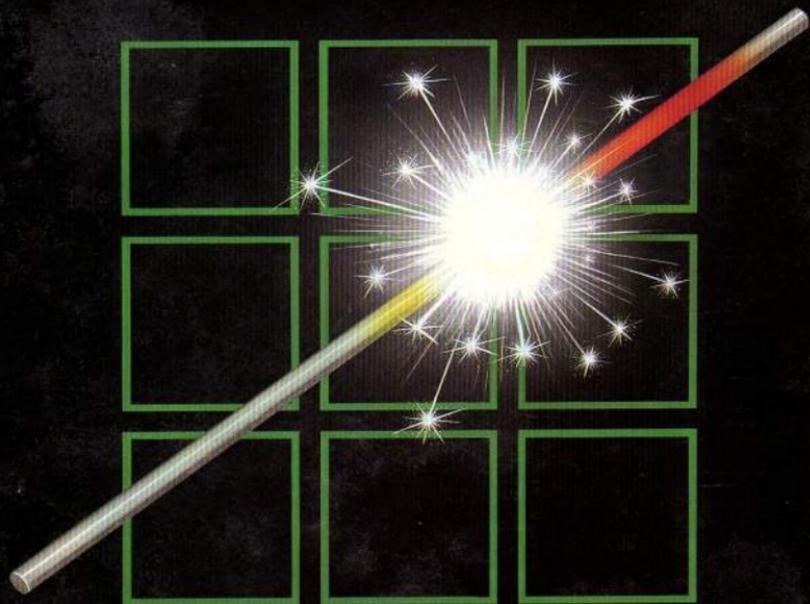
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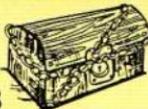
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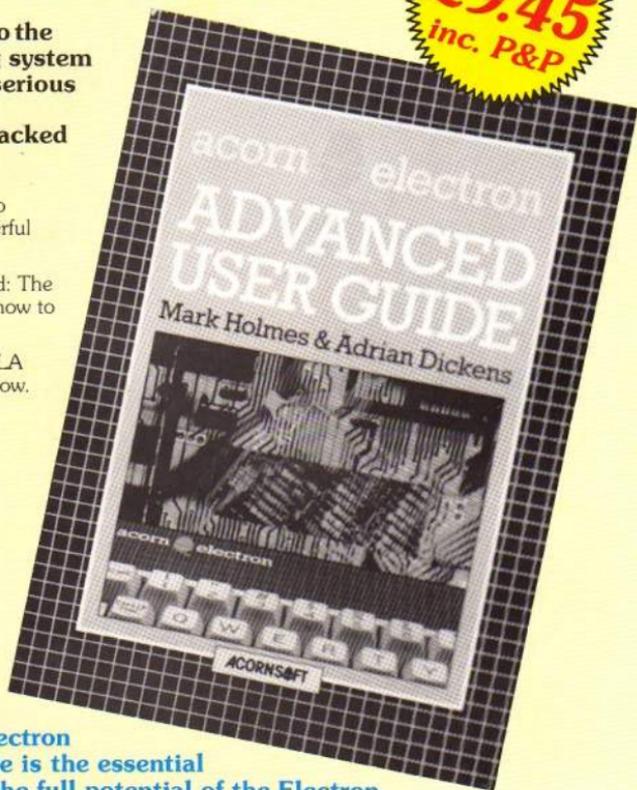
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Cut price offer ends

A MAIL order operation offering top selling games at rock bottom prices has apparently stopped, just as leading software publishers including Acornsoft were investigating its activities.

Money has been returned to people who ordered software packs from a firm called A1 Software Services, of Hornchurch, Essex.

Famous titles like Elite, Pole Position, Micro Olympics, Hunchback, Football Manager and Combat Lynx – all Electron favourites – were mentioned in the promotion, which offered as many as 50 games for £30.

React

Acornsoft's head of technical services, John Collins, was among the first to react to the mail shot after hearing about it from readers of Database Publications.

Collins sent a postal order for £19 to A1 Software Services for a pack of 15 games.

An Acornsoft col-



Massive queues for the big, big show

ALL previous attendance records were smashed during the latest in the series of Electron & BBC Micro User shows.

In all, well in excess of 20,000 visitors filed their way through the turnstiles in the New Horticultural Hall, London, over the four day event.

At peak times on Saturday and Sunday, queues more than a mile

long formed as enthusiasts braved unseasonal icy winds to wait their turn to get inside.

One non-computer buff who passed by remarked: "I've seen smaller crowds at Wembley on Cup Final day. What's going on?"

Extra door staff were being rushed into position to speed up the entry flow and so prevent the crowd backlog from presenting central London with a

major traffic problem.

"Based on our previous shows, we had expected a significant turnout", said Derek Meakin, head of Database Publications, the show's organisers.

"But we were amazed by the size of the crowds this time.

"If nothing else, it was a supreme vote of confidence in both the Electron and the BBC Micro by the people who count – the users". Nor

were Electron users disappointed when they finally got inside.

Continuing support for the machine was amply demonstrated by the emphasis placed on the Electron by the exhibiting companies.

Typical of this was Cumana, the disc drive supplier, which displayed two Electrons running with Plus 1 and one of the company's interfaces.

"There were plenty of goodies around for the machine which made the trip very well worthwhile", said John Roberts from Wallasey, who had travelled from Merseyside just to attend the show.

"It was good to see a noticeable shift away from games and with more serious applications for the Electron such as complete O level English language courses".

Cassette prices cut

ACORNISOFT has cut the prices of nearly all its cassette titles for the Electron.

The new prices, which makes titles 24 per cent cheaper at £6.99, have been introduced "to give Electron software the same increased value-for-money that the Electron now represents at

£129", says Acornsoft.

The new price applies to all games on cassette except Elite and Countdown to Doom, and to all education, business and home interest cassette titles except the Linkwood foreign language tutors.

Altogether a total of 56 titles have had their prices cut.

Turn to Page 6

Brush up French

EDUCATIONAL software house Chalksoft wants to help Electron users brush up on their French.

Eiffel Tower is a dual program aimed at schoolchildren, students, tourists and businessmen and contains hundreds of words grouped in families.

Users can insert their own word sets, and there's a fun element as correct answers "build" the Eiffel Tower onscreen. Price is £9.25.

Disc toolkit

ADVANCED Computer Products has brought out what it claims is the most versatile advanced disc toolkit ever for the Electron and other Acorn legal compatibles.

The 16k eprom contains more than 30 commands, works in any screen mode and enables the user to view over 2k of memory at a glance.

Price is £29.

Offer ends

From Page 5

league sent 25p postage and packing for a "free" game chosen from a list of 20 well-known titles.

Collins told *Electron User*: "My money was refunded along with a slip of paper saying 'A1 Software Services has ceased trading'."

"My colleague has not yet received a reply. "I shall be pleased if this mail order operation has stopped.

"We were most concerned that our titles had been mentioned in it and our legal department was ready to act should any infringement of copyright have been involved".



Software pool plan wins two micros

STEPHEN Perugi, aged 13, has won a unique Acorn micro for his school, Bedford Modern, and an Electron home computer for himself in the first competition organised by The Times Network for Schools.

Entrants were asked to devise a project for TTNS that would make full use of the network's communications and database features and be of social value.

Stephen suggested developing a pool of software for schools for the mentally handicapped, pointing out that the cost of buying specialist packages is beyond most school budgets.

His idea was for special schools needing software to put descriptions of their requirements on the database, for programmers in other schools to work from.

Once programs were developed they would

be added to a TTNS software library and downloaded free of charge by any school needing them.

Stephen's idea will be implemented by TTNS over the next few months, and special schools will be encouraged to take part.

The unique Acorn machine won by Bedford Modern School is a 32 bit micro based on the NS 32016 processor, with a 10mbyte hard disc and a high resolution colour monitor.

Stephen's personal prize is Acorn's "Have Fun With The Electron" pack, consisting of an Electron, Plus One extension, software, joysticks, books and accessories.

Ten runners-up will get a copy of the 1985 Times Atlas of the World for their schools and a copy of the 1985 Times Concise Atlas for themselves.

Acorn decided to

donate a special prize of a BBC Micro with voice synthesiser to Linden Lodge School for the Visually Handicapped.

Pupils of the weekly boarding school submitted a collective entry proposing that TTNS should help integrate handicapped children with those in ordinary schools through the use of speech synthesisers and Braille link add-ons for micros.

News of local and

national events would then be readily available from the database, and students could swap ideas and information. ● Picture shows Lord Young of Graffham with prizewinners of The Times Network for Schools Communicate Competition (left to right): Gordon Jones, chief executive of TTNS, Stephen Perugi, Bedford Modern School and Martin Maidment, Linden Lodge School.

Summer boost for

ACORN will continue to promote the Electron through an extensive advertising campaign to be held during the traditionally quiet summer sales season.

The thinking behind the campaign is not to try to stimulate

the dormant home user market but to promote the machine in the small business and speciality markets.

Marketing chief John Caswell told *Electron User*: "We are not aiming at traditional markets

Down garden path to maths

To get away from the question - and - answer type computer maths programs, Hilditch Software has released a Creative Mathematics three-part series for the Electron.

The first in the package, *How Does Your Garden Grow?* is for three - to - seven - year-olds.

Progressing from the numbers one to nine, then through larger numbers and simple arithmetic, it claims to allow a child to design a flower garden.

Mosaic, part two, is a design program suitable for all ages, and uses repeated small elements to build up a picture.

It can also be used to design embroidery patterns, construct bar charts and explain mathematical concepts.

Based on the use of coordinates, *Hunt the Treasure* - the final part - is for children in the middle school-age range.

It is intended to develop language skills, design abilities and logic.

Programs on tape cost £9.50 or £11.50 on disc.

Electron

like games players, but hoping to break into new ones.

"We will be test marketing in strategic areas.

"We have a lot of exciting projects on the go which will be announced during the next few months".

Retailer raps sub-standard educational software

MUCH of the educational software available for the Electron is of poor quality, claims mail order executive Bradley Viner.

He says it is this which is preventing the educational market from realising its full potential.

Now Viner, managing director of mail order house First Byte, is calling on fellow retailers to unite to "banish the bad".

"There is a lot of high

quality software around - such as from Penguin, Shards, Highlight, ASK and Mirrosoft - but it is a question of sorting the good from the bad", he said.

"The customer cannot be expected to do this. He relies on advice given by the retailer.

First Byte keeps an eye on the market by compiling a database of program reviews from all sources, plus their own feelings on the software, said Viner. It

enables the company to recommend software they feel will be of benefit to the buyer.

The company also runs the Brain Train Club, membership of which entitles its customers to discounts, more advice and newsletters.

Unfortunately a lot of retailers were not in a position to do this because of their lack of specialist knowledge, he said.

"You have got to take

an active interest rather than sell everything pushed through or whatever has highest margins.

"You've got to look for high quality material and only sell that if you want to restore the public's confidence in educational software.

"The educational market will not grow to its full potential unless the trade in general supplies the right quality software at the right price".

Paul, 17, collects the Elite £1,000

A SCHOOLBOY took time off from studying for his A levels to become the world champion Elite player recently.

Paul Shonk, 17, the son of a Croydon sales executive, snatched the title in the face of fierce competition during the Electron & BBC Micro User Show.

The youngster, who had practised the cult space game for seven hours a week before the build up to his exams, carried off a £1,000 prize.

Twelve finalists converged on the New Horticultural Hall to display their skills during the marathon two-day

play off.

Each had previously won eliminating heats organised by Acornsoft since the company launched Elite in September, 1984.

The finalists were: Dave Brunner, a computer studies teacher from Romford, Essex.

Joseph Buchdahl, a 14-year-old schoolboy from Horningssea, Cambridge, who much prefers history and biology to computing.

Philip Carson, aged 18 and studying physics, maths and electronic engineering at Surbiton School, Surrey.

David Duckworth, a 19-year-old who sells cleaners on a market

stall in his home town of Preston, Lancashire.

Mathew Huddleston, a 14-year-old student at Kings Manor, Shoreham, who can be found playing the theatre organ - or Elite - when not studying for his O levels.

Mike Keating, a biology teacher from Leeds who ran an afoul of domestic problems for playing Elite seven hours a day when it first came out.

Brett Keys, a 30-year-old electronics technician who writes accounts software packages in his spare time.

Andrew Myers, a 16-year-old rugby enthusiast who is about to take O levels at

Whitchurch.

Darren Rowley, aged 19 and an employee of a food company in Rugby.

Kemal Sangar, 15 a student at Our Lady's High School, Cumberland, Glasgow.

Andrew Vickery, a 17-year-old British Telecom apprentice engineer and self confessed Elite-aholic who plays up to four hours a night.

"The competition was really hot and I'm just very pleased to have emerged the winner", said Paul Shonk.

He's already decided what to do with the prize money. He is going to buy a BBC B+ and a bigger disc drive.





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**Not that you'd ever
want to use one, but . . .**

How not to let those GOTOs drive you loopy!

LAST month we had a look at the way that GOTO works and sampled some of the many problems it can cause. Again let me repeat that while I may have told you about it I don't recommend its use, except among consenting adults who really know what they're doing.

Used badly, GOTOs can, at worst, destroy a program. At best they can make it incomprehensible. In fact they should carry a health warning.

Having said all that, this time we'll be having a closer look at the way we can use GOTOs to create loops.

No, I'm not being inconsistent. By the time we've finished we'll have come across a way of avoiding GOTOs. We're exploring them to learn how to do without them.

Take a look at Program 1, last month's Program XIV. Does it remind you of anything?

```
10 REM PROGRAM 1
20 REM OLD PROGRAM XIV
30 LET variable=1
40 PRINT variable
50 LET variable=variable
+1
50 IF variable<=10 THEN
GOTO 40
```

Program 1

There's no mystery about how it works. The variable *variable* is initially given the value 1 in line 30. The next line displays the value of *variable* and, this done, line 50 increases its value by one.

The program then comes on to the IF . . . THEN of line 60. This tests *variable* to see if it is less than or equal to 10. If this is the case the GOTO (boo, hiss) after the THEN sends the program back to line 40 and the whole process repeats.

Eventually *variable* has the value 11, the condition of line

60 fails and the program ends.

You can test this by adding:

```
70 PRINT variable
```

and running the program again.

In other words, the program lines form a loop which cycles while *variable* goes from 1 to 10 and then stops dead. If line 60 had been:

```
50 GOTO 40
```

the loop would have carried on forever (or until we hit Escape, Break or the Electron). It would have been an infinite loop.

As it is, the IF . . . THEN of line 60 provides a way out of the loop. If *variable* is greater than 10, then the condition is false and the part of the line after the THEN is ignored. In effect, the GOTO only works within the conditions of the IF . . . THEN.

While *variable* is less than or equal to 10 the program is stuck in the loop. If and when it becomes greater than 10, the loop stops.

Put more formally, the exit

condition for the loop is that *variable* is greater than 10. When this is the case, the program exits out of the loop and, in this case, ends.

Try changing the last line of the program to lines such as:

```
50 IF variable<10 THEN GOTO
40
50 IF variable=10 THEN GOTO
40
50 IF variable>10 THEN GOTO
40
```

and see if you can understand what's happening. Notice that the loop is always performed at least once.

Finally, try:

```
50 IF variable<=10 THEN
GOTO 30
```

This is quite a common mistake which can be surprisingly hard to spot. As I've said before, beware GOTOs, they're easy to use but hard to use well.

Have you figured out what

Program 1 resembles? Program 11, which does the same job, gives the answer.

```
10 REM PROGRAM 11
20 FOR variable=1 TO 10
30 PRINT variable
40 NEXT variable
```

Program 11

As you can see, it's our old friend the FOR . . . NEXT loop. If you cast your mind back, you'll remember that all the lines between the FOR and the NEXT are repeated. The number of times that this happens depends on the values given to the loop control variable.

In this case *variable* is to range in value from 1 to 10.

Why, you may ask, if we can do its job with a simple GOTO, should the Electron's Basic have a FOR . . . NEXT loop? It seems a bit redundant.

The answer is that the FOR . . . NEXT loop is a much better structure. Compare the two programs.

Program 11 is much easier to understand. The FOR . . . NEXT loop sets out its limits clearly. It's obvious that the loop will cycle ten times and that everything inside the loop will be repeated ten times.

The workings of Program 1 are much more complicated and obscure. And where there's complication and obscurity, bugs lurk, waiting to destroy your programs!

Get the line number after



From Page 9

the GOTO or the operators in the condition wrong and there's the devil to pay. And, because the structure is fairly complicated, it can be murder to figure out what's going wrong.

The moral is, don't use GOTOs to form loops if a FOR...NEXT loop will do the job. This will benefit both your programs and your sanity!

Program III is a variant of Program I in which *variable* is increased by two each time round the loop.

```
10 REM PROGRAM III
20 LET variable=1
30 PRINT variable
40 LET variable=variable
+2
50 IF variable<=10 THEN
GOTO 30
```

Program III

You should be able to see why it prints out 1, 3, 5, 7, 9 and then stops. Can you rewrite the program using a FOR...NEXT loop with a STEP of two?

Notice that the GOTO of line 50 only comes into effect while *variable* is less than or equal to 10. In other words the loop carries on until *variable* is greater than 10. The exit condition of the loop is that *variable* must be greater than 10.

If you must insist on using GOTO to create your loops, make sure that your exit condition will actually exist. If you don't see what I mean, try changing line 50 of Program III to:

```
50 IF variable <= 10 THEN
GOTO 30
```

You'll find that you've got an endless loop on your hands.

What's happened is that you've told the program that when it reaches line 50 it is to go back to line 30 provided that *variable* isn't equal to 10.

The only time it won't loop is when *variable* is equal to 10.

The trouble is that the way that the program is constructed means that this exit condition won't happen. *variable* goes from 1 to 3 then 5, 7 and 9, followed by 11, 13 and so on. It never actually equals 10, so the loop carries on.

This is a problem to watch out for. While in this example it was fairly obvious, when you have a condition made up of lots of little conditions joined with ANDs and ORs and suchlike it can happen very easily.

Program IV shows us GOTO in action again, only now there are two of them.

```
10 REM PROGRAM IV
20 LET variable=1
30 PRINT variable
40 LET variable=variable
+2
50 IF variable<=20 THEN P
RINT "Less than or equal to
20":GOTO 30
60 IF variable>20 THEN P
RINT "Greater than 20":GOTO
30
```

Program IV

Line 50 tests *variable* and if it is less than 20 it tells you so before sending the program back to line 30. Line 60 tells you if it is greater than 20 and then sends control back to 30.

Notice the way we have to use a GOTO after each IF. Not very efficient.

Also notice that while we've got a couple of IFs, we haven't got an exit condition – the loop keeps on going.

Program V solves the exit

condition problem by means of a cunning AND.

```
10 REM PROGRAM V
20 LET variable=1
30 PRINT variable
40 LET variable=variable
+2
50 IF variable<=20 THEN
PRINT "Less than or equal t
o 20":GOTO 30
60 IF variable>20 AND va
riable<=100 THEN PRINT "Grea
ter than 20":GOTO 30
70 PRINT "The End"
```

Program V

Now line 60 has a joint condition and the GOTO only works while *variable* is between 21 and 99. As soon as it goes over this, the loop ends and the program goes on to line 70.

So now we've got our exit condition – but it's not really a very neat solution, is it? Try rewriting the whole thing using a FOR...NEXT loop. I'm sure you'll agree that it's a lot easier to understand.

Observant readers may have noticed that the condition in line 50 changed from:

```
IF variable<=20
```

in Program IV to:

```
IF variable<=20
```

in Program V.

While it makes no difference in this case (*variable* never gets to 20) it's much better to have every number catered for as in the second case. If you don't follow that,

try making line 40 of Program IV read:

```
40 LET variable=variable+1
```

and see what happens when you run the program.

In the examples we're using it's fairly simple to see that *variable* will never be 20, so this problem won't arise.

However in more complicated programs you may not have any idea of what values may emerge.

So make sure you don't leave any "holes" between two sets of conditions, because if you do it's odds-on that the program will find them and bring things to an untimely halt.

Now have a look at Program VI. You should have no difficulty in seeing that the main part of it is a loop that cycles ten times.

```
10 REM PROGRAM VI
20 variable=0:loopno=0
30 loopno=loopno+1:PRINT
"Loop number ":loopno
40 variable=variable +1
50 IF variable <= 10 PRINT
"As variable is ":variable
", the loop continues.":GOT
O 30
60 PRINT "As variable is
now ":variable", so it end
s."
70 PRINT "There have bee
n ":loopno" cycles round th
e loop."
```

Program VI

While our old friend *variable* is less than 10, the GOTO of line 50 keeps on sending the

HEALTH WARNING:

GOTOs can seriously damage your sanity!



'We're exploring them ... to learn how to do without them'

program round the loop. However, eventually line 40 is going to make *variable* equal to 10 and the condition fails. Now the GOTO is ignored and the program carries on to lines 60 and 70 and ends.

Make sure that you understand what's happening in the program. It should be clear to you that lines 30 and 40 are repeated over and over while *variable* is less than 10.

Put another way, the loop repeats lines 30 and 40 until *variable* is equal to 10. Then the loop stops and the program carries on with the next lines.

You can look at Program I in the same way. There, lines 40 and 50 were repeated until *variable* was equal to 11.

Similarly, in Program V the loop cycled until the exit condition of *variable* being 100 was reached.

In all these cases you can look on the loop as being repeated over and over again until a certain condition is reached. The loop is repeated until the exit condition is true.

This is quite a useful concept. After all, when we use a FOR ... NEXT loop we have to know the number of times it's going to loop. We have structures like:

```
10 FOR loop=1 TO 100
50 NEXT loop
```

which are fairly rigid. It's much more flexible to have a loop repeating over and over until it's done the task we want.

The structure would be something like:

```
REPEAT
SOME TASK
UNTIL IT'S DONE
```

This is vastly different from the FOR ... NEXT loop. Here the loop will carry on forever unless its exit conditions are met. And it's such a useful loop structure that the advanced Basic in the Electron has it as standard.

You don't have to mess about with GOTOs. You can do

```
10 REM PROGRAM VII
20 variable=0:loopno=0
30 REPEAT
40 IF variable < 10 THEN
PRINT "As variable is "variable", the loop continues."
50 loopno=loopno+1:PRINT
"Loop number "loopno
60 variable=variable+1
70 UNTIL variable=10
80 PRINT "As variable is now "variable", so it ends."
90 PRINT "There have been "loopno" cycles round the loop."
```

Program VII

it all with a simple REPEAT ... UNTIL loop. Program VII, a variant of the previous program, shows it in action.

Here the REPEAT ... UNTIL loop is formed by lines 30 and 70. Now everything between those lines will be repeated over and over until *variable* is greater than or equal to 10. This means in effect, that the loop repeats ten times, then finishes.

One point to bear in mind is that a REPEAT ... UNTIL loop is always performed at least once. This is because the condition is tested by the UNTIL at the end of the loop.

The program performs all the code up to the UNTIL and then tests the exit condition. If this is met, the loop ends. If it's not, it carries on, sending the program back to the REPEAT.

But, whatever the result of the test, the code preceding

the UNTIL will have been processed. Hence a REPEAT ... UNTIL loop always cycles once.

Try changing line 70 of Program VII to:

```
70 UNTIL variable=-2
```

Obviously *variable* is greater than -2 when the loop starts so the exit condition of line 70 is met.

However, the program doesn't know this until the UNTIL of line 70 and ploughs on through the preceding lines.

The flexibility of REPEAT ... UNTIL loops comes as a breath of fresh air after the confines of FOR ... NEXT loops and the horrors of GOTOs. Have a look at the way one is used to read data in Program VIII.

```
10 REM PROGRAM VIII
20 total=0
30 REPEAT
40 READ number
50 total=total+number
60 UNTIL number=0
70 PRINT total
80 DATA 12,45,67,897,8
```

Program VIII

All the program does is to total up the numbers in the DATA statement and display the result.

However, notice the exit condition of the loop. It repeats until the *variable number* is equal to 0. Now adding 0 to the running total leaves it the same, so why bother?

The answer is that the 0 exit

condition is a flag that tells the program when I want the loop to end.

Try changing line 80 to:

```
80 DATA 1,2,3,4,5,8
```

or

```
80 DATA 209,365,3,8
```

and you'll see the flexibility of the structure. The numbers are read and added to the running total until the program finds a 0.

Compare this with using a FOR ... NEXT loop for the same job as in Program IX:

```
10 REM PROGRAM IX
20 total=0
30 FOR loop= 1 TO 4
40 READ number
50 total=total+number
60 NEXT loop
70 PRINT total
80 DATA 12,45,67,897
```

Program IX

This is a much more rigid program. If you want to change the data line you have to add up the number of items in it and change the FOR ... NEXT loop accordingly.

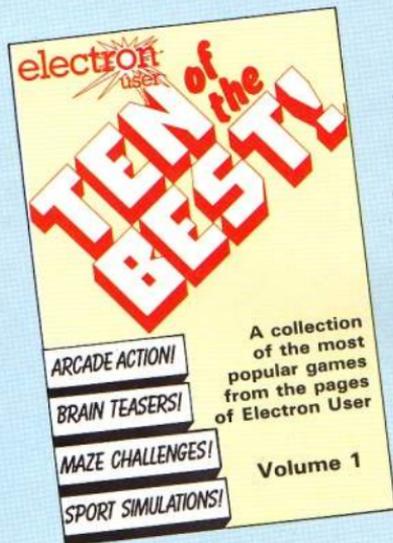
I think you should see that the REPEAT ... UNTIL is a much better program structure.

And that's it for this month. I leave it to you to try your hand at your own REPEAT ... UNTIL loops.

Last month we used a GOTO to form a mugtrap. Can you rewrite the program using a REPEAT ... UNTIL loop instead?

Repeat the process until you're sure you understand it.

Out of the many thousands of programs submitted to **Electron User** . . . out of the dozens that have been considered good enough to appear in these pages . . . we have selected 20 of the most outstanding to delight, intrigue – and frustrate! – **Electron users everywhere.**



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has there been such a helpful, easy-to-understand guide to BBC Basic

There has been an enthusiastic welcome from users of the BBC Mico and Electron to "Getting Started on BBC Basic". And with good reason. For its author, Mike Bibby, is acknowledged to be one of Britain's leading experts on BBC Basic, and in it he achieves new standards in simplifying the teaching of Basic programming.

The book, which is based on his highly-praised series for beginners in *The Micro User*, takes the reader step by step through the fundamentals of writing programs.

Its hands-on approach has been specifically designed to teach the

absolute novice not only the formal rules of Basic but also that elusive quality – good programming style.

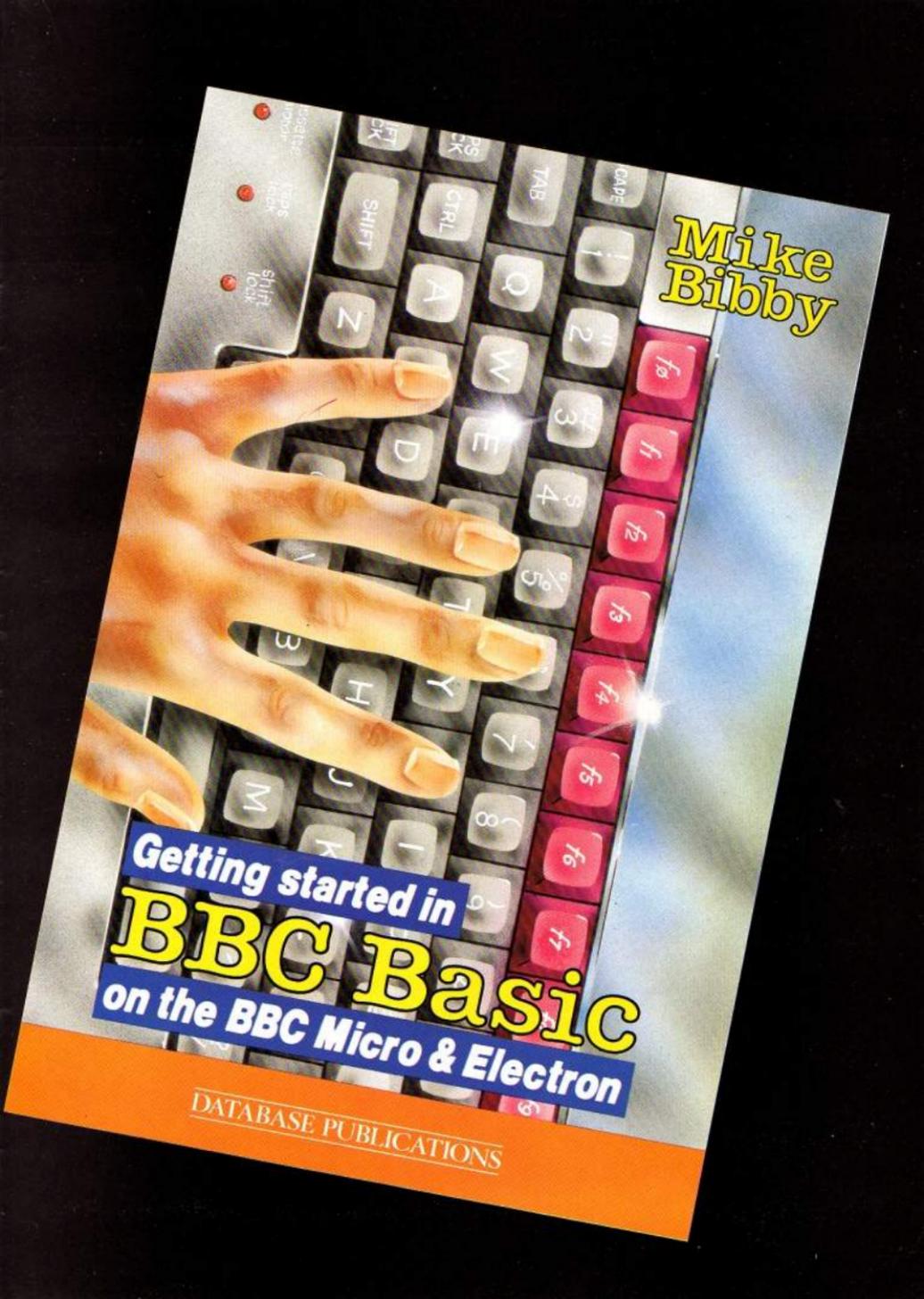
By working through its many examples, the reader will gain a clear insight into structured programming, and will quickly acquire the ability to use structured techniques in creating his own programs.

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- ★ Controlling loops with FOR ... NEXT statements
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Getting started in

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DATABASE PUBLICATIONS

It's a race against the clock in

TIME-BOMB!



CARL DUNKERLEY's explosive game

IS life getting boring? Do you feel the need to spice it up with a little danger? Well why not try Carl Dunkerley's game Time-Bomb?

The object is simple. You have to collect all the TNT mines, and so gain points, before the timer reaches zero and they explode, taking you with them.

As you move around the screen you'll destroy all the

blocks that you come into contact with. Don't worry if you leave one edge of the screen, you'll re-appear at the opposite side.

The block you are currently on is capable of sliding horizontally into an empty space, but it doesn't move vertically. If you do try to move it this way your Electron will ignore you.

You can obtain more points by eating the fruit scattered

around the screen, but will lose a life if you run into a skull. A bonus man is awarded every 10,000 points.

You'll need a lot of luck and skill to beat the high score.

All REMs can be safely omitted from the listing.

In case you're wondering, *FX200.1 disables the Esc key while *FX202 forces Caps Lock.

The keys used for movement are:

A - up
Z - down
< - left
> - right
Space - pause on/off

PROCEDURES

PROCassemble	Store machine code for double height characters.
PROCcharacters	Define characters and envelopes.
PROCinstructions	Print instructions.
PROCinitialise	Reset variables for a new game.
PROCgrid	Draw screen.
PROCplay	Play game.
PROCget	Select mans direction.
PROCpause	Pauses until SPACE is pressed.
PROCnext	Add a BONUS to score and increment frame counter.
PROCdead	Lose a life.
PROClocate	Find an empty square.

FUNCTIONS

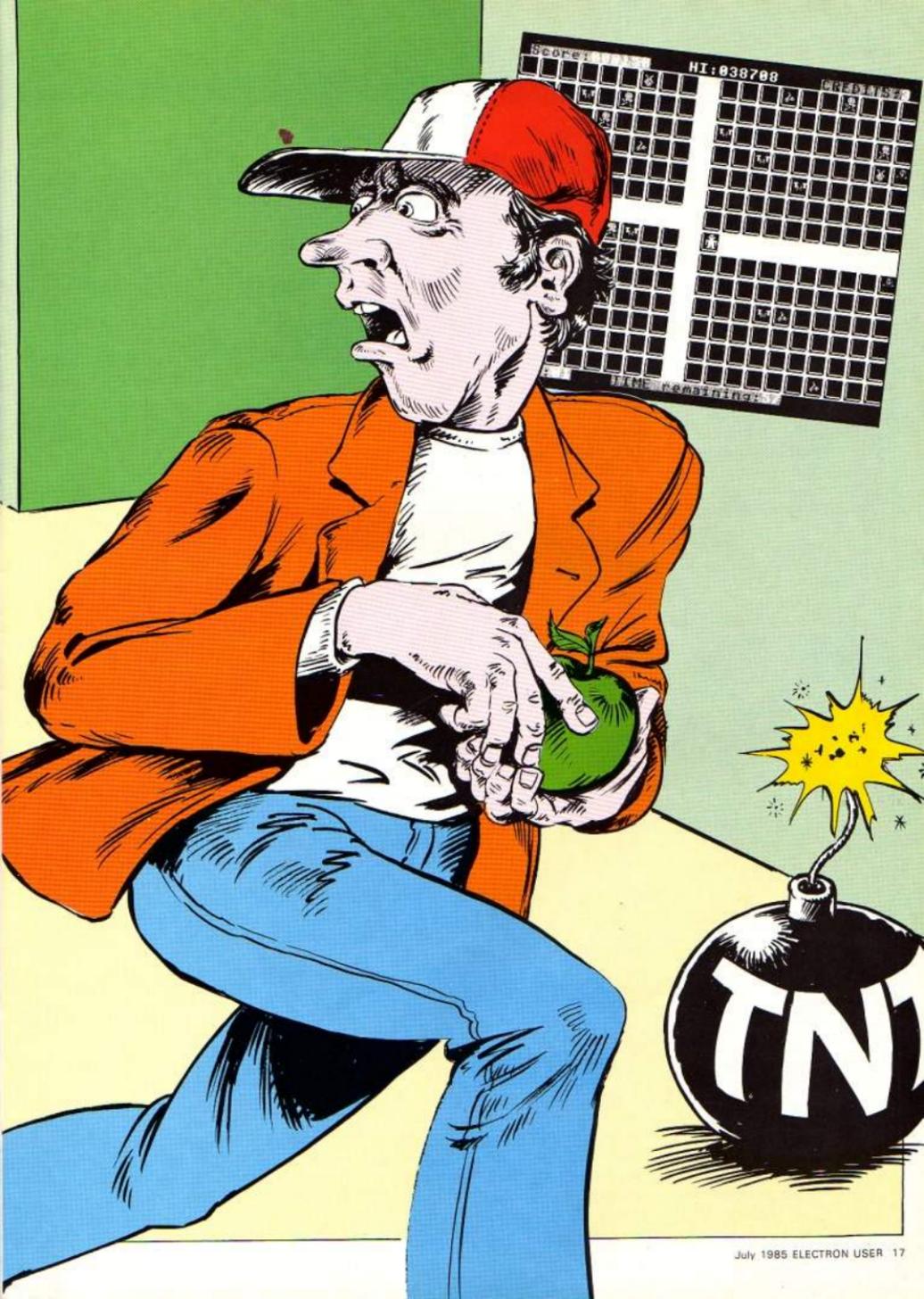
FNs(V%,N%) Formats V%, by adding leading 0 until it has N% digits.

VARIABLES

X%,Y%,N%,M%,P%,Z%,T%,D,AS,DS	General
G%	Delay loop counter.
S%	Score.
L%	Lives.
F%	Frame number.
Q%	Bonus man marker.
H%	High score.
D%	Man's current direction.
C%	Contents of square man is moving into.
O%	Number of TNT mines to be eaten.
MAN\$	String of CHR\$ forming the man.
SPA\$	String of CHR\$ forming a blank square

ARRAYS

S%(14,20) Screen contents.
Q%250 Machine code storage.



Time Bomb listing

From Page 17

```

10 REM TIME=BOMB
20 REM BY CARL DUNKERLY
30 REM (C) ELECTRON USER
1985
40 ON ERROR GOTO2610
50 #fx202
60 #fx11
70 #fx200 1
80 HX=30700
90 DIMSX(14,20),GX250
100 MODE6
110 PROCAssemble
120 PROCCharacters
130 MODE1
140 VDU23,1,0,0;0;0;0;
150 REM### main loop ###
160 REPEAT
170 PROCInstructions
180 PROCInitialise
190 REPEAT
200 ?%FE27=255
210 PROCGrid
220 #*.
230 PROCPlay
240 UNTILLX=0 DRTX=6000
250 REM### game over ###
260 COLOUR2
270 IFTX=6000COLOUR129;5
DUND1,2,10,0;IX=17;YX=4;#da
ta="TIME-UP":CALLdnor
280 COLOUR120
290 IFSX)HX HZ=5X:IX=15:Y
X=10;#data="NEW HI-SCORE":C
ALLdnor:FORNX=1T05000:NEXT
300 IX=12;YX=20;#data="An
other Game(Y/N)?:CALLdnv
310 REPEAT A#=#GET#:UNTLA
s="Y"ORA#=#N"
320 UNTILAs="N"
330 MODE6
340 END
350 REM### run frame ###
360 DEFPROCPlay
370 TX=0:YX=10:YX=0
380 PROCget
390 K#=#INKEY#0:IFK#(<)"*AN
DINSTR("AZ, ",K#)<0DZ=ASCX
#
400 IFK#=# "PROCpause"
410 NX=IX+(DX=44)-(DX=46)
:MX=YX+(DY=65)-(DY=90):IFMX
<1MX=14ELSEIFMX)14MX=1
420 IFNX)20NX=1:MX=MX+(MX
>1)ELSEIFNX<1NX=20:MX=MX-(M
X<14)
430 CX=5X(MX,NX):FORPX=1T
06X:NEXT:IFCX=20RCX=4SOUND1
,2,7,CX,3;SX=5X+25+CX
440 IFCX=30RTIME)=6000PRO
Cdead:TIME=TX:IFLX=0RTX)=6
000ENDPROC
450 IFNOT(CX<0ORDX=44ORD
X=46)SOUND1,1,25,1:DX=ASC(M
ID#(" ",RND(2),1)):GOTO390
460 COLOUR0:COLOUR129:IFS
X)=GXQX=GX+10000:LX=LX-(LX<
6):SOUND1,2,100,10:PRINTTAB
(30,1);LX
470 PRINTTAB(7,1);FNs(SX,
6);TAB(20,30);FNs(INT((6000
-TIME)/100),2):COLOUR120:PR
INTTAB(IX+2-2,YX+2)SPA#SX:IX
YX,XX)=0:IX=NX:YX=MX:SX(YX,
XX)=5:COLOUR3:PRINTTAB(IX+2
-2,YX+2)MAN#IFCX=20X=DX-1:
IFDX=0PROCNext:ENDPROC
480 GOTO390
490 ENDPROC
500 REM### pause ###
510 DEFPROCpause
520 TX=TIME
530 REPEATUNTILGET#=" "
540 TIME=TX
550 ENDPROC
560 REM### get initial dir
ection ###
570 DEFPROCget
575 VDU 23,1,0,0;0;0;0;0;
580 #fx21
590 REPEAT:D#=#GET#:UNTLI
NSTR("AZ, ",D#)<0
600 DX=ASC(D#):TIME=TX
610 ENDPROC
620 REM### bonus, next fra
me ###
630 DEFPROCnext
640 TX=(6000-TIME)/100
650 COLOUR2
660 IX=15:YX=10;#data="NE
XT PATTERN":CALLdnor
670 FORN=TX T01 STEP-1
680 IFTX<0 SX=5X+10+250#
FX/TX
690 SOUND10,-1,N,MOD5,1
700 COLOUR0:COLOUR129:PRI
NTTAB(20,30);FNs(N,2);TAB(7,
1);FNs(SX,6)
710 IFSX)=GXQX=GX+10000:L
X=LX-(LX<6):SOUND1,2,100,10
:PRINTTAB(30,1);LX
720 FORD=1T090:NEXT,
730 PRINTTAB(20,30);"00"
740 COLOUR120
750 FORNX=1T05000:NEXT
760 FX=FX+1
770 ENDPROC
780 REM### lose a life ##
790 DEFPROCdead
800 TX=TIME
810 SOUND1,1,100,10
820 LX=LX-1
830 COLOUR129:COLOUR0:PRI
NTTAB(30,1);LX
840 IFTX)=6000 PRINTTAB(2
0,30);"00"
850 COLOUR120:PRINTTAB(XX
+2-2,YX+2)SPA#
860 SX(YX,XX)=0:NX=10:MX=
0
870 COLOUR3:PRINTTAB(NX+2
-2,MX+2);MAN#
880 #fx21
890 FORM=1T0450:NEXT
900 SOUND1,1,1,1
910 IFLX<0 ANDTX<6000 PR
OCget
920 #fx21
930 NX=10:MX=0
940 ENDPROC
950 REM### define chr# ##
960 DEFPROCCharacters
970 ENVELOPE1,3,124,-254,
-5,2,4,100,0,0,0,0,0
980 ENVELOPE2,2,10,-10,10
,-1,-1,-1,0,0,0,0,0,0
990 REM empty block:=1
1000 VDU23,224,0,63,95,95,
95,95,95,95
1010 VDU23,225,0,254,254,2
54,254,254,254,254
1020 VDU23,226,95,95,95,95
,95,95,127,0
1030 VDU23,227,254,254,254
,254,254,2,252,0
1040 REM Tnt block:=2
1050 VDU23,228,0,0,0,0,0,14,
4,4,4
1060 VDU23,229,0,0,0,0,0,20,
0,0,0
1070 VDU23,230,0,0,0,0,0,0,
1,1
1080 VDU23,231,0,0,0,0,0,0,
32,160
1090 VDU23,232,1,1,0,0,0,0,
0,0
1100 VDU23,233,96,32,0,0,0,0
,0,0,0
1110 REM APPLE & CHERRY=0
NUS FRUIT=4
1120 VDU23,235,16,0,12,16,
0,0,0,0
1130 VDU23,236,0,0,0,2,39,
114,32,0
1140 VDU23,237,90,52,0,0,0,
0,0,0
1150 VDU23,238,0,0,24,52,1
14,126,60,24
1160 REM SKULL & CROSSBONE
S=3
1170 VDU23,240,0,0,0,0,0,0,0
,0,6
1180 VDU23,241,3,0,3,6,0,0,0
,0,0
1190 VDU23,242,24,224,24,1
2,0,0,0,0
1200 VDU23,243,0,0,224,240
,00,240,224,160
1210 VDU23,244,0,0,0,1,1,1,
0,0,0
1220 VDU23,245,0,0,0,0,0,0,0
,0,12
1230 REM MAN=5
1240 VDU23,246,0,63,95,94,
94,95,00,00
1250 VDU23,247,0,254,30,17
4,14,30,2,10
1260 VDU23,248,90,90,94,92
,95,96,127,0
1270 VDU23,249,10,10,70,70
,254,2,252,0
1280 MAN#=#CHR#246+#CHR#247+
CHR#8+#CHR#9+CHR#10+#CHR#240+
CHR#249
1290 SPA#=" "+CHR#8+#CHR#0
+#CHR#10+" "
1300 ENDPROC
1310 REM### draw screen ##
1320 DEFPROCGrid
1330 GX=GX+15*(GX<0)
1340 FORM=1T03:VDU19,N,0;0;
;NEXT
1350 COLOUR131
1360 CLS
1370 VDU5
1380 GCOL0,0
1390 MOVE338,995:PRINT"HI:
"+FNs(HX,6)
1400 VDU4
1410 COLOUR129:COLOUR2
1420 PRINTTAB(1,30);"Frame
":TAB(13,30);"TIME remaini
ng":TAB(1,1);"Score":TAB(
30,1);"CREDITS":;COLOUR0:P
RINT;LX;TAB(7,1);FNs(SX,6);
TAB(7,30);FNs(FX,2);TAB(28,
30);"60";TAB(0,2);
1430 COLOUR120:COLOUR3
1440 FORYX=1T014
1450 FORX=1T020
1460 SX(YX,XX)=1
1470 VDU224,225

```

```

1480 NEXT
1490 FORX=1T0Z0
1500 VDU226,227
1510 NEXT,
1520 REM MAN
1530 SX(10,10)=5
1540 COLOUR3:PRINTTAB(10,1
6)MAN$
1550 VDUS
1560 REM TnT
1570 TX=5+5*FX:IFTX>25 TX=
25

```



```

1580 OX=TX
1590 FORYX=1T0TZ
1600 PROClocate
1610 SX(ZX,XX)=2
1620 GCOL0,1
1630 VDU228,229,8,8,230,23
1,8,8,10,232,233
1640 MOVEIX*64-58,1021-64*
ZX
1650 VDU228,229,8,8,230,23
1,8,8,10,232,233
1660 GCOL0,0
1670 MOVEIX*64-60,1021-64*
ZX
1680 VDU228,229,8,8,10,0,2
,230,231,8,8,10,232,233
1690 NEXT
1700 REM APPLE+CHERRY=BOU
S FRUIT
1710 TX=RND(7)+3
1720 FORYX=1T0TZ
1730 PROClocate
1740 SX(ZX,XX)=4
1750 MOVEIX*64-64+16,1023-
64*ZX-16
1760 AY=RND(2)
1770 IFAX=1 GCOL0,0:VDU235
,8,236:MOVEIX*64-58+16,1023
-64*ZX-16:GCOL0,2:VDU235,8:
GCOL0,1:VDU236
1780 IFAX=2 GCOL0,0:VDU237
,8,238:MOVEIX*64-58+16,1023
-64*ZX-16:GCOL0,2:VDU237,8:
GCOL0,1:VDU238
1790 NEXT
1800 REM SKULL & CROSSBONE
S
1810 TX=5+5*FX:IFTX>20 TX=
20
1820 FORYX=1T0TZ
1830 REPEAT
1840 SUMX=0
1850 PROClocate
1860 IFZX(<0 IF SX(ZX-1,XX
)=3 SUMX=SUMX+1
1870 IFZX(>14 IF SX(ZX+1,X
Z)=3 SUMX=SUMX+1

```

```

1880 IFX(<0 IF SX(ZX,XX-1
)=3 SUMX=SUMX+1
1890 IFX(>20 IF SX(ZX,XX+
1)=3 SUMX=SUMX+1
1900 UNTIL SUMX<4
1910 SX(ZX,XX)=3
1920 GCOL0,0
1930 VDU240,245,8,8,10,241
,242,8,8,11,244,243
1940 MOVEIX*64-58,1023-64*
ZX
1950 GCOL0,2
1960 VDU240,245,8,8,10,241
,242
1970 GCOL0,1
1980 VDUS,8,11,244,243
1990 NEXT
2000 VDU4,20,19,3,4;0;19,2
,5;0;
2010 ENDPROC
2020 REM### choose a squar
e ###
2030 DEFPROClocate
2040 REPEAT IX=RND(20):ZX=
RND(14):OPTILSX(ZX,XX)=1
2050 MOVEIX*64-64,1023-64*
ZX
2060 ENDPROC
2070 REM### double height
chr$ ###
2080 DEFPROCassemble
2090 V=AFEE
2100 FORN=0TO1:PX=0Z
2110 IOPT0:dnor:LDA00:JMP
start
2120 .dinV:LDA0*6FF
2130 .start:STA089:LDA031:
JSRV:TXA:JSRV:TYA:JSRV:LDA0
B:PHA
2140 .loop0:PLA:TXA:LDA0dat
a,X:CMPI3:BEQend:STA080:IN
X:CPX21:BEQend:TXA:PHA:LDX
0:LDY00:LDA00:JSR*FFF1:
LDA023:JSRV:LDA025:JSRV:LD
Y#1
2150 .loop3:LDA080,Y:EOR08
9:JSRV:JSRV:INY:CPY#5:BNEL0

```

```

op3:LDA#255:JSRV:LDA#10:JSR
V:LDA#0:JSRV:LDA#23:JSRV:LD
A#255:JSRV
2160 .loop4:LDA080,Y:EOR08
9:JSRV:JSRV:INY:CPY#9:BNEL0
op4:LDA#255:JSRV:LDA#11:JSR
V:JMP1000
2170 .end:RTS:DATA:EQU$
*
2180 J:NEXT
2190 ENDPROC
2200 REM### score formatti
ng ###
2210 DEFFNS(NX,PX):S$=STR$
(NX):=STRING$(PX-LENS$,0)
+S$
2220 REM### initialise ###
2230 DEFPROCinitialise
2240 G%-105:8%-0:LX=3:FX=1
:GX=10000
2250 ENDPROC
2260 REM### instructions #
##
2270 DEFPROCinstructions
2280 VDU20
2290 COLOUR120:COLOUR3
2300 CLS
2310 IX=13:YX=1:DATA="Ti
me=Boob":CALLdnor
2320 COLOUR2
2330 PRINT""The object o
f this game is to defuse al
l the bombs ('TNT'),before t
he counter reaches zero.
"
2340 PRINT"A bonus is awa
rded for time remaining att
he end of the frame and for
each piece of fruit eaten.
"
2350 PRINT"However,if you
collide with a 'SKULL' ort
he counter reaches zero you
will lose alive."
2360 PRINT"A bonus MAN is
awarded every 10000points-
up to a maximum of six."

```

```

2370 PRINT"You control th
e man using the following k
eys:"
2380 COLOUR3:PRINTTAB(19);
"A*CHR$(3CHR$10;TAB(10)*<
">CHR$(13CHR$10;TAB(20);"Z"
2390 PRINT"SPACE".... P
ause ON/OFF"
2400 IX=6:YX=30:DATA="Pre
ss any key to:CALLdnor
2410 IX=23:DATA="continue
...":CALLdnor
2420 #fx21
2430 A=GET
2440 FORYX=4T029
2450 PRINTTAB(0,YX);SPC(40
);
2460 NEXT
2470 COLOUR2:PRINTTAB(0,5)
;
2480 PRINT"As you move aro
und the screen you will de
stroy all the 'BLOCKS' that
you come into contact wit
h."
2490 PRINT"If you leave o
ne edge of the screen, you
will reappear at the other."
2500 PRINT"The following
only applies when you try a
nd move into an empty space
!"
2510 PRINT"The 'BLOCK' yo
u are on can slide left &
right, but not up and dow
n.If you tryto make it slid
e up or down the computerwi
ll ignore your command and
move you either left or r
ight instead."
2520 COLOUR3
2530 IX=3:YX=30:DATA="Do
you want the soun?CALLdnor
2540 IX=23:DATA="d ON (Y/
N)?":CALLdnor
2550 REPEAT A#GET#
2560 UNTIL A#="Y"OR A#="N"
2570 IFA#="Y"THEN#fx210
2580 IFA#="N"THEN#fx210 1
2590 ENDPROC
2600 REM### ERROR ###
2610 NODE6
2620 REPORT
2630 PRINT"at line #;ERL

```

This listing is included in this month's cassette tape offer. See order form on Page 61.

ROLAND WADDILOVE begins a new series on programming graphics with arcade games in mind

Machine code can make your games faster, smoother and paint box bright

HAVE you ever looked at the latest arcade games and been amazed by the incredibly fast, super smooth, multi-colour, sprite-like graphics?

Wish your programs could have graphics like that? Well it's not that hard.

Over the next couple of months I shall be covering the basic techniques involved in moving multi-coloured characters of any size smoothly round the screen.

The only way to achieve such animation is through the use of machine code, as it runs many times faster than Basic which is too slow.

So to make the most of these articles you will need a fair knowledge of 6502 machine code. But even if you don't, then you should be able to follow the first section which looks at how the screen memory is organised, and you'll have till next month to swot up on the subject.

As many of the arcade games written for the Electron are in Mode 5, this is the one we shall be concentrating on.

Although there are fewer colours than Mode 2, programs run much faster, in fact at almost the same speed as the BBC in Mode 2. So it's a swings and roundabouts situation — do you want speed or colour?

The secret to high speed multicolour graphics is to directly access the screen memory. This is the top 6-20k of memory, depending on the mode, from which the TV picture is built up, and is formed from the bit pattern of the bytes stored there.

The operating system is best used as little as possible. Not that there is anything wrong with it, it's excellent, but it simply wasn't designed specifically to run arcade games in Mode 5.

In the OS ROM is a superb routine which will print any character you care to define, in any colour and in any mode at

any pixel (a pixel is the smallest element of the screen display — when you plot a single point, that's a pixel). The calculations it must perform are mind boggling.

The bit pattern must be fetched, then the foreground and background colour found and the bytes required to produce the pattern calculated.

This depends on the mode, and whether you are printing at the text or the graphics cursor using VDU 5.

The correct addresses in the screen memory must be found and the data poked in.

A fantastic amount of time can be saved by working out all the data beforehand and saving it. Then all that is necessary is to poke the pre-packaged data into the correct location, using a fairly simple routine.

First we will try to find out how the Electron organises the screen memory. You will need Program 1 for this.

The memory map of page 128 of the User Guide tells us that the RAM used for high resolution graphics is located between HIMEM and &8000, and that HIMEM is a movable boundary.

Try putting the Electron into different modes and printing HIMEM:

```
PRINT HIMEM
```

You can see that more RAM

is required by higher resolution graphics or more colours, and that in Mode 5 HIMEM is equal to &5800.

Type in and run Program 1. It prints the alphabet starting at the top left of the screen and then waits for a key to be pressed.

The variable *address* is initially set to HIMEM, and whenever a key is pressed its value is printed and &OF stored in the screen memory. The address is then incremented by 1.

Run the program a few times and hold down a key. You will see that each character is made up of two strips, each 8 bytes high, and that each line is made up of 40 of these strips or columns.

If you are using a TV and can't see the top line add this line:

```
55 VDU 30.11.11
```

Look at the address printed and note when it runs on to the next line. It is &5800 at the start of the first line, &5940 at the start of the second line, &5A80 on the next and so on. Each line starts &140 lower than the previous one.

It can be seen from Program 1 that a Mode 5 character is stored in 16 bytes, two columns of 8 bytes.

Figure 1 shows the first character position. As each character is 8 pixels wide (in any mode) a single byte must

hold the colour information for four pixels.

Also we saw earlier that each line of 20 characters is made up of 40 columns, and since there are 160 pixels across the Mode 5 screen 160 divided by 40 equals 4 — four pixels per byte.

How is the information coded? Program 11 will help here. The four pixels in the first byte of the screen memory can be set to any of the four colours by pressing the keys 1-4, 1 for the first, 2 for the second and so on.

The value of this byte is printed in hex and its binary bit pattern is shown.

Try altering the colour of the pixels and look for a pattern in the hex value or binary pattern. It doesn't seem to make sense does it?

```
10 REM PROGRAM 11
20 MODE 5
30 address=HIMEM
40 PRINT "ABCDEFGHIJKLMN
OPQRSTUVWXYZ"
50 PRINT TAB(0,10):"Addr
es=";...
60 key=GET
70 PRINT TAB(9,10):"addr
ess
80 ?address=00F
90 address=address+1
100 GOTO 60
```

Program 11

70 *byte%*—the first byte of screen memory.
 80 Hexadecimal value printed.
 110-130 Bit pattern printed.
 150-180 Pairs of bits for each pixel printed.
 200 *key%*=code of key pressed-48.
 210 Call PROCchange() if keys 1-4 pressed.
 screen Sets up screen display, initialises variables.
 bit(N%) Prints coloured square if bit N% in byte set.
 change(pixel) Changes colour of pixel.

Two bits can be used to store the numbers 0 to 3, %00, %01, %10 and %11 in binary. So a byte, consisting of 8 bits can store the colours (0-3) for four pixels.

It would be logical to use the first two bits for the first pixel, the second two for the second pixel and so on. However it's not quite so simple.

Bits 7 and 3 store the colour for pixel 1, 6 and 2 for pixel 2, 5 and 1 for pixel 3 and 4 and 0 for pixel 4. Program II prints the pairs of bits for each pixel near the bottom of the screen.

Press key 1 and the bits 7 and 3 will cycle through the four colours, %00, %01, %10 and %11 in binary. Similarly the others can be changed by pressing keys 2, 3 or 4. Watch the bit pairs run through the colours.

A multi-coloured character could be designed on paper and each horizontal group of four pixels could be set using this program and the data noted. It could then be stored at any position on the screen.

This would be a very clumsy method though. So in a later article in this series we will employ a sprite designer to make it a bit easier.

You should now be able to see why in Program I storing &OF in the screen memory coloured it red. Set all four pixels to red and look at the hex value and bit patterns — &OF and 01, 01, 01, 01.

Maybe it's coincidence, I don't know, but look what happens when all the pixels are the same colour in Program II.

When all are black the byte is &00, red is &0F, yellow is &FO and white is &FF. See the pattern?

It looks like the binary pattern %00, %01, %10 and %11, of the four colours (0-3), doesn't it? This makes it very easy to remember how to completely colour a byte of memory.

● *That's all for now. Next month we will look at some simple machine code routines for printing characters.*

```

10 REM PROGRAM II          300 COLOUR 2:PRINT TAB(6,
20 REM By R.A.Maddilove  19)*76543210*:TAB(3,24)*73
30 MODE 5                 62 51 40*:TAB(12,6)*1111
40 PROCscreen            *
50 REPEAT                 310 FOR IX=1 TO 4
60 COLOUR 2              320 colourX(IX)=1
70 byte%=?HIMEM          330 NEXT
80 IF byteX(16) PRINT TAB 340 ?HIMEM=&F
(3,5)*"00":byte% ELSE PRINT 350 COLOUR 1
TAB(3,5)*"1":byte%      360 PRINT TAB(12,4)STRING
90 COLOUR 129            $(4,CHR$(255))
100 PRINT TAB(6,20);     370 COLOUR 129:COLOUR 2
110 FOR IX=7 TO 0 STEP -1 380 PRINT TAB(1,30)" 1-4
120 PROCbit(IX)          Change pixel *
130 NEXT                 390 COLOUR 128
140 PRINT TAB(3,25);     400 MOVE 0,95:DRAW 1280,9
150 FOR IX=7 TO 4 STEP -1 5:MOVE 0,650:DRAW 1280,650
160 PROCbit(IX):PROCbit(1 MOVE 600,650:DRAW 600,1024
IX-4)                   410 ENDPROC
170 PRINT CHR$(9):CHR$(9; 420 DEF PROCbit(NX)
180 NEXT                 430 IF (byteX AND 2)*NX) C
190 COLOUR 128          OLOUR 2 ELSE COLOUR 0
200 key%=GET-48:FX21,0   440 VDU 255
210 IF keyX(8) AND keyX(5 450 ENDPROC
PROCchange(keyX)         460 DEF PROCchange(pixelX
220 UNTIL FALSE          )
230 END                  470 colourX(pixelX)=(colo
240 DEF PROCscreen       urX(pixelX)+1)MOD 4
250 VDU 23,1,0;0;0;0;0; 480 PRINT TAB(12,4);
260 VDU 23,255,0,126,126, 490 FOR IX=1 TO 4
126,126,126,126,0       500 BCOL 0,colourX(IX)
270 DIM colourX(4)       510 PLOT 69,0*(IX-1),1023
280 DRAW 0,1023:DRAW 1276 520 COLOUR colourX(IX)
,1023:DRAW 1276,0:DRAW 0,0 530 VDU 255,0,10,10,17,2,
290 PRINT TAB(11,2)*Pixel colourX(IX)+48,11,11
s":TAB(3,3)*Byte":TAB(4,15) 540 NEXT
"Bit Pattern"           550 ENDPROC

```

Program II

%5600	%5608	...
%5601	%5609	...
%5602	%560A	...
%5603	%560B	...
%5604	%560C	...
%5605	%560D	...
%5606	%560E	...
%5607	%560F	...

Figure 1: Memory map of the first character position

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Software Surgery

THE COLUMN THAT TAKES A LOOK INSIDE THE LATEST RELEASES

Screens full of high speed action

WHAT an absolutely brilliant game. This must be the ultimate in high speed arcade action. The sound is excellent and the graphics superb.

The screen is filled with laser bolts, flying debris, brain waves, mutating monsters and robots. It's got to be seen to be believed.

There are nine screens full of various nasties to be disposed of and people to be rescued. As you progress through each screen the number of nasties increase and they get meaner and meaner.

You start off positioned in the centre, surrounded by assorted robots and monsters with nowhere to hide and only a laser pistol with which to defend yourself.

On screen one there are only robots plus a few obstacles. These can be dealt with quickly, in fact if you don't blast everything in sight within about five seconds then you have had it.

Bonus points are gained if you pick up the two humans wandering around.

Screen two starts with ordinary robots, large indestructible robots, pulsating rings, people and more obstacles. After a short while the pulsating rings mutate into machines which hover about the screen firing spinners at you, so speed is essential.

Screens three and four are the same only worse, that is there are twice as many robots and machines.

Screen five is a bit tricky. In addition to all the other

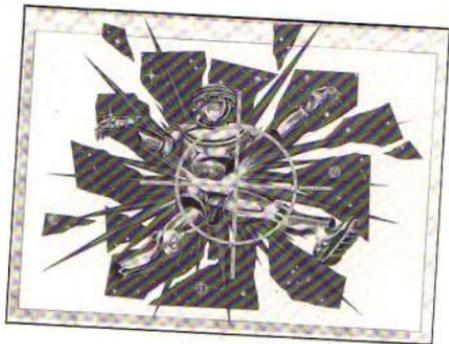
Robotron 2084 Atarisoft

obstacles and nasties, there are giant brains with tiny bodies and legs. These fire thought bolts or brain waves which home in on you and then mutate into another indescribable form.

Six is the same as four, which is a bit of a relief after the struggle to blast your way through five.

Seven is nearly impossible. There are pulsating rings — different to the previous ones — bouncing about the screen at high speed. They quickly mutate into giant frogmen's heads on tank tracks which emit spinning balls.

Eight and nine are like three



except that there are far more robots — over 40.

There are the usual options available before the game starts — sound on/off, set start level, keyboard/joysticks and a two player game. Once the game has started there is a pause facility so you can stop for a second to get your breath back.

To play Robotron properly you will need a pair of joysticks (Plus 1 type). There is a keyboard option but it is impossible as there are four keys to move and another four

to fire in each direction.

The only way to play is to use the two joystick option. One joystick is for moving and the other to fire. You can actually run one way and fire another.

The problem with two joysticks is how to hold them though. I ended up strapping one to each leg!

Robotron is a highly recommended action packed arcade classic. On a scale of 1 to 10 would give it 11 for addictiveness.

Roland Waddilove

Tanks on target

Blitzkrieg Software Invasion

ONE of the most straightforward, yet most addictive, games I've ever had the pleasure to meet, Blitzkrieg is a winner.

Based on the familiar arcade game, the idea is to destroy as many enemy tanks as you can, gaining points in the process, while sustaining as little damage as possible.

You can receive only ten direct hits, then you're a goner. You start out as a private, and are promoted every 10,000 points. I won't tell you what rank I reached, though

rank is probably the right word.

There are smaller tanks and larger ones out to get you — and watch out, because they don't wait too long before they turn and fire, so get your shot in first.

The graphics, with their 3D effect, are absolutely superb. Although all in green, the detail achieved is striking and the sound effects are also good.

However, your gun position can only sweep from left to right. It seems a pity that it isn't more mobile and can move backwards and forwards too.

A First Byte joystick option



is available, plus a pause facility if the kettle boils at a particularly unnerving moment. There is also a sound on or off option.

The keys are well placed and simple to use — kids from 9 to 90 will find it easy and great fun.

Bev Friend

BE A SUPER SECRET AGENT

Super Agent Flint
Potter Programs

THE first thing that strikes you about Super Agent Flint is the reasonableness of its price – an example I hope other software houses will emulate.

When you load the program, you find that your task is to infiltrate a secret TERD base to capture their evil plans for world domination.

Your only means of escape is a rocket which you must use to dock with a British space station.

Happily for those of you who lack astronaut experience, the game assumes that successfully firing the rocket is enough.

The adventure begins in an aeroplane over the South Pacific. You've got a parachute and there's a green light showing, so your next move is fairly obvious.

Once you've landed you can start to explore the surrounding countryside. A submarine and a helicopter will help you in your travels, though the cable car is more useful in keeping things dry.

The rocket is soon found, but getting it started is something else. You need to find four things to operate the rocket successfully and finish the game.

Although there are only about 40 locations, don't expect these four objects to be easy to find.

As is beginning to seem usual with Potter Programs, there's no save-game facility, though there are spelling mistakes.

What there is is quite a lot of program protection, including a routine to intercept a Ctrl-Break.

At the price of these programs, the programming involved might be put to better use writing a save-game routine.

Overall, although it's in Basic it's quite fast and fun to play. At the price I must recommend it.

Merlin



It was a hard day's night at the bier keller

Auf Wiedersehen Pet
Tynesoft

FDR any fans of the popular TV show, this may have a special appeal.

The central character in our neat little plot is Oz, the well known loudmouth. Our Oz is put into a variety of tricky little situations over in Dusseldorf, and it's up to you to get him out of them!

Firstly, at the building site, Oz is under instructions to build as wide and tall a wall as possible, and if you thought bricklaying was easy, try this!

As well as avoiding the

watchful Erics and the falling trowels, poor Oz must be careful not to tumble from the wall.

The more wall he builds, the more marks he earns for his night at the bier keller.

At the bier keller, Oz must try to drink as many pints as possible before 11.30 (clock provided). The more he drinks, the more fearsome the barmaids become and the more numerous the tables to fall over.

If you're not full of pity already, you will be when you find he's got to guide himself home as all the street lights in Dusseldorf flicker and die.

He must remember the route, then try to find his way through a pitch-black maze of lamp-posts and police cars! Even when he gets to the hut, he's got to avoid the security guard.

Is it really worth going out? You may well ask.

Take the controls and see for yourself.

The keys are easy to operate, and you will find the graphics are well up to standard. But just allow me a few grumbles, being the fusspot I am!

First, the instructions are a little harsh on the eyes in glaring Mode 2. Mode 1 would be preferable.

Second, the game seems to be a little slow-moving in parts – particularly when the lights are going out. Finally, more-adventurous sound-effects wouldn't come amiss.

All in all, though, a promising game for all ages, with plenty of variety.

Bev Friend

Worth its salt

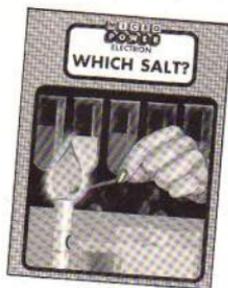
Which Salt?
Micro Power

THIS program is designed to be used to help students revising for O level or CSE exams in chemistry. It provides practice in that well-known bane of chemists known as qualitative analysis.

After loading – a long process, but with no hitches – you are shown a picture of a reagent bottle containing a salt, together with some information on colour and solubility in water.

You are given 100 points to start with as you begin a series of standard tests. First comes the flame test, which, like all the rest is shown graphically, but with a sentence of explanation as well – vital for those with monochrome monitors.

Then you are shown the



Wongo goes to the Wall

Wongo
Icon

kind of creature, the jumping gremlin.

Not only does he have to face all this, but the Great Wall itself, being a little older than most of us here (except possibly the editor), is in a sorry state.

Parts of it have crumbled away. This leaves a gaping gap which can only be crossed by a rather bloody-minded flying ferry which simply doesn't want to wait for you. Timing is

of the essence.

It's a fast-moving game with three levels of difficulty and a pause facility should you develop finger cramp.

The keys are easy to use, the instructions are clear, and you also have the option of having the sound on or off.

If you defuse five bombs without losing a life (you have three) you get a bonus score. There's also an extra life after every 20,000 points. A Hall of Fame is available for good scores.

Keith Young

effect of heat on your salt, with further tests offered if any gas is evolved. Ten points are lost if any of these tests are needed.

Next you find the effect of adding alkali and ammonia. The final set of tests are for anions (the non-metal part of your salt). Again points are lost for using these.

It is now assumed that you will know your salt and you check your result by picking one of the nine cations and one of the seven anions used in the program.

Entering these is done by pressing Space at the correct time, so there is no chance of poor spelling being a stumbling block.

When you have selected the salt correctly, a summary sheet gives details of the chemistry of the tests used. You also get a score and a message such as "Seek help", "Boffin" or "Einstein".

A quibble on these messages is that scoring 100 per cent earns you "Cheat".

My other two criticisms are that the prompt "Press Space to continue" is forgotten at times, and more seriously that it is not possible to repeat a test, which can reduce you to wild guessing.

That apart, this is an excellent program. The graphics are tidy and fast, good use is made of the computer's colour and, thankfully, the program is silent.

It is packaged with details of the chemical knowledge required for the program and also a single copy of a worksheet which may be photo-copied.

At £6.95 this is a very cheap educational program and definitely worth getting for home revision.

Rog Frost

Games in Basic

Games Collection
Century Software

THIS is a sparkling collection of 20 strategy and arcade type games, all written in Basic for the Electron. An accompanying book gives full instructions and detailed descriptions explaining how the programs

ELKMAN is a sideways ROM designed for use with an external ROM expansion board such as Slogger's own Rombox, (not the Plus 1), and is identical to the ROMs that BBC owners have been using for years.

ElkMan is a ROM manager so needs to have priority over all other ROMs present to operate properly. This means that it is best placed so that it appears as ROM 15 to the operating system.

Placing it in the rightmost socket on Slogger's Rombox achieves this. You'll have to check the manual on other systems.

ElkMan is a service ROM, which means that all its commands are available while another ROM is in use, using a * command.

These commands can even be used within a Basic program.

While writing this review using View I can test each function without leaving the work processor.

*HELP ElkMan reveals the ROMs 16 commands and their syntax. One of the simplest is

work. However, although there is a great variety of arcade games their speed is generally slow.

Their appeal is not great compared with the more sophisticated machine code games available, but they do provide a good insight into programming games in Basic.

It is an intention of the publishers that users would use the listings to pick up expert hints on programming their Electrons. The variety makes up for any loss in quality.

The strategy games are not affected detrimentally by the fact that they are programmed in Basic and not machine code. Speed of presentation and response is not important.

The programs are available elsewhere in various forms; the ideas are new.

This collection enables users to find out how the programs work so I would

ElkMan keeps your ROMs in order

ElkMan Sideways
ROM Manager
Slogger

*PROMS which lists all the ROMs present, their state and size.

ROMs can be in one of three states. They are either on, off or killed. *OFFROM and *ONROM can be used to enable or disable a ROM.

If it has been disabled it will not respond to any commands and cannot be used. This is useful if two ROMs have the same name for different commands. The offending ROM taking the command can be switched off.

Even though a ROM may be off it can still reserve valuable memory. *KILLROM is equivalent to physically removing a ROM. I found it useful for disabling the Plus 3 when playing games on tape.

*PEEK is a memory lister which can be used to display any section of memory, even sideways ROMs. The output is

in hexadecimal and Ascii. *POKE will place a series of bytes or a string anywhere in memory.

ElkMan contains a complete 6502 disassembler, which again is capable of operating on sideways ROMs. The hex address, object code, mnemonics and Ascii codes are listed.

There are several commands which operate on sideways RAM. These can clear the RAM if fitted, load it with data from memory, tape or disc, and save it to memory tape or disc.

ElkMan is well written and simple to use. The documentation is excellent. It comes with a very smart 21-page manual which explains fitting and use in a clear and easy-to-read manner.

Even if it's the only ROM you have, you'll still find most of the utilities useful. I can recommend ElkMan to all serious Electron users.

Roland Waddilove

seriously recommend it for budding programmers.

Euler's Touring Knight is a particular favourite of mine. The problem is to move a knight about a chess board calling in at each and every square.

The computer is programmed to demonstrate a solution, then the user can try it out.

One of the other programs, Robotank, requires Logo-type commands.

Ace High is a patience card game. Instead of manipulating your own pack you press a letter to deal and another to move the cards.

I think I prefer to use real cards, but the simulation is a good one.

I can recommend this collection for those people who wish to increase their powers of programming by seeing how others do it.

John Woollard

Revision aid

Where?
Micropower

THIS is an excellent little program for testing general knowledge of places, rivers, cities, hills etc in Britain.

The format is simple. A place is indicated on the map and a choice of four answers is given. The user presses the number key corresponding to the answer chosen.

If the answer is wrong the correct answer is given. After 10 questions the score is displayed. It is based on the number of correct answers plus the speed of response.

It is not stimulating enough to teach on its own, but it is a good program for revision.

John Woollard

OVER the next few months we'll be looking into the special functions called *FX available to Electron users.

Before we start finger tapping I'll explain the jargon. Then we'll have a look at some of those *FX commands which will improve your programming powers.

When your Electron is switched on a lot of short machine code programs are transferred into the RAM and values entered into specific locations in memory.

Those programs and values determine how the computer will behave under certain conditions.

For example, there are two locations whose contents determine how long the flashes of the flashing colours last. That is, the duration of the flash is stored in two specific locations.

If we knew the exact place of these locations we could change them and so affect the way our computer behaves.

Also as the Electron and its sister computers alter, the size of these machine code programs will change. Therefore the places in memory where these programs start and various locations used will change.

Acorn computers are provided with the *FX function so that if such changes take place our present programs will still be able to run on all future machines.

When people talk of *FX they also talk of OSBYTE and CALLS. CALLING means going to a particular piece of machine code program, doing something and then returning back.

The operating system of the computer is packed with short programs that do many wonderful and seemingly trivial, yet vital, jobs such as putting a letter on the screen or reading a tape file.

All such routines are given names or are grouped together under one name. They're listed on page 229 of the User Guide.

OSBYTE is one family of programs called through one particular memory location &FFF4. The *FX command is designed to call these OSBYTE routines.

So what can the OSBYTE

Call up the magic and unleash the power that lies in your

JOHN WOOLWARD begins a new series about those special functions called *FX

programs do? There are a potential 256 calls, so their action is wide and varied.

They range from asking the computer to wait for vertical synchronisation of the screen to a program that will reset all of the function keys of the keyboard.

All of these powerful mach-

necessary to write them as part of a program, they can be entered directly. In every case Return has to be pressed at the end of the line.

Type *FX0 and press Return to reveal the operating system that you have in your computer. Mine is OS 1.00
Now let's try some other,

You will notice that the blue stays on the screen for the slightest fraction of a second - one fiftieth to be exact. To change the duration of the second colour, yellow, we use *FX10.

Type:

*FX10,100

Now the yellow will stay on the screen for 100 fiftieths of a second which, if my maths is correct, is two seconds.

We can use this technique to create an interesting title page for a program as illustrated in Program 1.

First, the actual colours of the screen are changed. The background is made red (but any colour could be chosen). The program's title and author are then printed in flashing red and cyan.

The information about the program is printed in flashing cyan and red (notice the difference!).

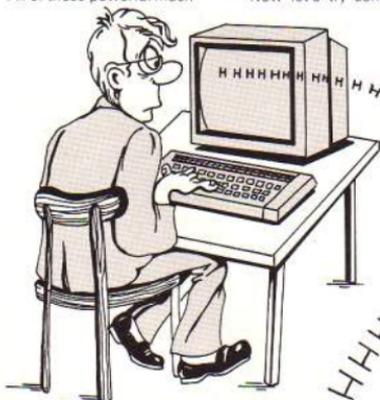
When the program title is red, which is invisible on the red background, the program information is a visible cyan. When the colours change the information becomes invisible and the title visible.

If the flash rate was not changed with the *FX calls of lines 60 and 70, then the information and the title would alternate too quickly.

By changing the rates the title is seen for two seconds then the information for five seconds.

The display gives the appearance of action, yet the computer can be carrying out some other task such as reading data or loading cassette files.

It's also possible to com-



*FX 12,1 and *FX 11,1: A good technique for fast moving arcade games - and a good trick to play on friends!

line code programs can be called from your Basic program using *FX.

In a way *FX is the magic word that allows you to unleash the power of the machine code routines in the Electron's ROM.

Enough of this theory, let's try our first *FX call.

At the moment there's only one version of the Electron operating system on the market, but we can check our own by using *FX0.

With all *FX calls it is not

rather more useful, calls.

You can, for instance, revalue the flashing colour mark state - that means change the speed at which the flashing colours flash.

First put some flashing colour on the screen by typing in:

VDU19,1,12,0,0,0

That will change the white writing to flashing blue and yellow. Now try:

*FX,1

ic word e power micro!

*FX OS CALLS

Part
One

bine the change in flash rates with graphics to create simple animation.

There are three points to be noted about *FX commands:

- The numbers following the *FX command are integers in the range 0 to 255. All other numbers will have no meaning.

- The commas may be omitted from between the numbers but there should be a space. I will continue to use commas to make the presentation clearer.

- None of this month's *FX commands affect the Break key. Pressing Break will nullify the previous *FX calls and return the micro to its original state.

To convince yourself you know what's happening, try some more combinations of *FX9 and *FX10 and then use Break to return the colours to their standard flash rate of half a second on, then off.

Now let's investigate *FX11 and *FX12. These calls affect the response of the keyboard.

The first determines how long a key has to be pressed before it starts to auto repeat.

The default time is 50 hundredths of a second. This means that the key must be held down for 50 hundredths of a second before the auto repeat starts.

Typing *FX11,100 makes the micro wait one second

before auto repeating. *FX11,0 switches off the auto-repeat altogether.

If I'm writing a program for physically handicapped users or for the very young I find it useful to use *FX11,0. *FX11,100 also helps.

*FX12 is used to set the auto repeat rate - that is the rate at which the following letters are placed on the screen once the repetition has actually started. It is normally eight hundredths of a second.

Try entering *FX12,1 and *FX11,1 and then typing a single letter. It's very difficult because the computer will type a letter for each hundredth of a second the key is held down.

This is a very good technique to use in fast moving arcade type games where you want the computer to respond continually to the holding down of a key. It's also a good trick to play on someone.

*FX12,0 resets both values to their default setting. Hit Break if you can't manage it.

Finally let's look at a *FX command which is not in the User Guide. *FX229,1 causes the Escape key to stop working.

Try this out on your computer. Press Escape and see that the response Escape is printed. Now, enter *FX229,1 and then press Escape. It doesn't work! Enter *FX229,0 to return the key to

its normal action.

We can now try this in a program. Program II will continue to count until the letter S is pressed. Pressing Escape will not stop the program.

Use of *FX229,1 can be part of security measures taken to prevent others from breaking into your program once it is running.

To sum up, this month we've seen how *FX calls can

effect the actions of the Electron.

*FX9 and *FX10 changes the colour flash rate. These were used to create a special effect for a program title.

*FX11 and *FX12 change the auto repeat action of the keys. Table I sums it up.

● Next time we'll take a closer look at some other calls that affect the keyboard and I'll show how they can be used to create better programs.

```

10 REM PROGRAM I
20 MODE1
30 PROCtitle
40 END
50 DEFPROCtitle
60 *FX9,250
70 *FX10,99
80 VDU19,0,1;0;
90 VDU19,3,0;0;
100 VDU19,1,9;0;
110 VDU19,2,14;0;
120 COLOUR1
130 PRINTTAB(9,11);"Program Title"
140 PRINTTAB(9,13);"Program Author"
150 COLOUR2
160 PRINTTAB(4,6);"This writing should contain"
170 PRINTTAB(4,8);"details of the program and"
180 PRINTTAB(4,10);"how it can be used. While"
190 PRINTTAB(4,12);"it is being displayed the"
200 PRINTTAB(4,14);"computer can be working"
210 PRINTTAB(4,16);"on other things such as"
220 PRINTTAB(4,18);"reading data and initiating"
230 PRINTTAB(4,20);"variables. The 'flashing'"
240 PRINTTAB(4,22);"display can include graphics"
250 PRINTTAB(4,24);"or be used while the computer"
260 PRINTTAB(4,26);"is loading another program."
270 PRINTTAB(4,30);
280 COLOUR3
290 MOVE100,100
300 DRAW100,900
310 DRAW100,900
320 DRAW100,100
330 DRAW100,100
340 ENDPROC
    
```

```

Program II
10 REM PROGRAM II
20 *FX229,1
30 number%=0
40 REPEAT
50 PRINT number%
60 number%=number%+1
70 GET$=GET$
80 UNTIL GET$="S"
90 *FX229,0
    
```

Call	Units	Default	Effect
*FX 9,n	1/50 sec	25	1st flashing colour duration
*FX 10,n	1/50 sec	25	2nd flashing colour duration
*FX 11,n	1/100 sec	50	Delay before auto-repeat begins
*FX 12,n	1/100 sec	8	Length of auto-repeat

Table I: The story so far

EVERY now and then something comes into the Electron User offices and there's a scramble for it.

Having used and been impressed with Cumana disc drives on my BBC Micro (in the dark old days when I used to work for *The Micro User*) I made sure that I won the latest tussle.

My prize? The Cumana floppy disc system for the Electron.

It consists of an interface cartridge, lead and either a 5½ or 3½ inch disc drive with its own power supply.

A second drive can be added if required, again of either size.

The cartridge, which contains among other things, the interface software, fits snugly into one of the slots on the Electron's Plus 1.

The lead, which, unlike on other micro products, is of adequate length, goes from this to the chosen disc drive.

Setting the system up was easy. Even if it hadn't been obvious what went where, the user guide supplied with the system gives more than adequate instructions.

So five minutes after receiving it I had a working disc system for my Electron. On the screen was not only the

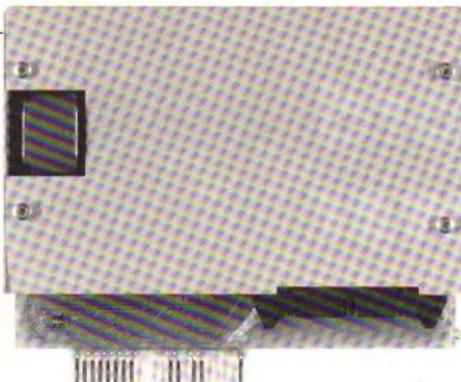
Cumana DISK System

message, there was also the date!

The next few hours were spent exploring the commands available under the system. The more I saw of it, the more I liked it.

Using the Cumana DFS, the familiar LOAD and SAVE still work, except now programs are saved to disc, not tape. The increase in speed and reliability this brings has to be experienced to be believed.

It's more than just a



The Cumana floppy disc system for the Electron:

It's an impressive piece of work

super-fast cassette, however. Because the saved programs or files are on a disc, not a tape, you can access a file you've saved without having to read all the previous programs.

This gives the system enormous flexibility and with it come a whole host of commands and utilities to take advantage of this.

Files can be copied, renamed, and deleted with ease, while *CAT gives you the name of all the files on the disc, instantly.

One whole category of commands is given over to organising and analysing these files, allowing operations that would be impossible or impractical on tape.

Also the system supports random access files, vital for more advanced and flexible databases.

Before a disc can be used by a disc system it has to be formatted. All this means is that the disc is magnetically organised so that data is stored on it in the way that the DFS expects.

The trouble is that there is no standard format, discs that work on one DFS not working on another.

The Cumana DFS has what is known as a double density format, but it's not the same as the Plus 3's double density format. Nor is it compatible with the Acorn DFS for the

BBC Micro.

This could be a problem, but supplied with the system comes a disc full of utilities to deal with the situation.

It's these utilities that give the flexibility that makes it a winner, allowing it to use discs written on both the BBC Micro and on the Plus 3.

With them you can copy files from a Plus 3 or BBC disc onto your Cumana discs.

Not only that, but you can format and write to discs that can be used on the BBC Micro. No other DFS has this adaptability and compatibility.

As if that wasn't enough, the utilities disc also has a verify program - to check discs - and a disc editor for more advanced users.

Even with the above features, to think of the Cumana Floppy Disc System as just a DFS would be to underrate it.

Not only does it have all the facilities you'd expect of a DFS, it also has a built-in real time clock and ROM socket for an additional ROM such as Addcom or Starmon.

Add to this that the maximum length of files is a massive 64k and the fact that the Cumana DFS doesn't use the Electron's memory (allowing easy tape to disc conversion) and the system becomes even more impressive.

It's a splendid, thoroughly professional piece of work.

The manual is comprehensive, if a little formal in parts, and the system does what it sets out to do and does it well. The obvious question is how it compares with the Plus 3.

The answer is, very well indeed. While not having the complexity of the Plus 3's directories and pathways, the filing system, with its 10 letter filenames and use of wildcards, is more than adequate for the home user.

When you throw in the real time clock, the ROM ability and the flexibility in the disc formats that can be read, then it comes out a clear winner.

There are only two drawbacks that I can think of. The first is that you have to have a Plus 1. I'm not sure if this is a drawback, as I think most people who want to expand to discs will already have one of these excellent bits of kit.

The second is that there is no utility that allows you to copy from your Cumana formatted discs to discs that will work on a Plus 3.

So as things stand, you could use your mate's Plus 3 discs but you couldn't copy your masterpieces on to a disc he can use.

Having said that, I don't think it will be long until someone does just that.

To sum up, it's a versatile, powerful piece of equipment that I recommend wholeheartedly.

Nigel Peters

electron
user
SPECIAL OFFER

You can save £45 on the Cumana floppy disc system with a special offer only available through Electron User. Full details on Page 52.

Here's something **SPECIAL** from

BARGAIN OFFER!
FOUR classic games for only £1.50 each

electron
user

We've commissioned four rip-roaring games for the Electron and BBC Micro

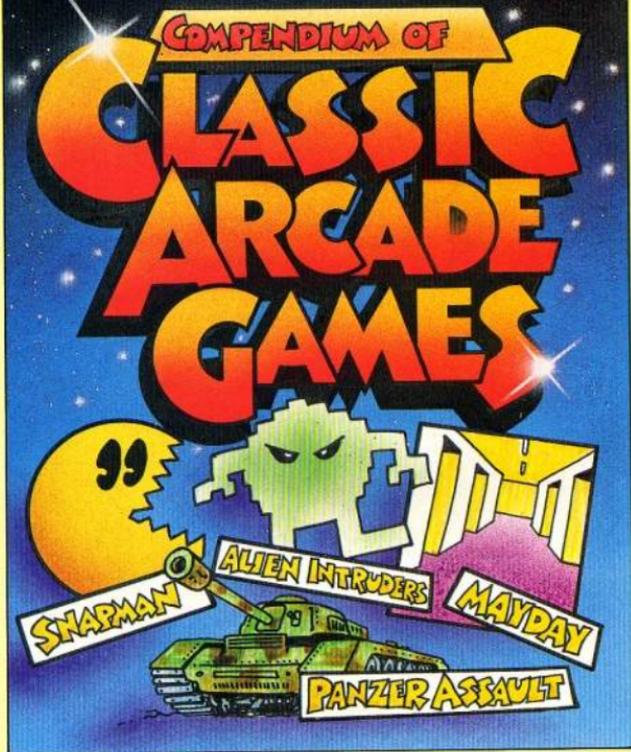
Three of this high-powered collection are top-rate machine-code versions of arcade classics and the fourth is a thrilling real-time adventure game. There's hours of enjoyment and something to suit everyone in this unique value for money collection

SNAPMAN – Guide your man through the maze as he munches energy pellets and avoids hostile aliens

ALIEN INTRUDERS – With only your laser for protection you must destroy the waves of aliens who threaten to engulf you

PANZER ATTACK – You are a tank commander engaged in vicious combat against encircling enemy forces

MAYDAY – A futuristic adventure! As captain of an interstellar cruiser you must guide the sole survivor of a stricken space freighter through the wreckage of his craft. If you fail to recover those vital medical supplies a whole planet is doomed!



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for £ _____
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(Please tick)

Name _____

Address _____

Post code _____ Tel: No. _____

Post to: Classic Arcade Games offer, Electron User, 68 Chester Road, Hazel Grove, Stockport SK7 5NY

SCRAPBOOK

SCRAPBOOK is the feature that contains a selection of all the short, simple programs sent in by our readers.

It's where we keep a record - our scrapbook - of all the interesting little routines that don't end up in the Notebook or in Program Probe but are too good for us not to share.

This month it's very much a graphics show. Next month - who knows? It's up to you.

So if you enjoy messing about with your Electron and want to share your discoveries with other Electron users, send them in to us.

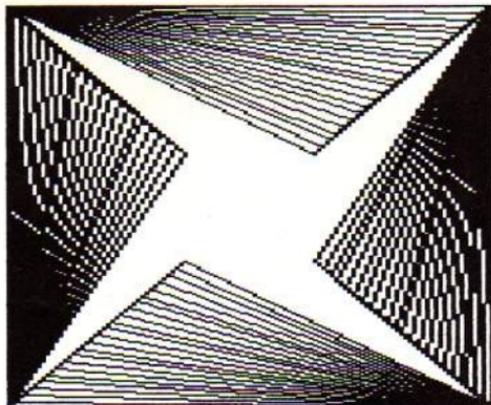


Sounds familiar? Alan Kerr

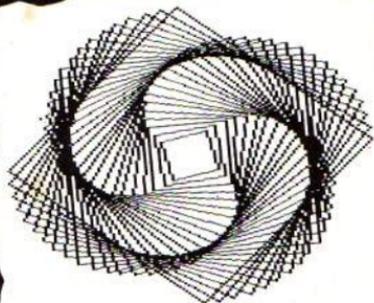
```
10 REM MOONLIGHT SONATA
20 MODE 1
30 VDU 23,1,0;0;0;0;
40 COLOUR 133:CLS
50 COLOUR 2
60 PRINT ***** MOONLIG
HT SONATA BY ALAN KERR*
70 COLOUR 3:PRINT ***
  AND BEETHOVEN*
80 COLOUR 2
90 PRINT *****
WHAT SPEED?
100 COLOUR 4
110 PRINT **
1/10*
120 COLOUR 2
130 PRINT **          FAS
T/SLOW*
140 COLOUR 3
150 INPUT TAB(14,18);Y
160 FOR X=1 TO 160 STEP 4
170 READ D:SOUND 1,-15,D,
Y: NEXT X
180 DATA 28,48,68,28,48,6
0,28,48,68,28,48,68,32,48,6
0,32,48,68,32,52,68,32,52,6
8,28,44,68,28,48,68,28,44,5
6,28,48,68,48,48,48,48
```

Colour graphics from Merton Court school

```
10 REM BOXES
20 REM CLASS J.4 MERTON
COURT SCHOOL, SIDCUP
30 MODE 5
40 VDU 23,1,0;0;0;0;
50 GCOL 1,1
60 FOR X=0 TO 450 STEP 1
5
70 MOVE 0,0
80 MOVE X,X
90 DRAW 900,0
100 DRAW 900-X,1
120 DRAW 900-X,900-X
130 DRAW 0,900
140 DRAW X,900-X
150 DRAW 0,0
160 DRAW X,X
170 DRAW 0,0
180 DRAW 450,0
190 NEXT X
200 REPEAT UNTIL FALSE
```



Send your programs to
Scrapbook, *Electron*
User, 68 Chester Road,
Hazel Grove, Stockport
SK7 5NY.



It's all squares by Jarrod Sanders

```

10 REM SPIRAL
20 REM BY JARROD SANDERS
ON
30 REM BRADFORD
40 r=500
50 MODE 2
60 VDU 23,1,0;0;0;
70 FOR theta=0 TO 360 ST
EP 5
80 x=r*cosradtheta

```

```

90 y=r*sinradtheta
100 MOVE 600*x,500+y
110 DRAW 600-y,500+x
120 DRAW 600-x,500-y
130 DRAW 600+y,500-x
140 DRAW 600*x,500+y
150 BCOL 0,RND(7)
160 r=r-(theta/5)
170 IF r<0 THEN END
180 NEXT theta

```

Tunnel of Doom? By R.Alexander



```

10 REM TUNNEL
20 REM BY R.ALEXANDER
30 REM IPSWICH
40 MODE 1
50 VDU 23,1,0;0;0;0;
60 CX=640
70 CY=512
80 FOR R=50 TO 500 STEP
50
90 GOSUB 120
100 NEXT R
110 GOTO 180
120 FOR X=-R TO R
130 Y=SQR(R*R-X*X)
140 PLOT 69,CX+X,CY+Y
150 PLOT 69,CX-X,CY-Y
160 NEXT
170 RETURN
180 VDU 29,640;512;
190 FOR r=50 TO 500 STEP
50
200 PROCa(r)
210 NEXT r
220 END
230 DEF PROCa(w)
240 MOVE -w,w
250 DRAW -w,-w
260 DRAW w,-w
270 DRAW w,w
280 DRAW -w,w
290 ENDPROC

```

A touch of tartan from St Albans

```

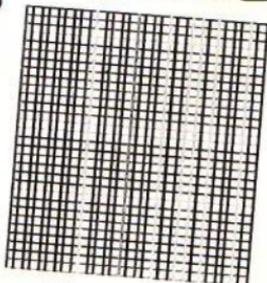
10 REM TARTAN
20 REM by E.Preston
30 REM St.Albans
40 MODE 2
50 VDU 23,1,0;0;0;0;
60 MOVE 300,200
70 DRAW 900,200

```

```

80 DRAW 900,800
90 DRAW 300,800
100 DRAW 300,200
110 FOR Y=200 TO 800 STEP
20
120 BCOL 0,RND(7)
130 MOVE 300,Y:DRAW 900,Y

```



```

140 NEXT
150 FOR X=300 TO 900 STEP
20
160 BCOL 0,RND(7)
170 MOVE X,200:DRAW X,800
180 NEXT

```

MAVIS mole, Martin the manic mole's girlfriend, has been wrongly arrested for leaking documents to the newspapers.

Help Martin collect the 11 jewels needed for her bail by guiding him through a maze of melting platforms, ice, holes, conveyor belts and invisible platforms.

In each room is a single jewel. When you have collected this a door to the next will open. You'd better be quick though. There's not much time, so get cracking!

MANIC MOLE!

Help Martin and Mavis out of their predicament in M.P. O'DONNELL's fast moving maze game



VARIABLES

X%,Y% Coordinates of the mole.
OX%,OY% Old coordinates of the mole.
ix%,iy% Coordinates of the jewel.
room% The room you are in.
room% Number of jewels collected.
jewels% Character number used for mole.
mole% Character number used for mole.
mole% Old character number used for the mole.
mole\$(I) The character used for Mavis.
mavis\$ The character used for the jewel.
gotone\$ Shows whether you have the jewel.

PROCEDURES

PROCchars Defines envelopes and characters.
PROCinit Defines variables.
PROCscreen Draws screen.
PROCplay Main procedure, tests for keys and moves mole.
PROCjump Makes the mole jump.
PROCfall Makes the mole fall.
PROCcheck Checks to see if you are touching the jewel.
PROCinstruct Prints instructions.
PROCclives Tests to see if you have lost all of your lives.
PROClost Tells you that you have lost all your lives.
PROCbang Makes the mole explode.
PROCcage Opens the cage surrounding Mavis.
PROCwon Tells you that you have won.
PROCtune Plays the tune when you free Mavis.
PROCtune2 Plays the tune when you have lost all your lives.
PROCpause Pauses the game until you press R.
PROCskill_level Waits for you to input a skill level.

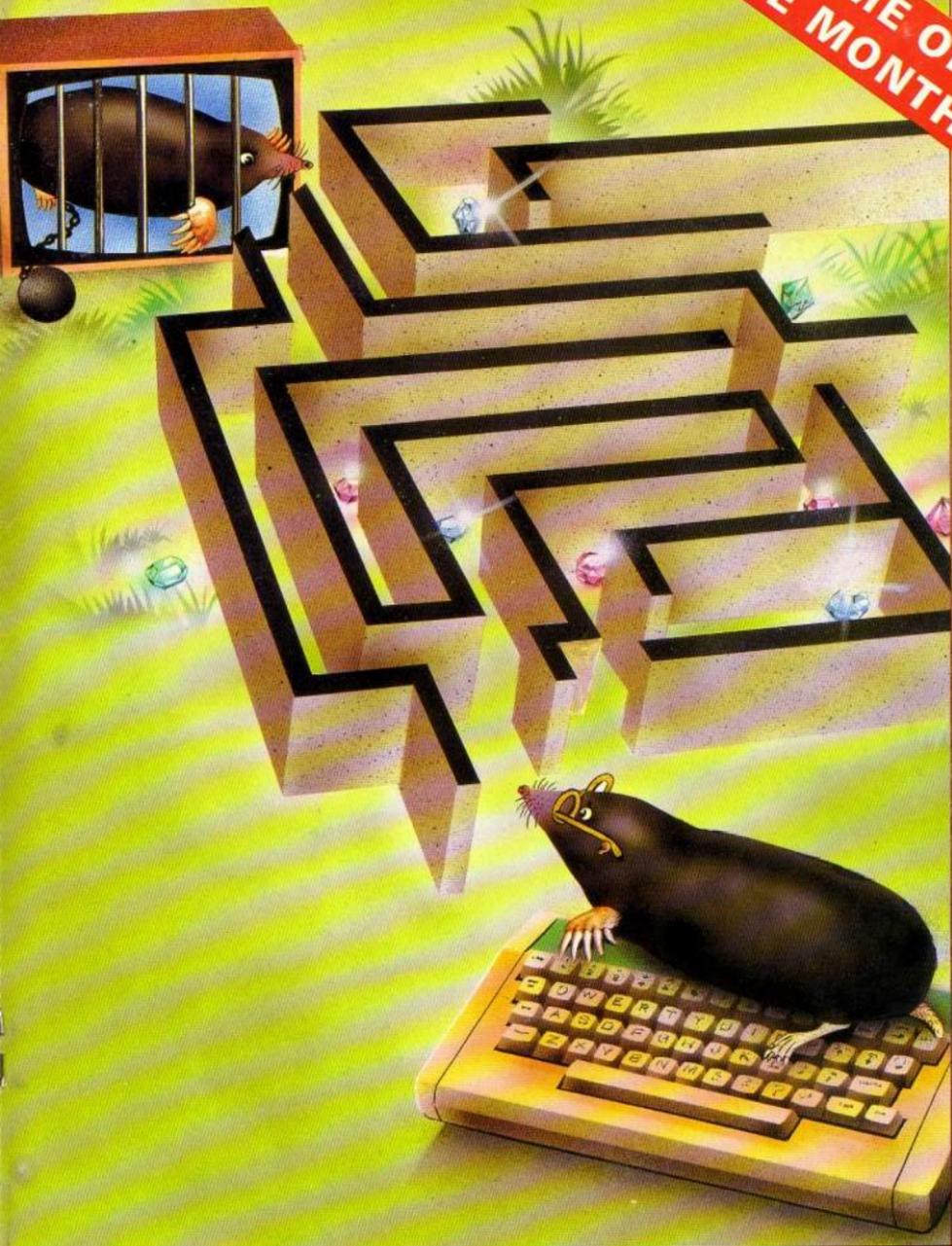
Manic Mole listing

```

10 REM ** MANIC MOLE **
20 REM By M.P.O'Donnell
30 REM (c) Electron User
40 ONERROR IF ERR=17 RUN
ELSE MODE6:REPORT:PRINT* a
t line*;ERL:END
50 DIM mole$(4):vX=1
60 #FX210,0
70 PROCchars
80 MODE4:VDU23;@202;0;0;
0;:PROCinstruct
90 REPEAT
100 roomI=1:jewelsI=0:liv
esI=3:gotoneI=FALSE
110 PROCinit
120 MODE5
130 PROCscreen
140 VDU5
150 REPEAT
160 PROCplay
170 UNTILlostI=TRUE OR wo
nI=TRUE
180 IF wonI=TRUE PROCtune
:MODE4:VDU23;@202;0;0;0;:PR
OCwon
190 IF lostI=TRUE MODE4:V
DU23;@202;0;0;0;:PROClost
200 UNTIL0
210 DEFPROCchars
220 VDU23,224,0,0,14,31,1
19,119,30,14
230 VDU23,225,31,27,59,93
,15,26,17,51
240 VDU23,226,0,0,0,14,31
,119,119,30
250 VDU23,227,14,27,39,31
,31,14,4,12
260 VDU23,228,0,0,112,240
,230,230,120,112
270 VDU23,229,240,216,220
,180,240,80,136,204
280 VDU23,230,0,0,0,112,2

```

**GAME OF
THE MONTH!**



15 full-length programs

designed to stimulate,
educate and entertain
– both in school
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£5.95 Electron
cassette

All necessary instructions are contained within the programs themselves, but more detailed descriptions can be found in **The Micro User Education Special**. Originally written for the BBC Micro, it includes complete listings of all the programs, together with advice on how they can be adapted to cater for individual needs.

Book +
Electron
cassette
£7

Book
only
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MATHS TRIO

Three invaluable elementary maths programs, which give the child guided practice and also graphically demonstrate the reasoning behind the sums.

Tuadd: Teaches how to add up two digit numbers, including carry and is illustrated with animated graphics. At various stages in the addition the child has to tell the Electron what to do next.

Tusub: Covers subtracting two digit numbers where the units won't go. The Electron shows the subtraction in all its stages with graphics designed to illustrate the reasons behind each stage.

Tumult: Helps with elementary multiplication of two digit numbers – in particular where there are 10s to carry.

Calculator: Sums at a stroke! We turn your micro's screen into an easy-to-use calculator.

Table Mountain: Despite ever-changing fashions in maths teaching, tables still have to be learned. This program adds a lively new dimension to what is all too often tedious rote.

Gottit! An intriguing two player word guessing game packed full of educational potential. Has three levels of difficulty.

House: Gentle, pictorial word, number and colour recognition for the very early reader or for those with learning difficulties.

Gallery: Based on a shooting gallery, this typing tutor will not only have parents, teachers and children touch-typing with ease – it's fun, too!

Whatnumber?: 'I'm thinking of a number' is a well known classroom standby. We've taken it much further in this computer version, giving children far more flexibility in their strategy.

Bridge Breaker: Find the hidden word before it is too late. This is an exciting and novel way to reinforce vocabulary and spelling skills.

Snap: Practice vital pre-reading skills with this letter and number recognition game. Also helps develop coordination.

Manipulation: This is a compulsive and thought-provoking maths game. Given the four rules of number and three integers to work with, how close can you get to the target number?

Matrices: Takes the calculations out of matrix manipulation, leaving the student free to understand the underlying concepts. (To obtain the fullest benefit from this program see *The Micro User Education Special*.)

Hidden Answers: Designed to help primary school children understand a maths learning technique called mapping maths. It explores the ideas of mapping with the use of simple number bonds.

Curvefit: Drawing lines of best fit between points, this program will find applications from the infants' class to the sixth form.

Now No. 1 BBC
game on Micro Deal
Top Fifty chart

YOU can go for gold ...with the

MICRO OLYMPICS

Fancy pitting yourself against the world's best at this summer's Olympics?

You can do so without going anywhere near Los Angeles – with the most challenging package of programs of 1984.

MICRO OLYMPICS is more than a game. It's a brilliantly written collection of ELEVEN track and field events.

And because we know we're going to sell many thousands of them we've brought the price right down – to just £5.95.

Ever imagined yourself as another Seb Coe? Then try to run against the world record holder at 1500 metres. And if that distance is too much for you then there's always the 100, 200, 400 and 800 metres to have a go at.

Not much good at running? Don't worry, MICRO OLYMPICS has many more challenges for you. Why not try your skill at the high jump or the long jump?

And if you can't beat the computer at running or jumping then you can always throw things around in frustration! The trouble is that it's just as hard to be a champion at the discus, the hammer or the javelin.

And the pole vault takes the event to new heights!

Yes, it's fast, furious fun, pitting yourself against the world's best times and distances on your micro.

You may not be another Steve Ovett or Alan Wells, but with practice you COULD become the Micro Olympics Champion!

Also available from WH Smith
and all other leading stores



Play Micro Olympics
– and let your fingers
do the running!

Send for it today

Please send me _____ copy/copies of

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<input type="checkbox"/> Electron cassette	£5.95
<input type="checkbox"/> BBC 40-track disc	£7.95
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Please tick box

I wish to pay by
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Signed _____
Name _____
Address _____

Post to: Micro Olympics offer, Database Publications,
68 Chester Road, Hazel Grove, Stockport SK7 5NY

EU7

Manic Mole listing

From Page 33

```

48,238,238,120
 290 VDU23,231,112,216,228
 248,248,112,32,48
 300 VDU23,232,126,255,255
 185,70,255,255,126
 310 VDU23,233,234,170,170
 238,0,0,63,0
 320 VDU23,234,224,64,64,64
 4,0,64,224,64
 330 VDU23,235,8,20,42,117
 87,42,20,8
 340 VDU23,236,28,28,28,28
 29,28,28,28
 350 VDU23,237,255,255,102
 0,0,0,0,0
 370 VDU23,239,14,27,39,31
 31,46,60,0
 380 VDU23,240,255,37,109,
 101,109,36,255,255
 390 VDU23,241,255,187,179
 187,187,145,255,255
 400 VDU23,242,255,255,185
 70,185,70,255,255
 410 VDU23,243,0,54,127,12
 7,127,62,28,8
 420 VDU23,244,0,28,62,238
 238,60,28,0
 430 VDU23,245,0,28,54,70,
 62,28,0,0
 440 VDU23,246,0,0,12,24,1
 6,48,0,0
 450 VDU23,247,0,32,48,16,
 24,0,0,0
 460 ENVELOPE1,1,0,-0,8,4,
 4,4,126,0,0,-126,126,126
 470 ENVELOPE2,0,6,50,0,20
 0,-6,50,0,0,0,0,0,0
 480 mole#(1)=CHR#224+CHR#
0+CHR#10+CHR#225
 490 mole#(2)=CHR#226+CHR#
0+CHR#10+CHR#227
 500 mole#(3)=CHR#228+CHR#
0+CHR#10+CHR#229
 510 mole#(4)=CHR#230+CHR#
0+CHR#10+CHR#231
 520 floor#=CHR#232
 530 roof#=CHR#233
 540 word#CHR#233+CHR#234
 550 jewel#=CHR#235
 560 mv#s=CHR#226+CHR#10
+CHR#0+CHR#239
 570 ENDPROC
 580 DEFPROCinit
 590 XT=64:YX=120
 600 OX%X:OY%Y%

```

```

610 mole%3:omole%4:mole%
620 step%1:facing%2
630 lost%FALSE:won%FALS
E
 640 jumping%FALSE
 650 falling%FALSE
 660 killed%FALSE
 670 highest%FALSE
 680 time%782:flag%0
 690 ENDPROC
 700 DEFPROCscreen
 710 IF room%4 VDU23,242,
255,255,85,170,85,170,85,17
0
 720 IF room%12 VDU23,242
,255,255,85,238,17,157,85,17
55
 730 IF room%11 VDU23,242
,255,255,255,251,129,251,25
7,255,255
 740 IF room%1 OR room%2
OR room%3 OR room%5 OR r
oom%8 OR room%9 OR room%
10 VDU23,242,255,255,185,70
,185,70,255,255
 750 IF room%5 OR room%7
VDU23,242,255,255,199,191,
191,191,255,255
 760 %*%6
 770 VDU4:CLS
 790 COLOUR%:PRINTTAB(2,3)
:jewel%
 800 VDU23:820:0:0:0:
 810 GCOL0,2:MOVE492,896:D
RAW788,996:DRAW788,950:DRAW
492,950:DRAW492,896
 820 COLOUR%
 830 PRINTTAB(0,1)"JEWEL%"
:SPC(2)"TIME":SPC(2)"LIVES"
 840 PRINTTAB(15,3):lives%
 850 COLOUR%
 860 PRINTTAB(0,5):floor%:
TAB(18,5):floor%:FORP%1 TO
17:PRINTTAB(PX,5):roof%:HEX
T
 870 FORP%6 TO 30:PRINTTA
B(0,PX):floor%:TAB(18,PX):flo
or%:NEXT
 880 IF room%1 RESTORE213
0
 890 IF room%2 RESTORE215
0
 900 IF room%3 RESTORE216
0
 910 IF room%4 RESTORE219
0
 920 IF room%5 RESTORE220
0

```



```

 930 IF room%8 RESTORE222
0
 940 IF room%7 RESTORE224
0
 950 IF room%8 RESTORE227
0
 960 IF room%9 RESTORE229
0
 970 IF room%10 RESTORE23
20
 980 IF room%11 RESTORE23
48
 990 IF room%12 RESTORE23
68
 1000 GCOL0,2:VDUS:READ j%
:jv%:d%:IF oqone%FALSE
MOVEj%,jv%:PRINTjewel%
1010 VDU19,1,2,0,0,0,2,19,2
,d%,0,0,0,19,3,d%,0,0,0
1020 VDU4
 1030 COLOUR:REPEAT:READ %
%,v%,i%:FORP%2 TO %+1%:P
RINTTAB(OX,v%):CHR#242:NEXT:
UNTIL%1 AND %30 AND %3=
0
 1040 IF room%12 COLOUR%P
RINTTAB(15,9):navis%:TAB(14
,5):CHR#240+CHR#241:GCOL0,2:
MOVE922,832:DRAW922,850:MOV
E992,872:DRAW992,850:MOVE89
2,828:DRAW992,800:GCOL3,1:M
OVE910,764:DRAW910,764:FOR
PX=920 TO 1000 STEP 22:MOVE
PX,760:DRAWPX,670:NEXT
 1050 VDU5
 1060 GCOL3,2:MOVE64,128:PR
INTTAB(3)
 1070 IF room%9 VDU19,1,0,
0,0,0
 1080 IF oqone%TRUE VDU4:
PRINTTAB(18,28)" :TAB(18,2
9)" :VDUS:MOVE1100,60:GCOL
0,d%:PRINTword%
 1090 ENDPROC
 1100 DEFPROCplay
 1110 rx%0
 1120 IF INKEY(-56) PROCpau
se
 1130 flag%flag%+1:IF flag
%>skill% flag%1
 1140 IF time%>504 SCOL0,2:
MOVETIME%:900:DRAMTIME%:946
:IF flag%1 time%time%2:1
F time%>504 killed%TRUE
 1150 IF lives%>0 lost%TRU
E:ENDPROC
 1160 OX%X:OY%Y%
 1170 omole%4:mole%
 1180 IF YX%64 killed%TRUE
:GOTO1230
 1190 IF jumping%TRUE AND
oqone%FALSE PROCcheck:GOT
O 1390
 1200 IF jumping%TRUE AND
oqone%TRUE GOTO 1390
 1210 IF falling%TRUE AND
oqone%FALSE PROCcheck:GOT
O 1400
 1220 IF falling%TRUE AND
oqone%TRUE GOTO1400
 1230 IF killed%TRUE lives
%>lives%-1:PROCban:PROCcliv

```

Manic Mole listing

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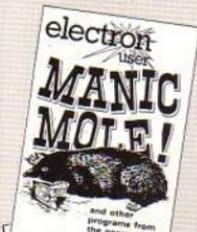
1240 IF POINT(X*32,Y*70)
=0 fallingX=TRUE
1250 IF YX<130:IF roomX=4
MOVEX,YX-68:GCOL0,0:PRINTC
HR#236
1260 IF roomX=5 OR roomY
=71 AND YX<64 AND X<1088 YX
=X*MX:GOTO1290
1270 MX=0
1280 IF roomX=11 AND X<10
88 X=X+X+16:MX=16:rZ=1:faci
ngZ=2
1290 IF INKEY(-98) AND X<
64 X=X-5X:MX=16:facingZ=
1:stepZ=stepZ+1:IF stepZ=3
stepZ=1
1300 IF INKEY(-67) AND X<
1088 X=X+5X:MX=16:facingZ
=2:stepZ=stepZ+1:IF stepZ=3
stepZ=1
1310 IF roomX=12 AND X<=8
16 AND YX=736 wonX=TRUE:PR
OCcage:ENDPROC
1320 IF X<10 AND roomY<5
AND roomX<7 AND rX<1:SDU
ND1.1,YZ/4,1
1330 IF YX<1088 AND YX=12
8 AND gotoneX=TRUE AND room
X<12:roomY=roomY+1:PROCini
tgotoneX=FALSE:PROCscreen:
ENDPROC
1340 IF INKEY(-1) jumpingZ
=TRUE:oyZ=YX
1350 IF stepZ=2 AND facing
Z=1 moleZ=1
1360 IF stepZ=1 AND facing
Z=1 moleZ=2
1370 IF stepZ=2 AND facing
Z=2 moleZ=2
1380 IF stepZ=1 AND facing
Z=2 moleZ=3
1390 IF jumpingZ=TRUE fall
ingZ=FALSE:PROCjump
1400 IF fallingZ=TRUE jump
ingZ=FALSE:PROCfall
1410 BCOL3,2:MOVEOX,YX:P
RINTtoef(omoleZ)
1420 MOVEX,YX:PRINTtoef(
moleZ)
1430 ENDPROC
1440 DEFPROCjump
1450 IF YX=oyZ+96 OR POIN
T(X*32,Y*2)=1 OR YX=816
highestX=TRUE:IF roomX=0 VD
U19.1,1,0,0,0
1460 IF highestX=FALSE YX=
YZ+32
1470 IF POINT(X1+32,YX-70)
=1 highestX=TRUE
1480 IF POINT(XX+32,YX-70)
=1 jumpingX=FALSE:highestX=
FALSE:IF roomX=0 VDUI9.1,0
,0,0,0
1490 IF highestX=TRUE YZ=Y
Z-16
1500 SOUND1.1,YZ/4,1
1510 IF YX<64 AND X<1088
X=X+X+MX
1520 IF YX=1152 AND YX=128
roomX=roomX+1:PROCscreen:P
ROCinit
1530 ENDPROC
1540 DEFPROCfall
1550 SOUND1.1,YZ/4,1
1560 YZ=YZ-16
1570 IF POINT(XX+32,YX-70)
=1 fallingX=FALSE
1580 ENDPROC
1590 DEFPROCcheck
1600 IF X1+32=jx+X AND X1+
32<=jxX+64 AND YZ=64<=jyZ-3
2 AND YZ=jyX jewelsX=jewel
sX+1:BCOL3,2:MOVEjxX,jyX:PR
INTjewelX:gotoneZ=TRUE:VDU4
:COLOUR2:PRINTTAB(2,3):jewe
lsX=jxX-200:GOUND1.2,50,4:
PRINTTAB(18,20)"*TAB(18,2
9)" :VDU5
1610 IF gotoneX=TRUE MOVE1
00,60:GCOL0,d1:PRINTword#
1620 ENDPROC
1630 DEFPROCinstruct
1640 VDUI9.3,6,0,0,0:PRINT
TAB(12,1)"MANIC MOLE!"
1650 PRINT"MAvis mole,you
r girlfriend,has been""wr
ongly arrested for leaking
documents""to a paper,Hel
p Martin the manic mole""
collect 11 jewels for her b
ail."
1660 PRINT""If you have
the jewel,go through the""
"door on the right of the s
creen and you""will come
out in another room."
1670 PRINT""2 ..... LEFT
""X ..... RIGHT""SHIFT
.. JUMP""P ..... PAUSE"
""R ..... RESUME"
1680 PRINTTAB(15,29)"Press
SPACE":REPEATUNTILGET=32:C
LS
1690 PRINT""SCREENS":COLO
UR1:PRINT"" 1 = The Quest
begins"" 2 = The Bottoe
ss Pit"" 3 = The Impossi
le Screen"" 4 = The Mel
ting Girder"" 5 = The Frid
ge Part 1""
1700 PRINT"" 6 = The Snake"
"" 7 = The Fridge Part 2"
"" 8 = The Disappearing S
creen"" 9 = The Invisible S
creen"" 10 = The Trap"" 11
= Conveyor Corner"" 12 =
The Prison"
1710 PRINTTAB(15,29)"Press
SPACE":REPEATUNTILGET=32:C
LS
1720 PRINT""While the gam
e is paused you can turn""
"the sound on/off by pressi
ng:""S .... ON""O ....
OFF"
1730 PRINT""SPC(8):"Enter
skill level 1-5""The low
er the skill level the slow
er the"SPC(9):"time limit
goes down."*REPEAT skillZ=6
ET-40:UNTILskillZ=0 AND ski
llZ=skilZ+7-skillZ
1740 ENDPROC
1750 DEFPROCclives
1760 IF livesZ=0 ENDPROC
1770 PROCscreen:PROCinit:E
NDPROC
1780 DEFPROClost
1790 VDUI9.3,6,0,0,0:PRINT
TAB(12,1)"Bad Luck!"
1790 PRINT""You
didn't free Mavis but you
reached""screen "roomZ":
""*PROCtune2:PRINT""SPC(5)
:"Press 1-5 to play again":
PROCskill1:level:ENDPROC
1800 DEFPROCbangq=16:uX=
48:FORP=4707:SOUND0,-15,P,3
:NEXT:TX=0:BCOL3,2
1810 MOVEOX,YX:PRINTwole
$(omoleZ):AX=YX,BZ=YX:CX=
DX:YX=EX:YX=FX:YX=GX:YX=
HX:YX=IY:REPEAT TX=TX+1:AX=
AX+qX:BY=BY+uX:CX=CX+qX:DX=
DX+uX:EX=EX+(qX*2):FX=FX+(uX*2):
GX=GX+(qX*2):HX=HX+(uX*2)
1820 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1830 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1840 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1850 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1860 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1870 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1880 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1890 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1900 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1910 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1920 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1930 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1940 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1950 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1960 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1970 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1980 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
1990 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2000 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2010 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2020 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2030 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2040 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2050 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2060 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2070 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2080 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2090 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2100 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2110 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2120 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2130 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2140 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2150 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2160 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2170 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2180 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2190 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2200 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2210 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2220 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2230 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2240 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2250 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2260 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2270 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2280 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2290 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2300 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2310 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2320 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2330 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2340 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2350 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2360 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2370 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2380 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2390 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2400 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2410 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2420 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2430 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2440 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2450 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2460 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2470 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2480 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2490 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2500 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2510 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2520 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2530 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2540 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2550 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2560 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2570 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2580 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2590 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2600 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2610 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2620 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2630 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2640 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2650 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2660 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2670 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2680 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2690 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2700 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2710 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2720 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2730 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2740 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2750 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2760 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2770 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2780 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2790 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2800 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2810 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2820 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2830 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2840 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2850 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2860 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2870 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2880 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2890 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2900 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2910 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2920 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2930 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2940 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2950 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2960 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2970 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2980 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
2990 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245
3000 MOVEAX,BX:GCOL3,2:VDU
244:MOVECX,DZ:VDU247:MOVEEY
,FZ:VDU246:MOVEGX,HX:VDU245

```


Listings

Save yourself the chore of typing in listings by sending for our monthly tapes, packed with games, utilities, graphics and other programs from the pages of *Electron User*.

ONLY
£3.75
each



On the July 1985 tape:
MANIC MOLE Machine code action at its best. **HIGHER OR LOWER** Guess the card. **TIME BOMB** Carefully collect TNT. **M/COE** GRAPHICS Two demonstrations. **FK172** The OS on call. **PIRATS** MATHS Sun fun. **NOTEBOOK** Password Generator.

On the June 1985 tape:
QUASIMODO Bellingring classic. **DISASSEMBLER** Machine code utility. **ACTIVITIES** Educational fun. **REFLECT** Aggressive aliens. **ENGINE** Animation. **DODGE** Race track action. **STRINGALONG** Scrolling fun. **CASLE** Medieval graphics. **MATHS CURVE** Angles and art. **NOTEBOOK** Trees.

On the May 1985 tape:
SKRAMBLE! Compulsive arcade action. **SHEEPNIM** The logic game. **TEXTWRITER** Screen utility. **LIFE** A cultured classic. **CEDRIC** Educational fun. **THREE-D** Outstanding utility. **SPOKES** Fascinating graphics. **MOONORBIT** Heavenly displays. **BLAZON** Heraldic devices. **FLOWERS** A basic bouquet. **NOTEBOOK** Annotated animation.

On the April 1985 tape:
SUPER ARCHER Target practice. **BINARY SEARCH** Searches data efficiently. **JOYPLUS** Switched joystick routine. **ODD ONE OUT** Educational fun. **POLYGONS** 3D rotation. **MONEY CRAZY** Arcade action. **STARCHART** The night sky. **FORTUNE TELLER** Horoscope. **COLLISION DETECTION** Alien invaders. **HILO** Guessing game. **NOTEBOOK** K helix to assembler.

On the March 1985 tape:
MR. FREEZE Ice cube arcade action. **SCREENDUMP** Two procedures for printer dumps. **FILLER** The machine code fill routine. **FRED'S WORD GAME** Educational fun. **BIG LETTERS** Large text utility. **RECY** Beat the burning fuse. **ANIMATION** Two example programs. **PIGS** Frying bacon. **NOTEBOOK** Display formatting.

On the February 1985 tape:
CRAAL The mystifying maze.

adventures. **BOUNCY** Addictively annoying action. **PAIRS** Can you remember the cards? **BASE A**. Binary-style sadomasochistic conversation utility. **CATCHER** Collect the eggs before they break. **CLOCK** Time keeping utility. **RACER** Grand Prix action. **NOTEBOOK** Graphics windows. **TRIG** All the right angles.

On the January 1985 tape:
SPACE BATTLE Destroy the deadly descending aliens! **NEW YEAR** A sound and graphics greeting. **ESCAPE FROM SCARGOV** Minefield action. **PIE CHART** Statistics made simple. **CLAYPIGION** An Electron basketball. **ORGAN** Music maestro please! **NOTEBOOK** An original program. **RANDOM NUMBERS** Or not so random! **SNAKES** Reptilian arcade action. **CHEESE RACE** Boat race mice.

On the December 1984 tape:
CHRISTMAS BOX Align the presents logically. **SILLY SANTA** Spin out the muddle. **SNAP** Match the Xmas pictures. **RECOVERY** The Best Program message terminated. **CAROL** Internet driven music. **AUDIODATA** A program that grows and glows. **NOTEBOOK** Simple sifting handling.

On the November 1984 tape:
STAR FIGHTER Anti-alien missions. **SCROLLER** RVs around machine code. **UREAN SPRAWL** Environmental action game. **SPELL** Alphabetic education. **JUMPER** Level-headed action. **CAESAR** Code breaking program. **KEYBOARD** Typing game.

On the October 1984 tape:
BREAKFREE Classic arcade action. **ALPHASAP** A logic game to strain your brain. **SOUND GENERATOR** Tame the Electron's sound channels. **MULTICHARACTER GENERATOR** Graphic characters made simple. **RIGEL 5** Out of this world graphics. **MAYDAY** Help with your memo code. **NOTEBOOK** Palindromes and string handling.

On the September 1984 tape:
HAUNTED HOUSE Arcade action in the spirit world. **SPLASH** A logic game for non-swimmers. **SORT SHOWS** How sorting algorithms

work. **SORT TIME** The time they take. **CLASSROOM INVADERS** Multicoloured characters go to school. **SAILORS** Nautical antics. **MATHS TEST** Try out your mental powers.

On the August 1984 tape:
SANDCASTLE The Electron seaside outing. **KNOCKOUT** Bouncing balls batter brick walls. **PARACHUTE** Keep the skydivers dry. **LETTERS** Large letters for your screen. **SUPER-SPELL** Test your spelling. **ON YOUR BIKE** Pedal power comes to your Electron. **SCROLLER** Slices strings while skydiving. **FLYING PIGS** Bacon on the wing.

On the July 1984 tape:
GOLF A day on the links with your Electron. **SOLITAIRE** The classic solo logic game. **TALL LETTERS** Large characters made simple. **BANK ACCOUNT** Keep track of your money. **CHARTIST** 3D graphs. **FORMULAE** Areas, volumes and angles.

On the June 1984 tape:
MONEY MAZE Use the ghosts to get the cash. **CODE BREAKER** A mappermind is needed to crack the code. **ALIEN** See the great men - the Electron way! **SETUP** Colour commands without bars. **CRYSTALS** Scientific graphics. **LASER SHOOT OUT** An interplanetic shooting gallery. **SMILER** Have a smile a day!

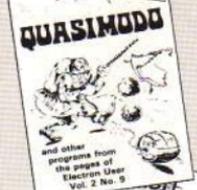
On the May 1984 tape:
RALLY DRIVER High speed car control. **SPACE PODS** More aliens to annihilate. **CODES** Secret messages made simple. **FRUIT MACHINE** Spin the wheels to win. **CHASER** Cross your opponent to survive. **TIC-TAC-TOE** Electron thoughts and crosses. **ELECTRON DRAUGHTSMAN** Create and save Electron masterpieces.

On the April 1984 tape:
SPACEHIKE A hopping arcade classic. **FREEZE** Electron wallpaper. **FELICIA** Cross roads safely. **CHESTTIMER** Clock your moves. **ASTEROID** Space is a minefield. **LIMERICK** Automatic rhymes. **ROMAN** Numbers in the ancient way. **BUNNYBLITZ** The Easter program. **DOODUCK** The classic logic game.

On the March 1984 tape:
CHICKEN Let dangerous drivers test your nerve. **COFFEE** A tantalising word game from Down Under. **PARKY'S PERIL** Parky's lost in an invisible maze. **REACTION TIMER** How fast are you? **BRAINEASER** A puzzling program. **COUNTER** Arithmetic can be fun! **PAPER, SCISSORS, STONE** Out-guess your Electron. **CHARACTER GENERATOR** Create shapes with this utility.

On the February 1984 tape:
NUMBER BALANCE Test your powers of mental arithmetic. **CALCULATOR** Your Electron's calculator. **DOOLIES** Multicoloured patterns galore. **TOWERS OF HANOI** The age old puzzle. **UNAR LANDER** Test your skill as an astronaut. **POSITION INVADERS** A version of the old arcade favourite.

On the introductory tape:
ANAGRAM Sort out the jumbled letters. **DOODLE** Multicoloured graphics. **DUOMAP** Test your geography. **KALEIDOSCOPE** Electron graphics run riot. **CAPITALS** New upper case letters. **ROCKET WHEELS** Countdown. Three fireworks programs. **BOMBER** Drop the bombs before you crash. **DUCK** Simple animation. **METEORS** Collisions in space.



Use the order form on page 61

Notebook Part 18

PASSWORD GENERATOR

RECENTLY, and much against my will as it means using a BBC Micro, the firm gave me a mailbox on Telecom Gold.

"What's your password going to be?" they asked. And my mind went blank.

It's not easy picking a password that can be remembered and that no one will guess. So I took my problem to my micro and the result was this Password Generator.

PROGRAM EXPLANATION

10-30 REMs to tell you what the program is called, who wrote it and a line to switch off the flashing cursor.

40 Sets up the string variable *possible\$*. In this case I've just used it to store the upper case letters of the alphabet. You might want to set up your own range of letters to fool amateur cryptographers.

50,60 Ask you how long the password is to be and puts the result in *number*. The next line is a mugtrap, making sure that you can't put in values that are less than one or go over 10 letters. If this happens the program goes back to the previous line.

70-180 Form the major REPEAT...UNTIL loop of the program. This goes round and round, producing a different password each time, until it's told that you're satisfied with the password.

80 The string variable *word\$*, which is later to be used to store the letters of the password, is set to the null string at the beginning of the loop. Leave this line out and see what happens.

90-120 Make up a loop which cycles once for each letter of the password. Each time round the loop a letter is chosen and added to *word\$*.

100 All this formidable line does is to pick a random whole number lying between 1 and the length of *possible\$* and store it in *chance*.

110 The MIDS function uses *chance* to pick one letter out of *possible\$*. It then adds this to the end of *word\$*. In this way *word\$* is made up of a random selection of letters selected from *possible\$*.

130,140 Display the password generated and ask if you like it, prompting a single letter reply.

150 Uses GETS to store the reply in *result\$*.

160 Another mugtrap. It uses INSTR to check whether *result\$* is one of the four letters YyNn. If not, the GOTO has the program asking you again.

180 By the time the program gets this far, *result\$* must hold one of the letters YyNn. If it's N or n the loop goes round again, producing another password, otherwise it ends.

190 Displays your chosen password.

Letters
password is
selected from

Cycles
until you're
satisfied

Mugtrap #1

Null string will be
used to store letters

Picks a random
letter and uses
it to build the
password

Mugtrap #2

```
10 REM Password generato
r
20 REM Trevor Roberts
30 VDU 23,1,0:0:0:0
40 possible$="ABCDEFGHJI
KLMNOPQRSTUVWXYZ"
50 INPUT "Number of lett
ers in word", number
60 IF number<10 OR numbe
r<1 THEN PRINT "Twit":GOTO
50
70 REPEAT
80 word$=""
90 FOR cycle= 1 TO numbe
r
100 chance=INT(RAND*IEN(po
ssible$))
110 word$=word$+MID$(poss
ible$,chance,1)
120 NEXT cycle
130 PRINT word$
140 PRINT "Do you want th
is word? Y/N"
150 result$=GET$
160 IF INSTR("YyNn",resul
t$)=0 THEN PRINT "Twit":GOTO 140
170 CLS
180 UNTIL INSTR("Yy",resu
lt$)<>0
190 PRINT "Your password
is "word$
```

Trevor Roberts

LIFE's not easy for Derek. He was quite happily sailing along on the SS Database when he was attacked by Captain Pinkbeard, of the pirate ship Redwood.

Derek's crew were taken prisoner and all his treasure became the pirate's booty.

That night Captain Pinkbeard and his buccaneers got drunk to celebrate their victory. And for entertainment they decided to test out Derek's mathematical abilities.

They'd ask him some questions and, if he got them right, his ship, crew and treasure would be returned.

But if he got five or more wrong he'd have to walk the plank and feed the sharks.

This is where you, as Derek, come on the scene. Get the answers wrong and he'll go for a sharky swim. But answer them correctly and he could live to be 80!

Jason Cann

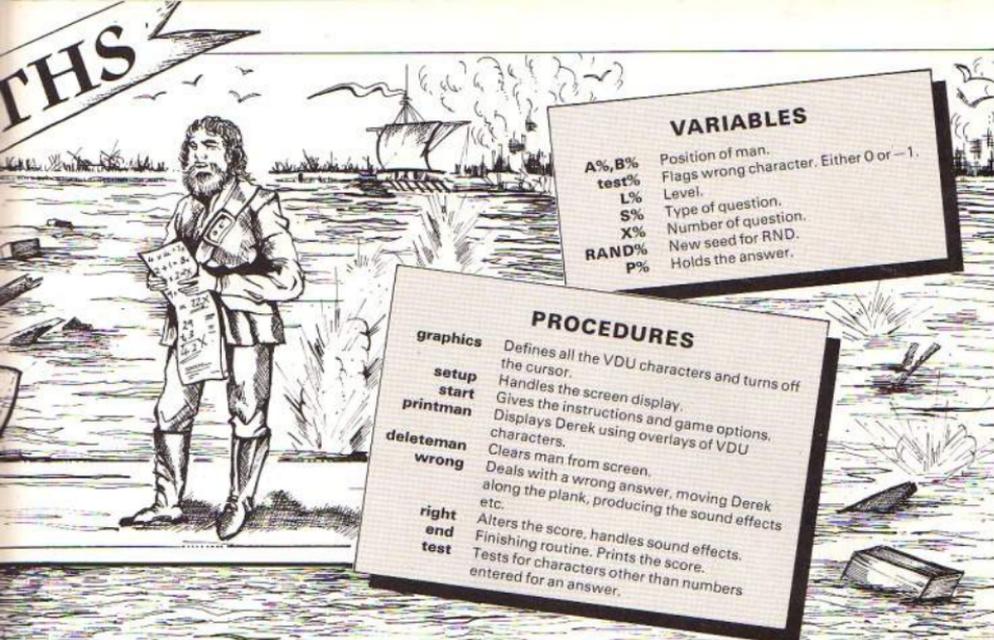


Pirate Maths listing

```

10REM *****      0,1950      4106COL0,1:MOVE390,930:VD
*****      210CLS      U240
20REM *      220PROCend      4206COL0,7:MOVE432,1000:V
*      230RUN      DU224
30REM * (C)ELECTRON      4306COL0,5
USER *      240*****      440MOVE92,450:MOVE232,300
40REM * PIRATE MAT      :PLOT81,0,150
HS. *      250DEFPROCsetup      450MOVE92,450:DRAW0,470
*      260COLOUR11      460MOVE730,450:MOVE590,45
50REM * BBC/ELECTR      0:PLOT81,0,-150
ON. *      270PRINTAB(4,31)*PLEASE
*      WAIT*;      470MOVE730,450:DRAW1000,4
60REM * 1985      280VDU5      50:MOVE730,446:DRAW1000,446
*      290AX=760:V=0:BX=400:FX=0      480MOVE232,300:MOVE232,45
70REM *      300FORNX=1T07:VDU19,NX,0;      0:PLOT81,366,0
*      0:NEXT      490MOVE232,300:MOVE590,45
80REM *****      310*FX19      0:PLOT81,0,-150
*****      3206COL0,1      5006COL0,6:MOVE1140,337:V
90      330MOVE92,400      DU231,232:MOVE1140,360:VDU
100ONERRORRUN      340MOVE392,400      29,230
110*FX200 1      350PLOT81,0,400      5106COL0,1:MOVE1140,360:V
120*KEY10*OLD:M:RUN:M*      360MOVE430,400      DU233:MOVE1140,337:VDU234
130MODE5      370MOVE430,800      5206COL0,4:MOVE1200,360:V
140PROCgraphics      380PLOT81,300,-400      DU235
150PROCstart      3906COL0,6      5306COL0,4:A#-STRING#(20,
160MODE2      400MOVE400,450:PLOT1,0,55      CHR#225):MOVE0,325:PRINT#
170PROCcurs      0:MOVE416,450:PLOT1,0,550:6      540FORIX=10T0650STEP90:M
180PROCsetup      COL0,3:MOVE424,1000:DRAW500      OLEX,430:6COL0,1:VDU236:6C
190PROCPrintean      1000:DRAW500,964:DRAW424,9      OL0,7:MOVEIX,430:VDU237:6C
200ON#Z0SUB1400,1630,179      64

```



VARIABLES

- A%, B% Position of man.
- test% Flags wrong character. Either 0 or -1.
- L% Level.
- S% Type of question.
- X% Number of question.
- RAND% New seed for RND.
- P% Holds the answer.

PROCEDURES

- graphics Defines all the VDU characters and turns off the cursor.
- setup Handles the screen display.
- start Gives the instructions and game options.
- printman Displays Derek using overlays of VDU characters.
- deleteman Clears man from screen.
- wrong Deals with a wrong answer, moving Derek along the plank, producing the sound effects etc.
- right Alters the score, handles sound effects.
- end Finishing routine. Prints the score.
- test Tests for characters other than numbers entered for an answer.

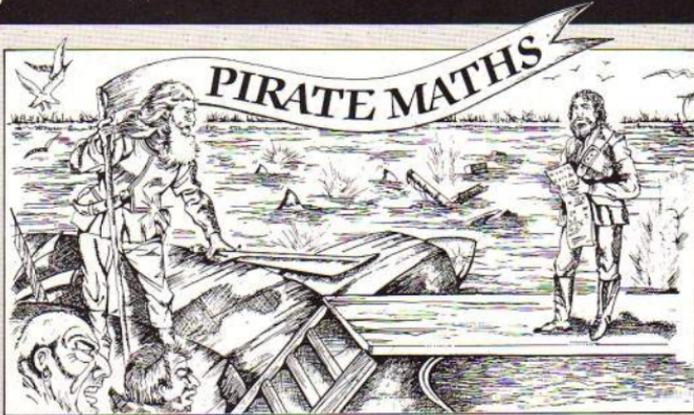
```

7,3,1,0
720VDU23,220,0,126,252,24
0,224,240,240,36
730VDU23,229,40,124,127,6
3,63,31,31,15
740VDU23,230,0,0,0,128,19
2,96,176,00
750VDU23,231,15,7,7,3,127
,127,62,31
760VDU23,232,240,252,252,
254,190,110,223,191
770VDU23,233,0,0,0,64,0,3
2,0,16
780VDU23,234,0,0,0,0,0,0,0
,0,0
790VDU23,235,0,0,0,0,0,12
0,64,32
800VDU23,236,255,129,129,
129,129,129,129,255
810VDU23,237,0,0,24,36,36
,24,0,0
820VDU23,238,126,102,90,9
0,102,126,0,0
830VDU23,239,0,0,0,0,255,
129,255,129
840VDU23,240,255,255,255,
255,255,126,60,24
850VDU23,241,16,16,16,16,
146,146,124,16
860VDU23,242,0,16,40,40,1
6,16,16,16
870VDU23,243,0,112,120,11
2,32,0,32,32
880VDU23,244,32,32,0,0,0,
0,0,48
890VDU23,245,0,0,0,0,0,11
2,112,112
900VDU23,246,112,112,0,0,
0,0,0,0
910VDU23,247,0,0,32,32,32
,32,32,0
920VDU23,248,112,96,96,64
,0,0,0,0
930VDU23,249,0,0,60,0,0,0
,0,0
940VDU23,250,2,2,2,0,0,0,
0,0
950VDU23,251,16,16,0,254,
254,0,16,16
960ENDPROC
970*****
980DEFPROCprintman
990VDUS
1000MOVEAX,BX:BCOL0,4:VDU2
46:MOVEAX,BX+33:VDU245
1010MOVEAX,BX:BCOL0,2:VDU2
47
1020MOVEAX,BX:BCOL0,3:VDU2
44
1030MOVEAX,BX+33:VDU243
1040MOVEAX,BX+33:BCOL0,1:V
DU240
1050TFV=1MOVEAX,BX:BCOL0,2
:VDU249:BCOL0,3:MOVEAX,BX:V
DU250:FORM=1TO100:NEXT
1060VDU4
1070ENDPROC
1080*****
1090DEFPROCdeleteman
1100VDUS
1110MOVEAX,BX:BCOL0,0:VDU2
26
1120MOVEAX,BX+33:VDU226
1130VDU4
1140ENDPROC
1150*****
1160DEFPROCstart
1170VDU19,3,3;0;
1180PROCcurs
1190COLOUR1
1200PRINT " PIRATE MATH
S"
1210COLOUR2
1220PRINT "Help Fred ans
er all"
1230PRINT"the questions. E
ach"
1240PRINT"time he doesn't
say"
1250PRINT"the correct ans
wer"
1260PRINT"he will have to
walk"
1270PRINT"one step nearer
to"
1280PRINT"the end of the
plank"
1290PRINT"and the hungry s
hark"
1300PRINT"in the water."
1310COLOUR1:PRINT "" BY
JASON CANN"
1320COLOUR3
1330PRINTTAB(0,20)"WHAT LE
VEL (1-5) ?"
1340PRINTTAB(0,30)" 1=EAS
Y, 5=HARD"
1350VDU7
1360FX21,0
1370LX=GET

```

Pirate Maths listing

From Page 43



```

1300IFL<490RL>S3THEN1370
1390L=LX-48
1400CLS:PRINT SPC(6) "LEVEL
;LX;FORN=1TO4:COLOUR1:RE
ADA#:PRINTAB(8,NX*6);"(;N
X;";":COLOUR2:PRINTAB(4,NX
*6);A#:NEXT
1410VDU7
1420*FX21,0
1430SX=GET:IFSX<490SX>S2T
HEN1430
1440SX=SX-48
1450DATAMULTIPLYING TEST,D
IVISION TEST,ADDING TEST,S
UBTRACTING TEST
1460ENDPROC
1470*****
1480FORX=1TO10
1490RAND=RND(-TIME)
1500N1=INT(RND(LX*6)):N2X
=INT(RND(LX*6))
1510:CLS:PRINT "WHAT IS"
1520PRINT:PRINT;N1; " x
;N2; " = ";
1530*FX21,0
1540INPUTAB(10,2)X#
1550PROCtest
1560IFtestX=1THEN1510
1570X=VALX#:PX=N1*N2:IF
DX=P2PROCRight ELSEPROCwron
g:PRINT " W R O N G " :PRI
NT;N1; " x " ;N2; " = ";P
X
1580*FX21,0
1590WAIT=INKEY(300)
1600NEXT
1610RETURN
1620*****
1630FORX=1TO10
1640RAND=RND(-TIME)
1650N1=INT(RND(4,4* LX)):N
2X=INT(RND(4,4* LX))
1660PX=N1*N2X
1670:CLS:PRINT "WHAT IS"
1680PRINT:PRINT;PX; " ;CH
R$(251); " ;N2; " = ";
1690*FX21,0
1700INPUTAB(10,2)X#
1710PROCtest
1720IFtestX=1THEN1670
1730X=VALX#:IFOX=N1PROCR
ight ELSEPROCwrong:PRINT "
W R O N G " :PRINT;PX; "
;CHR$(251); " ;N2; " = ";
N1X

```

```

1740*FX21,0
1750WAIT=INKEY(300)
1760NEXT
1770RETURN
1780*****
1790FORX=1TO10
1800RAND=RND(-TIME)
1810N1=INT(RND(LX*6)*LX):
N2X=INT(RND(LX*6)*LX)
1820PX=N1*N2X
1830:CLS:PRINT "WHAT IS"
1840PRINT:PRINT;N1; " *
;N2; " = ";
1850*FX21,0
1860INPUTAB(10,2)X#
1870PROCtest
1880IFtestX=1THEN1830
1890X=VALX#:IFOX=P2PROCRi
ght ELSEPROCwrong:PRINT " W
R O N G " :PRINT;N1; " *
;N2; " = ";PX
1900*FX21,0
1910WAIT=INKEY(300)
1920NEXT
1930RETURN
1940*****
1950FORX=1TO10
1960RAND=RND(-TIME)
1970N1=INT(RND((15)*LX)):
N2X=INT(RND(N1X))
1980PX=N1*N2X
1990:CLS:PRINT "WHAT IS"
2000PRINT:PRINT;N1; " -
;N2; " = ";
2010*FX21,0
2020INPUTAB(10,2)X#
2030PROCtest
2040IFtestX=1THEN1990
2050X=VALX#:IFOX=P1PROCRi
ght ELSEPROCwrong:PRINT " W
R O N G " :PRINT;N1; " -

```

```

;N2; " = ";PX
2060*FX21,0
2070WAIT=INKEY(300)
2080NEXT
2090RETURN
2100*****
2110DEFPROCwrong
2120V=1:PROCPrintean
2130PROCdeleteean
2140AX=AX+44:V=0
2150PROCPrintean
2160IFAX=1032THEN2320
2170FORV=100TO8STEP-5
2180SOUND1,-15,VX,1
2190NEXT
2200ENDPROC
2210*****
2220DEFPROCRight
2230PRINT " I G H T "
2240FORV=50TO120STEP10
2250SOUND1,-15,VX,1
2260SOUND1,-15,VX-10,1
2270SOUND1,-15,VX-20,1
2280NEXT
2290FX=FX+1
2300ENDPROC
2310*****
2320ENVELOPE1,129,-1,-1,
,78,60,0,126,0,0,-126,126,
126
2330SOUND1,1,230,40
2340FORN=1TO6
2350PROCdeleteean
2360BX=BZ-20
2370*FX19
2380PROCPrintean
2390NEXT
2400PROCdeleteean
2410SOUND0,-15,5,20
2420FORN=1TO1000:NEXT

```

```

2430RETURN
2440*****
2450DEFPROCend
2460PRINT " YOU HAVE S
CORED " ; " ;FX*10; "X
" " " ON LEVEL ;LX
2470FORM=1TO4:FORCX=150TO
00STEP10:SOUND1,-15,CX,1:NE
XT:FORCX=200TO150STEP-10:SO
UND1,-15,CX,1:NEXT
2480*FX21,0
2490WAIT=GET
2500ENDPROC
2510*****
2520DEFPROCcurs
2530BVDUZ(1,0;0;0;0;
2540*FX19
2550*FX10 1
2560*FX4,2
2570*FX225
2580*FX226
2590*FX227
26000=0
2610ENDPROC
2620*****
2630DEFPROCtest
2640loopX=0
2650REPEAT
2660loopX=loopX+1
2670IFASC(MID$(X$,loopX,1)
)<48OR ASC(MID$(X$,loopX,1)
)>57THEN testX=1:ENDPROC
2680UNTILloopX=LEN(X$)
2690testX=0
2700ENDPROC
2710*****

```

This listing is included in this month's cassette tape offer. See order form on Page 61.

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SPREADSHEET

	A	B	C	D
1	MONEY			
2	MONTH	80.37	80.70	80.70
3	FOOD	44.24	41.42	78.20
4	FUEL	44.75	20.00	20.00
5	LEISURE	20.50	47.78	58.43
6	OTHER	29.85	17.50	58.43
7	TOTAL SPEND	229.66	211.80	225.06
8				
9	EARNINGS	221.21	221.21	221.21
10	P. WAG.	27.75	27.75	27.4
11	TOTAL SPEND	203.46	193.51	197.66
12	SPARE	286.84	211.50	274.4
13	REMAINING	78.38	117.99	76.74
14				
15	SALE	6.00	85.25	95.4
16	G. WAG.	6.00	27.45	28.4

DATABASE

RECORD No. 1	RECORD No. 1
SURNAME: JONES	SURNAME: ANDREWS
FIRST NAME: SIMON	FIRST NAME: JAMES
ADDRESS: 4 RADGAS LANE	ADDRESS: 12 ELF ROAD
ADDRESS: LIVERPOOL	ADDRESS: HEREFORD
TELEPHONE: 051-833 9000	TELEPHONE: 321-623451
AGE: 42	AGE: 15

RECORD No. 2	RECORD No. 2
SURNAME: ANDREWS	SURNAME: ANDREWS
FIRST NAME: PETER	FIRST NAME: PETER
ADDRESS: 15 ELF ROAD	ADDRESS: 15 ELF ROAD
ADDRESS: HEREFORD	ADDRESS: HEREFORD
TELEPHONE: 321-623451	TELEPHONE: 321-623451
AGE: 19	AGE: 19

RECORD No. 3	RECORD No. 3
SURNAME: SMITH	SURNAME: BROWN
FIRST NAME: JANE	FIRST NAME: MIRTH
ADDRESS: 42 HIGH STREET	ADDRESS: 15 MILL ROAD
ADDRESS: BILFORD	ADDRESS: MARTINSTON
TELEPHONE: 403-61421	TELEPHONE: 803-809423
AGE: 27	AGE: 30

RECORD No. 4	RECORD No. 4
SURNAME: YATES	SURNAME: BROWN
FIRST NAME: IAN	FIRST NAME: JIM
ADDRESS: 177 ROAD ROAD	ADDRESS: 17 LEWARDS
ADDRESS: GULLHAM	ADDRESS: KORTWICH
TELEPHONE: 452-486 74543	TELEPHONE: 971-1428
AGE: 35	AGE: 21

RECORD No. 5	RECORD No. 5
SURNAME: ANDREWS	SURNAME: BROWN
FIRST NAME: JAMES	FIRST NAME: JIM
ADDRESS: 12 ELF ROAD	ADDRESS: 8 ELW RD
ADDRESS: HEREFORD	ADDRESS: NANTWICH
TELEPHONE: 321-623451	TELEPHONE: 881-42
AGE: 17	AGE: 11

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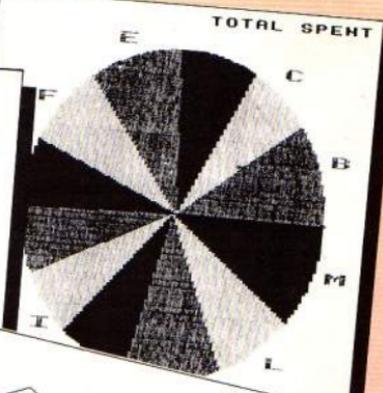
	MAY		JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		TOTAL
APRIL	91.27	81.07	91.27	91.27	91.27	91.27	27.98	26.99	80.89	74.84	88.45	80.26	88.45	88.45	88.45	1005.75	480.26
MAY	81.27	81.07	81.27	81.27	81.27	81.27	27.98	26.99	80.89	74.84	88.45	80.26	88.45	88.45	88.45	1005.75	480.26
JUNE	25.41	25.04	25.41	25.41	25.41	25.41	25.41	25.41	25.41	25.41	25.41	25.41	25.41	25.41	25.41	254.10	101.58
JULY	49.29	49.29	49.29	49.29	49.29	49.29	49.29	49.29	49.29	49.29	49.29	49.29	49.29	49.29	49.29	492.90	197.16
AUGUST	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	1811.50	726.47
SEPTEMBER	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	1811.50	726.47
OCTOBER	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	1811.50	726.47
NOVEMBER	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	1811.50	726.47
DECEMBER	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	1811.50	726.47
TOTAL	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	181.15	1811.50	726.47

GRAPHICS

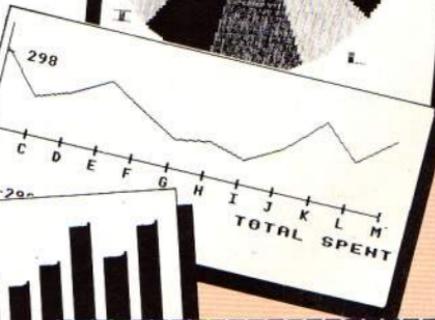
Page 1

WORD PROCESSOR

This is a demonstration of the MINI OFFICE word processor showing the various printout options available.



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ELECTRON OWNERS

If you are thinking of expanding the capabilities of your Electron computer your first choice should be the ADDCOMM ROM.

ADDCOMM is now well established with BBC 'B' owners and the same chip is used with a ROM board to increase the Electron's BASIC language by forty new commands.

These new statements cover a wide range of utilities such as GRAPHICS, where eleven commands enable any shape to be drawn any size and filled with any colour combination (choice of 2 billion in Mode 2), more easily and faster than you thought possible. The TOOLKIT commands include 'find' and 'replace' statements, and a very efficient 'compact' command all of which put ADDCOMM into the top league of a recent Toolkit comparison review. The GENERAL PURPOSE statements include a sorting routine, and the ability to set up to seven windows on the screen – each with its own cursor. Split listing and jumping to a line via a label are also some of the other useful additions in this section. Eight LOGO GRAPHIC statements provide the necessary routines that when combined with BBC BASIC and ADDCOMM'S enhanced graphics give an exceptional Logo Graphics system.

ADDCOMM is available from Vine Micros, Marshborough, Nr. Sandwich, Kent, CT13 0PG. The price of £28.00 includes V.A.T. and first class post, or, if you would like more details, send a stamp for the sixteen page brochure which includes recent reviews.

Micro Messages

Where educational software is failing

It was with interest and dismay that I read Mike Cowley's article on "Where has all the educational software gone?" in the May Electron User.

I am a teacher in Leeds, where one of my responsibilities is the development of educational techniques through the use of computer technology.

In doing this job I also have come across comments similar to those expressed by parents in the article.

Naturally I have also come across many types of educational software. It was from this angle that my interest in the article was aroused. My dismay came from what I read.

One of the parents quoted likened buying a computer for educational purposes to buying a car to find later that there was no petrol available.

Having all too frequently been asked by parents to advise them on appropriate hardware to aid their children's educational development, I am astounded by their willingness to part with

money! Their approach goes against every reasonable consumer practice.

Would you buy a car if petrol was not available?

Surely if you are interested in the educational development of your child and you have this order of money to spend, your first approach should be to find out the most effective way of providing this development.

I am forced to wonder how many parents consulted subject teachers.

How can you remedy something when you are neither sure what it is that you are remedying nor are you sure how the remedying should be done?

It is a recurrent theme throughout the May article. The average lay person has a very vague understanding of the nature of education. It is a

false assumption that computers per se are going to provide this.

If, however, a parent feels that a computer is the best solution, then my advice is - Find the software first, then buy the machine which runs it.

This will also have the longterm knock-on effect of encouraging dealers to improve their educational software supplies.

To do your buying the other way round is like buying a sewing machine when what you really need is clothes.

My second point of dismay, and perhaps more profound, is the lack of discussion in the article as to just what constitutes educational software.

This I realise is a thorny problem, but there are some points which must be made.

What software houses often deem as educational

software are nothing more than drill and practice routines.

At best these may provide some small but very limited service to the user. At worst they can confuse and sometimes hinder progress by using strange vocabulary or methods.

Perhaps the worst crime in this area is the use of language in instructions or guidance which is beyond the reading age of the target audience.

There is little point in producing a good, imaginative program on basic number bonding, when the successful child is rewarded by words like "Excellent".

Such words are unreadable by a child who would find such a program of value.

In any case most of such software is aimed at primary-school-aged children, and yet it seems that most children acquire their computers around 10-13. Good software at this level is indeed very scarce.

Why is good software scarce? The basic problem is, as was mentioned in the May article, a lack of potential volume sales.

This is further aggravated when one starts to consider the nature of good educational software.

In the main this must be related to work that is already going on in school - it must play a supportive role.

As courses are different in nature from one school to the next, it is of little wonder that the prospect of volume sales is remote.

Further, how many parents have enough detailed knowledge of what their child is doing in school in order that they may make sound software purchases?

There is another problem, too. In many cases, so-called

SKRAMBLE!

PLEASE could you help me with Roland Waddilove's program Skramble in the May issue of Electron User?

I have typed it all out, but when I run it, the instructions come on.

It then says press Space, so I did and a list of options came on. Number five was to start, but when I pressed it the instructions just came back on.

Is there anything I could do? - Paul A. Howson, Rochdale.

● There is probably a simple typing error somewhere in your listing. This is being picked up by the ON ERROR in line 40, causing the program to run again. Simply delete line 40 and run the program again to see which line it's in.

Several readers have had

problems with this game. Are long machine code arcade games just too difficult to enter and de-bug? Would you prefer shorter, simpler listings? Let us know.

I HAVE come to my wits' end with Skramble in your May edition. Three people have checked my listings and can find nothing wrong.

I have removed line 40 on Error Run and the trouble starts at line 990. It says there is a syntax error at this line.

Can you tell me what to do next? - L. Fendyke, Boston, Lincs.

● Unfortunately Skramble didn't reproduce too well and some copies were difficult to

read. The underline character seems to have been particularly faint on these two lines, use it to join the two words together.

COULD you please answer a query on the listing for Skramble in the May issue?

Line 3300 has the symbol | printed. I am only a learner on the Electron and can't find this symbol on the keyboard except on the copy key.

Can you help as this symbol appears on other lines in the listing? - Harry Simnis, Atherton, Manchester.

● The square brackets on the copy key indicate the beginning and end of an assembly language listing.

educational software has been written by non-education-
alists.

While not wishing to sound elitist, I am often insulted by the suggestion that this kind of software in some way reflects what is going on in school.

No, the best software I have seen to date has either been produced by teachers or by those who have very close links with the educational service.

But by its very nature this software is not suitable for the general market. It invariably needs to be used by someone with detailed knowledge in the area, or it is so specific in nature that it would only be of value to any one child for about five minutes.

In a school, this is often an advantage, whereas it is a positive disadvantage to any purchasing parent.

In short, by its very nature of what is good in educational software it excludes itself from the shelf of the typical software shop.

There is, however, some good news.

Perhaps one of the most important educational facilities provided by the home micro is the word processor.

While on the face of it not an obvious piece of educational software, it is the one which will have the largest educational impact.

Most schoolwork demands writing in one form or another. In using a word processor to do this I have seen some staggering developments in children of all ages and academic ability.

It is not the purpose of this letter to expound the virtues of word processing, but for the

parent who is looking for some readily-available good educational software, you could do a lot worse than this. — Alan Smith, Leeds.

Is this a record?

I PURCHASED an Acorn data recorder — featured in February's *Electron User* — only to find within ten days that the lid to the cassette port would not open.

The recorder was replaced without question by a leading High Street retailer.

The second recorder lasted six weeks, when it was found we could not record or cue forward. It has since been returned under guarantee.

Both recorders were treated with the respect they deserved and should not have malfunctioned in such a short space of time.

Have any other users of this peripheral experienced difficulty, or were both recorders I received the rogues of the batch? — J. Gilbert, Bedford.

● This is the first we have heard. Maybe you have just been unlucky.

Just the program . . .

I AM a teacher and spend much of my spare time trying to "improve" educational programs — by adding colour, extra text, loops, etc.

I also attempt small "progs" of my own but am hampered by my lack of expertise in programming.

I've tried books but I guess I

am just thick. They seem to start way above me.

Today I discovered your *Intro to Programming* by Pete Bibby and it seems that it would be just the help I need.

Unfortunately I've missed most of it because being on BBCs I don't usually buy a mag to do with *Electrons*.

Is it possible for me to get reprints of the article? Obviously getting the back copies would solve the problem but I really can't afford £14 — 14 copies at £1, assuming one article per month.

Any constructive suggestions would be appreciated. — Anthony Staniland, Sheffield.

● You should find Mike Bibby's book *Getting Started* in BBC Basic just what you're looking for.

Lurking in line 80

IN the March issue of *Electron User*, I found the "Fill it up — Fast" program and typed it in.

Problem — Running the program gives me a "Bad Command at line 80". The line is correct — I've checked it, re-typed it, etc.

If I delete the line, I get the listing and then, on top of the listing, is superimposed the graphics being filled in.

What do I do? What am I doing wrong? What is the function of line 80? The *User Guide* is of no help here. — Paul Allard, Leicester.

● The *FX command in line 80 switches off the Plus if it is attached. If not then a bad command is reported. If you haven't got a Plus 1 then delete line 80 — sorry, we should have spotted this.

Joy from Joyplus

I WOULD like to congratulate you on your superb *Joyplus* utility in the April issue. Apart from *Micro Power* games, it also works with the following games, using memory location 110 and Negative Inkey:

Mr Wiz (*Superior*), *Parcy Penguin* (*Superior*), *Allen*,

Dropout (*Superior*), *Tempest* (*Superior*), *Bugblaster* (*Alligata*), *Cylon Attack* (A&F), *Hunchback* (*Ocean*).

Here are some of my high scores, using my joystick: *Tempest* 79,120, *Positron* 1,103,220, *Cylon Attack* 56,000, *Mr Wiz* 29,050. — Matthew O'Donnell, Reading.

The bracket bandit strikes again

WHAT'S happening to the *Electron User* offices? No sooner had I read about the missing bracket in *Super Archer* (June *Micro Messages*) than I find another missing bracket.

Unless you're making use of some particularly arcane property of Basic, shouldn't line 280 of *May's Spring Flowers* program read:

```
280DEFPROCplant (X,Y,Z) and not:
```

```
280DEFPROCplant (X,Y,Z) as you had it? — Tim Brown, Hartlepool.
```

● You're perfectly right, Tim, it's yet another case of the missing bracket. The program the listing was printed from was fine. All we can do is apologise to the author, Roger Frost, and try to find out who's collecting the final brackets. Has anyone out there any theories?

. . . and again

RE *Spring Flowers* in your *May* issue. My program crashed at line 370 and on examination I find that due to a misprint part of line 370 and also line 280 are missing. Can you help? — A. Peckham, Brightlingsea, Essex.

● The bracket at the end of line 280 seems to have disappeared, but line 370 is OK, but not very clear in some copies. Here they are again . . .

```
280 DEFPROCplant (X,Y,Z,
)
370 MOVEB, YX-10:MOVE-XX/2
,YX/4+YX-10:PLOTBS, -X%0,8,X
%+YX
```

Mini Office on disc

I HAVE recently purchased an *Electron Plus 3* disc drive so as to have quicker access to database programs that I have on cassette at present — these are based on your superb *Mini Office* tape.

Question — Can these be transferred to Plus 3 discs? and if so how do I do that?

If it is not possible, is there a

Mini Office disc for the Plus 3 (3 $\frac{1}{2}$ inch single-sided)?

I thoroughly enjoy *Electron User* and, hopefully, am looking forward to articles and information on the Plus 3 in future issues. — N. Gill, Camberley, Surrey.

● The *Mini Office* team are currently transferring the programs to Plus 3 disc format.

Software selection

I HAVE had my Electron for nearly a year. I am very satisfied with it and the expansions available. However, I have one complaint – software.

I am always hearing about new games for the BBC, CBM64, Spectrum, and even the Amstrad has now got more.

How about Manic Miner, for example? It is out for every good home computer apart from the Electron.

Also, there are many other games that not just me but everyone else would like to see. So please more and more software! – J. Fulbrook, Burnham, Bucks.

Unfair to the Scots

LAST year I went to Manchester for an Electron show. It's all very well having shows down in England, but I spent most of the time on the train. What's wrong with having one up here in Edinburgh? Come on, show a little consideration for us Scots. – Jane Robertson, Edinburgh.

PS. By the way, my score for Chuckie-Egg is: 2,800,000. Level 149. Beat that!

Ruled outside

WILL there be football games like Match Day (for the Spectrum) and International Soccer (for the CBM64) on the Acorn Electron?

All the other football games are management simulation, but on these two games you can control the players and dribble, shoot, pass etc.

Match Day is coming out for the BBC B and CBM64. Why can't it come out for the Acorn Electron? Is it that the Electron hasn't got enough memory? – Michael Tang, Epping, Essex.

● The lack of memory when

WHAT would you like to see in future issues of Electron User?

What tips have you picked up that could help other readers?

Now's here is your opportunity to share your experiences.

Remember that these are the pages that you write yourselves. So

tear yourself away from your Electron keyboard and drop us a line. And please, if you want a reply, enclose an SAE.

The address is:

**Micro Messages
Electron User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY.**

using graphics, even in Mode 5, is always a problem. It's unlikely that a good simulation will be produced.

Mystery address

CAN you solve a problem for us? We have a Vulcan joystick interface and when playing the game of Gauntlet the computer asks for the address of the joystick. We do not understand what it means.

Our computer is an Acorn Electron. – M.P. Park, Liskeard, Cornwall.

● This is for owners of the First Byte joystick interface. A conversion program must be loaded before the main game.

Let there be light

UPON seeing a demonstration of a light pen at school, I decided to purchase one.

After searching through all the computer shops I could think of I was unable to find one – and am writing to Micro Messages to ask if anyone else has heard or seen of a light pen for the Electron. – A.R. Bill, Nottingham.

● We haven't heard of a light pen available for the Electron yet.

Enhanced screen dump

ROLAND Waddilove's screen dump programs published in your March issue are the best

thing yet that I have got out of your magazine.

The only change I would like to make to the programs is to expand the bit image section to produce in hard copy form the different colours which may be sent to the screen, as is achieved in the graphics section of Mini Office.

My own attempts have so far failed. How about a little help, Roland? – C.J. Stump, London S.W.1.

● It's something we've had in mind for quite a while. The trouble is trying to find the time to work on it. Can anyone supply a suitable listing? –



Bring back the Kid

WE have just bought all the back issues of Electron User and want to tell you how much we have enjoyed them, and how great they are.

We appreciate a magazine in which all the programs are specifically written for the

Electron.

We prefer the harder games and would like more 3-D graphic programs like Star Fighter (Vol. 2, No. 2, Nov. 1984).

The idea of printing readers' corrections to programs is a good one, but we would like the program print made easier to read (eg Y & V, 1 & L).

The information on soft and hardware for the Electron is great.

We would like more space to be given to Sounds Exciting. However we miss the Micro Kid from the front of the magazine. – Neil & Michael Comerie, Dunfermline.

● Brackets explained, we do try our best with listings and are always trying to improve them. Does anyone else miss the kid?

Copyright barrier

I HAVE bought several magazines for the Electron and yours is the best around. It's great.

Could you please recommend a good shoot-'em-up for the Electron? And could we have a few articles on how to get into commercial programs? – Jason Schofield, Aylesbury, Bucks.

● Zalaga should meet your requirements for a good shoot-'em-up. We can't explain how to break into commercial software as they are copyright.

Sim snag

I RECENTLY bought the game Sim and am finding it extremely difficult to get past the channel 4 signs on the screen where it says "Wot no adverts".

Is there anybody who can help me and give me tips on how to play?

And is it possible to print a fairly short games program, because I hate typing in long programs? – Graeme Padgham, Tonbridge, Kent.

● Can our readers help? We try to include a wide range of programs – short, long, simple and complicated. There should be something for everyone.

DISC POWER

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NOW it's cheaper than ever to add the power of discs to your Electron Plus 1 – with the Cumana floppy disc system.

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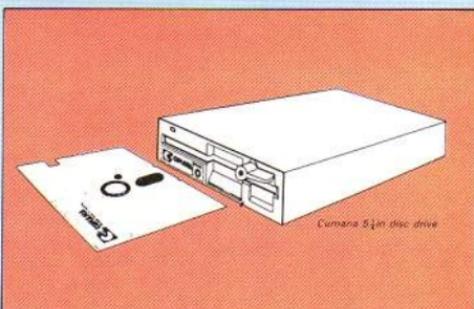
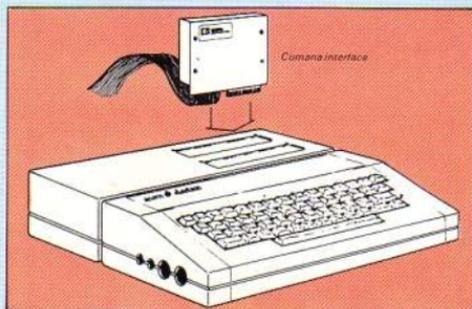
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When you add to this the fact that the cartridge has a built in real time clock and a ROM socket (for additional software on a chip) then you'll realise why the Cumana floppy disc system has been so warmly welcomed by Electron users.



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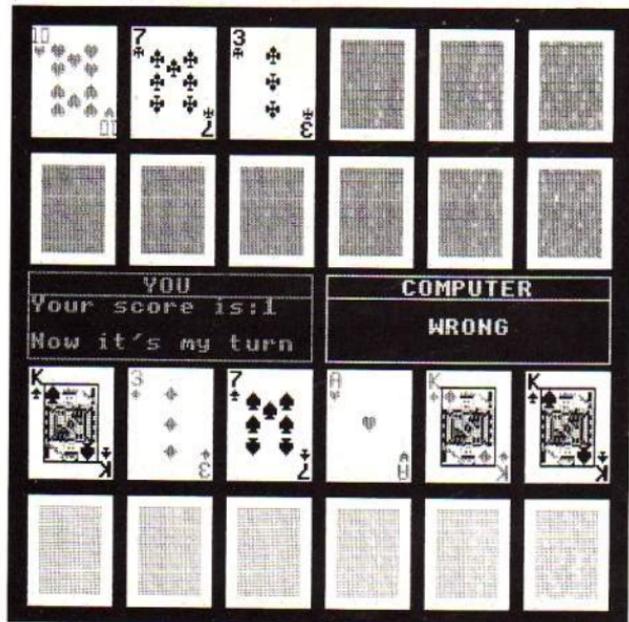
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Will it be Higher or Lower?



IN Higher or Lower you play the Electron at cards. Reminiscent of the popular television card game, it's easy to learn, simple to play — but hard to win.

There are three main parts to the program. The first deals with the instructions. These are displayed before each game, explaining the rules, how the controls work and also giving a choice of having

the sound on or off.

Next comes the game proper. Twenty four cards are drawn on screen, half with red backs and half with yellow.

Also two text windows are set up, the red one dealing with the red cards and, logically, the yellow with the yellow cards.

A card is turned over and the player is asked if he wants to change it. If he does he

presses Y, if not he presses N.

Then the micro asks if the player thinks the next card will be higher or lower in value. He presses H or L in reply.

If the player is right then a tune is played and the process repeated until an error is made.

Once this happens (beware, the same value card is counted as wrong) the player is told his score and the Electron takes

its turn.

The micro does exactly the same as the player, but uses the yellow backed cards. When it makes an error the game is over and the program goes onto the third and final stage, the results.

Here the scores of player and micro are compared and the winner (if any) is duly congratulated with a tune and message. There is then the option of finishing or having another go.

PROCEDURES

- PROCcompare** Compares scores and prints according merits.
- PROCcourt** Draws a court card at position x%, y%.
- PROCsetup** Draws screen with card backs and windows.
- PROCYou** Controls player's turn.
- PROComputer** Determines the Electron's turn.
- PROCono to** Set up and draws the non-court cards at x%, y%.
- PROcten** Gives instructions, sets up variables and sound option.
- PROcins** Chooses random card and suit. Decides position on screen for next card.

VARIABLES

- AS** Yes/no replies.
- ns%** Finds out when new cards are required.
- U%** User's score.
- C%** Computer's score.
- loop%** Time delay.
- so%,son%** Sound delay.
- jqk%** VDU 23 numbers for court cards.
- suit%** RND(4) gives suit of card.
- r%** RND(13) picks number of card.
- x%,y%** Coordinates of card.
- v%** Value of last card.
- ans\$** Carries high/low decision.
- ch%** Allows user to change first card.
- che%** Computer change first card.



Play your cards right – and you could beat your Electron at this guessing game by IAN COOPER

```
10REM HIGHER OR LOWER
20REM BY IAN COOPER
30ON ERROR GOTO 2600
40MODE1
50FX4,1
60VDU23:8202;0;0;0;
70CLEAR:VDU26:CLS:ENVELO
PE4,2,10,-10,10,5,5,126,0
,0,-126,126,126
80nsZ=0:UZ=-1:CL=-1:chlZ=
1:chlX=1
90PROC1ns
100PROCsetup
110PROCyou
120PROCcomputer
130PROCcompare
140GOTO70
150END
160DEFPROCcompare
170#FX15,1
180ENVELOPE3,5,5,-5,5,0,0
,0,126,0,0,-126,126,126
```

```
190IFUZ<CX THENGOTO370 EL
SEIFUZ>CXTHENGOTO270
200VDU28,2,17,18,15:CLS:P
RINT* ":COLOUR2:PRINT"
DRAW*
210VDU28,20,17,36,15:COLO
UR1:PRINT* "ANOTHER GAME?":
PRINT* "(Y/N)"
220#s=GET# :IFA#<>"Y" ANDA
#<>"N"THENGOTO260
230IFA#="N"THEN240 ELSEEN
DPROC
240VDU26:COLOUR128:COLOUR
3:CLS:END
250ENDPROC
260VDU7:GOTO210
270VDU28,2,17,18,15:CLS:P
RINT* ":COLOUR2:PRINT"
YOU WON"
280VDU28,20,17,36,15:CLS
290SOUND1,soZ,65,60
300FORloopZ=0TO3000:NEXT1
```

```
oopZ
310VDU28,20,17,36,15:CLS:
COLOUR1:PRINT* "ANOTHER GAM
E?":PRINT* "(Y/N)"
320#s=GET# :IFA#<>"Y" ANDA
#<>"N"THENGOTO360
330IFA#="N"THEN340 ELSEEN
DPROC
340VDU26:COLOUR128:COLOUR
3:CLS:END
350ENDPROC
360VDU7:GOTO310
370VDU28,20,17,36,15:CLS:
PRINT* ":COLOUR1:PRINT"
I WON"
380VDU28,2,17,18,15:CLS
390SOUND1,soZ,65,60
400FORloopI=0TO3000:NEXT1
oopZ
410VDU28,2,17,18,15:CLS:C
OLOUR2:PRINT* "ANOTHER GAME
?":PRINT* "(Y/N)"
```

```
420#s=GET# :IFA#<>"Y" ANDA
#<>"N"THENGOTO460
430IFA#="N"THEN440 ELSEEN
DPROC
440VDU26:COLOUR128:COLOUR
3:CLS:END
450ENDPROC
460VDU7:GOTO410
470DEFPROCcourt
480RESTORE2340
490FORjqkX=230TO241
500READIX,JX,KX,LX,MX,NX,
OX,PX
510VDU23,jqkX,IX,JX,KX,LX
,MX,NX,OX,PX
520NEXTjqkX
530MOVE31,31:6COL0,0:DRAW
31,164:DRAW132,164:DRAW132,
31:DRAW31,31:VDU24,32;64;12
0;128;16COL0,130:CLS
```

Higher or Lower listing

From Page 55

```

540MOVE34,126;VDU230,234,
238,8,10,240,8,8,236,8,8,23
2,8,11,18,8,1,231,235,239,8
,10,241,8,8,237,8,8,233
550IFrX=11THENRESTORE2440
ELSEIFrX=12THENRESTORE2410
ELSESTORE2390
560FORjqkX=242T0251
570READI1,JX,KX,LX,MX,NX,
OX,PX
580VDU23,jqkX,I1,JX,KX,LX
,MX,NX,OX,PX
590NEXTjqkX
600VDU24,32;32;128;168;:M
OVE66,156;VDU242,249,8,10,
,8,0,243,248,8,8,18,0,2,244
610MOVE32,68;VDU18,0,1,25
1,245,8,8,18,0,8,250,247,8,
18,0,2,246
620IFsuiX<3THENGCOLB,0 E
LSEGCOLA,1
630MOVE31,160;VDUqX;MOVE9
6,61;VDU(qX-27)
640ENDPROC
650DEFPROCsetup
660VDU23,255,54,127,127,1
27,62,28,8,8,23,252,8,28,28
,107,127,107,8,28,23,253,8,
28,62,127,62,28,8,0
670VDU23,254,8,28,62,127,
127,127,28,62,23,225,28,8,1
07,127,107,28,8,23,226,0,
8,28,62,127,62,28,8,23,227
,62,28,127,127,127,62,28,8
680VDU23,228,8,8,28,62,12
7,127,127,54
690FORY=824T0600STEP-224
700FORx=64T01152STEP192
710 VDU29,xX;YX;VDU24,0;
0;168;192;:GCOLB,131:CLB:VDU
U24,20;28;140;172;:GCOLB,12
9:CLB
720NEXTX
730NEXTY
740FORY=224T08STEP-224
750FORx=64T01152STEP192
760VDU29,xX;YX;VDU24,0;0
;168;192;:GCOLB,131:CLB:VDU
24,20;28;140;172;:GCOLB,130
:CLB
770NEXTX
780NEXTY
790GCOLA,1;VDU26,29,60;43
2;5;MOVEB,0;DRAW548,0;DRAW5
48,152;DRAW0,152;DRAW0,0;MO
VEB,112;DRAW544,112;MOVE223
,146;PRINT"YOU"

```

```

800GCOLB,2;VDU29,636;432;
5;MOVEB,0;DRAW548,0;DRAW548
,152;DRAW0,152;DRAW0,0;MOVE
0,112;DRAW548,112;MOVE144,1
46;PRINT"COMPUTER";VDU
810FORY=0T0500;NEXTlo
opX
820ENDPROC
830DEFPROCyou
840nsX=0;xX=64;yX=824;PRO
Ccard
850vYrX=rX;UX=UX+1;IFUZ=11T
HENGOTO1110
860GOTO880
870VDU7
880VDU28,2,17,18,15;COLOU
R1:CLS:IFChZ=0THENGOTO940
890FX15,1
900PRINT" DO YOU WANT A
:PRINT" DIFFERENT CARD"?
PRINT" (Press Y or N)?"
910A=GET$:IFA$(">")Y" ANDA
$(">")M" THENGOTO900
920IFA$="N" THENGOTO940
930ChZ=0;xX=64;yX=824;PRO
Ccard;vYrX
940ChZ=0:CLS:PRINT" HIGHE
R or LOWER"
950PRINT" (Press H or L)?"
*
960FX15,1
970Ans$=GET$:IFans$(">")M"
ANDans$("<")L" THENGOTO870
980X=X+192;IFX>1160THE
NY=600
990IFX>1160THENXZ=64
1000PROCcard
1010IFvYrX<X ANDans$="H"THE
NGOTO1020 ELSEIFvYrX>X ANDan
s$="L" THENGOTO1020 ELSEGOTO
1050
1020VDU28,2,17,18,15:CLS:C
OLOUR1:PRINT" *PRINT"
CORRECT"
1030SOUND1,soX,97,10;SOUND
1,soX,105,10;SOUND1,soX,89,
10;SOUND1,soX,41,10;SOUND1,
soX,69,20
1040FORloopX=0T02850;NEXTl
oopX;GOTO8950
1050VDU28,2,17,18,15;COLOU
R1:CLS:PRINT" *PRINT"
WRONG":SOUND1,sonX,65,30;F
ORloopX=0T04000;NEXTloopZ
1060CLS:PRINT"Your score i
s: ";UX
1070PRINT" *
1080PRINT" Now it's my turn
";

```

```

1090FORloopX=0T03000;NEXTl
oopX
1100ENDPROC
1110FORYX=824T0600STEP-224
1120FORx=64T01152STEP192
1130VDU29,xX;YX;VDU24,0;0
;168;192;:GCOLB,131:CLB:VDU
24,20;28;140;172;:GCOLB,129
:CLB
1140NEXTX
1150NEXTY
1160X=X+64;yX=824;nsZ=1;PRO
Ccard
1170GOTO850
1180ENDPROC
1190DEFPROCcomputer
1200nsX=0;xX=64;yX=224;PRO
Ccard
1210vYrX=rX;CX=CX+1;IFCX=11T
HENGOTO1420
1220VDU28,20,17,36,15;COLO
UR2:CLS:IFchZ=0THENGOTO126
0
1230IFrX>0 OR rX<5 THENGOT
O1260
1240PRINT" *PRINT" I'M CHA
NGING CARD";:FORloopX=0T015
00;NEXTloopX
1250chZ=0;xX=64;yX=224;PR
OCcard;vYrX
1260chZ=0:CLS:PRINT" HIGH
ER or LOWER"
1270PRINT" *
1280IFvY>6THENans$="L" ELS
Eans$="H"
1290IFans$="L" THENPRINT"
LOWER"; ELSEPRINT"
HIGHER";
1300FORloopX=0T02000;NEXTl
oopX
1310X=X+192;IFX>1160 TH
ENY=0
1320IFX>1160 THENXZ=64
1330PROCcard
1340IFvYrX<X ANDans$="H"THE
NGOTO1350 ELSEIFvYrX>X ANDan
s$="L" THEN1350 ELSEGOTO1380
1350VDU28,20,17,36,15;COLO
UR2:CLS:PRINT" *PRINT"
CORRECT"
1360SOUND1,soX,97,10;SOUND
1,soX,105,10;SOUND1,soX,89,
10;SOUND1,soX,41,10;SOUND1,
soX,69,20
1370FORloopX=0T04300;NEXTl
oopX;GOTO1210
1380VDU28,20,17,36,15;COLO
UR2:CLS:PRINT" *PRINT"
WRONG":SOUND1,sonX,65,30;

```

```

FORloopX=0T04000;NEXTloopZ;
CLS
1390PRINT" My score is: ";
1400FORloopX=0T04300;NEXTl
oopX
1410ENDPROC
1420FORYX=224T08STEP-224
1430FORx=64T01152STEP192
1440VDU29,xX;YX;VDU24,0;0
;168;192;:GCOLB,131:CLB:VDU
24,20;28;140;172;:GCOLB,130
:CLB
1450NEXTX
1460NEXTY
1470X=X+64;yX=224;nsZ=1;PRO
Ccard
1480GOTO1210
1490ENDPROC
1500DEFPROCone
1510MOVE64,112;VDUqX
1520ENDPROC
1530DEFPROCtwo
1540MOVE64,64;VDU(qX-27);M
OVE64,168;VDUqX
1550ENDPROC
1560DEFPROCthree
1570MOVE64,64;VDU(qX-27);M
OVE64,112;VDU(qX-27);MOVE64
,168;VDUqX
1580ENDPROC
1590DEFPROCfour
1600MOVE40,80;VDU(qX-27);M
OVE40,144;VDUqX;MOVE88,80;V
DU(qX-27);MOVE88,144;VDUqX
1610ENDPROC
1620DEFPROCfive
1630MOVE32,80;VDU(qX-27);M
OVE32,144;VDUqX;MOVE96,80;V
DU(qX-27)
1640MOVE96,144;VDUqX;MOVE6
4,112;VDUqX
1650ENDPROC
1660DEFPROCsix
1670MOVE48,72;VDU(qX-27);M
OVE48,112;VDUqX;MOVE48,152;
VDUqX;MOVE88,72;VDU(qX-27);
MOVE88,112;VDUqX;MOVE88,152
:VDUqX
1680ENDPROC
1690DEFPROCseven
1700MOVE32,72;VDU(qX-27);M
OVE32,112;VDUqX;MOVE32,152;
VDUqX;MOVE96,72;VDU(qX-27);
MOVE96,112;VDUqX
1710MOVE96,152;VDUqX;MOVE6
4,136;VDUqX
1720ENDPROC
1730DEFPROCeight

```

```

1748MOVE32,72:VDU(qz-27):M
OVE32,112:VDU(qz-27):MOVE32
,152:VDUqz:MOVE64,96:VDU(qz
-27)
1750MOVE64,136:VDUqz:MOVE9
6,72:VDU(qz-27):MOVE96,112:
VDU(qz-27):MOVE96,152:VDUqz
1760ENDPROC
1770DEFPROCine
1780MOVE64,112:VDU(qz-27):
MOVE32,64:VDU(qz-27):MOVE32
,96:VDU(qz-27):MOVE32,128:V
DUqz:MOVE32,160:VDUqz
1790MOVE96,64:VDU(qz-27):M
OVE96,96:VDU(qz-27):MOVE96,
128:VDUqz:MOVE96,160:VDUqz
1800ENDPROC
1810DEFPROCten
1820MOVE64,80:VDU(qz-27):M
OVE64,144:VDUqz:MOVE32,64:V
DU(qz-27):MOVE32,96:VDU(qz-
27)
1830MOVE32,128:VDUqz:MOVE3
2,160:VDUqz:MOVE96,64:VDU(q
z-27):MOVE96,96:VDU(qz-27)
1840MOVE96,128:VDUqz:MOVE9
6,160:VDUqz
1850ENDPROC
1860DEFPROCins
1870CLS
1880VDU19,1,0;19,2,0;0;1
9,3,0;0;
1890COLOUR1
1900PRINT":PRINTTAB(12);
"HIGHER or LOWER"
1910COLOUR2
1920 PRINTTAB(12);"=====
=====
1930COLOUR1
1940PRINT":PRINTTAB(12);"
(by Ian Cooper)"
1950COLOUR3
1960PRINT":PRINTTAB(7);"
You compete against the"TAB
AB(7);"computer to get as
many"
1970PRINTTAB(7);"right que
sues as possible."PRINT":
PRINTTAB(7);" If you thin
k the next"
1980PRINTTAB(7);"card is g
oing to be higher";TAB(7);"
then press 'H'. If you"
1990PRINTTAB(7);"think it
will be lower";TAB(7);"then
press 'L'. When you"
2000PRINTTAB(7);"get one w
rong the computer";TAB(7);"
will have its go."

```

```

2010PRINT":PRINTTAB(9);"
The winner is the one";TAB(
9);"with the highest score.
"
2020COLOUR2:PRINTTAB(12,22
);"ACE COUNTS LOW."
2030COLOUR3:PRINTTAB(17,24
);"SOUND":COLOUR1:PRINTTAB(
17,25);"=====
2040COLOUR3:PRINTTAB(16);"
(Y)= ON";TAB(16);"(N)=OFF"
2050PRINTTAB(13,29);"Press
Y or N!"
2060VDU19,1,1;0;19,2,3;0;1
9,3,7;0;
2070*FX15,1
2080A$=GET$;IFA$(*)Y ANDA
$(*)N"THENGOTO2080
2090IFA$="Y"THENsoz=3 ELSE
soz=0
2100IFA$="Y"THENson=4 ELSE
Eson=0
2110CLS
2120ENDPROC
2130DEFPROCcard
2140VDU23,224,207,73,73,73
,73,73,239,0
2150VDU29,xX,yY;VDUS,24,0
;0;160;192;6COL0,131:CLS
2160IFns=i1THENGOTO2180
2170r=RND(13):suit=RND(14
)
2180ns=i+0
2190IFsuit=i1THENqz=252 EL
SEIFsuit=2THENqz=254 ELSEI
FSuit=3 THENqz=253 ELSEqz=
255
2200no=rX+40;IFrX=i1THENno
X=65 ELSEIFrX=i1THENnoX=224
ELSEIFrX=i1THENnoX=74 ELSE
IFrX=i2THENnoX=81 ELSEIFrX=
13THENnoX=75
2210RESTORE((rX+10)+2460)
2220READIX,JX,KX,LX,MX,NX,
OX,PI
2230VDU23,229,IX,JX,KX,LX,
MX,NX,OX,PI
2240RESTORE((suit+10)+259
0)
2250FORloopX=250TO251:READ
IX,JX,KX,LX,MX,NX,OX,PI
2260VDU23,loopX,IX,JX,KX,L
X,MX,NX,OX,PI:NEXTloopX
2270IFsuitX=THENGCOL0,0 ELSE
LSEGCOL0,1
2280MOVE96,188:PRINTCHR$(no
X);VDUB,10,250:MOVE132,28:
PRINTCHR$(229);VDUB,11,251
2292IFrX=i1THENPROCone ELSE

```



```

IFrX=2THENPROCtwo ELSEIFrX=
3THENPROCthree ELSEIFrX=4TH
ENPROCfour ELSEIFrX=5THENPR
OCfive
2300IFrX=6THENPROCsix ELSE
IFrX=7THENPROCseven ELSEIFr
X=8THENPROCeight ELSEIFrX=9
THENPROCnine ELSEIFrX=10THE
NPROCten
2310IFrX=10THENPROCcourt
2320VDU4
2330ENDPROC
2340DATA199,232,82,74,200,
200,72,72,32,16,13,18,4,4,4
,4,203,200,72,75,202,210
2350DATA111,65,4,7,7,4,5,1
3,16,32,132,59,129,133,7,2
,9,20,67,68,70,74,72,81,112,
42
2360DATA20,200,32,240,161,
129,220,33,42,4,196,10,82,9
8,34,194,130,246,75,83,210,
18,19
2370DATA211,4,0,176,160,32
,224,224,32,18,19,19,82,
74,23,227,32,32,32,160,1
76,0,4
2380DATA101,255,0,0,0,0,56
,0,0,0,254,0,40,0,0,0,0,0
,130,131,131,195,0,20,0,0,0
,0
2390DATA255,173,195,193,19
3,193,66,0,0,0,0,0,0,20,0,1
27,0,0,1,3,3,3,0,0,3,120,
0,96
2400DATA40,6,15,3,0,192,0
,0,192,192,192,192,0,19
2,240,60,12,7,0,1
2410DATA0,124,4,6,2,2,115,
1,62,2,3,1,0,1,0,0,0,0,120
,136,4,4,4,6,120,206,64,64,
96,32
2420DATA62,0,96,32,32,32,1
7,30,0,0,0,0,120,130,120,19
2,64,124,0,0,0,120,192,224,
48
2430DATA40,3,7,15,15,7,3,1
93,193,12,12,7,3,1,0,0,0,13
1,131,192,224,240,240,224,1
92
2440DATA0,0,127,0,0,0,20,0

```

This listing is included in this month's cassette tape offer. See order form on Page 61.

I'VE had literally dozens of letters asking for help with Twin Kingdom Valley, so this month I am going to explain the uses of most of the objects you come across and some of the problems you will therefore face in the adventure.

Firstly, though, I have a copy of Peter Gerrard's book Exploring Adventures on the Electron to give away.

There are three problems I can't solve (well, three particular problems) and the first person to write in with all the solutions or the best combination of them will get the book.

So get writing in - the closing date is one month from publication of this issue.

The problems are:

- How do you get past the rat in **Program Power's Adventure?**

- In **Classic Adventure** how do you get into the repository and what do you do when you get there?

- Are there any secret entrances in the inner sanctum and how do you get to them in **Sphinx Adventure?**

While I'm flaunting my fallibility, I've had quite a few letters from people stuck in adventures that I haven't seen.

So, can anyone help with the following:

In **Strange Odessey** how do you get the plastic out of the hexagonal room and how do you read the alien script on the boulder in the cave?

In **Mystery Fun House** how do you get out of the pit?

In **Countdown to Doom** how do you stop the computer spitting out the discs?

Finally, in **Five Stones of Anadon** (yes, I got stuck here) how do you get past the ghost in the cellar?

Now back to the Twin Kingdom Valley, and many thanks to Michael Dunlop and Mike Farmer, who both provided solutions I desperately needed.

Now be warned! Read no further unless you are well and truly stuck!

The Treasures:

Three bags of gold: Give one to the guard when put in prison.
Three bags of silver: The castle guards have two and the



Route through Twin Kingdom Valley...

sandlurker one.

The crown: This is worn by the desert king.

Ball of gold: You will find this in the upper levels of the castle.

Treasure chest: This is very heavy and you cannot carry anything else. A friend can help here.

Staff of gold: The witch in the east turret has this.

Diamond: This is in the cave near Watersmeet.

Diamond ring: The dwarf has this. To get it from him you'll



need to ensure that he can't get out!

The secret of life: This is at the river of gold, behind the rockfall.

Jug of gold: Try filling the jug.

Silver key: This will be given to you in exchange for rescuing the princess.

Gold key: This is in the kitchen behind a secret door.

Other objects:

Jug: Handy for carrying water and gold!

Flint: You have to have this to light the lamp.

Beer (available from the inn): Very refreshing? Watch what it does to your health, though.

Crystal ball: If you give this to the witch with the bronze key, she will reward you.

Amulet: The princess will recognise you with this on.

Short rod: You can wave it to get a short-cut to the desert king's castle.

Master key: Very handy. Opens any door.

The wooden staff: The ultimate weapon.

The treasure chest: Needed to get to the river of gold. Look in the castle.

The ill giant: Free him and go to Watersmeet. Try to make him feel better.

Holdall: Very handy for carrying things!

Uniform: This makes you look like a guard from a distance, though not close up.

Watersmeet: Swim here to regain strength. If you drink you will get the secret of closed doors.

And finally, 1,024 points? Really want to know? Well,

look at the following code:

MVEIRELWISNEWCARSEETRE

If you take every other letter starting with the second one, you'll find the answer.

You should now be able to solve TKV. Admittedly, you



still have a lot of work to do, but you should find that you now have enough information to solve it.

This month we have received a plea for help from a BBC adventurer stuck in the jungle in **Countdown to Doom**. This is a maze of looks-all-the-same locations.

Anything DROPPed "disappears into the undergrowth".

This maze is NOT all the same. The descriptions differ slightly.

Make a map based on whether the descriptions change, or not.

The save game facility is a big help here. When you find a location whose description



differs radically from the others, you'll be close to the exit.

A. Marsh says he has mapped all of *Adventureland* but cannot find the last treasure. How many times have you rubbed the lamp?

J. Lutley says she can't get the anchor in *Pirate Adventure*. Dig it out!

M. Burns and Barbara Wilkinson are having problems with *Castle Frankenstein*. To get up the slope, use your head. To get rid of the monster, cut the bridge while he's standing on it. The violin isn't used, but it does count towards your score.

Stephen Buxton is having trouble with the knights in *Quest for the Holy Grail*. Use a matching sword.

Scott Bowie also has problems. If you want to get the axe, hide it first. Carry the plank up the tree, you'll find the swamp when you come

back down again.

Beryl Webber, Phillip Macdonald and Julie Powell all want help with *Sphinx Adventure*. The mithril ring is in the grotto across the swamp. Use the sword on the ogre. Yes, there are things worth having in the mazes and the catacombs. The sphinx is in the desert. Map it. Use the dragon's teeth to get past the goblins.

Neil Costigan can't get across the lake in *Kingdom of Klein*. Go to the chapel. Push the portrait and unlock the safe.

Sally Barber, Deryck Wiloughby, Andrew Teece and Scott Bowie need some



answers for *Classic Adventure*.

Get the pirate's treasure chest from the maze with the pit.

Say "PLOVER" at Y2 to get the platinum pyramid.

Free the bear to scare the troll and you can get across the bridge. Where you see the green light you can drop the lamp to enter the cave.

From Witt's End keep going south.

You don't get any batteries at the machine as far as I can tell.

To get the nugget out, say "PLUGH" at Y2.

The person waving at you is you. You are seeing your own reflection in a mirror.

To get past the bear, FEED HIM, UNLOCK CHAIN, GET CHAIN, GET BEAR, then see above.

What are the mirrors used for? Nothing.

Is there any way to get



through the waterfall? No.

Is there any way to get past the fissure with the molten lava? No.

As you can see from the competition, I've not finished *Classic Adventure*. So it's possible that I've missed something in the answers I have given. If I have, I hope you'll let me know.

● If you want Merlin's help write to:
Merlin, Electron User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.
— and enclose an SAE if you would like a reply.

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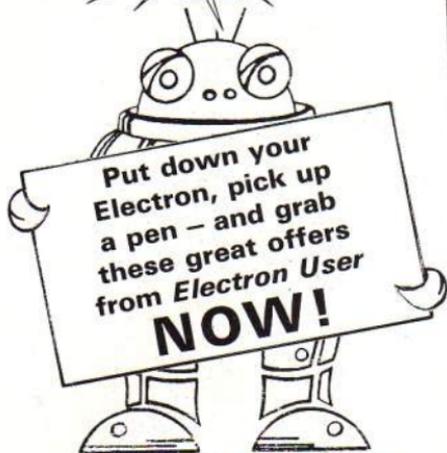
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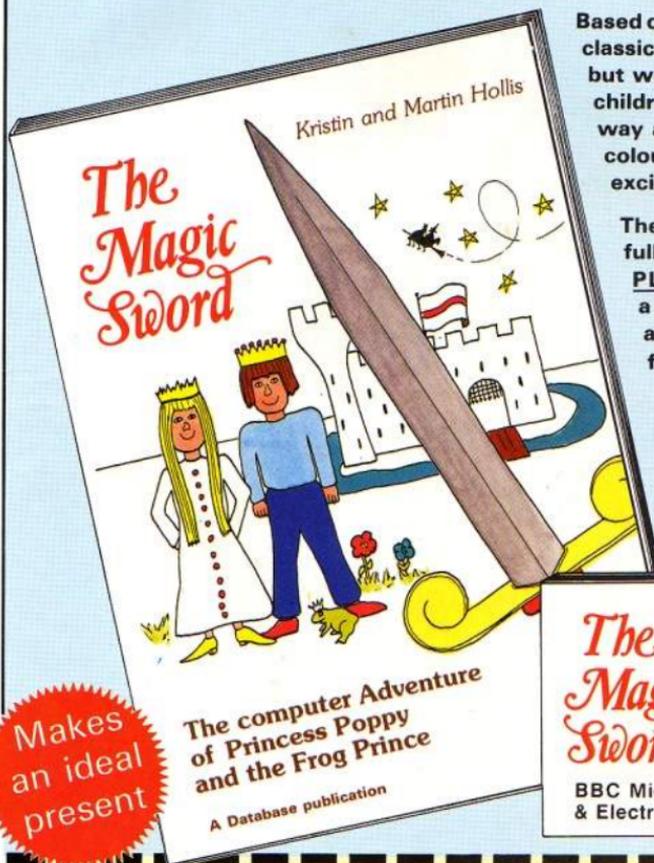
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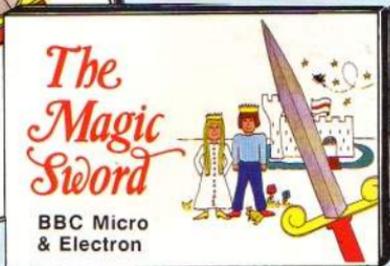


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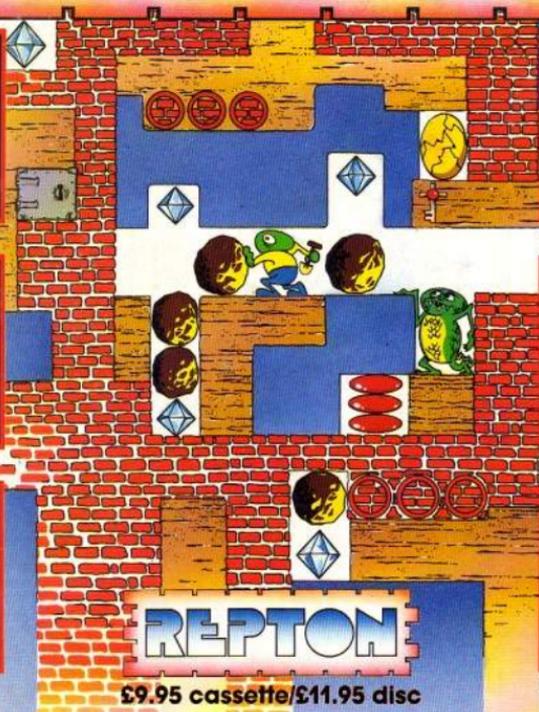
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