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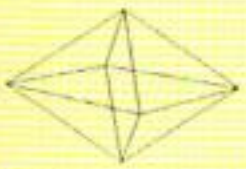

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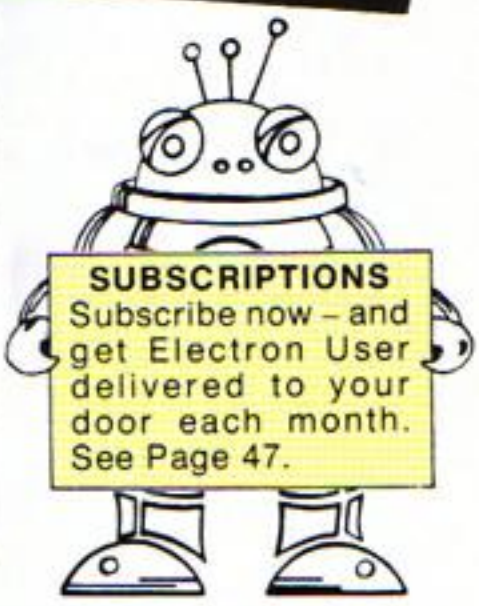

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How to teach your Micro a thing or two

Thousands of home computer owners have yet to discover their microcomputer's potential to help with many of the problems and decisions that come up every day in the home or office.

Perhaps you have always promised yourself that you would teach yourself programming, but have been put off by manuals which seem to assume a lifetime spent studying computer science and mathematics. Maybe you have looked at other computer books, but have yet to find one which is free of unnecessary jargon or where the program examples bear some relevance to real life and not space invaders.

Relax, your search is over.

The 'Learn BASIC' tutorials from Logic 3 are the latest development of a teaching method pioneered by Professor Andrew Colin and perfected by testing on 3 generations of students at Strathclyde University. The 'Strathclyde Method' has been translated into 8 languages and used by over 300,000 microcomputer users.

'Learn BASIC' is a jargon free, step by step, course in computer programming, which explains everything clearly in English, not computer talk. In a matter of hours you will be writing your first programs.

'Learn BASIC' is designed for people who want to keep abreast of the computer age, for people who realise that understanding computers is a key to future success at work, at school, and as a parent.

Get 'Learn BASIC' and teach your micro how to be useful! (Available from major branches of W.H.Smiths, Boots, Laskys, Greens, John Menzies and better computer shops nationwide.)

02

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electron user NEWS

CLAIRE WAS SHOW STAR

TINY two years old Claire Hirst became a child celebrity overnight after she opened the latest Electron and BBC Micro User Show in Westminster.

Although Claire cannot read or write yet, she is already a child prodigy on the computer.

National newspapers, television and radio all converged on the New Horticultural Hall to watch Claire go through her paces.

And she duly obliged by demonstrating how she had written a tune on the micro and even designed a Christmas card for her mummy.

'Reliable Electron' report under fire

A REPORT claiming the Electron is the most reliable micro available in the UK has come under fire.

Critics were quick to cast doubt on the findings after it was learned that Acorn has strong links with the publishing house that commissioned the survey.

However Acorn has strongly defended the results, which reveal that the failure rate for the Electron – based on faulty machines returned to dealers – is only four per cent.

"The survey is as reliable as it could be", an Acorn spokesman told *Electron User*. "It's just a pity that some people are trying to suggest it is biased".

It wasn't what the report stated about Acorn products which has caused the attack – but the way it slammed other leading micro manufacturers.

The survey roasted Commodore for its "high failure rate", claiming 18 per cent of Vic 20s and 13 per cent of Commodore 64s are returned to dealers.

But it was Sinclair Research which was named as "the worst culprit". According to retailers interviewed, more than a quarter of all Spectrums sold are returned.

And it was Sinclair, understandably smarting under the criticism, who spearheaded the counter attack.

"We reckon the true return rate is about half the figure given in this survey and 40 per cent of these are in no way faulty", said a Sinclair spokesman.

"And we are not very happy about the manner in which this survey was conducted. It appears that a number of retail store managers were simply telephoned and quizzed on home micro return rates.

"We also believe that the survey was carried out on behalf of a company in which Chris Curry has an interest".

The survey was commissioned by Venture

Turn to Page 6

DISC DRIVE BATTLE IS JOINED

NOW that the Electron has come of age, the stage is being set for a battle of the disc drives.

Developments by Acorn and Cumana have pushed the machine into the league of systems costing hundreds of pounds more and opened the doors for users to create sophisticated databases.

The products that have dramatically boosted the Electron's capabilities and appeal are a 3½in disc interface and drive from Acorn and a range of 5¼ and 3½in disc drives complete with interface from Cumana.

Electron users got their first hands-on experience of Acorn's new Plus 3 at the Electron and BBC Micro User Show in December when it was demonstrated using the Acornsoft database program.

The Plus 3 provides Electron users with a faster and more flexible alternative to cassettes for the storage of programs and data.

It comprises a self-contained disc interface and 3½in single-sided drive and offers 300k of storage.

A new Acorn advanced disc filing system – described by critics as better than that available for the BBC – provides facilities at the basic level, but also has features equipping it for business use.

The Plus 3 costs £229.

Cumana is supplying its full range of disc drives complete with interface for use with the Electron.

The interface costs £149.95. The 100k 3½in drive – including the interface – costs £299.95, and the 100k 5¼in drive with interface costs £289.95.

Acorn's Plus 3 disc drive

Row over Electron survey

From Page 5

UK, a magazine run by Redwood Publishing, a company in which Acorn's managing director Chris Curry and Chris Ward, an Acorn non-executive director, both have substantial interests.

"But no matter who called for the report in the first place, we still insist that it is as accurate as any other similar survey would be", said the Acorn spokesman.

"The results for the Acorn products were almost identical to ones we've had from our own internal studies. So that satisfies us as to its validity".

Joysticks snag ironed out

SOFTWARE publisher Micro Power has announced a major breakthrough for Electron users.

It has solved the problem of the joystick games that won't run while the Plus 1 add-on is fitted. This snag was first pointed out in the August issue of *Electron User*.

Now Micro Power has written a remedial routine. You load it, pick out which game you want to play from the resulting menu – and then load the game as usual.

According to Chris Payne, Micro Power's marketing chief, this works for 20 of their 22 Electron games.

And, says Payne, with a bit of trial and error most other publishers' games will run too.

A define option on the menu lets you enter information about which keys do what on your particular game – up, down, fire and so on.

Best news of all for readers is that *Electron User* will shortly publish a listing of the Micro Power routine.

Meanwhile Micro Power – which has been getting 20 or 30 phone calls a week from baffled joystick fans – is considering releasing the routine on a cassette.

"We don't want to charge money for it", says Payne, "just a small sum to cover our costs".

Warp drive is go

A BUG in Elite, the best-selling game from Acornsoft, is about to be ironed out.

The trouble came to light when the Electron version was released. Electron users found they could not go from one galaxy to another in hyperdrive as is possible in the BBC game.

"We are working flat out to repair the omission", said a spokesman for Acornsoft.

"People who bought the earlier version will be offered a replacement".

Extending range of education

ACORNSOFT believes it can radically influence the development of education in the home with its new range of what it calls "learning environment" software.

The first four titles – Workshop, ABC, Talk-Back and Spooky Manor – are said to go beyond the limitations of school curricula.

Don Clark, head of Acornsoft's home education division, said: "The programs create opportunities for learning, rather than setting up exercises with narrow, pre-determined goals.

"Through them users can explore, experiment, solve problems, even set their own challenges – all essential tasks in real life.

"Our programs are also fun to use, though not mere games. Enjoyment is important in home education because the traditional motivations of the classroom – teachers and exams – don't exist.

"We have found that if adults find programs boring, so will children. We have designed our programs for everybody.

"They make home learning a group activity".

American operation takes a £6m blow

A DRAMATIC cutback of Acorn's operations in the United States appears to have finally killed off any plans the company had to launch an American version of the Electron.

Acorn has announced it is to reduce its US presence by 80 per cent following poor sales.

This will have cost the company about £6 million as a result of failing in its bid to capture a major share of the educational market States-side with the BBC Micro.

This means there is even less hope of the Electron securing a foothold in the highly competitive American domestic marketplace.

An American version of the Electron was first mooted in The Acorn Guide to The Electron – a Penguin publication.

In this the authors, Neil and Pat Cryer, make numerous references to an Electron being built for the United States market.

"Electrons built for the United States have different characteristics from those built for the United Kingdom", they wrote in one section.

However when contacted by *Electron User*, the official spokesman for Acorn claimed to be totally in the dark about an Electron for the States.

"There's no such machine as far as we are aware", he said.

Further enquiries at Acorn unearthed a technical man who had heard "rumours" of such a machine but insisted that it never left the drawing board.

"Unless there's a mole working away on one here at Acorn, I'm sure it never went further than the idea stage", he confided.

But what about the references to it in the Acorn Guide?

"I think it may well have been a case of pre-guessing on the part of the authors . . ."

SHARE PRICE TUMBLES

FOLLOWING reports of Acorn's massive cutback in the USA, the company's share price slipped to one third of its previous high on the Unlisted Securities Market.

A spokesman admitted that Acorn had scaled down its US operation by four fifths after fierce competition from native companies.

But he denied that share prices had been influenced by this.

"There are two reasons for the drop", he said.

"One is that US sales of home micros have been declining, and consequently investors think it will happen over here next.

"The other is that they have the idea all companies on the USM will double their size every year. But as Acorn is easily the biggest company on the USM, it is much less likely to show exponential growth".

Add-on puts on the brakes

A GADGET that can put the brake on the fastest Electron game has been launched by Cambridge Computing Research.

Called the Slomo, it has a variable speed control and can slow down or even stop everything on the screen.

As well as allowing the user to cheat at games – building up amazing scores – it is useful for small children or handicapped people who cannot cope with high speeds.

Games writers can use Slomo to debug their programs, and it could also be used when taking screen photos or by people who just want to figure out how games work.

Says marketing manager Linda Tippey: "The gadget fits on the back of the Electron, extending the expansion bus, so you can still add a joystick.

"We have had lots of interest from the educational field, especially from the lower level and special schools".

NEW RECORDER GOES ON SHOW

MAKING its bow at the latest Electron and BBC Micro User Show was Acorn's new data recorder for the Electron.

The controls feature a full six key mechanism giving fast forward, rewind, play, record, pause and stop. The cue and review facility enables rapid searching of the tape.

The three digit tape counter is a further aid.

It is battery or mains operated and comes with the necessary leads and mains adapter.

Price: £35.

IF conditions are right THEN your progams can make decisions

Now your programming skills are really starting to develop

YOU may have noticed that so far all the programs we have had in this series have started at the beginning and go on, line by line, to the end.

Occasionally we've sent the program whirling round a loop, but always the result was the same. They progressed relentlessly, obeying every line completely.

While programs that work this way have the benefit that they are easy to debug, they are a bit rigid. They can't make decisions, they just obey orders.

Wouldn't it be nice if there was a way that we could have a program that took decisions for us? We could have programs that could vary what they do in line with the data you give them.

This means that instead of just following the line numbers, what the program does depends on what information it is given.

Happily for Electron users there is a Basic structure that allows programs to take decisions for themselves and act according to circumstances.

This is the IF...THEN statement. Program I shows it in action.

Run it a couple of times and see what happens. You can press any letter key you want, but you only get a message if you press capital Y.

```
  10 REM PROGRAM I
  20 INPUT "Press a key "
key$
  30 IF key$="Y" THEN PRIN
T "You pressed the Y key."
```

Program I

Line 20 just asks you to press a key and, when you hit the Return key, it stores the result in the string variable *key$*.

The work is done in line 30 which reads almost exactly like a line of English. It looks at *key$* and if it contains (or is equal to) Y then the Electron prints the message.

Notice that only IF the condition is true THEN the Electron goes onto processing the rest of the line.

If you run the program again and press, say, T you'll find that you get no message, just the prompt to tell you that the program has ended and the Electron is waiting for something to do. Not very exciting, is it?

What's happened is that line 20 has stored T in *key$*. Line 30 checks to see if the variable *key$* is the same as Y.

In this case it isn't, so the condition is false and the rest of the line is ignored. No message is printed.

The Electron now looks for the next line, finds that there isn't one and so the program stops.

The rule is that IF the condition is true THEN the rest of the line is obeyed. IF the condition isn't true THEN the rest of the line is ignored and the Electron goes onto the next line if there is one.

The trouble with Program I is that if you pressed y instead of Y you didn't get the message. You know that Y and y both mean the same thing, but to the Electron they're very different. Program II checks for both y and Y.

Here line 30 checks for Y then line 40 checks for y. The message only gets printed if one of the conditions is true.

If neither y nor Y have been pressed, neither condition is true and so no message appears.

```
  10 REM PROGRAM II
  20 INPUT "Press a key "
key$
  30 IF key$="Y" THEN PRIN
T "You pressed the Y key."
  40 IF key$="y" THEN PRIN
T "You pressed the y key."
```

Program II

As you might imagine, you could use lots of these one after another to check various conditions but it might get a bit long-winded.

Program III shows that numeric variables can be used in conditions as well as the string variables we've used previously.

```
  10 REM PROGRAM III
  20 FOR loop=1 TO 5
  30 READ x
  40 IF x = 5 THEN PRINT "
x is 5"
  50 NEXT loop
  60 DATA 1,5,6,5,3
```

Program III

Here the FOR...NEXT loop cycles five times, each time reading a value from the data statements into the variable *x*. This means that *x* will be 1 the first time round, 5 the second time round and so on.

Line 40 contains the conditional part of the program. Each time a new value of *x* is read it checks to see if it is equal to five. If it is it prints the message, if it isn't it just ignores the rest of that line.

As *x* has the value 5 on two occasions two messages are printed.

The next program uses exactly the same condition but this time it doesn't print out a message. It keeps a running total of how many times *x* has been equal to 5.

```
  10 REM PROGRAM IV
  20 count=0
  30 FOR loop=1 TO 5
  40 READ x
  50 IF x = 5 THEN count=c
ount+1
  60 NEXT loop
  70 PRINT "The condition
is true ";count;" times."
  80 DATA 1,5,6,5,3
```

Program IV

The difference lies in line 50. Here the IF condition is the same, it's the rest of the line after the THEN that has changed.

What happens now is that IF *x* has the value 5 THEN one is added to the variable *count*.

In this way *count* keeps track of the number of times the condition has been met. As you'll see if you think about it, this is more useful than just printing messages.

To recap on what we've covered so far we can use an IF...THEN statement to make the Electron choose between alternatives.

IF a condition is met THEN the program will do one thing otherwise it will go onto the next line and do something else.

This is the sort of logic behind such questions as "Do you want another go?" and "Which skill level?" that you find in games. What the program does depends on what you reply.

So far the only condition we've met is one using the equals sign.

Program IV counted the number of times *x* was equal to 5. Is there some way that we could make it keep track of the number of times that *x* was not equal to 5? Program V shows how it's done.

```
  10 REM PROGRAM V
  20 count=0
  30 FOR loop=1 TO 5
  40 READ x
  50 IF x <> 5 THEN count=
count+1
  60 NEXT loop
  70 PRINT "The condition
is true ";count;" times."
  80 PRINT "This means tha
t ";count;" of the numbers
are not equal to 5"
  90 DATA 1,5,6,5,3
```

Program V

Line 50 looks very much the same as before. It has a condition beginning with an IF and a THEN followed by

```
count=count+1
```

The difference is that this time the condition is

```
x <> 5
```

instead of the

```
x=5
```

we had before.

Don't be worried by the <> sign. All it means is "not equal to". This means that line 50 reads "if x is not equal to 5, then add 1 to the value of count".

The IF . . . THEN works in exactly the same way, only adding one to *count* when the condition is true, that is, when *x* is anything but 5.

What if we wanted to count the number of times that *x* is less than 5? Program VI shows how it's done.

```
  10 REM PROGRAM VI
  20 count=0
  30 FOR loop=1 TO 5
  40 READ x
  50 IF x <5 THEN count=co
unt+1
  60 NEXT loop
  70 PRINT "The condition
is true ";count;" times."
  80 PRINT "This means tha
t x is less than 5 on ";cou
nt;" occasions."
  90 DATA 1,5,6,5,3
```

Program VI

Once again we've introduced a new symbol into our condition. Don't let it worry you, all < means is "less than". (I remember it because < is almost like an L.)

Since *x* is less than 5 on two occasions the final value of *count* in Program VI is two.

You might guess that if we can test for a "less than" condition being true we can also test for a "more than" condition. Line 50 of Program VII shows how this is done.

```
  10 REM PROGRAM VII
  20 count=0
  30 FOR loop=1 TO 5
  40 READ x
  50 IF x >5 THEN count=co
unt+1
  60 NEXT loop
  70 PRINT "The condition
is true ";count;" times."
  80 PRINT "This means tha
t x is greater than 5 on ";
count;" occasions."
  90 DATA 1,5,6,5,3
```

Program VII

As you'll no doubt have guessed, > is short for "greater than". Line 50 now adds one to *count* for every time that *x* exceeds 5.

And we needn't stop there. Suppose we want to keep track of the number of times that *x* is either greater than or equal to five.

Obviously we could add together the results from Program IV (the number of times *x* is equal to 5) and Program VII (the number of times it's greater than 5).

There is, however, an easier way as shown in Program VIII.

```
  10 REM PROGRAM VIII
  20 count=0
  30 FOR loop=1 TO 5
  40 READ x
  50 IF x >= 5 THEN count=
count+1
  60 NEXT loop
  70 PRINT "The condition
is true ";count;" times."
  80 PRINT "This means tha
t x is either bigger than o
r equal to 5 on ";count;" o
ccasions."
  90 DATA 1,5,6,5,3
```

Program VIII

It will come as no surprise to learn that >= means "either greater than or equal to". And, of course, there is the mirror-image condition which is used in Program IX.

```
  10 REM PROGRAM IX
  20 count=0
  30 FOR loop=1 TO 5
  40 READ x
  50 IF x <= 5 THEN count=
count+1
  60 NEXT loop
  70 PRINT "The condition
is true ";count;" times."
  80 PRINT "This means tha
t x is either less than or
equal to 5 on ";count;" occ
asions."
  90 DATA 1,5,6,5,3
```

Program IX

Here <= means "either less than or equal to". What it means is that when *x* has a value that is either equal to or less than 5, line 50 adds increments *count*.

Don't let all these different logical operators (as they are known in polite society) worry you.

I've summed them all up in Table I. At first they may be a little intimidating, but after a bit of practice you'll find they become second nature.

Vary the DATA statements in Programs IV to IX and see if you can understand the results.

Bear in mind that it doesn't matter what logical operator is in use in an IF . . . THEN statement. As long as the condition is true, the rest of the line after then THEN is obeyed. If it isn't true everything after the THEN is ignored.

And that's it for this month. Have fun playing around with IF . . . THEN statements and when you think you've mastered them try Program X for size. Try changing the DATA statements and see what happens.

```
  10 REM PROGRAM X
  20 count=0
  30 FOR loop=1 TO 5
  40 READ x
  50 IF x <2 OR x >5 THEN
count=count+1
  60 NEXT loop
  70 IF count <3 THEN PRIN
T "The condition is true ";
count;" times." ELSE PRINT
"The condition is false ";(
5-count);" times
  90 DATA 1,5,6,5,3
```

Program X

● *IF you want to know more about conditionals THEN don't miss next month's article.*

Operator	Meaning
=	equals
<	less than
>	greater than
<>	not equal to
<=	less than or equal to
>=	greater than or equal to

Table I: Logical operators

REWRITE THE HIGH SCORE TABLES

So, you've got an Electron. You've also got enemies. With the Gunshot, you'll have all the opposition cowering in corners. 8-directional action and an all-in-one moulded stem allows accurate annihilation and strength to survive those all-night sessions. Dual fire buttons for fading fingers (and a rapid fire version when they're really coming thick and fast). And, if you break it (and we know you'll try) our 12-month guarantee will prove invaluable. Only £8.95.

For the Gunshot, Vulcan's totally hardware Electron interface comes with a free tape which converts all keyboard software for joystick use. And it'll allow you to destroy BBC game enemies on your Electron, too! £19.95, 12-month guarantee

See the range of Vulcan joysticks and interfaces at your local stockist ...
we'll see you on the high score tables.

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Animated Electron

An introduction to things graphical by ALAN PLUME

THIS is the first of a short series of articles which will show how to achieve simple but effective animation on the Electron using only the Basic language.

As must be expected, no great speed is achieved. The intent is merely to introduce the reader to the basic techniques (no pun intended) and hopefully to foster an interest in things graphical.

The first technique we'll cover is text and character animation. This is probably the simplest method both to understand and to programme.

Smooth movement of text can be achieved by careful positioning of text using the PRINT and TAB(X,Y) commands.

Program I shows this technique moving one word around the screen.

The only important thing to remember is to erase the word at the last position before writing it at the next. Obviously you can use this method to move portions of text around the screen in almost any direction that you choose.

The next example, Program II, shows that with a little effort and using a tiny bit of graphics, the method above can be built upon.

Line 40 redefines character number 224 to be an "i" without the dot. Then using MOVE and the relative PLOT commands a "dot" (in fact two dots) can be moved down to dot the "i". Lines 60 to 110 use the technique outlined above of displaying and then erasing to give the impression of movement.

Lines 130 onwards display another piece of text which is printed with a small delay. Once printed the Electron "realises" that the apostrophe is missing. The appropriate section of text is moved to the right and an apostrophe moved in to the gap.

The third and final example shows the use of redefined characters with the above techniques.

A number of "frames" are formed that, when displayed one after the other, give the impression of smooth movement.

Thirteen characters are defined, once again using the VDU 23 statement familiar from the *Electron User* Casting Agency series.

These are assembled on the screen using VDU 31,X%,Y% to position the characters.

The first frame is displayed for a set time using a delay, then the appropriate parts are overwritten giving frame 2.

This is repeated for frame 3 and the whole sequence is repeated until ESCAPE or BREAK is hit.

Note that frame 1 has a space character (32) in its second line. This is to blank out the upraised arm in frame 3.

Frame I

Frame II

Frame III

Program I

```
10 REM PROGRAM I
20 MODE5
30 REM
40 REM Turn cursor off
50 REM
60 VDU23,1,0;0;0;0;
70 Text$="Animation"
80 REM
90 REM Blank$ is n spaces, where n is the length of Text$
100 REM
110 Blank$=STRING$(LEN(Text$)," ")
120 REM
130 REM X% is horizontal position where Text$ is to be printed.
140 REM
150 X%=5
160 PRINTTAB(X%,0)Text$
170 FORY%=1 TO 30
180 PRINTTAB(X%,Y%-1)Blank$
190 PRINTTAB(X%,Y%)Text$
200 FOR delay=1 TO 50:NEXT delay
210 NEXT
220 FORY%=30 TO 1 STEP -1
230 PRINTTAB(X%,Y%)Blank$
240 PRINTTAB(X%,Y%-1)Text$
250 FOR delay=1 TO 50:NEXT delay
260 NEXT
```

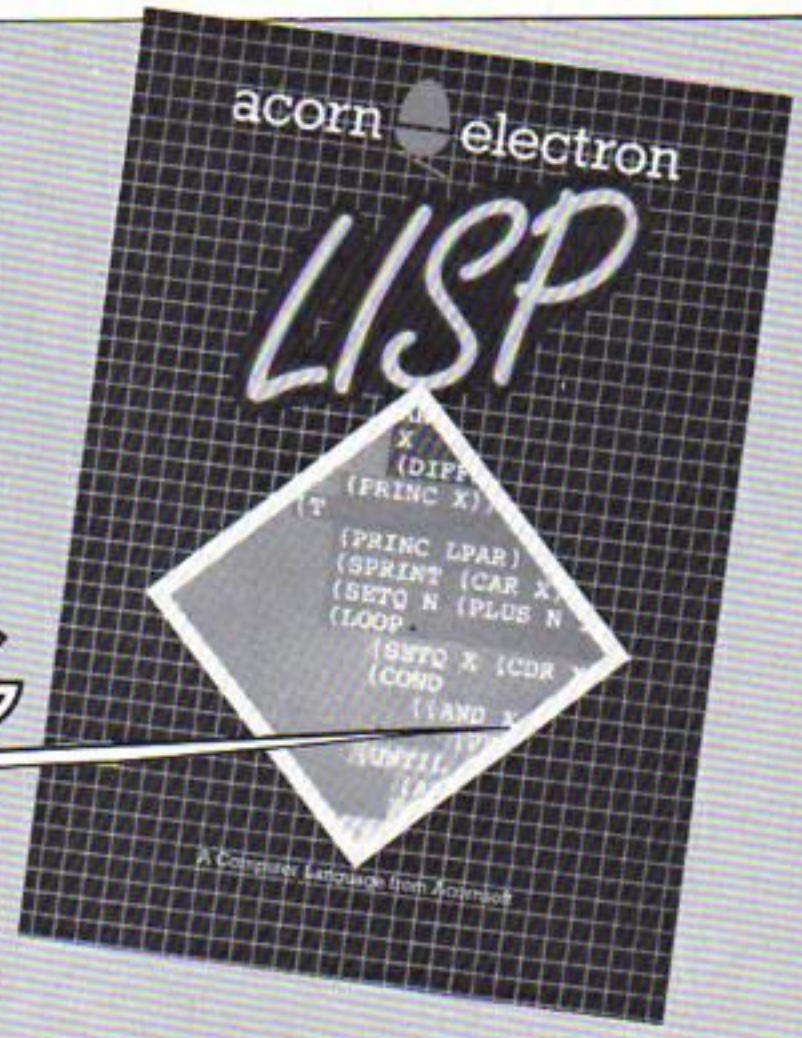
Program II

```
10 REM PROGRAM II
20 MODE1
30 VDU23,1,0;0;0;0;
40 VDU23,224,0,0,56,24,24,24,60,0
50 COLOUR 1
60 PRINTTAB(0,10)"Always dot your "+CHR$224+"'s."
70 X%=524
80 FORY%=1023 TO 712 STEP-4
90 MOVEX%,Y%:PLOT1,7,0
100 MOVEX%,Y%:PLOT2,7,0
110 NEXT
120 MOVEX%,Y%:PLOT1,7,0
130 COLOUR 2
140 Text$="And dont forget your apostrophes."
150 L%=LEN(Text$)
160 FOR letter=1 TO L%
170 PRINTTAB(letter-1,15)MID$(Text$,letter,1)
180 FOR wait=0 TO 40:NEXT
190 NEXT
200 move$=" "+RIGHT$(Text$,26)
210 PRINTTAB(7,15)move$
220 COLOUR 3
230 PRINTTAB(0,14)"'"
240 FORX%=0TO6
250 PRINTTAB(X%,14)" "
260 PRINTTAB(X%+1,14)"'"
270 FOR wait=0 TO 40:NEXT
280 NEXT
290 PRINTTAB(7,14)" "
300 PRINTTAB(7,15)"'"
310 VDU 30
```

Program III

```
10 REM PROGRAM III
20 MODE5
30 PRINTTAB(3,30)"EXERCISE TIME!"
40 VDU23,1,0;0;0;0;
50 VDU23,224,0,0,0,0,0,0,0,255,127
60 VDU23,225,0,96,240,240,240,96,252,254
70 VDU23,226,3,1,1,1,0,1,1,1
80 VDU23,227,255,251,251,251,243,251,251,250
90 VDU23,228,1,1,1,1,1,1,1,3
100 VDU23,229,152,152,152,152,152,152,152,156
110 VDU23,230,0,0,0,0,0,0,0,3,7
120 VDU23,231,15,13,13,13,12,13,13,13
130 VDU23,232,0,0,0,0,0,0,0,7,15
140 VDU23,233,0,96,240,240,240,240,96,254,255
150 VDU23,234,27,49,97,193,128,1,1,1
160 VDU23,235,253,248,248,248,240,248,248,248
170 VDU23,236,128,192,96,48,16,0,0,0
180 X%=0:Y%=10
190 REPEAT
200 REM 1st figure
210 VDU31,X%,Y%,224,225
220 VDU31,X%,Y%+1,226,227,32
230 VDU31,X%,Y%+2,228,229
240 REM 2nd figure
250 TIME=0:REPEAT UNTIL TIME=20
260 VDU31,X%,Y%,230
270 VDU31,X%,Y%+1,231
280 REM 3rd figure
290 TIME=0:REPEAT UNTIL TIME=20
300 VDU31,X%,Y%,232,233
310 VDU31,X%,Y%+1,234,235,236
320 TIME=0:REPEAT UNTIL TIME=20
330 UNTIL FALSE
```

LISP, THE LANGUAGE THAT STRIKES LIKE LIGHTNING



LISP, developed around 1960 by John McCarthy and others at the Massachusetts Institute of Technology in America, is one of the oldest computer languages still in use.

His main objective was to produce a powerful language for defining and transforming functions. Lisp was designed to manipulate abstract symbols called atoms and combinations of symbols called lists. It is a LISt Processing language.

Perhaps the most publicised used of Lisp has been in the field of artificial intelligence research. The expressive power of the language was recognised by workers who were wrestling with the difficult symbolic manipulation problems involved.

Programs have been written that hold conversations, write stories for children and summarise text.

Most mainframe computers support Lisp and now a few micros as well. There is no generally accepted standard, so as a result there are many dialects around. However, adapting Lisp to run on another machine is usually straightforward, making the language fairly portable.

Acornsoft's variant is available on cassette or ROM cartridge. The cassette version is the one considered here. The ROM cartridge will have all the facilities offered by the cassette version, plus a few extra, and a lot more memory.

The cassette and manual are sold separately, which seems a little strange. Unless you are already an expert Lisp programmer – and not many people are – then neither is much use without the other. Price of the package is about £23.

Large scale implementations may contain hundreds or even thousands of built-in functions. Consequently a small micro such as the Electron cannot hope to provide all of them, so only the bare essentials are built into Acornsoft's Lisp.

However this should be sufficient. Fortunately, many of the standard utilities can be written in Lisp itself and appendix B in the manual lists a few of these.

Since many of the functions not provided would only be used occasionally and may have specialised uses, these can be typed in as and when needed for each application.

Acornsoft Lisp has a few extra functions not normally found in other systems. These are to allow the use of the Electron's excellent graphics and sound capabilities.

One of the most powerful is the VDU command which provides an easy interface with the Electron's machine operating system.

Lisp takes about four minutes to load. It has 5.5k of machine code interpreter and 3k of initialised Lisp workspace containing utilities and constants. These can be deleted, if not required, to gain extra memory.

When loading is complete the user is asked to select a mode – either 3, 4, 5 or 6. Once one has been selected it is not possible to change to another using MODE n, so if you want to use graphics or the 80 column mode 3 you must start up in the correct mode.

There are two main questions to be asked of Lisp:

- *What can you do with it?*
- *How easy is it to use?*

Chapter 23 in the manual answers the first question – 11 applications are listed demonstrating its use. The programs are not complete, but do provide the building blocks for constructing much larger Lisp applications, and the user is encouraged to develop them further.

The examples include: Sorting a list into alphabetical order, arbitrary precision arithmetic (how to cope with very large numbers), a Lisp pretty-printer (used to display large pieces of Lisp structure, spreading its output over many lines and using indentation to make it more legible), an animal guessing game (you think of an animal and the Electron has to try and guess it), a route finding program (also on the cassette), graphic displays (how to create pictures), and mazes and dungeons (an adventure game).

The answer to the second question is entirely subjective and everyone will have their own opinion. I have to disagree with the manual which states: "It provides a complete introduction to Lisp and assumes no previous knowledge of the language", and that "Lisp is easy to learn . . ."

Lisp seems very strange and confusing at first, operating on lists and atoms, recursion being very common. Unlike Basic, you need to know and understand a large proportion of Lisp before you can even think of writing your first simple program, and this is the main stumbling block.

Lisp operates on the "lightning principle". The concepts strike you suddenly when you are almost ready to give up. Once you have been struck, everything falls into place. Strength, stamina and perseverance are required.

Acornsoft's Lisp is an excellent package for anyone interested in programming and computer languages. It will teach pattern recognition, and recursion will become second nature.

A word of warning though, it is not for the absolute beginner. Be prepared for a struggle, and remember the "lightning principle".

One last note: If you are unsure whether to invest in Lisp, try to get hold of The Little LISPer by Daniel P. Friedman (I borrowed it from the local library).

This is not a manual on how to use Lisp on the BBC or Electron, but it explains the structure, principles and concepts involved in a very simple and amusing manner.

You do not need Lisp or even a computer to understand and appreciate it. Read it. I think you will find Lisp fascinating.

Roland Waddilove

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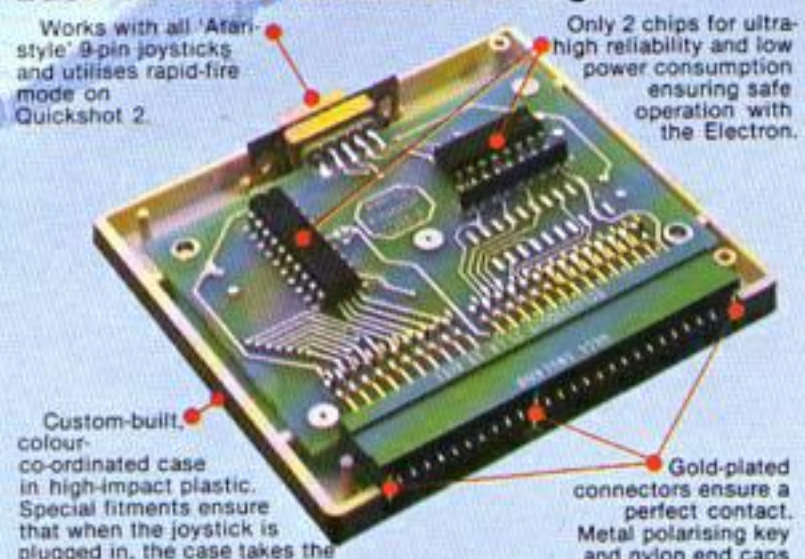
Look at these advanced design features.



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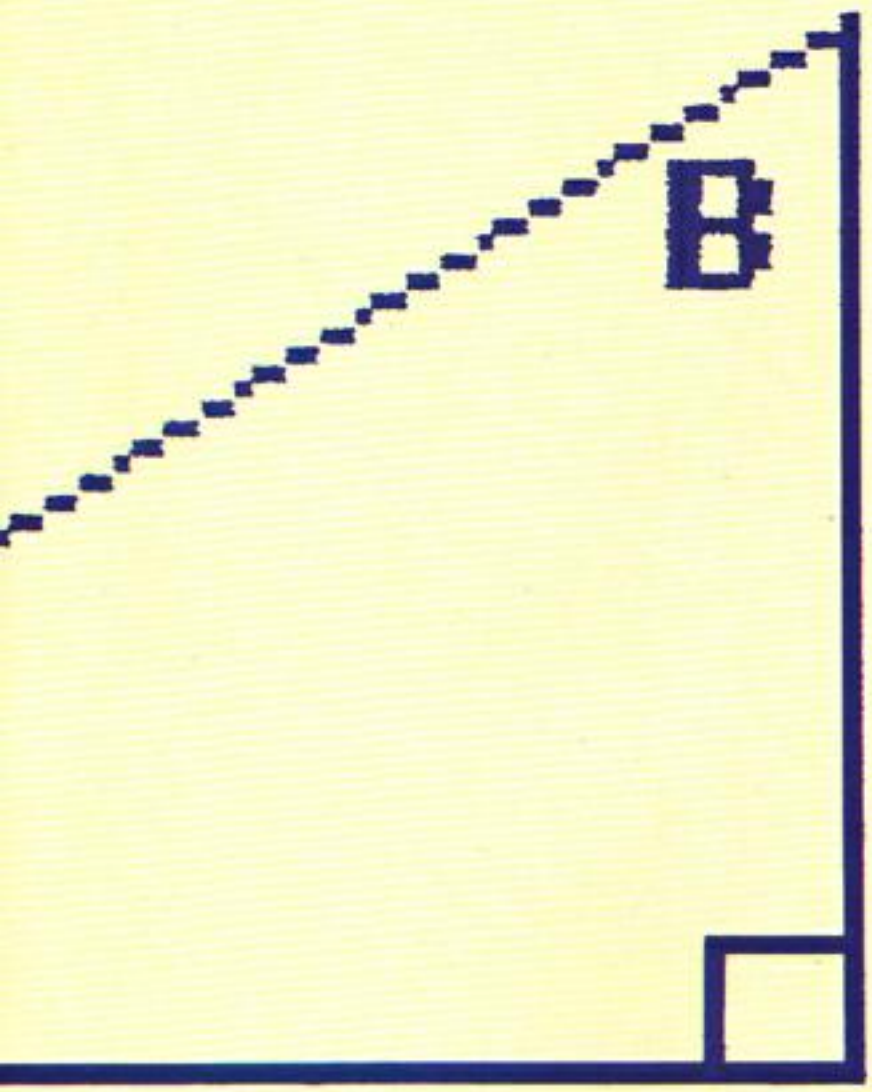
Don't be obtuse - get your angles right on!

TRIG, as you might guess from its name, is a program to help with trigonometry problems.

Written by GRAHAM HAWKINS it will calculate the length of the sides and the angles of any right angled triangle from a minimum of information with a minimum of fuss.

All the instructions are in the program. So get typing and let your Electron tame those triangles!

```
10 REM TRIG
20 REM (C) ELECTRON USER
30 *KEY10,OLD|M
   :RUN|M
40 *FX11,0
50 *FX200,1
60 MODE 5
70 PROCtitle
80 MODE 4
90 VDU 23,1,0;0;0;0;
100 PROCinfo
110 PROCintro
120 END
130 DEF PROCintro
140 CLS
   :PROCtriangle
150 PRINT TAB(6,14)"WHAT
    INFORMATION DO YOU HAVE"
160 PRINT
   :PRINT "Do you know the
    length
        of two sides?.......
   .............PRESS 1"
170 PRINT "Do you know one
    side and one angle?.....
    .............PRESS 2"
180 PROCreturn
190 INPUT " "one_or_two
200 IF one_or_two=1
    THEN PROCsides
210 IF one_or_two=2
    THEN PROCanglesides
220 IF one_or_two>2
    THEN PROCmistake
230 DEF PROCmistake
240 PRINT
    :PRINT "YOU HAVE GIVEN
     A WRONG ANSWER ,
          PLEASE TRY AGAIN"
250 ENVELOPE 3,2,-25,-80
    ,-6,15,0,0,126,0,0,-126
    ,126,126
260 SOUND 1,3,156,27
270 FOR T=1 TO 4000
    :NEXT T
    :CLS
    :PROCintro
280 ENDPROC
290 DEF PROCsides
300 CLS
310 PROCtriangle
320 PRINT TAB(0,16)"Name
    the first side known
    X,Y or Z...."
330 INPUT TAB(37,16)" "first$
340 PRINT TAB(0,18)"Name
    the second side known
    X,Y or Z..."
350 INPUT TAB(37,18)" "second$
360 IF first$<"X"OR second$<
    "X"
    THEN PROCmistake
370 IF first$=second$
    THEN PROCmistake
380 CLS
    :PROCtriangle
390 PRINT TAB(0,16)"Enter
    length of side ";first$;
    "
     "
400 INPUT TAB(35,16)first
410 PRINT TAB(0,18)"Enter
    length of side ";second$
    ;"                "
420 INPUT TAB(35,18)second
430 IF first$="X"AND second>f
    irst
    THEN PROCpythagoras
440 IF second$="X"AND first>s
    econd
    THEN PROCpythagoras
450 IF first<=0
    THEN PROCtoosmall
460 IF second<=0
    THEN PROCtoosmall
470 IF first$<>"X" AND second
    $<>"X"
    THEN PROCnot_x
480 IF first$<>"Y" AND second
    $<>"Y"
    THEN PROCnot_y
490 IF first$<>"Z" AND second
    $<>"Z"
    THEN PROCnot_z
500 ENDPROC
510 DEF PROCnot_x
520 CLS
    :PROCtriangle
530 IF first$="Y" AND second$
    ="Z" OR first$="Z"
    AND second$="Y"
    THEN third=first*first+(s
    econd*second)
540 IF first<.5
```




```
Length of side Y is 1 units
Length of side Z is 1 units
Length of side X is 1.41421356 units
Angle A is 45 degrees
Angle B is 45 degrees
   PRESS SPACE TO ENTER ANOTHER SET OF
                MEASUREMENTS
```

```
FORMULAE

 The formulae used to find the unknowns
are SINE,COSINE and TANGENT thus:

          SIN = OPPOSITE / HYPOTENUSE

          COS = ADJACENT / HYPOTENUSE

          TAN = OPPOSITE / ADJACENT

     Press SPACE to continue.
```

```
    THEN PROCsure
550 IF second<.5
    THEN PROCsure
560 PROClength_of
570 PRINT TAB(0,20)"Length
     of side X is ";SQR (thir
    d);" units"
580 IF first$="Y"
    THEN A=DEG (ATN (first/se
    cond))
    ELSE A=DEG (ATN (second/f
    irst))
590 B=90-A
600 PRINT
    :PRINT "Angle A is ";A;
    " degrees"
610 PRINT
    :PRINT "Angle B is ";B;
    " degrees"
620 PROCagain
630 ENDPROC
640 DEF PROCnot_y
650 CLS
    :PROCtriangle
660 IF first$="X" AND second$
    ="Z"
    THEN third=first*first-(s
    econd*second)
    ELSE third=second*second-
    (first*first)
670 IF first=second
    THEN PROCpythagoras
680 IF first<.5
    THEN PROCsure
690 IF second<.5
    THEN PROCsure
700 PROClength_of
710 PRINT TAB(0,20)"Length
     of side Y is ";SQR (thir
    d);" units"
720 IF first$="X"
    THEN B=ASN (second/first)

    ELSE B=ASN (first/second)
730 A=90-DEG (B)
740 PRINT
    :PRINT "Angle A is ";A;
    " degrees"
750 PRINT
    :PRINT "Angle B is ";
    DEG (B);" degrees"
760 PROCagain
770 ENDPROC
780 DEF PROCnot_z
790 CLS
    :PROCtriangle
800 IF first$="X" AND second$
    ="Y"
    THEN third=first*first-(s
    econd*second)
    ELSE third=second*second-
    (first*first)
810 IF first=second
    THEN PROCpythagoras
820 IF first<.5
    THEN PROCsure
830 IF second<.5
    THEN PROCsure
840 PROClength_of
850 PRINT TAB(0,20)"Length
     of side Z is ";SQR (thir
    d);" units"
860 IF first$="X"
    THEN A=ASN (second/first)
    ELSE A=ASN (first/second)
870 B=90-DEG (A)
880 PRINT
    :PRINT "Angle A is ";
    DEG (A);" degrees"
890 PRINT
    :PRINT "Angle B is ";B;
    " degrees"
900 PROCagain
910 ENDPROC
920 DEF PROCtriangle
930 MOVE 380,760
940 DRAW 780,990
950 DRAW 780,760
960 MOVE 380,760
970 DRAW 780,760
980 PRINT TAB(17,3)"X"
990 PRINT TAB(25,4)"Y"
1000 PRINT TAB(18,9)"Z"
1010 PRINT TAB(14,7)"A"
1020 PRINT TAB(23,2)"B"
1030 MOVE 750,760
1040 DRAW 750,790
1050 DRAW 780,790
1060 ENDPROC
1070 DEF PROClength_of
1080 PRINT TAB(0,16)"Length
     of side ";first$;" is
```

Turn to Page 57

BOUNCY

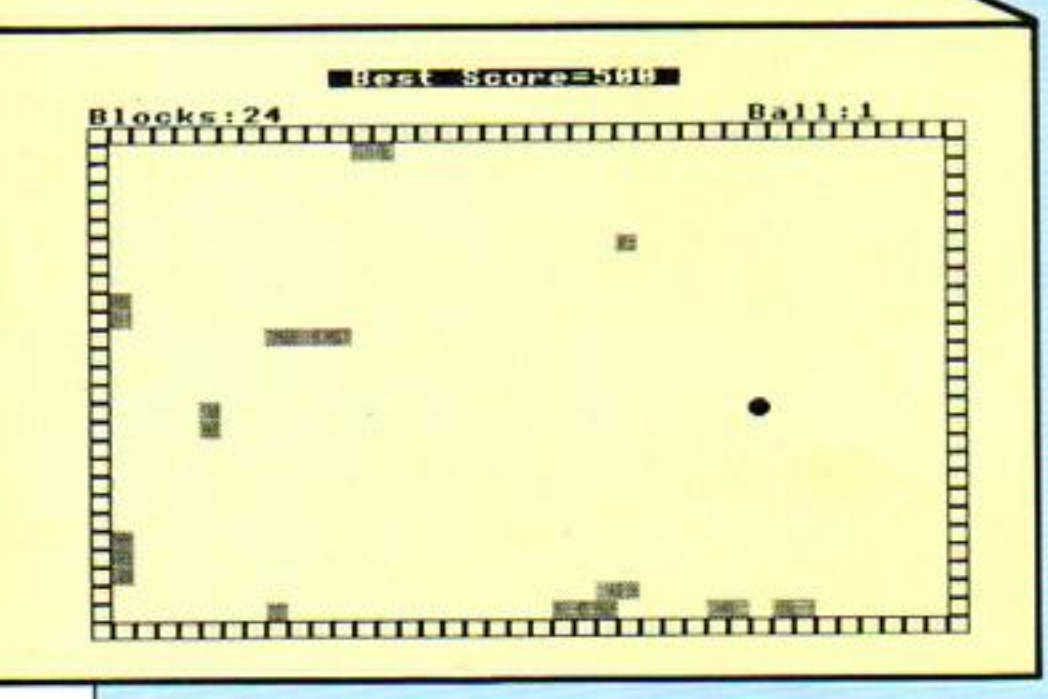
Have a ball with ROLAND WADDILOVE's enjoyable little game

BOUNCY is a simple but enjoyable game in which you have to trap a ball which is moving around the screen, bouncing off any objects in its way.

Your only control is the space bar, which can be used to place a block just behind the ball.

After practice you should be able to build a box by tapping the space bar and placing blocks at a selected spot as the ball flies past. When the ball bounces into the box press the space bar to trap it.

There are 25 balls in all and the object of the game is to trap them using as few blocks as possible. The lower your score the better you are.



Full listing starts on Page 53

PROCEDURES

PROCinitialise	Defines the characters used and sets the best (lowest) score.
PROCscreen	Draws the border, prints best/ball/ blocks.
PROCnew_ball	Finds an empty space and prints the ball, sets the vertical and horizontal components of movement.
PROCmove_ball	Moves the ball until it is trapped, calls PROCbounce if there is a block in the way.
PROCbounce	Works out the new direction, uses FNpoint to see if there is a block in the way.
FNpoint	Sees if there is a block in the way.
PROCdelay (T%)	Waits for T% hundredths of a second.
PROCgame_over	Prints your rating, score and high score, sees if you want to play again.
PROCinstructions	Prints the instructions, sets the difficulty level.

VARIABLES

ball	Number of balls.
best	Best (lowest), score.
B%	Number of blocks placed.
I%	Loop counter.
X%,Y%	Coordinates of ball.
V%,H%	Vertical and horizontal components of movement.
E%	Flag to show whether an easy or hard game.
T%	Time delay.
a$	Rating.

Plan your colour schemes

ROGER FROST
demonstrates the Electron's design capabilities

SWATCH is one of those programs that amaze you with the range of effects the Electron can produce.

This program of lines and colours automatically turns the pages of a never-ending wallpaper pattern book or a swatch of curtain materials.

The designs vary from plain, bold colours, through Regency stripes and exciting Welsh tweeds to a range which seems to have been lifted directly from the seats of British Rail trains.

It is amazing what can be produced with just horizontal and vertical lines, and it is often hard to believe that only four colours are present on the screen at any one time.

Plan your colour schemes for home decorating, or just sit back and boggle at the versatility of your Electron.

```
10REM***SWATCH***
20REM***BY R.Frost***
30REM (C) ELECTRON USER
40MODE5
50VDU23;8202;0;0;0;
60GCOL0,129:CLG
70col%=0
80REPEAT
90FORstep%=8TO10
100FORN%=0TO20
110GCOL2,N%
120FORX%=0TO1279STEPstep%
+4
130MOVE X%,0:DRAWX%,1023
140NEXT
150VDU19,3,col%,0,0,0
160GCOLN%,3
170FOR Y%=0TO1023STEPstep
%
180MOVE0,Y%:DRAW1279,Y%
190NEXT
200col%=col%+1:IF col%>7
col%=0
210NEXT
220NEXT
230UNTIL0
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

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

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

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Software Surgery

THE COLUMN THAT TAKES A LOOK INSIDE THE LATEST RELEASES

A cave to conjure with

Classic Adventure
Melbourne House

IT wouldn't really matter how good or bad this program is – as it is the only Electron version of the original Colossal Cave adventure, I'd have to recommend it.

So it comes as a bonus to find that this adaptation is superb.

I haven't played the original Crowther and Woods version so I can't say how close to the original this is. However it seems to have all the problems I have read about so it must be a full – or nearly full – adaptation of the original.

In it you play the part of a typical greedy adventurer. You come hot-footing it, flushed with success from your last adventure. You've heard of the fabulous treasure to be found in the area and are eager to get your share.

Armed with the objects you find above-ground you race off to the grating that gives access to the labyrinth of caves below.

You soon come across your first major obstacle – a large venomous snake. Its teeth soon puncture your ego as well as your skin. It is at this point that you realise that things aren't going to be quite as easy as you thought.

Careful exploration of the earlier locations soon reveals

the solution – though the final answer is for the birds.

You'll also find the first magic word. This returns you to the building but remember to turn off your lamp – it won't last forever.

You progress slowly, solving a maze and other puzzles and finally enter the main body of the adventure. Eventually you will solve the game but it is more likely to take weeks rather than days. Well, what else can I add? Very few adventures ever reach the standards set by this one.

It is deservedly called Classic. Somehow it is exciting to visit all these locations I have heard so much about before.

In a way it is like a legend coming to life. All I can say is it's a superb game and one that no true adventurer should be without. Magic!

Merlin

Touch too violent?

Swag
Program Power

SWAG is a rarity in arcade style games – it is a genuine two player game with the option of the second player being the micro.

The aim is to acquire jewellery to the value of £250,000 by moving your man to randomly placed

jewels and returning with them to your house.

If that sounds easy, then don't forget that your opponent is after the same treasure as you and is quite prepared to shoot you to get it.

You may also have insurance company robots on your trail. Any collision with them means a quick, empty-handed return home.

Of course you have the same advantages as your opponent. There is a different type of robot after him.

Robots can be converted from one kind to another by shooting them or by travelling to a special symbol which occurs on the screen from time to time.

Attempting to keep order in this lawless area are the police. There are three police cars which score points for your opponent if you go near them.

If you shoot one, it relentlessly follows you until you drink a can of beer and shoot it again. You can use that to your advantage by stopping the car near your opponent's home.

With all this shooting you will probably run out of ammunition, but they sell it at the bank, provided you've got gold.

Regrettably, in translating this program from a BBC Micro version, one or two things have been forgotten. The instructions give a most unsuitable group of keys to

→

Super for stargazers

Constellation
Superior Software

THIS well written program enables the user to view the stars from any point on the Earth's surface on any date and at any time – all without leaving the comfort of your armchair.

Your monitor can now show a vast array of more than 450 stars in 50 major constellations.

For your part, move the telescope-style display up, down, right or left as well as zooming in and out, all via the keyboard.

The well constructed program allows you to view the heavens in two different ways – as you might observe by looking up into the night sky by the varying magnitude of the stars and secondly, the display can be changed to show each constellation by a code of letters.

For example, a group of letter Gs indicate the position of the constellation Gemini.

Using this letter code all 50 constellations are listed, the accompanying notes giving additional information to the user.

All in all a very good educational package which is simple to use. Amateur astronomers might also like to consider this one if they're fortunate enough to own an Electron.

Ken Smith

From Page 19

player two, but fear not, the actual keys are O (up), L (down), + (left), * (right) and Return (fire).

More seriously, you do not seem able to redefine the keys as you might wish.

The game is provided with many options: sound on or off, or a start for either player.

I personally worry about the glorification of theft and violence. Is this what we really want for our teenagers? The trouble is like so many of these games, it is addictive.

Rog Frost

Beat the busy bees

Pengi
Visions

PENGI type games have become quite popular lately with two or three software houses having their own versions on the market.

The game is derived from Pac-Man, but Visions' Pengi is far superior to any Pac-Man program.

You are in control of a cute little penguin who is trapped in a maze made up of large ice blocks inhabited by snow bees.

The object of the game is to line up three special white ice diamond blocks without being caught by the snow bees.

Fortunately these can be killed by squashing them with an ice block which slides along if you push it.

The graphics are excellent as is the sound, and I found it difficult enough just avoiding the snow bees, never mind lining up the ice diamond blocks.

There is a high score table of famous penguins, on screen scoring, redefinable keys, and a practice mode in which you can't be killed. If you're into arcade games you will love this one.

Roland Waddilove

No loss of power

Jet Power Jack
Micro Power

A COUPLE of months ago I played this game's BBC version on the big brother machine and found it fascinating. It is one of those annoying addictive games which Micro Power have the knack of producing.

I was delighted on receiving the Electron version to find that it is identical – no scaled down sound or fewer features, but the full implementation with no perceptible change, not even in speed.

Perhaps I should add that I find the game a little too fast, as I prefer to achieve some degree of success straight away, and my young son also enjoys trying the games out. But we both found the initial action too speedy.

I have tried the BBC version on the Electron and found I was able to accumulate a decent score and develop a strategy.

There are five screens, which may be accessed separately from the menu. If screen 1 is chosen, and you are a better player than I, the other screens are encountered in order.

On each the basic format is the same, with a spaceship on the left needing to be refuelled with fuel which is on the right. Shades of Jet Pac, perhaps, which I enjoyed greatly in my misspent youth on a Sp*ctr*m.

The man is moved across the screen by careful use of the left/right controls, and the hover motor.

There are safe platforms to rest on briefly, but nearly everything else is quite lethal to Jack. Each screen has different problems, with elements of other games appearing, such as the vertically moving monsters which have the same effect as the lifts in Corporate Climber.

The graphics are good, the smoothness of the movement superb. Sound is fair, and can be turned off if required. The key response is quick, precise and accurate.

I just wish my reactions were!

Phil Tayler

Galactic surprises

Galaxy Wars
Bug Byte Software

ANOTHER game from the Space Invaders camp with a few differences and a couple of surprises.

You are the little destroying machine at the bottom of your screen, moving left to right with your FUNC and Q keys, firing with the Delete key. F freezes the game.

The first screen of alien bombers are in an easy to pick off formation lined across the screen. That is, easy if you get your rhythm right.

However, watch out for the space pods which land on your level and can blow you to smithereens if you run into them.

But there's no time for complacency – as soon as you've fought them off, the H wing fighters appear on the screen. These are both hard to dodge and at times seemingly impossible to blow up.

And, after all this, you have

QUIZ HAS ALL THE ANSWERS

THIS marvellous little package is more than a quiz, more than a game and much more than so many of the educational programs on the market.

High praise you say, but consider what you get for your money.

A choice of 15 quiz topics each containing 50 questions, three different ways of answering – multiple choice, true or false and fill in the missing letters.

Then there's a facility to pass if you're really stuck, a summary of your performance and the chance to re-run the ones you passed or got wrong.

All this under the eyes of the micro timekeeper.

Answer Back
Senior Quiz
Kosmos Software

Add to that good graphics in the form of craters, planets, space-ships and your friendly robot with his laser gun. Mix in a little sound and you have part two – a game, triggered by correctly answering a question.

A tone sounds, an alien spaceship appears from behind your planet, you hit the robot's laser fire button and try to shoot it down.

It's really compelling stuff. But wait . . . there's more to come. Being the mastermind you are it won't take you long to come to grips with the correct answers to most of the 750 questions available.

Therefore create your own.

Even this can be done using the program's create, save and verify facility. Now you have a package made for the kids to do their homework with.

You set the questions and they get to shoot down all the nasties from outer space. Peace will reign in your household.

Watch out Magnus Magnusson, your job's in jeopardy.

Ken Smith

to dock with your mother ship to refuel.

All in all it's an exciting game for the arcade addict, with reasonable graphics and good sound effects.

Keith Young

Offers you can refuse

Survivor
MP Software

THE year is 1910 and you're on a cruise of the tropics when there is an accident and the ship sinks. The result is that you find yourself swimming in a shark-infested sea.

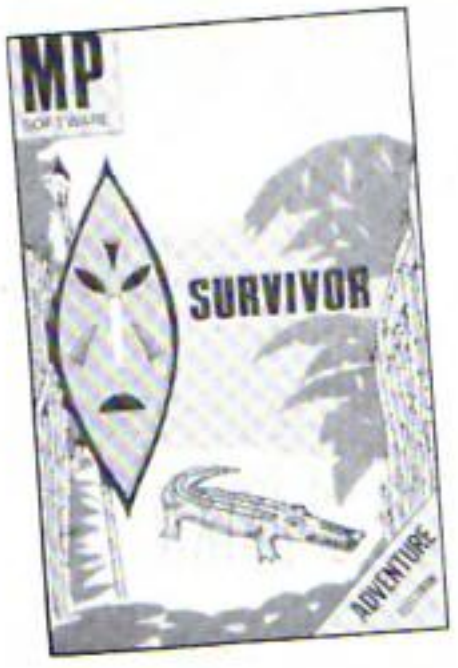
Can you survive and find your way back to civilisation, or alternatively find happiness on a tropical island?

There are very few actual puzzles to solve in this adventure. Almost everything is accomplished by choosing between two alternatives – HIDE or STAND, EAT or STARVE, ACCEPT or REFUSE.

The results of these choices can be hilarious. For instance, on entering a village you have to bribe the tribal chief. If you have what he wants he then offers you his daughter's hand in marriage.

If you accept you are given your own hut. You are then given a further choice – STAY or ESCAPE. If you STAY the game ends and presumably, you live happily ever after. If you REFUSE the chief gets angry and swops you with another village for a pig.

Here you are offered some food and, again, you have a choice – EAT or REFUSE. If you REFUSE you become lunch for the tribe. If you EAT you are imprisoned in a hut and have to steal the witch-doctor's clothes to escape.



You'll also meet Robinson Crusoe who asks you to stay and be his friend. If you accept . . . end of game again. There is also a secret civilisation in the depths of the island. If you find them, guess what? Yes, end of game yet again.

I'm not sure I'd call this an adventure as such and I'm sure I didn't manage to find all the endings – how do you get past the rhino?

Overall, a departure from the usual M&P style of adventure but there are so many alternatives in the course of the game for you to choose from, that I'm sure, like me, you'll spend your time discovering the results of all of them. It's an unusual and highly entertaining adventure.

Merlin

Memory monitor

Starmon Machine Code Monitor
Slogger Software

IF you've always thought that a monitor was an alternative to the family TV, you may think that a machine code monitor would be a fast version. In fact Starmon is a piece of software stored on a microchip.

This type of software is sometimes called firmware, and to be able to use it you will need a sideways ROM card to plug into the expansion port at the back of your Electron.

A machine code monitor program like Starmon enables you to look at the contents of the micro's memory, both the 32k of RAM and the other 32k of ROM.

The program is very easily loaded. Just type *ST. and it's there – instantly.

Once loaded, you may well wonder what to do with it. Well, the clever part of Starmon is that it uses the memory normally occupied by Basic so running Starmon will not interfere with the program in memory.

It is easily possible to study any program – even those unlistable ones. Of course, you do not get a Basic listing. It is the contents of memory you see, but Starmon will do its best for you.

The contents of memory can be displayed in decimal, hexadecimal, binary or even octal. In addition, if Starmon thinks it detects an Ascii character it will print that. It can also disassemble code – that is, it produces a listing in assembly language.

This all sounds very fearsome, but if you are a beginner to this kind of thing don't be put off, because you can quickly learn some skills.

For example it is very easy to alter the contents of memory without spoiling the program, I have personalised halls of fame so that they load with my name.

For the advanced user, Starmon is a very full program. With it you can search memory for bytes or strings, or move chunks of code around from one area of memory to another.

You can block fill memory, write directly to memory locations or alter the 6502 registers. There are also facilities to single step through programs, which can greatly help with debugging, or allow you to learn what machine code instructions do.

It is also possible to dump Starmon screens to a printer for future reference.

Starmon comes with a well written 42 page booklet, which makes the program easy to use. This whole package would be very useful to anybody keen to program, or even just dabble in machine code.

It is a thoroughly professional piece of firmware.

Rog Frost

TIME TO LEARN

What's the Time?
Collins Software

THIS is one of a series of early-learning tapes previously available for the Spectrum, but which have now been brought to the Electron.

The packaging verges on the ridiculous, being about 11in x 9in – to contain one cassette. There is actually a work book included as well which presumably is meant to excuse the size but some manufacturers really are going to extremes.

Four programs actually comprise the package, dealing with hours, half-hours, quarters and minutes. Together they cover an extensive age range and also quite a wide band of ability.

The trouble I found with most of them was that the un-DRAWing and DRAWing of the clock hands seemed to be rather a slow and laborious process.

Hours introduces a little figure called Microman who works through his day to illustrate the passing of hours. There follows a fairly standard kind of test on hours, with appropriate responses from the computer.

Half hours extends this idea, and follows a similar format which again means rather tedious drawing. Quarters starts in the same vein, but then asks the child to move the hands of the clock using the H and M keys.

Although this was much more meaningful to the youngsters I tried this on, even they showed signs of frustration at the slow rate of action.

Minutes was altogether better, attempting to explain the link between the numbers on the clock face and those curious expressions we use with minutes to or minutes past an hour.

The final part of Minutes asks the child to enter the time, by pressing the hours followed by the minutes.

If only the screen display could be made a little speedier on occasions, this would be a good piece of software for the parent to use at home.

Phil Tayler

As time

CLOCK is an Electron utility program which can be either used on its own or embodied in any program where a readout display of the time is required, such as in a game or a database program.

It starts by asking you to enter which screen mode you want to use to display the time.

Next you are asked to key in the correct time. This should be in a 24 hour format, so that 2.30pm would be entered as 14,30,0.

Pressing Return when the seconds coincide with the correct seconds on your own watch will cause the program to start counting and calculating the time. This means that you can set the time very accurately.

Then you will be asked to enter the coordinates for the screen display position. These coordinates (X and Y) will dictate where the time is printed. They should be entered as, for example, 10,15 (column 10, line 15).

Note that the screen display position coordinates vary with the mode entered, so the X and Y values should not exceed those shown in Table I.

After entering the screen coordinates you will be shown

Mode	X values	Y values
0	0–70	0–29
1	0–30	0–29
2	0–12	0–29
3	0–70	0–22
4	0–30	0–29
5	0–12	0–29
6	0–30	0–22

Table I: Coordinate limits of the seven modes

SLOGGER ADVANCED SYSTEMS

ROMBOX is a sideways ROM extension unit which enables many existing BBC ROM based programs to be run on the BBC or the Electron. Fully compatible with either computer, it is strongly constructed and will also support the Plus 1 on the Electron. ROMBOX is supplied with comprehensive instructions and an inter-connecting cable for the BBC.

BBC **£49.95** (including cable)
Electron **£39.50**

STARMON is the only machine code monitor for the Electron and provides a powerful and easy to use command repertoire for advanced debugging and machine code programming. A ROM extension unit is required when used with the Electron. STARMON is also available for the BBC and both versions are supplied with a comprehensive and easy to follow User Manual.

BBC **£27.50**
Electron **£22.50**

All prices include V.A.T. and postage and packing within the U.K.

SLOGGER ADVANCED SYSTEMS

Dealer enquiries are welcomed. Available from good computer shops or from:
Slogger Limited, 215 Beacon Road, Chatham, Kent. ME5 7BU.
Telephone: Medway (0634) 811634.

goes by...

you could be keeping a check on it with this utility program

by ROY PAGE

the display position you have entered. If this is correct, pressing Y will cause the time to be shown at this screen position.

Pressing N will take the program back to ask for another pair of coordinates so you can reposition the display.

To embody the Clock in one of your own programs, first include in your program Lines 40 to 80 (selection of mode may not be needed and if not line 50 can be discarded).

Then incorporate lines 200 to 300 in your program, located (and RENUMBERed) at any point where you wish to display the time. The procedures, of course, are added to the end of your program.

For those readers who are not familiar with the Electron program merging facilities, the Electron User Guide, chapter 28, pages 200 and 201 will provide further assistance.

Merging the Clock program into another program is probably best carried out as follows:

- Ensure that the Clock is saved on cassette at least twice. This is always a good idea in case the first save will not load. Then load Clock into your Electron.
- Using the direct command, DELETE 10, 190.
- Using the direct command, RENUMBER 20000 will renumber the procedure statements to a high starting point. When merged into your program, existing lines will not be overwritten by Clock.
- Ensure that the program into which you intend to merge Clock does not have line numbers greater than 19999. If it does, use a larger value for renumbering.
- With a separate cassette tape loaded into the tape recorder key in:

***SPOOL "TICK"**

"Record then Return" will appear on the screen. Put the recorder into Record and, after ensuring the tape leader is past the record heads, press Return. This will stop the tape recorder (assuming your recorder has motor control).

- The command LIST followed by Return will cause the program to be saved in Ascii format on to the tape. Then enter *SPOOL to close the spooled file.
- Load your own program and list it to ensure line numbers do not exceed 19,999.
- Reload your cassette tape on to which you "spooled" Clock and rewind to the start position. Give the command *EXEC "TICK". The Clock program will now be merged into your program.
- Lines up to and including 80 can now be retyped into the start of your program and the renumbered lines 200 to 300 can be put in your program where you need the time to be displayed.

KEYS

When the clock is running

Ctrl	*Stops the clock display from updating the time.*
Caps Lk	*Restarts the display updating.*
Delete	*Stops the ticking sound.*
Shift	*Restarts the ticking sound.*

```
  10 REM *********CLOCK*********
  20 REM *****BY ROY A PAGE*******
  30 REM ***(C) ELECTRON USER*****
  40 CLS
  50 INPUT "CLOCK"''"ENTER SCREEN MODE"''"( 0 TO 6 )",:mode=GET:MODE mode
  60 PROCinput_time
  70 PROCset_time
  80 PROCdisplayposition
  90 REM ********************************
  100 REM *TO INCLUDE THIS CLOCK WITH-*
  110 REM *-IN ANOTHER PROGRAM IT IS  *
  120 REM *SUGGESTED THAT LINES UP TO *
  130 REM *AND INCLUDING 80 FORM THE  *
  140 REM *FIRST PART OF THE PROGRAM. *
  150 REM *LINES 200 TO 300 INC.      *
  160 REM *SHOULD BE INCLUDED WHEN    *
  170 REM *THE TIME IS REQUIRED TO    *
  180 REM *BE PRINTED ON THE SCREEN.  *
  190 REM ********************************
  200 stoptick=0
  210 REPEAT
  220 PROC_time
  230 tick=TIME
  240 IF INKEY(-1) THEN stoptick=0
  250 IF INKEY(-90) THEN stoptick=1
  260 IF stoptick=0 THEN REPEAT:UNTIL TIME=tick+95: SOUND 1,-8,192,1
  270 UNTIL INKEY(-2)
  280 REPEAT:UNTIL INKEY(-65)
  290 GOTO 210
  300 END
  310 DEF PROCinput_time
  320 INPUT "ENTER THE TIME"''"(HR,MIN,SEC)"''"EXAMPLE !-"''"12,10,30  ?"HRS,MINS,SECS
  330 ENDPROC
  340 DEF PROCset_time
  350 time=(HRS*360000)+(MINS*6000)+(SECS*100)
  360 PRINT TAB(0,10) "TIME SET TO !-"
  370  PRINT'';HRS;"!";MINS;"!";SECS
  380 TIME=time
  390 REPEAT:UNTIL TIME = time + 250
  400 ENDPROC
  410 DEF PROC_time
  420 VDU 23,1,0;0;0;0;
  430 time2=TIME
  440 hrs=time2 DIV 360000
  450 min1=time2 MOD 360000
  460 min2=min1 DIV 6000
  470 sec1=min1 MOD 6000
  480 sec2=sec1 DIV 100
  490 IF hrs>23 THEN TIME=time2-(24*360000)
  500 IF hrs<10 THEN PRINT TAB(X,Y);"0";hrs;
  510 IF hrs>9 THEN PRINT TAB(X,Y);hrs;
  520 IF min2<10 THEN PRINT;"!";"0";min2;"!";
  530  IF min2>9 THEN PRINT;"!";min2;"!";
  540 IF sec2<10 THEN PRINT;"0";sec2
  550 IF sec2>9 THEN PRINT;sec2
  560 ENDPROC
  570 DEF PROCdisplaypositi on
  580 CLS
  590 PRINT''"ENTER SCREEN"''"CO-ORDINATES"''"FOR DISPLAY POSITION"''"( X,Y )";:INPUT,X,Y
  600 CLS:COLOUR 131:COLOUR 0:PRINT TAB(X,Y)"(-OK-?-)":VDU 20:PRINT TAB(0,0)"IS THIS CORRECT?"''"(Y OR N)"
  610 Q$=GET$:IF Q$="N"THEN CLS : GOTO 590
  620 CLS
  630 ENDPROC
  640 REM ********************************
  650 REM *Press CTRL To Stop Clock *
  660 REM *Press CAPS LK To Restart *
  670 REM *Press DELETE To Stop Tick*
  680 REM *Press SHIFT To Start Tick*
  690 REM ********************************
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

Make light work of listings

To save your fingers most of the listings in *Electron User* have been put on tape.

On the February 1985 tape:
CRAAL The mystifying maze adventure. **BOUNCY** Addictively annoying action. **PAIRS** Can you remember the cards? **BASE** A Binary/hexadecimal conversion 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. **CLAYPIGEON** An Electron birdshoot. **ORGAN** Music maestro please! **NOTEBOOK** An original program. **RANDOM NUMBERS** Or not so random! **SNAKES** Reptilean arcade action. **CHEESE RACE** Beat rival mice.

On the December 1984 tape:
CHRISTMAS BOX Align the presents logically. **SILLY SANTA** Sort out the muddle. **SNAP** Match the Xmas pictures. **RECOVERY** The Bad Program message tamed. **CAROL** Interrupt driven music. **AUTODATA** A program that grows and grows. **NOTEBOOK** Simple string handling.

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

On the October 1984 tape:
BREAKFREE Classic arcade action. **ALPHASWAP** A logic game to strain your brain. **SOUND GENERATOR** Tame the Electron's sound channels. **MULTICHARACTER GENERATOR** Complex characters made simple. **RIGEL 5** Out of this world graphics. **MAYDAY** Help with your morse 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. **SAILOR** 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** Sliced strings slide sideways. **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 Avoid the ghosts to get the cash. **CODE BREAKER** A mastermind is needed to crack the code. **ALIEN** See little green men – the Electron way! **SETUP** Colour commands without tears. **CRYSTALS** Beautiful graphics. **LASER SHOOT OUT** An intergalactic shooting gallery. **SMILER** Have a nice day!

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

On the April 1984 tape:
SPACEHIKE A hopping arcade classic. **FRIEZE** Electron wallpaper. **PELICAN** Cross roads safely. **CHESSTIMER** Clock your moves. **ASTEROID** Space is a minefield. **LIMERICK** Automatic rhymes. **ROMAN** Numbers in the ancient way. **BUNNYBLITZ** The Easter program. **DOGDUCK** 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 ? **BRAINTEASER** A puzzling program. **COUNTER** Mental 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** Make your Electron a calculator. **DOILIES** Multi-coloured patterns galore. **TOWERS OF HANOI** The age old puzzle. **LUNAR LANDER** Test your skill as an astronaut. **POSITRON INVADERS** A version of the old arcade favourite.

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

HOW TO ORDER

Please send me the following *Electron User* cassette tapes:

Fourteen programs from the February 1985 issue	£
Ten programs from our January 1985 issue	£
Nine programs from the December 1984 issue	£
Nine programs from the November 1984 issue	£
Seven programs from the October 1984 issue	£
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The Kingdom of Craal

By MIKE BIBBY

FAR far way, beyond the Ice Mountains, lies the weird and wonderful Kingdom of Craal with its magnificent palace, crystal clear lake and enchanted forest.

It is a peaceful land, ruled for many happy years by King Meek who was respected by most of his subjects for his good nature and integrity – and his rather dishy, if inefficient, handmaiden Jut.

There was one character however who was not party to this overwhelming admiration – Vadham the evil wizard.

Many years ago, he was banished to the castle dungeons for trying to nick the king's gold plated penknife – the one with a special blade for taking stones out of horses hooves.

In his spare time when he was not mixing spells or playing Gauntlet, he turned the dungeon into a labyrinth of despair, where only the brave had the courage to enter. Having said that, we haven't seen any of them come back yet.

You were born in Craal, the handsome son of a cobbler and many years ago you decided to seek a fortune in far off lands.

You returned many times to visit your old mum and dad and spend the occasional happy hour in the company of the king's daughter Andrea.

What was once a childhood crush blossomed into love, and you have returned for good to claim your bride.

Alas on this last visit you found the king dead and the palace in uproar. The wizard had taken a heaven sent opportunity and, as the king opened the door down to the dungeons to let out the castle moggie, he grabbed his magnificent gold crown and disappeared into his hidey hole in

From Page 25

the depths – better than a penknife no doubt, but not much use for getting things out of horses hooves.

You, in your typical youthful manner, were only interested in your future wife – Andrea. The palace guards, the footmen, the courtesans and even Ethel the cleaner, however, were not impressed with your infatuation and by a unanimous decision volunteered your services to retrieve the crown.

They threw you head-over-heels down the dungeon steps with a warning that should you return empty handed all your beloved possessions would be forfeit, even your subscription to *Electron User*. Some people stop at nothing.

Well, you have your challenge and you don't really have much option but to accept it.

In this serious adventure you have at your disposal six single letter commands. These are n, s, e, w, l and i – for the four compass directions, plus look and inventory. Notice – they're all in lower case.

The program will also accept other standard adventure commands such as take, drop, hit and say. These words are intelligent, which means that if you have a key and want it in a lock, all you need to say is 'Drop key'. It will automatically go in the lock.

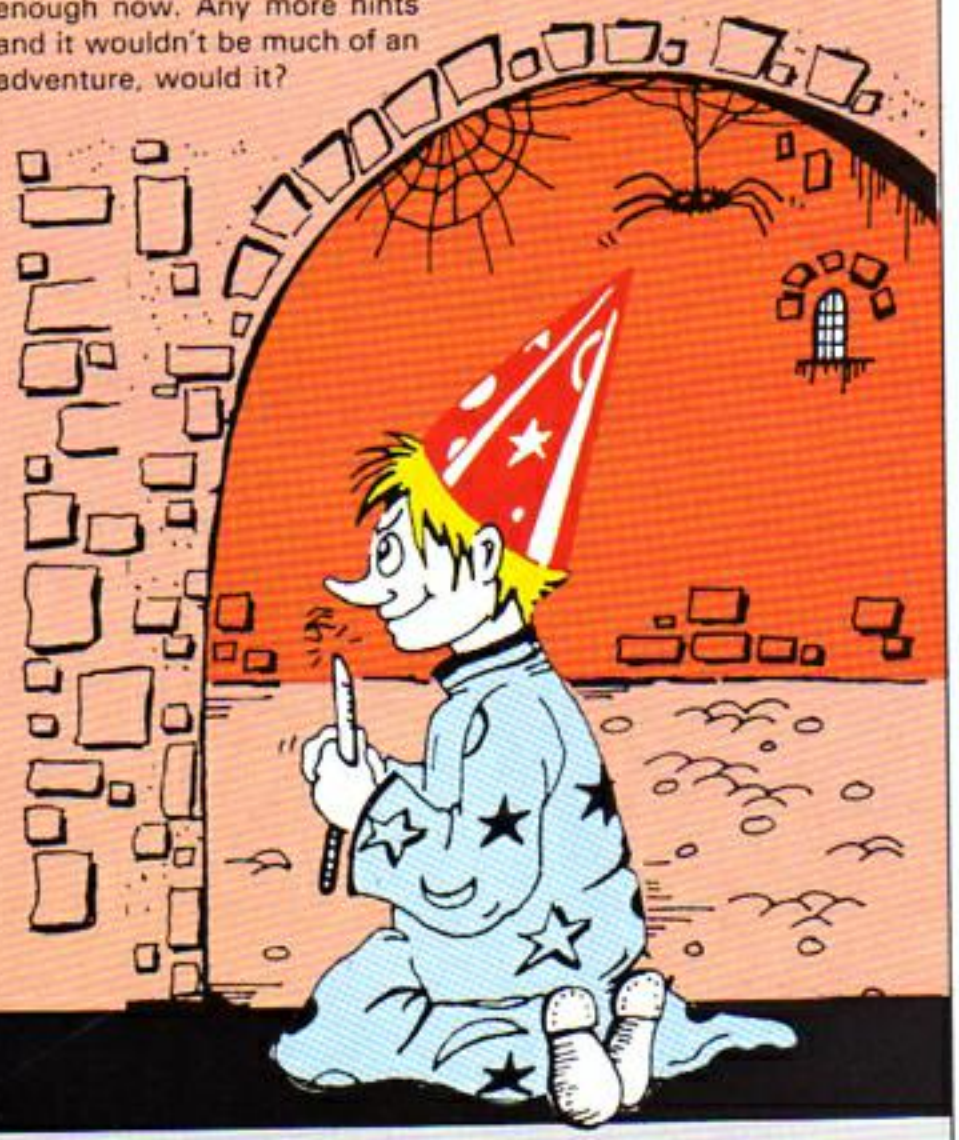
Now there's not much point in your typing in an adventure and finding, as you do, all the solutions within the listing. In order to conceal the clues therefore, I've written the important messages in code and they're all in the data statements at the end of the program.

There's nothing clever in what I've done, and I'm sure you'll soon spot that all the printed text has been offset by three letters. The sub-routine starting at line 510 decodes it all and turns it into sensible English in the finished product.

It is imperative that great care is taken when entering these data lines if you are to enjoy the result of your toils.

Well, I think I've told you enough now. Any more hints and it wouldn't be much of an adventure, would it?

It only remains to wish you luck when you set out in your search for the crown – you're going to need it!



Craal listing

```
  10 *FX202,48
  20 MODE 6
  30 GOTO 180
  40 DIM d%(10,4)
  50 h$=STRING$(25," "):c$
=h$:o$=h$:h$="":c$="":o$=""
  60 hh$=STRING$(255," "):
oo$=h$:hh$="":oo$=""
  70 FOR I%=1 TO 10: FOR J
% = 1 TO 4
  80 READ d%(I%,J%)
  90 NEXT: NEXT
 100 N% = 12 : T% = 7: M%
= 51
 110 DIM j$(N%): DIM o%(N%
): DIM m$(M%)
 120 FOR I% = 1 TO N% :REA
D hh$,cc$:GOSUB 510: j$(I%)
=oo$:hh$=cc$:GOSUB 510: o%(
I%)=VAL(oo$): NEXT I%
 130 FOR I% = 1 TO M% :REA
D m$(I%): NEXT I%
 140 h$="":c$="":o$=""
 150 b% = TRUE : d% = TRUE
: e% = TRUE: s% =  FALSE: l
% = FALSE : a% = TRUE : g%
= FALSE: f% = TRUE
 160 R% = 2: x% = 3
 170 GOTO 230
 180 PRINT "On a visit to
the Palace of Craal, you  f
ind the place in uproar. Th
e King is  dead and his cr
own stolen by a wicked  wi
zard who's fled to his den
in the  palace dungeons.
"'
 190 PRINT "By paying rath
er too much attention to  t
he ex-king's daughter, you
find  yourself volunt
eered to recover it."'
 200 PRINT "You are thrown
 into the dungeons and  t
old not to come back withou
t the crown."
 210 PRINT"Here begins the
 adventure...."'
 220 GOTO 40
 230 REPEAT
 240 IF R% <> x% THEN GOSU
B 590
 250 x% = R%
 260 C%=0:REPEAT: GOSUB 36
0 : UNTIL C%<> 0
 270 ON C% GOSUB 790,830,8
60,910,1070,590,980,940,101
0,1160
 280 UNTIL g%
 290 PRINT
 300 IF o%(0)=1 GOTO 320 E
LSE PROCm(31):PRINT
 310 PROCm(32):PRINT: GOTO
340
 320 PROCm(29):PRINT
 330 PROCm(30): END
 340 PRINT:PROCm(51)
 350 c$ = GET$: IF INSTR("
Nn",c$) END ELSE RUN
 360 PRINT "What now?"
 370 REPEAT: INPUT "===>"
c$ : UNTIL c$<>""
 380 IF LEN(c$)<>1 GOTO 40
0
 390 C%=INSTR("nsewil",c$)
: IF C%<>0 RETURN ELSE PRIN
T "I don't recognise this s
ingle letter command - only
 n,s,e,w,i,l.":RETURN
 400 S%=INSTR(c$," "): IF
S%=0 PRINT "I don't underst
and - put a space between c
ommand and object, please."
:C%=0:RETURN
 410 verb$ = LEFT$(c$, S%-
1): o$=" "+MID$(c$,S%+1):RE
PEAT: o$= RIGHT$(o$, LEN(o$
)-1): UNTIL LEFT$(o$,1)<>"
"
 420 C% = INSTR("droptakes
ayhit", verb$)
 430 IF C%<>1 AND C%<>5 AN
D C%<>9 AND C%<>12 THEN PRI
NT "I don't understand your
 command." :C%=0:RETURN
 440 IF C%=1 C%=7 ELSE IF
C%=5 C%=8 ELSE IF C%=12 C%=
10 ELSE IF C%=9 RETURN
 450 z%=0:I%=1:M%=0: REPEA
T
 460 IF LEFT$(o$,4)=LEFT$(
j$(I%),4) THEN M% = 1
 470 I% = I% +1
 480 UNTIL M%=1 OR I%=N% +
1
 490 IF M%=1 z%=I%-1 ELSE
PRINT "I don't understand t
he object you mean." : C%=0
 : RETURN
 500 RETURN
 510 oo$=""
 520 FOR JJ% = 1 TO LEN(hh
$)
 530 RR%=ASC(MID$(hh$,JJ%,
1)) - 3
 540 IF RR%=38 OR RR%=41 O
R RR%=34  RR%=RR%+3
 550 oo$ = oo$ + CHR$(RR%)
 560 NEXT
 570 RETURN
 580 END : ****************
```

Turn to Page 54

Is your memory as good as the Electron's?

Find out in ALAN GORNALL's version of the classic card game

PAIRS is a game relying heavily upon memory, where you have to locate, among the pack of face down cards laid out before you, a pair that match up.

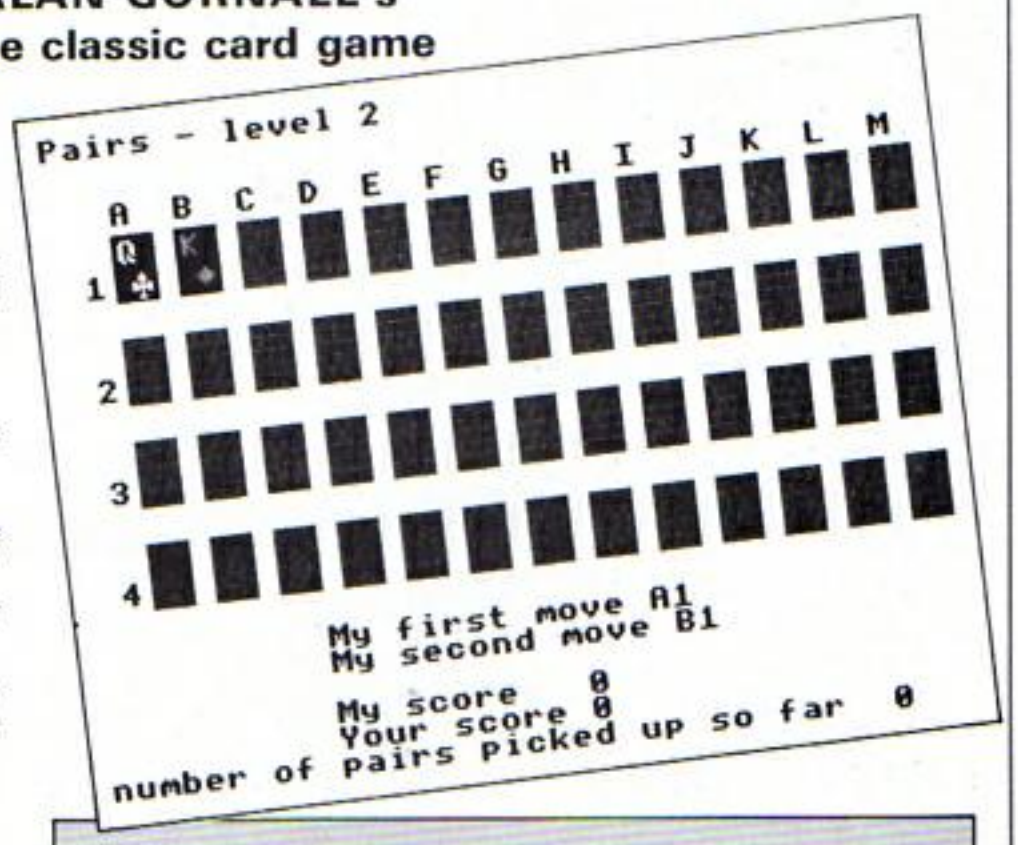
Each time you do this the pair is removed from the pack, your score increases by one, and you are allowed another go.

The micro plays by the same set of rules, its ability being pre-determined by the level of play – from one to four – that you select.

Level one is the easiest, and each successive level becomes increasingly difficult, up to the last which is almost impossible to beat without resorting to pad and pencil.

A card is chosen by first entering its horizontal coordinate (A to M), and then its vertical coordinate (1 to 4).

The computer always has first go, but this is no real hardship, as it is unlikely to pick up a pair at its first attempt.



PROCEDURES

PROClevel	Decides the level of play.
PROCinit	Sets up certain variables, the user-defined characters and the one and only envelope used.
PROCshuffle	Shuffles a pack of cards.
PROCsetup	Draws pack face down, and axes.
PROCmymove	Decides and executes the program's move.
PROCstat	Displays scores.
PROCresult	Determines the consequences of either player's move.
PROCyourmove	Enters and executes the move of your choice.

Other sub-procedures are called from within these procedures during the course of a run, and these are briefly explained in REM statements in the program.

VARIABLES

M%	Your score (in games).
N%	The program's score (in games).
myscore%	The program's score (in pairs).
yourscore%	Your score (in pairs).
A$(52)	Contains the cards in a shuffled form. Cards are removed from this array during the course of a game, as they are picked up.
Pack$	Contains an unshuffled pack of cards.
MEM$( )	The program's memory, containing the cards and their positions on the playing surface. The extent of this memory is determined by:
MEMORY	Set during PROClevel.

The remaining variables are not included as they are either procedure-specific or flags used to see whether a specific event has occurred or not.

```
  10 REM Pairs
  20 REM by  ALAN GORNALL
  30 REM (C) ELECTRON USER
  40 *KEY0 MO.6|M|NL.|M
  50 *KEY1SAVE"Pairs"|M|MS
AVE"Pairs"|M|M
  60 *KEY2M%=0:N%=0|MRUN|M
  70 REM initiation
  80 ON ERROR GOTO 3260
  90 MODE1
 100 VDU23;8202;0;0;0;
 110 PROClevel
 120 PROCinit
 130 PROCshuffle
 140 PRINTTAB(0,4);"Pairs
 - level ";LEVEL$
 150 PROCsetup
 160 PROCstat
 170 REM  core of progra
 180 REPEAT
 190 REPEAT
 200 PAIR=FALSE
 210 comp=TRUE
```

From Page 27

```
  220 PROCaymove
  230 PROCresult
  240 UNTIL PAIR=FALSE
  250 comp=FALSE
  260 REPEAT
  270 PAIR=FALSE
  280 PROCyourmove
  290 PROCresult
  300 UNTIL PAIR=FALSE
  310 UNTIL FALSE
  320 REM  start of proced
ures
  330 REM decide on level o
f play
  340 DEF PROClevel
  350 PRINT"Which level of
skill do you want to playat
 (1 to 4) ?"
  360 REPEAT
  370 A$=GET$
  380 UNTIL A$>="1" AND A$<
="4"
  390 REPEAT
  400 READ LEVEL$,MEMORY
  410 UNTIL LEVEL$=A$
  420 DIM MEM$(MEMORY)
  430 CLS
  440 ENDPROC
  450 REM set up variables,
etc.
  460 DEF PROCinit
  470 myscore%=0
  480 yourscore%=0
  490 pairs%=0
  500 VDU19,2,4;0;
  510 VDU23,240,8,28,28,107
,127,107,8,28
  520 VDU23,241,8,28,62,127
,62,28,8,0
  530 VDU23,242,54,127,127,
127,62,28,8,0
  540 VDU23,243,8,28,62,127
,127,127,28,62
  550 DIM ST$(4)
  560 ST$(1)=CHR$18+CHR$0+C
HR$0+CHR$240
  570 ST$(2)=CHR$18+CHR$0+C
HR$1+CHR$241
  580 ST$(3)=CHR$18+CHR$0+C
HR$1+CHR$242
  590 ST$(4)=CHR$18+CHR$0+C
HR$0+CHR$243
  600 ENVELOPE2,2,6,0,0,255
,0,0,126,0,0,-126,126,126
  610 ENDPROC
  620 REM shuffle cards
  630 DEF PROCshuffle
  640 SEED%=RND(-TIME)
  650 DIM A$(52)
  660 Pack$="AC2C3C4C5C6C7C
8C9CTCJCQCKCAD2D3D4D5D6D7D8
D9DTDJDQDKDAH2H3H4H5H6H7H8H
9HTHJHQHKHAS2S3S4S5S6S7S8S9
STSJSQSKS"
  670 DIM C%(52)
  680 FOR I%=1 TO 52
  690 REPEAT
  700 Random%=RND(52)
  710 UNTIL C%(Random%)=0
  720 A$(I%)=MID$(Pack$,Ran
dom%*2-1,2)
  730 C%(Random%)=1
  740 NEXT
  750 ENDPROC
  760 REM draw pack face do
wn
  770 REM and coordinate ax
es
  780 DEF PROCsetup
  790 FOR I%=1 TO 13
  800 FOR J%=1 TO 4
  810 PROCcard(I%,J%,2)
  820 NEXT
  830 NEXT
  840 VDU5
  850 GCOL0,3
  860 FOR I%=1 TO 13
  870 MOVE88*I%,804:PRINTCH
R$(I%+64)
  880 NEXT
  890 FOR I%=1 TO 4
  900 MOVE44,847-128*I%:PRI
NT;I%
  910 NEXT
  920 VDU4
  930 ENDPROC
  940 REM draw the face of
the card,
  950 REM card$, at the coo
rdinates X%,Y%
  960 DEF PROCvalue(X%,Y%,c
ard$)
  970 X%=88*X%
  980 Y%=847-128*Y%
  990 VDU5
 1000 SUIT$=MID$(card$,2,1)
 1010 IF SUIT$="C" OR SUIT$
="S" THEN GCOL0,0 ELSE IF S
UIT$="D" OR SUIT$="H" THEN
GCOL 0,1 ELSE GCOL 0,3
 1020 MOVE X%+20,Y%
 1030 IF SUIT$="C" THEN SUI
T$=ST$(1)
 1040 IF SUIT$="D" THEN SUI
T$=ST$(2)
 1050 IF SUIT$="H" THEN SUI
T$=ST$(3)
 1060 IF SUIT$="S" THEN SUI
T$=ST$(4)
 1070 PRINTSUIT$
 1080 MOVE X%+4,Y%+40
 1090 PRINTMID$(card$,1,1)
 1100 VDU4
 1110 ENDPROC
 1120 REM draw the card its
elf at the
 1130 REM coordinates X%,Y%
 in the
 1140 REM desired colour
 1150 DEF PROCcard(X%,Y%,co
lour%)
 1160 X%=88*X%
 1170 Y%=815-128*Y%
 1180 GCOL0,colour%
 1190 MOVE X%,Y%
 1200 DRAW X%,Y%+80
 1210 PLOT 85,X%+56,Y%
 1220 DRAW X%+56,Y%+80
 1230 PLOT 85,X%,Y%+80
 1240 ENDPROC
 1250 REM the computer make
s its move
 1260 DEF PROCaymove
 1270 PROCsearch
 1280 PRINTTAB(10,24);"My f
irst move ";X1$;Y1$
 1290 PROCcard(ASCX1$-64,VA
LY1$,3)
 1300 PROCto(ASCX1$-64,VALY
1$)
 1310 PROCvalue(ASCX1$-64,A
SCY1$-48,A$(Z))
 1320 *FX15,0
 1330 A$=INKEY$(300)
 1340 PRINTTAB(10,25);"My s
econd move ";X2$;Y2$
 1350 PROCcard(ASCX2$-64,VA
LY2$,3)
 1360 PROCto(ASCX2$-64,VALY
2$)
 1370 PROCvalue(ASCX2$-64,V
ALY2$,A$(Z))
 1380 A$=INKEY$(300)
 1390 PRINTTAB(0,24);STRING
$(80," ")
 1400 ENDPROC
 1410 REM the computer sear
ches its
 1420 REM memory, MEM$() fo
r a pair
 1430 DEF PROCsearch
 1440 PROCsearchpr
 1450 IF pr=TRUE THEN ENDPR
OC
 1460 PROCsearch1
 1470 ENDPROC
 1480 REM PROCot and PROCto
convert
 1490 REM a position in the
pack to
 1500 REM a position on the
screen and
 1510 REM vice versa
 1520 DEF PROCot(Z%)
 1530 Y=(Z% DIV 13)+1
 1540 IF Z% MOD 13=0 THEN X
=13:Y=Y-1 ELSE X=Z% MOD 13
 1550 ENDPROC
 1560 DEF PROCto(X%,Y%)
 1570 Z=(Y%-1)*13+X%
 1580 ENDPROC
 1590 REM subsidiaries to P
ROCsearch
 1600 DEF PROCsearchpr
 1610 pr=FALSE
 1620 FOR I%=0 TO MEMORY-1
 1630 FOR J%=I%+1 TO MEMORY

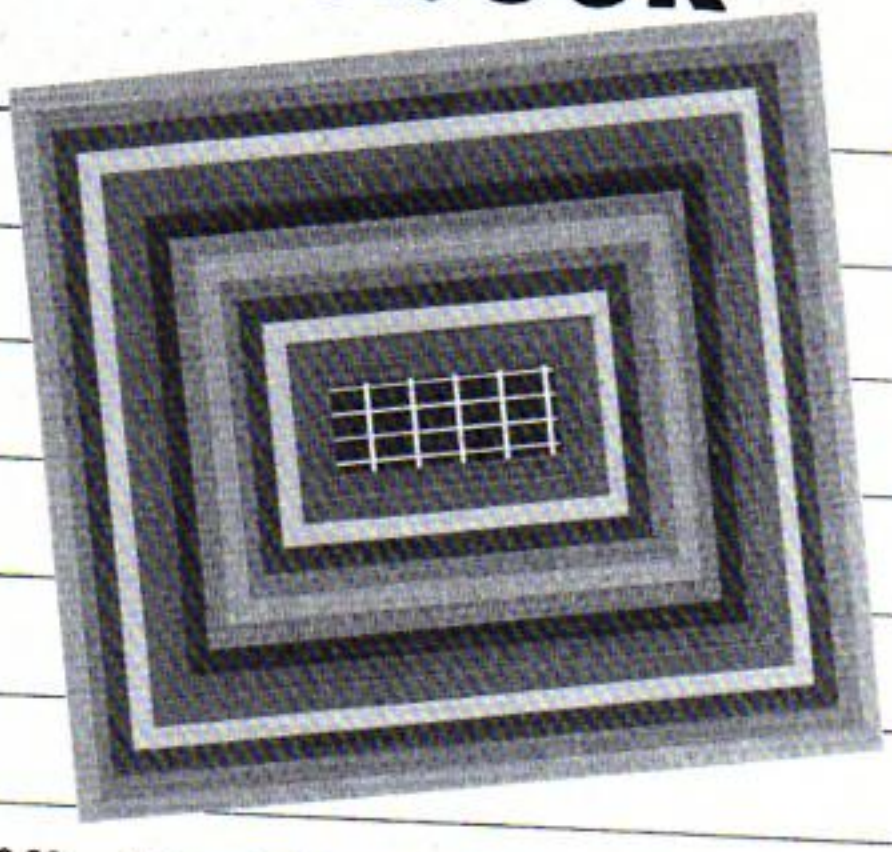
 1640 IF LEN MEM$(I%)=0 THE
N 1680
 1650 IF LEN MEM$(J%)=0 THE
N 1670
 1660 IF MID$(MEM$(I%),1,1)
=MID$(MEM$(J%),1,1) THEN pr
=TRUE:X1$=MID$(MEM$(I%),3,1
):X2$=MID$(MEM$(J%),3,1):Y1
$=MID$(MEM$(I%),4,1):Y2$=MI
D$(MEM$(J%),4,1)
 1670 NEXT J%
 1680 NEXT I%
 1690 ENDPROC
 1700 DEF PROCsearch1
 1710 pos=0
 1720 REPEAT
 1730 eq=FALSE
 1740 ual=FALSE
 1750 pos=pos+1
 1760 IF LEN A$(pos)=0 THEN
 eq=TRUE:GOTO1830
 1770 temp1$=MID$(A$(pos),1
,1)
 1780 temp2$=MID$(A$(pos),2
,1)
 1790 FOR I%=0 TO MEMORY
 1800 IF MID$(MEM$(I%),1,1)
=temp1$ AND MID$(MEM$(I%),2
,1)<>temp2$ THEN ual=TRUE:i
%=I%
 1810 IF MID$(MEM$(I%),1,1)
=temp1$ AND MID$(MEM$(I%),2
,1)=temp2$ THEN eq=TRUE
 1820 NEXT
 1830 UNTIL eq=FALSE OR ual
=TRUE
```

```
1840 IFual=TRUE THEN PROCa
:ENDPROC
1850 PROCot(pos)
1860 X1$=CHR$(64+X)
1870 Y1$=STR$Y
1880 REPEAT
1890 eq=FALSE
1900 pos=pos+1
1910 IF LEN A$(pos)=0 THEN
eq=TRUE:GOTO1970
1920 temp1$=MID$(A$(pos),1
,1)
1930 temp2$=MID$(A$(pos),2
,1)
1940 FOR I%=0 TO MEMORY
1950 IF MID$(MEM$(I%),1,1)
=temp1$ AND MID$(MEM$(I%),2
,1)=temp2$ THEN eq=TRUE
1960 NEXT
1970 UNTIL eq=FALSE
1980 PROCot(pos)
1990 X2$=CHR$(64+X)
2000 Y2$=STR$Y
2010 ENDPROC
2020 DEF PROCa
2030 PROCot(pos)
2040 X1$=CHR$(64+X)
2050 Y1$=STR$Y
2060 X2$=MID$(MEM$(i%),3,1
)
2070 Y2$=MID$(MEM$(i%),4,1
)
2080 ENDPROC
2090 REM remove a card fro
m memory
2100 DEF PROCsub(sub1$,sub
2$)
2110 PROCto(ASCsub1$-64,VA
Lsub2$)
2120 A$(Z)=""
2130 I%=-1:REPEAT:I%=I%+1
2140 IF LEN MEM$(I%)=0 THE
N 2160
2150 IF MID$(MEM$(I%),3,1)
=sub1$ AND MID$(MEM$(I%),4,
1)=sub2$ THEN MEM$(I%)=""
2160 UNTIL I%=MEMORY
2170 ENDPROC
2180 REM checks if a certa
in card is
2190 REM in memory
2200 DEF PROCrel(rel1$,rel
2$)
2210 relevant%=TRUE
2220 FOR I%=0 TO MEMORY
2230 IF LEN MEM$(I%)=0 THE
N 2250
2240 IF MID$(MEM$(I%),3,1)
=rel1$ AND MID$(MEM$(I%),4,
1)=rel2$ THEN relevant%=FAL
SE
2250 NEXTI%
2260 ENDPROC
2270 REM add a card to mem
ory
2280 DEF PROCadd(add1$,add
2$)
2290 bit=FALSE
2300 FOR I%=0 TO MEMORY
2310 PROCto(ASCadd1$-64,VA
Ladd2$)
2320 IF LEN MEM$(I%)=0 AND
bit=FALSE THEN MEM$(I%)=A$
(Z)+add1$+add2$:bit=TRUE
2330 NEXT
2340 ENDPROC
2350 REM forced delay, hav
e to press
2360 REM a key to continue
2370 DEF PROCkey
2380 PRINTTAB(0,24);"hit a
key to continue"
2390 A$=GET$
2400 PRINTTAB(0,24);STRING
$(80," ")
2410 ENDPROC
2420 REM displays various
bits of
2430 REM relevant informat
ion
2440 DEF PROCstat
2450 PRINTTAB(10,27);"My s
core   ";myscore%
2460 PRINTTAB(10,28);"Your
score ";yourscore%
2470 PRINTTAB(0,29);"numbe
r of pairs picked up so far
 ";pairs%
2480 ENDPROC
2490 REM find the result o
f a move
2500 DEF PROCresult
2510 PROCto(ASCX1$-64,VALY
1$)
2520 Z1=Z
2530 PROCto(ASCX2$-64,VALY
2$)
2540 Z2=Z
2550 IF MID$(A$(Z1),1,1)=M
ID$(A$(Z2),1,1) THEN PROCpa
ir ELSE PROCnopair
2560 ENDPROC
2570 DEF PROCnopair
2580 PROCrel(X1$,Y1$)
2590 IF relevant%=TRUE THE
N PROCadd(X1$,Y1$)
2600 PROCrel(X2$,Y2$)
2610 IF relevant%=TRUE THE
N PROCadd(X2$,Y2$)
2620 PROCkey
2630 PROCcard(ASCX1$-64,VA
LY1$,2)
2640 PROCcard(ASCX2$-64,VA
LY2$,2)
2650 ENDPROC
2660 DEF PROCpair
2670 SOUND1,2,4,15
2680 PAIR=TRUE
2690 pairs%=pairs%+1
2700 IF comp=TRUE THEN mys
core%=myscore%+1 ELSE yours
core%=yourscore%+1
2710 PROCstat
2720 IF pairs%=26 THEN PRO
Cend
2730 PROCsub(X1$,Y1$)
2740 PROCsub(X2$,Y2$)
2750 PROCkey
2760 PROCcard(ASCX1$-64,VA
LY1$,0)
2770 PROCcard(ASCX2$-64,VA
LY2$,0)
2780 ENDPROC
2790 REM the game has ende
d
2800 DEF PROCend
2810 PRINTTAB(10,0);"GAME
OVER"
2820 IF myscore%>yourscore
% PRINT"I WIN":M%=M%+1 ELSE
 IF myscore%<yourscore% PRI
NT"YOU WIN":N%=N%+1 ELSE PR
INT"IT'S A DRAW"
2830 PROCkey
2840 CLS
2850 PRINTTAB(10,10);"Your
score ";yourscore%
2860 PRINTTAB(10);"My scor
e   ";myscore%
2870 PRINTTAB(0,15);"and i
n games:"
2880 PRINTTAB(15,18);"YOU
";N%
2890 PRINTTAB(15,19);"ME
";M%
2900 PRINTTAB(0,25);"Do yo
u want another game? (Y/N)"
2910 REPEAT:A$=GET$:UNTIL
A$="Y" OR A$="N"
2920 IF A$="Y" THEN RUN EL
SE END
2930 ENDPROC
2940   REM your move
2950 DEF PROCyourmove
2960 REPEAT
2970 PRINTTAB(10,24);"firs
t move     ";
2980 REPEAT:X1$=GET$:UNTIL
 X1$>="A" AND X1$<="M":PRIN
T TAB(23,24);X1$;
2990 REPEAT:Y1$=GET$:UNTIL
 Y1$>="1" AND Y1$<="4":PRIN
TY1$
3000 PROCto(ASCX1$-64,VALY
1$)
3010 UNTIL LEN A$(Z)>0
3020 PROCcard(ASCX1$-64,VA
LY1$,3)
3030 PROCvalue(ASCX1$-64,V
ALY1$,A$(Z))
3040 REPEAT
3050 REPEAT
3060 PRINTTAB(10,25);"seco
nd move    ";
3070 REPEAT:X2$=GET$:UNTIL
 X2$>="A" AND X2$<="M":PRIN
T TAB(23,25);X2$;
3080 REPEAT:Y2$=GET$:UNTIL
 Y2$>="1" AND Y2$<="4":PRIN
TY2$
3090 PROCto(ASCX2$-64,VALY
2$)
3100 UNTIL LEN A$(Z)>0
3110 UNTIL X1$<>X2$ OR Y1$
<>Y2$
3120 PROCcard(ASCX2$-64,VA
LY2$,3)
3130 PROCvalue(ASCX2$-64,V
ALY2$,A$(Z))
3140 PRINTTAB(0,24);STRING
$(80," ")
3150 ENDPROC
3160 REM number on left is
 the level
3170 REM the other is the
number of
3180 REM cards the compute
r can hold
3190 REM in memory simulta
neously at
3200   REM that level
3210 DATA 1,6
3220 DATA 2,8
3230 DATA 3,10
3240 DATA 4,14
3250 REM error handling, e
sp. ESCAPE
3260 MODE6
3270 IF ERR<>17 THEN REPOR
T:PRINT" at line ";ERL
3280 END
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

Notebook

THIS month Notebook looks at the way VDU24 can be used to create a series of graphics windows.



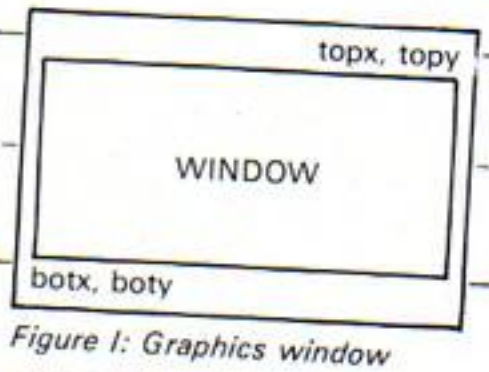


Figure I: Graphics window

10,20 The usual REM statements identifying the program.

30,40 Change the mode and switch off the flashing cursor.

50-70 A FOR . . . NEXT loop which repeats eight times using the control variable *swap*.

60 Uses VDU19 to change the flashing colours (actual colour numbers 8 to 15) to steady colours.

80-120 A FOR . . . NEXT loop with control variable *colour* which cycles 15 times.

90 Calculates the coordinates of the bottom left corner of the graphics window (see Figure I).

100 Figures out the coordinates of the top right corner.

110 Calls PROCwindow, giving it the parameters in the brackets, which have been worked out in the previous two lines. Since these values depend on the value of *colour* they will be different each time round the loop. This means that fifteen different windows will be defined.

130 Calls PROCgrid which uses the graphics commands DRAW and MOVE to draw a grid.

140 This endless REPEAT . . . UNTIL loop just keeps the prompt (>) from reappearing.

150-190 PROCwindow

160 Defines a graphics window using VDU24. The following parameters define the position of its corners. Notice the semicolons between them.

170 Uses GCOL0 to redefine the background colour.

180 Has CLG clearing the graphics window to this new background colour. Notice that only the present window is affected.

200-300 PROCgrid. This uses the by now familiar MOVE and DRAW commands to put a black grid on the screen. Notice that while the coordinates seem to cover the whole screen with lines, only the part inside the final graphics window appears.

```
10 REM Windows and Grids
20 REM Ivan Clarke
30 MODE 2
40 VDU23,1,0;0;0;0;
50 FOR swap=8 TO 15
60 VDU 19,swap,swap-8,0,
0,0
70 NEXT swap
80 FOR colour=1 TO 15
90 bx=50+(colour-1)*30:b
y=bx
100 tx=1200-(colour-1)*30
:ty=1000-(colour-1)*30
110 PROCwindow(bx,by,tx,t
y,colour)
120 NEXT colour
130 PROCgrid
140 REPEAT UNTIL FALSE
150 DEF PROCwindow(botx,b
oty,topx,topy,colour)
160 VDU 24,botx;boty;topx
;topy;
170 GCOL 0,128+colour
180 CLG
190 ENDPROC
200 DEF PROCgrid
210 GCOL 0,0
220 FOR x=0 TO 1279 STEP
64
230 MOVE x,0
240 DRAW x,1023
250 NEXT x
260 FOR y=0 TO 1023 STEP
32
270 MOVE 0,y
280 DRAW 1279,y
290 NEXT y
300 ENDPROC
```

Swaps steady colours for flashing ones

Loops 15 times calculating coordinates

Defines window

Calls final procedure

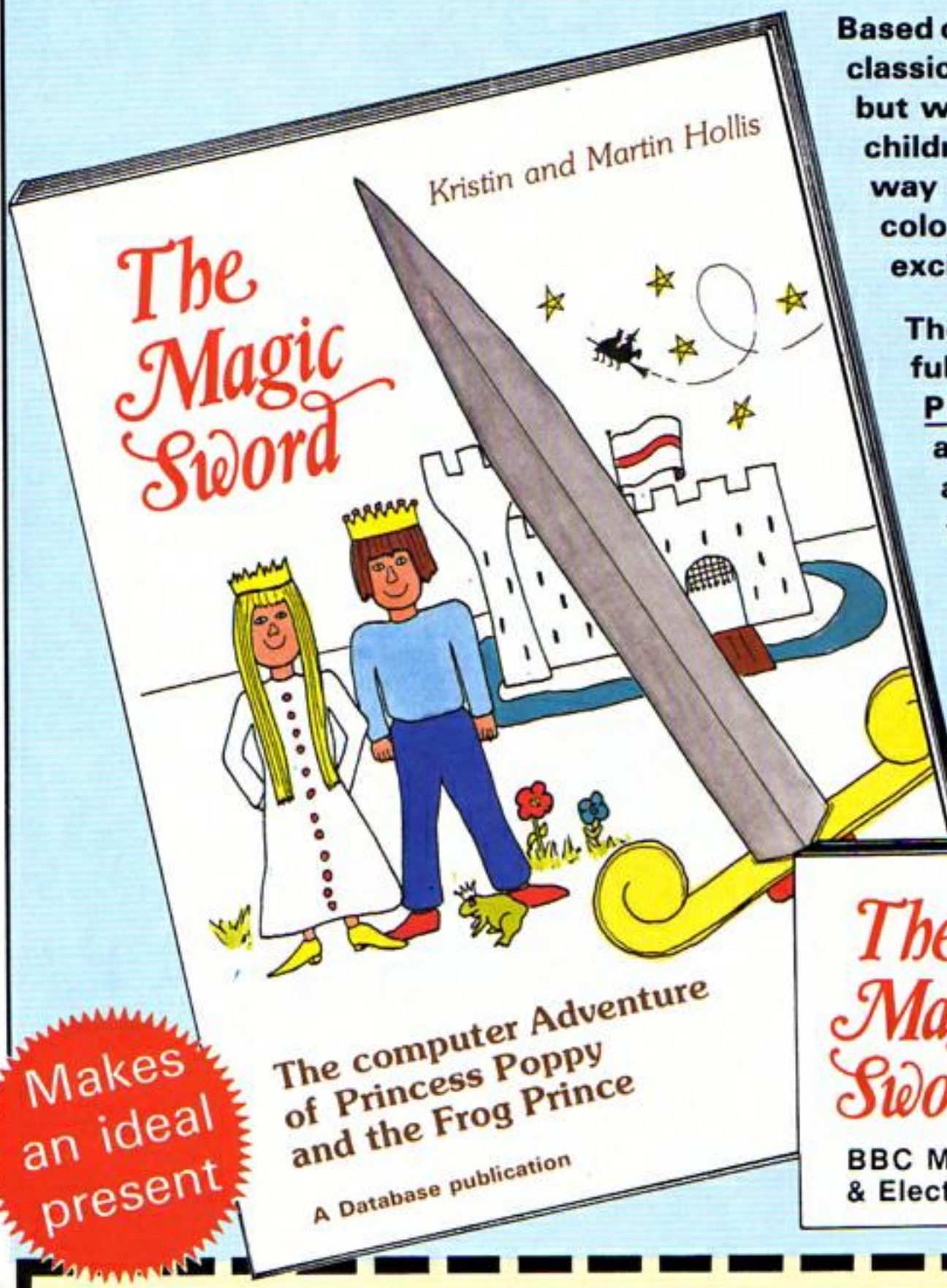
Sets background colour

Chooses black

Draw vertical lines

Draw horizontal lines

You're never too young to play a Magical Adventure on the BBC Micro or Electron!



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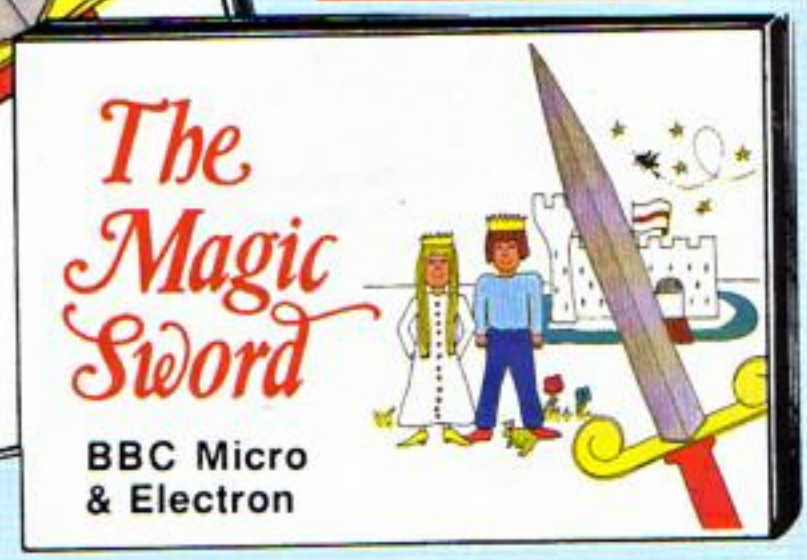

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No. _____

Signed _____

SEND TO: **Adventure offer, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY**

Join in the farmyard fun!

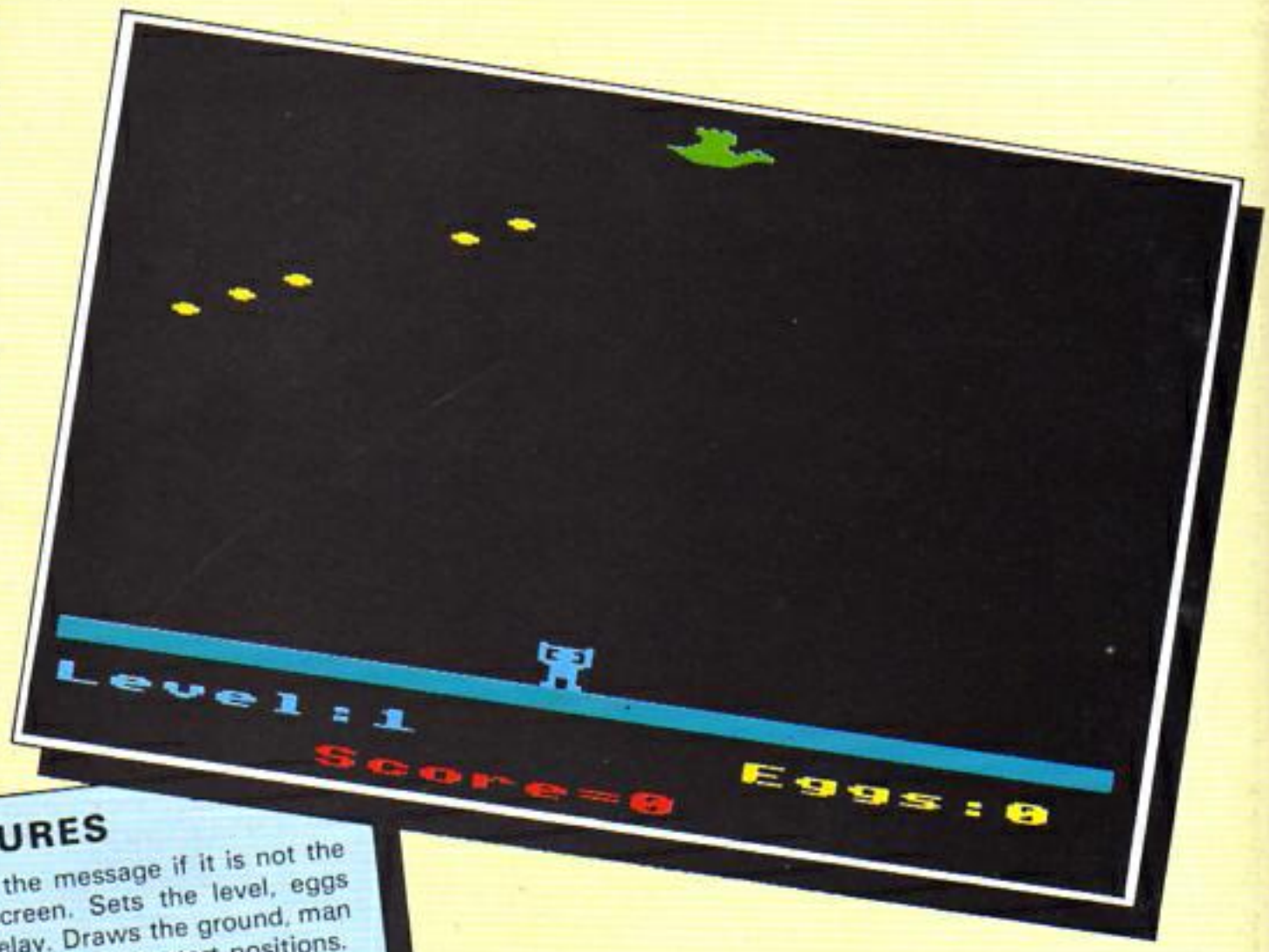
. . . and have a smashing time in this eggstra special game by ROLAND WADDILOVE

OLD farmer Brown has been having a spot of trouble with his chickens lately – they just will not stay still while he collects the eggs.

The birds fly to and fro, the eggs ending up everywhere.

Can you help him catch the eggs as they drop?

If you manage to catch 50 or more before the chicken reaches the bottom you move on to the next level, where everything moves faster.



PROCEDURES

PROCstart	Prints the message if it is not the first screen. Sets the level, eggs and delay. Draws the ground, man and bird. Sets the start positions.
PROCinitialise	Defines the envelope and characters for the egg and ground. Sets the level, score and eggs to their initial values.
PROCassemble	Assembles a short machine code routine to move the eggs, man and bird.
PROCman	Checks if keys are pressed, calls code to move the man.
PROCbird	Moves the chicken to the right. If at the end of the line, move to the start of the next.
PROCegg	If there is an egg then calls the code to move it. Erases it if it is at the bottom.
PROCanother	Prints the final score and asks if you want to play again.
PROCinstructions	Prints the instructions.

VARIABLES

T%	Time delay.
E%	Eggs collected.
level	Level.
S%	Score.
X%,Y%	Chicken's coordinates.
Z%	Man's coordinates.
I%,J%	Loop counters.
C%,D%	Pointer to coordinates of eggs.
mm	Address of code to move man.
mb	Address of code to move bird.
me	Address of code to move eggs.

```
   10 REM ******CATCHER****
*
   20 REM *For Electron Use
r*
   30 REM *By R.A.Waddilove
*
   40 ON ERROR PROCerror
   50 PROCasseable
   60 PROCinitialise
   70 MODE 1:VDU 23,1,0;0;0
;0;
   80 PROCinstructions
   90 MODE 2:VDU 23,1,0;0;0
;0;
  100 REPEAT
  110 REPEAT
  120 PROCstart
  130 REPEAT
  140 TIME=0:PROCman:PROCbi
rd
  150 REPEAT UNTIL TIME>T%
  160 TIME=0:PROCman
  170 FOR I%=1 TO 5
  180 IF I%?C%<255 PROCegg
  190 NEXT
  200 REPEAT UNTIL TIME>T%
  210 UNTIL Y%=20
  220 UNTIL E%<50
  230 PROCanother
  240 UNTIL INSTR("Nn",GET$
)
  250 MODE 6
  260 END
  270
  280 DEF PROCstart
  290 VDU 7
  300 IF E%>0 COLOUR 11:COL
OUR 140:PRINT TAB(2,5);"CON
GRATULATIONS":COLOUR 12:COL
OUR 139:PRINT TAB(0,10);"Le
vel ";level+1;" coming up !
":TIME=0:REPEAT UNTIL TIME>
500
  310 T%=20-level*2:S%=S%+1
0*E%
  320 level=level+1:E%=0
  330 VDU 19,8,RND(6);0;19,
9,RND(6);0;
  340 COLOUR 128:CLS
  350 COLOUR 2:COLOUR 129
  360 PRINT TAB(0,27);STRIN
G$(20,CHR$225)
  370 COLOUR 128:COLOUR 6
  380 PRINT TAB(0,29);"Leve
l:";level
  390 COLOUR 1
  400 PRINT TAB(5,31);"Scor
e=";S%;
  410 COLOUR 3
  420 PRINT TAB(13,29);"Egg
s:0"
  430 X%=0:Y%=level:REM bir
d x,y coord.
  440 RESTORE
  450 FOR I%=0 TO 1:FOR J%=
0 TO 63:READ data:?(&3000+(
Y%+I%)*640+J%)=data:NEXT:NE
XT
  460 Z%=9:REM man x coordi
nate
  470 FOR I%=0 TO 1:FOR J%=
```

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Sum way to rescue a damsel!

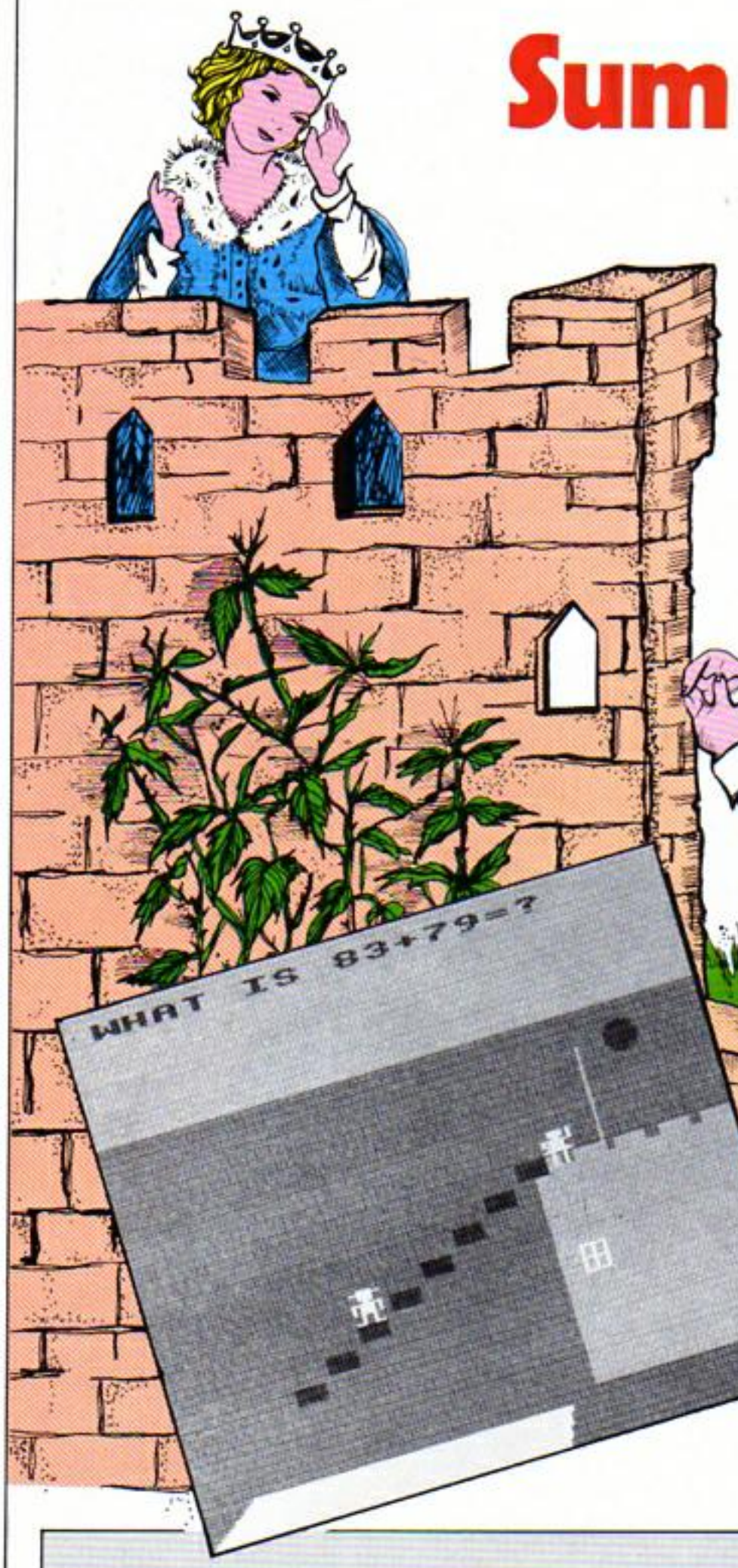
HAVE you ever fancied yourself as a handsome prince, rescuing a damsel in distress from the castle where she's imprisoned?

ANDREW GARDINER's program, Education Castle, lets you find out just how successful you would be.

Can you answer the questions correctly and reach the top of the steps? Or are you bad at sums and due for a ducking?

Either way it's a great way to practice simple sums.

Now all we need is a game about frogs and princesses . . .



```
10 REM EDUCATION CASTLE
11 REM BY ANDREW GARDINER
12 REM (C) ELECTRON USER

20 ENVELOPE1,1,35,55,155,
255,155,1,126,0,0,-126,126,1
26:ENVELOPE2,1,10,10,10,230,
230,230,126,0,0,-126,126,126
:SOUND1,2,100,100:end%=0:MOD
E1:PROCTITLE:MODE2:VDU23,1,0
;0;0;0;:PROCVAR:PROCSCREEN:P
ROCACTUALGAME
30 DEF PROCSCREEN
40 GCOL 0,134:CLG
50 GCOL0,4:MOVE0,0:MOVE77
0,0:PLOT85,50,75:PLOT85,800,
75
60 GCOL 0,2
70 MOVE 770,0:MOVE 800,0:
PLOT85,800,100:PLOT85,1279,0
:PLOT85,1279,100
80 GCOL 0,5:MOVE 850,500:
MOVE 1279,500:PLOT 85,850,10
0:PLOT 85,1279,100
90 VDU 23,224,255,255,255
,255,255,255,255,255
100 FOR Z=850 TO 1279 STEP
90
110 MOVE Z,520:VDU5:VDU224
:NEXT Z
120 GCOL0,2:MOVE0,0:MOVE0,
200:PLOT85,300,200
130 GCOL0,1:MOVE 1000,500:
DRAW1000,700
140 VDU 23,225,61,61,61,25
,255,188,252,60:VDU 23,226,1
26,255,36,36,36,36,36,36
150 WOM$=CHR$225+CHR$8+CHR
$10+CHR$226
160 VDU 23,229,60,255,60,6
0,60,24,255,189:VDU23,230,18
9,189,189,36,36,36,36,231:MA
N$=CHR$229+CHR$8+CHR$10+CHR$
230
170 GCOL0,4:MOVE 880,565:V
DU5:PRINTWOM$
180 GCOL0,0:MOVE 100,265:V
DU5:PRINTMAN$
```

```
 190 MOVE 1180,100:MOVE 127
9,100:GCOL0,1:PLOT85,1180,30
0:PLOT85,1279,300
 200 GCOL 0,4:MOVE900,300:D
RAW950,300:DRAW950,350:DRAW9
00,350:DRAW900,300:MOVE925,3
00:DRAW925,350:MOVE900,325:D
RAW950,325
 210 GCOL0,3:FOR I=700+30 T
O 700-30 STEP -4
 220 J=SQR(ABS(30*30-(I-700
)*(I-700)))
 230 MOVE 1100-J,I:DRAW 110
0+J,I:NEXT I
 240 PROCBRICK
 250 VDU 28,0,7,19,0
 260 VDU 4
 270 COLOUR 129:COLOUR 7:CL
S
 280 ENDPROC
 290 DEF PROCTITLE
 300 VDU 19,0,4,0,0,0:COLOU
R 128:COLOUR 3:CLS
 310 VDU 23,1,0;0;0;0;:PRIN
TTAB(11,5)"W E L C O M E"
 320 PRINTTAB(16,10)"T O"
 330 PRINTTAB(3,20)"E D U C
 A T I O N  C A S T L E"
 340 PRINTTAB(11,28)"by A.G
ardiner."
 350 COL%=0
 360 VDU 19,7,COL%,0,0,0,0
 370 COL%=COL%+1
 380 IF COL%=8 THEN GOTO 42
0 ELSE IF COL%=4 THEN COL%=5
 390 SOUND 1,1,100,25
 400 FOR x%=0 TO 300:NEXT x
%
 410 GOTO 360
 420 COLOUR 7:CLS
 430 PRINTTAB(10,1)"Educati
on Castle."
 440 PRINTTAB(0,4)"CAN YOU
ANSWER THE QUESTIONS CORRECT
LY?":COLOUR 2:PRINT:PRINT"AN
D RESCUE THE PRINCESS BY CLI
MBING A":PRINT:COLOUR 7:PRIN
T"BRIDGE OVER TO THE CASTLE?
 IF YOU CAN":COLOUR 2:PRINT:
PRINT"THEN ENTER YOUR SKILL
LEVEL AND PLAY"
 450 COLOUR 7:PRINT:PRINT"A
WAY."
 460 PRINTTAB(1,15)"Please
enter your skill level (1-99
)":PRINTTAB(1,19)"THEN PRESS
":COLOUR 131:COLOUR0:PRINTTA
B(12,19)"RETURN"
 470 COLOUR 128:COLOUR 3
 480 *FX15,1
 500 SKILL%=0
 510 INPUT TAB(20,22)""SKIL
L$:IF LEN SKILL$>2 THEN PRIN
T TAB(20,22);STRING$(91," ")
:PRINTTAB(20,22):STRING$(3,"
"):GOTO490:IF SKILL$="" THE
N 490 ELSE SKILL%=VAL SKILL$

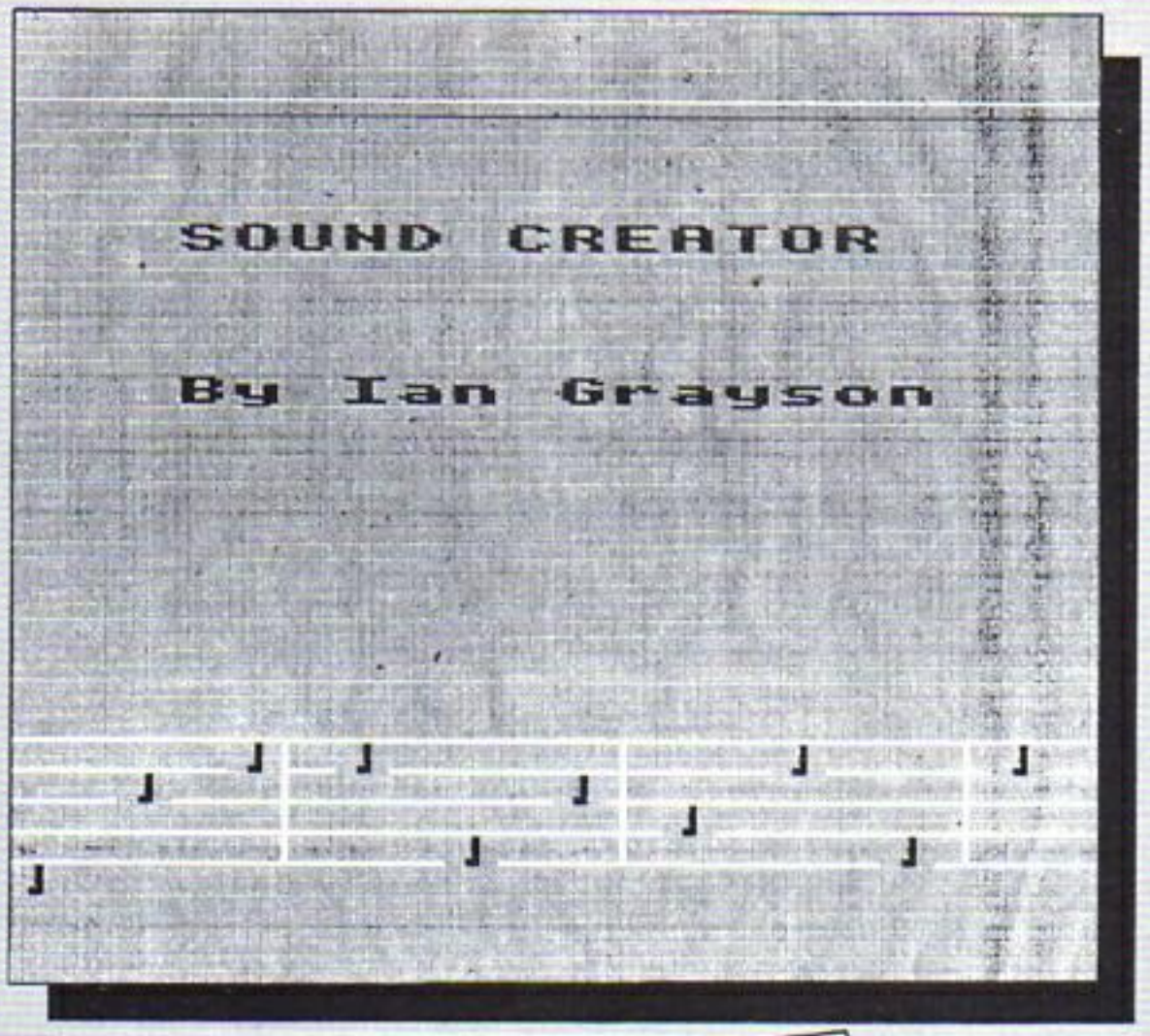
 520 REM IF SKILL%<1 OR SKI
LL%>99 THEN PRINT TAB(21,20)
;"         ":GOTO 490
 521 IF SKILL%<1 OR SKILL%>
99 THEN PRINT TAB(21,20);STR
ING$(9," "):GOTO 490
 530 PRINTTAB(9,28)"Now let
's start"
 540 TIME=0:REPEAT:SOUND1,2
,100,2:UNTIL TIME>200
 550 ENDPROC
 560 DEF PROCACTUALGAME
 565 VDU 23,1,0;0;0;0;
 570 QUE%=INT RND(SKILL%):q
ue%=INT RND(SKILL%)
 580 PRINT TAB(1,1);"WHAT I
S ";QUE%;"+";que%;"=";
 590 ans%=0
 600 *FX15,1
 610 INPUT ans$:IF LEN ans$
>4THEN PRINTTAB(0,0):STRING$
(151," "):GOTO 580 ELSE ans%
=VAL ans$
 620 IF ans%=QUE%+que% THEN
 PROCcorrect ELSE PROCwrong
 630 IF end%=0 THEN GOTO 57
0 ELSE RUN
 640 DEF PROCcorrect
 650 VDU4:PRINT TAB(1,4);"Y
OU ARE CORRECT !"
 660 SOUND 1,-15,33,3:SOUND
 1,-15,49,3:SOUND 1,-15,61,3
:SOUND 1,-15,33,3:SOUND 1,-1
5,49,3:SOUND 1,-15,61,3:SOUN
D 1,-15,33,3:SOUND 1,-15,49,
3:SOUND 1,-15,61,3:SOUND 1,0
,61,7:SOUND 1,-15,61,3:SOUND
 1,0,61,3:SOUND 1,-15,61,3:S
OUND 1,-15,49,3
 670 SOUND 1,0,49,3:SOUND 1
,-15,33,3
 680 MOVE ACROSS%,UP%:VDU5:
GCOL0,6:PRINTMAN$
 690 ACROSS%=ACROSS%+80
 700 IF ACROSS%>=260 THEN U
P%=UP%+40
 710 IF ACROSS%=820 AND UP%
=585 THEN MOVE 820,585:VDU 5
:GCOL0,0:PRINTMAN$:PROCend:E
NDPROC
 720 MOVE ACROSS%,UP%:VDU5:
GCOL0,0:PRINTMAN$
 730 VDU4:PRINT TAB(1,4);"Y
OU ARE CORRECT !":FOR tyr%=0
 TO 400:NEXT tyr%
 740 VDU4:CLS
 750 ENDPROC
 760 DEF PROCVAR
 770 ACROSS%=100
 780 UP%=265
 790 ENDPROC
 800 DEF PROCwrong
 810 SOUND 1,-15,100,2:SOUN
D 1,-15,90,2:SOUND 1,-15,80,
2:SOUND 1,-15,70,2:SOUND 1,-
15,60,2:SOUND 1,-15,50,2:SOU
ND 1,-15,40,2:SOUND 1,-15,30
,2:SOUND 1,-15,20,2:SOUND 1,
-15,10,3:SOUND 1,-15,0,5
 820 CLS
 830 IF ACROSS%<=265 OR ACR
OSS%)=740 THEN 840 ELSE PROC
FALL:PROCBRICK
 840 GCOL0,6:MOVE ACROSS%,U
P%:VDU5:PRINTMAN$:GCOL0,0:MO
VE 100,265:VDU5:PRINTMAN$
 850 VDU4
 860 PRINT TAB(1,3)"YOU ARE
 WRONG!";TAB(1,5)"It should
have been"TAB(9);QUE%+que%
 870 TIME=0:REPEAT
 880 UNTIL TIME>300
 890 CLS
 900 PROCVAR:ENDPROC
 910 DEF PROCBRICK
 920 MOVE 260,240:VDU5:VDU2
24
 930 MOVE 340,280:VDU5:VDU2
24
 940MOVE 420,320:VDU5:VDU22
4
 950MOVE 500,360:VDU5:VDU22
4
 960MOVE 580,400:VDU5:VDU22
4
 970 MOVE 660,440:VDU5:VDU2
24
 980MOVE 740,480:VDU5:VDU22
4
 990MOVE 820,520:VDU5:VDU22
4
 1000 ENDPROC
 1010 DEF PROCFALL
 1020 MOVE ACROSS%,UP%
 1030 FOR FALL%=UP% TO 45 ST
EP -15
 1040 MOVE ACROSS%,FALL%:GCO
L 0,0:VDU5:PRINTMAN$
 1050 GCOL0,6:MOVE ACROSS%,F
ALL%:SOUND 1,-15,FALL%/3,1:V
DU5:PRINTMAN$
 1060 NEXT FALL%
 1070 GCOL0,4:MOVE0,0:MOVE75
0,0:PLOT85,120,75:PLOT85,770
,75:GCOL0,3:PROCBRICK
 1080 FOR fd%=29 TO 1 STEP -
2:SOUND1,-15,fd%,1:NEXT fd%:
ENDPROC
 1090 DEF PROCend
 1100 FOR sd%=254 TO 0 STEP
-8:SOUND 1,-15,sd%,1:NEXT sd
%
 1110 GCOL0,0:CLG
 1120 GCOL0,5:MOVE 300,0:MOV
E 1279,0:PLOT85,300,500:PLOT
85,1279,500:FOR bri%=300 TO
1279 STEP 90:MOVE bri%,530:V
DU5:VDU224:NEXT bri%
 1130 GCOL0,1:MOVE 600,530:D
RAW 600,800
 1140 SOUND 1,-15,100,3:SOUN
D1,-15,105,3:SOUND 1,-15,100
,3
 1150 MOVE 350,500:GCOL0,4:D
RAW 350,600:MOVE 430,500:DRA
W430,600:MOVE 450,600:DRAW33
0,600
 1160 PLOT85,390,650:PLOT85,
450,600
 1170 GCOL0,2:MOVE 415,620:M
OVE 360,620:PLOT85,415,700:P
LOT85,360,700
 1180 X%=390:Y%=715:R%=25
 1190 GCOL0,3:FOR I%=Y%+R% T
O Y%-R% STEP -4
 1200 J%=SQR(ABS(R%*R%-(I%-Y
%)*(I%-Y%))):MOVE X%-J%,I%:D
RAW X%+J%,I%:SOUND1,-15,X%+Y
%,1:NEXT
 1210 GCOL0,4:PLOT69,380,720
:PLOT69,400,720
 1220 GCOL0,3:MOVE 0,400:VDU
5:SOUND 1,-15,0,3:VDU224:MOV
```

Turn to Page 59

IF you've been following Nigel Peters' articles on sound but are too busy or too lazy to work it all out for yourself, then Sound Creator is the program for you.

Written by IAN GRAYSON of Wakefield, this menu-driven utility has the Electron producing noises using random SOUNDs and ENVELOPEs.

When you hear something you like the program will display all the necessary parameters for you to recreate them in your own programs.



PROCEDURES

PROCMENU	Prints out the menu and asks for your choice. It then goes to the chosen procedure.
PROCCHANNEL	Asks for the sound channel. If 0 is chosen then the pitch value is then asked for.
PROCGENERATE	Generates the random sound and returns to the menu.
PROCVALUE	Displays all the needed values (SOUND, ENVELOPE).
PROCREPEAT	Repeats the generated sound.
PROCTITLE	Draws out the title page.
PROCFLUSH	Flushes all buffers to stop the sound when not wanted.

VARIABLES

A$	Reads the keyboard buffer.
A–F	Random ENVELOPE values.
Q	Sound channel (0 or 1).
P	Pitch value (100 or 0-7).

```
10 REM SOUND CREATOR
20 REM By Ian Grayson
30 REM (C)ELECTRON USER
40 REM MAIN LOOP
50 A=0:Q=2
60 MODE2
70 VDU23;8202;0;0;0;
80 PROCTITLE
90 MODE1
100 VDU23;8202;0;0;0;
110 PROCMENU
120 REM PROCEDURES
130 REM The Menu
140 DEFPROCMENU
150 VDU19,0,4;0;
160 CLS
170 PRINTTAB(17,4)"MENU"
180 PRINTTAB(7,7)"1. SELECT CHANNEL"
190 PRINTTAB(7,9)"2. GENERATE SOUND"
200 PRINTTAB(7,11)"3. INSPECT ENVELOPE VALUES"
210 PRINTTAB(7,13)"4. REPEAT LAST SOUND"
220 PRINTTAB(13,20)"ENTER CHOICE?"
230 A$=GET$
240 IFA$="1" THEN PROCCHANNEL
250 IFA$="2" THEN PROCGENERATE
260 IFA$="3" THEN PROCVALUES
270 IFA$="4" THEN PROCREPEAT
280 GOTO230
290 ENDPROC
300 REM Repetition of generated sound
310 DEFPROCREPEAT
320 CLS
330 PRINTTAB(5,12)"PRESS SPACE TO RETURN TO MENU"
340 IFA=0 AND Q=2 THEN PROCMENU
350 SOUNDQ,1,P,255
360 IFA$=" " THEN PROCFLUSH
370 A$=INKEY$(1000)
380 GOTO350
390 ENDPROC
400 REM Generate the sound
410 DEFPROCGENERATE
420 IFQ=2 THEN PROCMENU
430 CLS:PRINTTAB(10,12)"PRESS SPACE TO STOP"
440 A=RND(128):B=RND(128):C=RND(128):D=RND(255):E=RND(255):F=RND(255)
450 ENVELOPE1,0,A,B,C,D,E,F,126,0,0,-126,126,126
460 IFP>7 THEN P=100
470 SOUNDQ,1,P,50
480 IFA$=" " THEN PROCFLUSH
490 A$=INKEY$(500)
500 GOTO440
510 ENDPROC
520 REM Envelope values
530 DEFPROCVALUES
540 CLS
550 IFA=0 THEN PROCMENU
```

```
  560 PRINTTAB(12,10)"SOUND
";Q;",1,";P;",100"
  570 PRINTTAB(7,12)"ENV.1,
0,";A;",";B;",";C;",";D;",";
;E;TAB(7,14)",";F;",126,0,0
,-126,126,126"
  580 PRINTTAB(6,22)"PRESS
SPACE TO RETURN TO MENU"
  590 IFA$=" " THEN PROCMEN
U
  600 A$=INKEY$(500)
  610 GOTO590
  620 ENDPROC
  630 REM Choose the sound
channel
  640 DEFPROCCHANNEL
  650 CLS
  660 PRINTTAB(10,12)"WHICH
 CHANNEL (0/1)"
  670 A$=INKEY$(0)
  680 IFA$="0" THEN Q=0:GOT
O 710
  690 IFA$="1" THEN Q=1:P=1
00:PROCMENU
  700 GOTO670
  710 CLS
  720 PRINTTAB(6,12)"WHICH
PITCH VALUE (0-7)"
```

```
MENU

1. SELECT CHANNEL
2. GENERATE SOUND
3. INSPECT ENVELOPE VALUES
4. REPEAT LAST SOUND


ENTER CHOICE?
```

```
  730 A$=GET$
  740 IFA$="0" THEN P=0:PRO
CMENU
  750 IFA$="1" THEN P=1:PRO
CMENU
  760 IFA$="2" THEN P=2:PRO
CMENU
  770 IFA$="3" THEN P=3:PRO
CMENU
  780 IFA$="4" THEN P=4:PRO
CMENU
  790 IFA$="5" THEN P=5:PRO
CMENU
  800 IFA$="6" THEN P=6:PRO
CMENU
  810 IFA$="7" THEN P=7:PRO
CMENU
  820 GOTO730
  830 ENDPROC
  840 REM Title page
  850 DEFPROCTITLE
  860 COLOUR129:CLS:COLOUR1
1
  870 PRINTTAB(3,7)"SOUND C
REATOR"
  880 COLOUR7
  890 PRINTTAB(3,12)"By Ian
 Grayson"
  900 VDU23,239,8,8,8,8,8,8
,24,24
  910 GCOL0,0
  920 FORI=256TO128STEP-32
  930 MOVE0,I
  940 DRAW1279,I
  950 NEXT
  960 FORX=0TO18STEP2
  970 Y=23+RND(5)
  980 PRINTTAB(X,Y)CHR$(239
)
  990 NEXT
 1000 FORI=320TO1120STEP400
 1010 MOVEI,256
 1020 DRAWI,128
 1030 NEXT
 1040 TIME=0
 1050 IFTIME=700 THENENDPRO
C
 1060 GOTO1050
 1070 ENDPROC
 1080 REM Stop sound by flu
shing all buffers
 1090 DEFPROCFLUSH
 1100 *FX15
 1110 PROCMENU
 1120 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES

EPIC ADVENTURES

The Definitive Adventures for the Electron...

"Having now tried all the Epic Adventures, they must be the yardstick by which all other adventures for the Electron should be judged." *ELECTRON USER*

"The Wheel of Fortune for the BBC and Electron is a highly-recommended state-of-the-art adventure." *SHIELDS GAZETTE*

"This has to be the adventure of 1984. It really is superb." *MICRONET 800*

"The definitive adventure. Highly recommended." *ELECTRON USER*

Our other three adventures have also received superb reviews in Electron User. They each contain approximately 230 locations and 25,000 characters of text.

The Wheel of Fortune

This game is a classic puzzle adventure with all the features you'd expect from EPIC...

PLUS

- Intelligent moving characters with varying moods. **And you can talk to them too!**
- Multistatement language and speech interpreters.
- Runs in real time.
- **250** locations and over **30,000** characters of text. Only Epic's compression techniques can pack so much into the Electron.

TO: EPIC SOFTWARE, DEPT.E, 10 GLADSTONE ST., KIBWORTH BEAUCHAMP, LEICESTER LE8 0HL *Please Rush Me -*

	CASSETTE	DISC
.....qty THE WHEEL OF FORTUNE	£9.95	£11.95
.....qty CASTLE FRANKENSTEIN	£7.95	£9.95
.....qty THE QUEST FOR THE HOLY GRAIL	£7.95	£9.95
.....qty THE KINGDOM OF KLEIN	£7.95	£9.95

STATE: BBC/ ELECTRON (Delete) No Graphics on Electron

POSTAGE & PACKING FREE FOR 2 OR MORE. ADD 50p FOR ONE.

I enclose Cheque/P.O. to the value of ..... (Payable to 'Epic Software')

NAME _____

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All programs available for immediate despatch. Dealer enquiries welcome. Help Service. Send letter if you don't want to cut magazine.

EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES...EPIC ADVENTURES

GOIN' FASTER THAN A ROLLER COASTER

Get yourself taken for a ride with JON WILLINGTON's clever graphics routine

COASTER is a short graphics routine which runs in Mode 1, drawing a spiral which curves in three dimensions.

Next it gives the impression of movement, creating what looks like a moving conveyor belt or roller coaster.

Lines 40 to 150 draw the spiral. They do this by drawing a damped cosine curve 20 times across the screen.

Each curve is drawn a few pixels to the right of the previous one. The size of the oscillations decreases as the waveform proceeds.

The curve is drawn in three colours – white, yellow and red – on a black background.

It gives a picture that looks like a striped football scarf.

The final section of the program – lines 160 to 220 – consists of a continuous loop which uses the VDU 19 command to animate the image.

As the program stands, the roller coaster effect uses red and white colours. This can easily be changed by altering the relevant lines.

For example, for a blue and cyan roller coaster, make the following alterations:

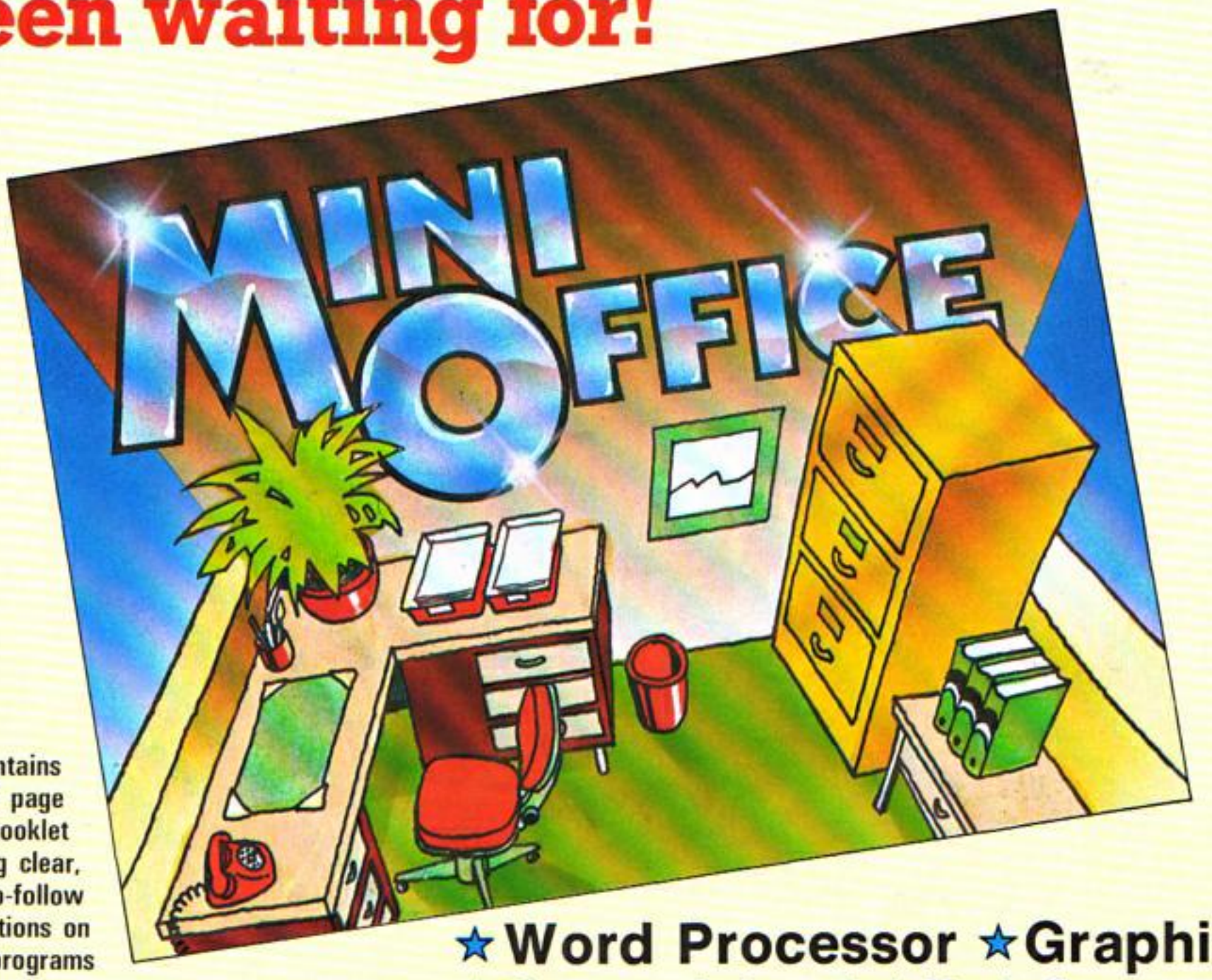
```
180 VDU 19,E,6;0;
200 VDU 19,E,4;0;
```

Using green and white or black and yellow also produces quite effective displays.

```
10 REM ******** COASTER
   ********
20 REM ***** By Jon Willingt
   on *****
30 REM *** (C)ELECTRON
    USER ***
40 MODE 1
50 DEF FNx(X,E)=X*100+E
60 DEF FNy(X,E)=COS (X)*
   EXP (-X/8)*(500-E)+512
70 K=16*PI /255
80 FOR E=0 TO 180 STEP 10
90 C=0
100 MOVE 0,1023
110 FOR X=K TO 4*PI STEP K
120 C=C+1
   :GCOL 0,C
130 DRAW FNx(X,E),FNy(X
   ,E)
140 IF C=3
   THEN C=0
150 NEXT
   :NEXT
160 REPEAT
170 FOR E=1 TO 3
180 VDU 19,E,7;0;
190 M=INKEY (5)
200 VDU 19,E,1;0;
210 NEXT
220 UNTIL FALSE
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

Just what you've been waiting for!



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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.

K.B. Turner is being friendly in a multi-coloured way

```
10 REM HELLO
20 REM K.B.TURNER
30 MODE 2
40 MOVE 415,399
50 GCOL 0,9
60 DRAW 864,399:DRAW 864
,624:DRAW 415,624:DRAW 415,
399
70 MOVE 479,431
80 GCOL 0,14
90 DRAW 800,431:DRAW 800
,592:DRAW 479,592:DRAW 479,
431
100 VDU 5
110 MOVE 416,623:FOR C=1
TO 6:GCOL 0,C:VDU 42:NEXT:G
COL 0,1:VDU 42
120 FOR X=1 TO 6
130 MOVE 416,623-32*X:GCO
L 0,7-X:VDU 42
140 MOVE 800,623-32*X:GCO
L 0,X+1:VDU 42
150 NEXT X
160 MOVE 480,430:FOR C=6
TO 1 STEP -1:GCOL 0,C:VDU 4
2:NEXT
170 MOVE 481,527:VDU 72,6
9,76,76,79
180 MOVE 0,0
190 N=2
200 REPEAT
210 FOR C=1 TO 6
220 N=N+1
230 IF N>6 THEN N=1
240 VDU 19,N,C;0;0;
250 FOR Z=1 TO 20:NEXT
260 NEXT C
270 N=N+1:IF N>6 THEN N=1
280 UNTIL FALSE
```

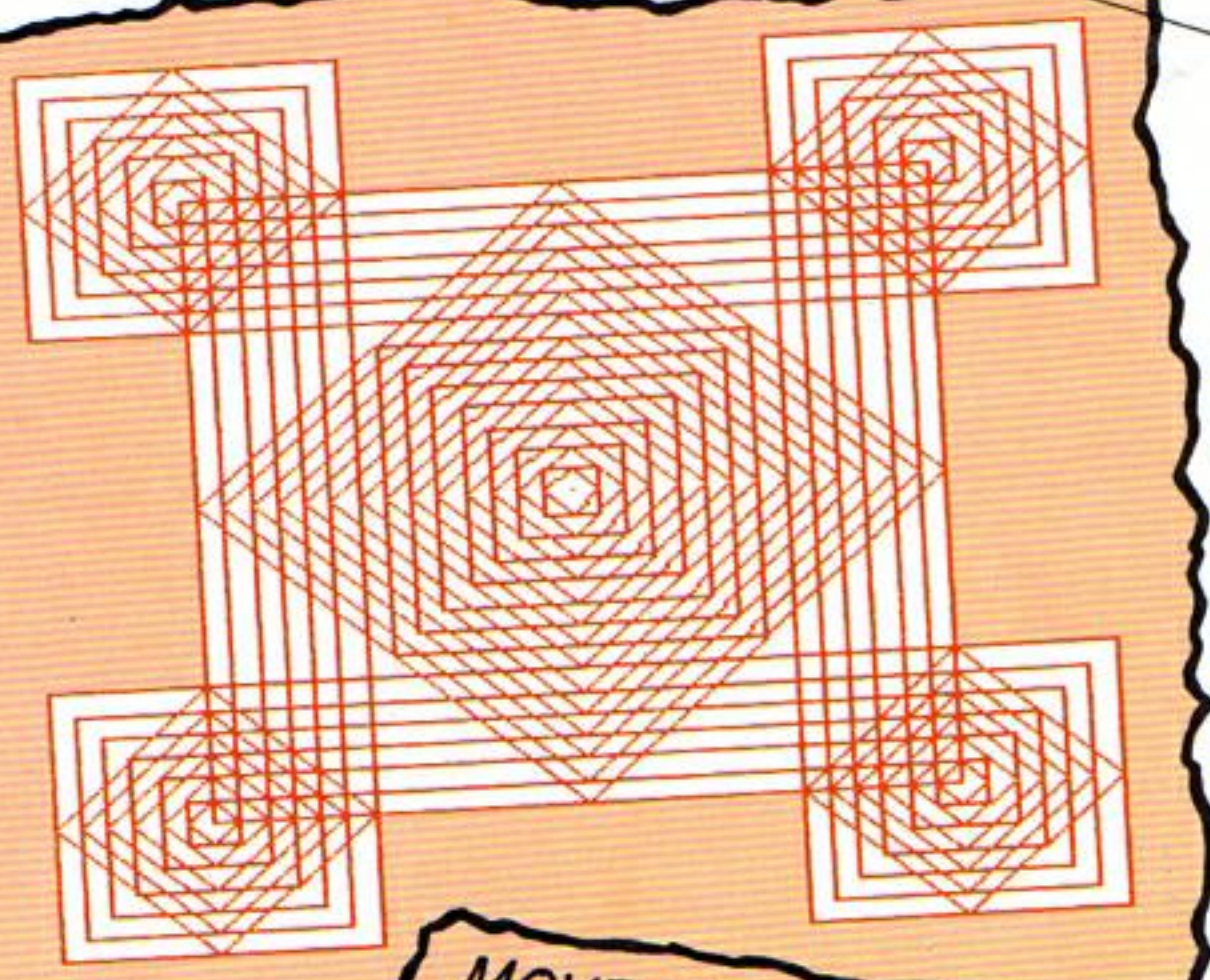
Trigonmetry is OK, K.B. – but where's the wine?

```
10 REM WINE GLASS
20 REM K.B.TURNER
30 INPUT"COLOUR NUMBER",
C
40 MODE 4
50 VDU 23,1,0;0;0;0;
60 GCOL 3,7
70 VDU 19,7,C;0;0;
80 FOR A=1 TO 2*PI-1 STE
P 0.0522
90 MOVE 640+300*SIN(A),7
23+300*COS(A)
100 DRAW 640+50*SIN(A+0.9
*PI),400+COS(A+0.9*PI)
110 NEXT A
120 FOR A=0 TO 2*PI STEP
0.0522
130 MOVE 640+240*SIN(A),7
23+300*COS(2*PI-1)+20*COS(A
)
140 DRAW 640+50*SIN(A+PI/
2),400+COS(A+PI/2)
150 NEXT A
160 FOR A=0 TO 2*PI STEP
0.0522
170 MOVE 640+50*SIN(A),40
0+COS(A)
180 DRAW 640+50*SIN(A+0.9
*PI),150+COS(A+0.9*PI)
190 NEXT A
200 FOR A=0 TO 2*PI STEP
0.0522
210 MOVE 640+50*SIN(A),15
0+COS(A)
220 DRAW 640+150*SIN(A+PI
),50+20*COS(A+PI)
230 NEXT A
240 REPEAT UNTIL FALSE
```

COLOUR NUMBER?

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

Sue Timms revisits January's Notebook program

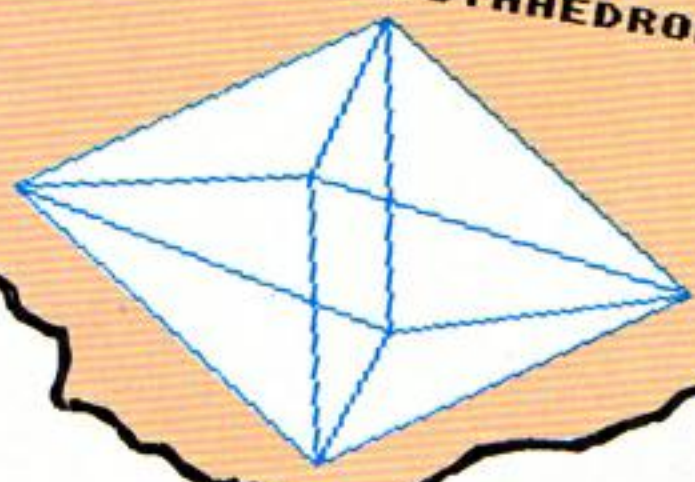


```
  10 REM ORIGINS REVISITED
  20 REM NEIL CANTHORNE
  30 REM ADDITONS BY SUE T
IMMS
  40 MODE 1
  50 VDU 23,1,0;0;0;0;
  60 VDU 19,1,4,0,0,0
  70 GCOL 0,1
  80 VDU 29,640;512;
  90 FOR radius= 0 TO 350
STEP 25
 100 PROCmandala(radius)
 110 NEXT radius
 120 FOR repeat=1 TO 4
 130 READ x,y
 140 PROCoutside(x,y)
 150 NEXT repeat
 160 REPEAT UNTIL FALSE
 170 DEF PROCoutside(x,y)
 180 FOR radius= 0 TO 150
STEP 25
 190 VDU 29,x;y;
 200 MOVE x,y
 210 PROCmandala(radius)
 220 NEXT radius
 230 ENDPROC
 240 DEF PROCmandala(w)
 250 MOVE 0,w
 260 DRAW -w,0
 270 DRAW 0,-w
 280 DRAW w,0
 290 DRAW 0,w
 300 MOVE -w,w
 310 DRAW -w,-w
 320 DRAW w,-w
 330 DRAW w,w
 340 DRAW -w,w
 350 ENDPROC
 360 DATA 290,862,290,162,
990,862,990,162
```

MOVE, DRAW and SOUND combine in Piers Jarman's program

```
  10 REM OCTAHEDRON
  20 REM by PIERS JARMAN
  25 REM EATON NR.GRANTHAM
  30 MODE 1
  40 COLOUR 1
  50 VDU 23,1;0;0;0;0
  60 MOVE 640,256:DRAW 688
,416
  70 DRAW 640,768:DRAW 592
,576
  80 DRAW 640,256:DRAW 960
,512
  90 DRAW 640,768:DRAW 320
,512
 100 DRAW 640,256:MOVE 688
,416
 110 DRAW 960,512:DRAW 592
,576
 120 DRAW 320,512:DRAW 688
,416
 130 PRINT TAB(9,4)"THIS I
S AN OCTAHEDRON"
 140 SOUND 1,-15,97,5
 150 SOUND 1,-15,105,10
 160 SOUND 1,-15,90,5
 170 GOTO 140
 180 END
```

THIS IS AN OCTAHEDRON



BE A RACE ACE

RACER gives you all the thrill of the race track as you use your Electron's keyboard to drive around the circuit.

The idea is to steer your car using the Z and X keys to go left and right respectively.

You gain points as you speed along, but you also lose them should you hit any of the white bollards that mark the track.

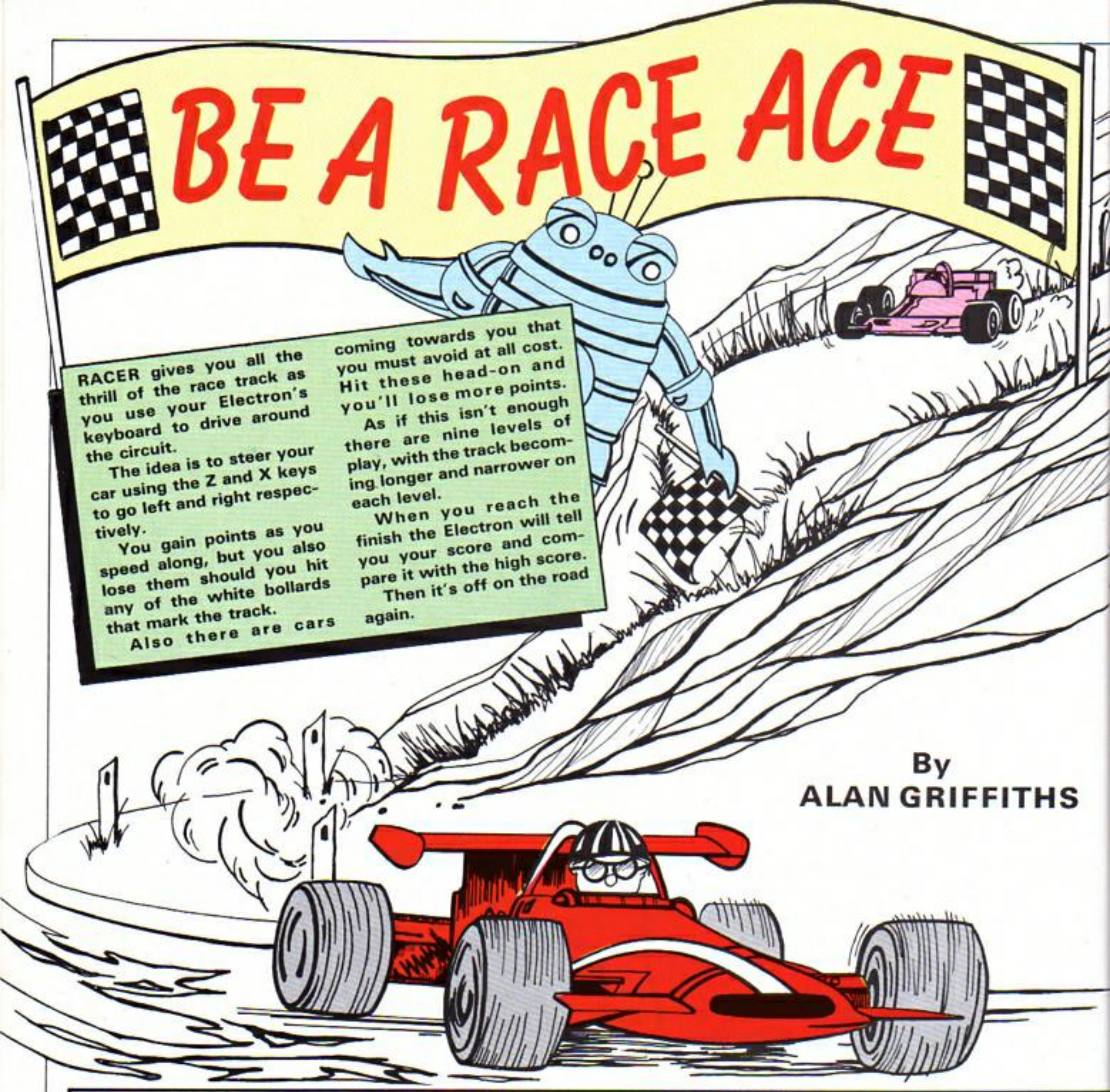
Also there are cars coming towards you that you must avoid at all cost. Hit these head-on and you'll lose more points.

As if this isn't enough there are nine levels of play, with the track becoming longer and narrower on each level.

When you reach the finish the Electron will tell you your score and compare it with the high score.

Then it's off on the road again.

By
ALAN GRIFFITHS



```
10 REM RACER
20 REM BY ALAN GRIFFITHS
30 REM (C) ELECTRON USER
40 MODE 5
50 ON ERROR GOTO 120
60 PROCinit
70 *FX11,10
80 *FX12,10
90 PROCstart
100 REPEAT
    :PROCnew
    :UNTIL A%>B%*100
    AND C%=7
    :REPEAT
    :PROCfinish
    :UNTIL D%=40
110 TIME =0
    :REPEAT UNTIL TIME =100

120 PROCscore
130 *FX 15
140 *FX12,0
150 PRINT TAB(0,10);"ANOTHE
    R GAME? (Y/N)"
160 A$=INKEY$ (200)
    :IF A$="" GOTO 160
170 IF A$="Y" RUN
180 MODE 6
    :END
190 DEF PROCcheck IF road%(
    E%))=F% OR road%(E%)+P%
    (=F% PROCcrash
    ELSE G%=G%+1
200 E%=E%+1
    :IF E%=19 E%=0
210 IF X%=17 AND Y%=F%
     PROCcrash2
220 ENDPROC
230 DEF PROCcrash G%=G%-10
    :SOUND 0,-15,52,3
    :ENDPROC
240 DEF PROCcrash2 G%=G%-20
    :SOUND 1,-15,4,5
    :ENDPROC
250 DEF PROCnew
260 IF INKEY (-98)PRINT
    TAB(F%,13);" "
270 IF INKEY (-98)F%=F%-1

280 IF INKEY (-67)PRINT
    TAB(F%,13);" "
290 IF INKEY (-67)F%=F%+1
300 H%=RND(3)-2
    :C%=C%+H%
    :road%(I%)=C%
310 IF C%<=2 C%=C%+1
320 IF C%>=10 C%=C%-1
330 PRINT TAB(F%,13);
    CHR$ 241
340 PRINT TAB(C%,31);B$
```

```
350 PRINT TAB(F%,12);"
    "
360 PRINT TAB(F%,13);
    CHR$ 241
370 PRINT TAB(0,0);"SCORE
    ";G%"  TIME  ";J%

380 I%=I%+1
    :IF I%=19 I%=0
390 IF A%=Y% PROCcar
400 A%=A%+1
    :IF A%)=18 PROCcheck

410 COLOUR 3
    :X%=X%+1
420 J%=TIME -J%
    :J%=J%DIV 100
430 ENDPROC
440 DEF PROCcar U%=
    RND(3)
    :COLOUR U%
    :PRINT TAB(C%+V%,30);
    CHR$ (241)
    :W%=W%+1
    :T%=S%+W%
    :X%=0
    :Y%=C%+V%
    :ENDPROC
450 REM ************ PROC
     START ********
460 DEF PROCstart
470 VDU 23,240,204,204
    ,51,51,204,204,51
    ,51
480 VDU 23,241,189,231
    ,165,36,60,189,255
    ,153
490 VDU 23,242,60,126
    ,255,255,255,255,126
    ,60
500 CLS
505 VDU 23,1,0;0;0;0
510 FOR K%=1 TO 31
    :PRINT TAB(H%,K%);B$
520 NEXT
530 FOR K%=8 TO (8+
    LEN (B$)-3)
    :PRINT TAB(K%,15);
    CHR$ (240)
    :NEXT
540 IF P%=7 Q%=9
550 IF P%=6 Q%=8
560 IF P%=5 Q%=8
570 PRINT TAB(Q%,16):"START
    "
580 PRINT TAB(F%,13);
    CHR$ 241
590 TIME =0
    :COLOUR 1
    :REPEAT UNTIL TIME =100
    :PRINT TAB(4,13);
    CHR$ 242
    :VDU 7
    :COLOUR 2
    :REPEAT UNTIL TIME =200
    :PRINT TAB(4,13);
    CHR$ 242
    :VDU 7
    :VDU 19,1,2;0;
    :COLOUR 1
    :REPEAT UNTIL TIME =300
    : PRINT TAB(4,13);:
    "GO"
    :VDU 7
600 REPEAT UNTIL TIME =330
    :PRINT TAB(4,13);"
     "
    :VDU 19,1,1;0;
    :COLOUR 3
610 TIME =0
    :J%=TIME
620 ENDPROC
630 REM ******** PROC
     INIT *********
640 DEF PROCinit
650 F%=10
    :H%=7
    :C%=7
    :B$="."
    :I%=0
    :A%=0
    :E%=0
    :G%=0
    :J%=0
    :B%=0
    :D%=0
    :S%=25
660 S=440
    :T=600
    :I$="RACER"
    :DIM road%(20)
    :W%=1
670 VDU 5
680 VDU 19,0,4,0,0,0
    :VDU 19,1,0,0,0,0
690 GCOL 1,3
700 MOVE S,T
    :PRINT I$
710 GCOL 1,1
720 MOVE S-8,T-8
    :PRINT I$
730 VDU 4
740 WAIT$=INKEY$ (100)
750 VDU 19,1,1,0,0,0
754 CLS
755 PRINT TAB(0,10)"1 IS
     EASY, 9 IS HARD"
760 INPUT TAB(0,5);"INPUT
     LEVEL(1-9)",B%
    :IF B%<1 OR B%>9
    GOTO 760
770 IF B%<=3 B%=B%+1
780 IF B%<=3 P%=7
790 IF B%>3 AND B%<7 B$=
    "."
800 IF B%>3 AND B%<7 P%=6

810 IF B%>6 B$="."
820 IF B%>6 P%=5
830 IF P%=7 V%=3
840 IF P%=6 V%=3
850 IF P%=5 V%=2
860 IF B%=8 S%=20
870 IF B%=9 S%=20
880 T%=S%
890 ENDPROC
900 REM ******** PROC
     FINISH *******
910 DEF PROCfinish
920 IF INKEY (-98)PRINT
    TAB(F%,13);" "
930 IF INKEY (-98)F%=F%-1
940 IF INKEY (-67)PRINT
    TAB(F%,13);" "
950 IF INKEY (-67)F%=F%+1
960 C%=7
    :D%=D%+1
970 IF F%<=C% F%=F%+1
980 IF F%>=C%+P% F%=F%-1
990 PRINT TAB(F%,13);
    CHR$ 241 TAB(C%,31);B$
1000 PRINT TAB(F%,12);"
     "
1010 PRINT TAB(F%,13);
     CHR$ 241
1020 PRINT TAB(0,0);"SCORE
     ";G%"  TIME  ";J%

1030 C$=CHR$ (240)
1040 IF D%=18
     THEN B$="."+STRING$(
     LEN (B$)-2,C$)+"."
1050 IF D%=19 AND P%=7
     B$=".FINISH."
1060 IF D%>19 AND P%=7
     B$=".      ."
1070 IF D%=19 AND P%=6
     B$=".FINIS."
1080 IF D%>19 AND P%=6
     B$=".      ."
1090 IF D%=19 AND P%=5
     B$=".    ."
1100 ENDPROC
1110 REM ******* PROC SCORE
     *********
1120 DEF PROCscore
1130 CLS
     :COLOUR 3
1140 L%=G%+(B%*100-J%)*(B%+1
     0)
1150 IF L%>M%
     THEN M%=L%
1160 PRINT TAB(6,1);"SCORES"

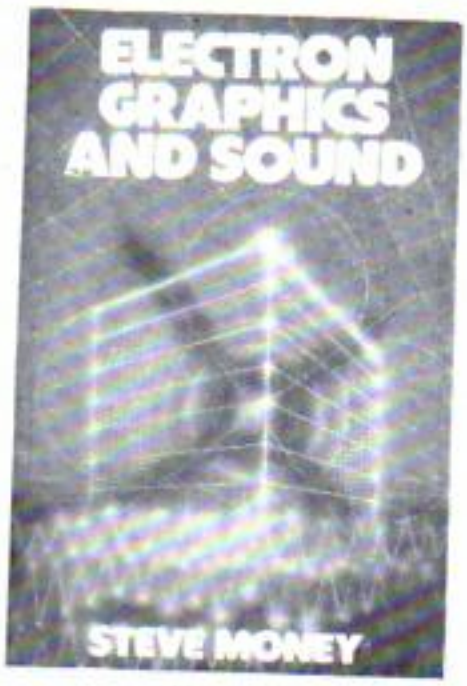
1170 PRINT TAB(5,2);"*******
     *"
1180 PRINT TAB(3,4);"HIGH
     SCORE  ";M%
1190 PRINT TAB(3,6);"YOU
     SCORED  ";L%
1200 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

BOOK SHELF

First principles of graphics and sound

Electron Graphics and Sound by Steve Money (Granada).



THE Electron programmer has quite an extensive list of graphics and sound commands at his fingertips. The number and variety of these can be quite bewildering to the newcomer.

The aim of this book is to explain the basic principles involved in producing interesting graphic displays and sounds.

The emphasis is more on useful routines than games programs, and many of the procedures could be used in your own programs.

The reader is taken from first principles – drawing a line and plotting a point – to the quite complex procedure of producing a perspective view of a wire frame object. All is explained in a clear and concise manner.

The sound section is not as good as the graphics. The author seems unaware that the Electron can only use one sound channel at a time and actually lists a program to play a series of notes on two channels simultaneously.

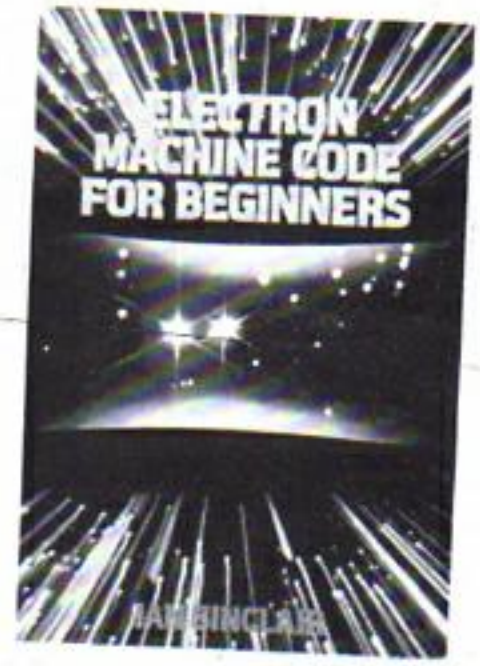
It was obviously written on a BBC Micro and sounds more like a rude noise on the Electron.

However I can recommend this book to anyone interested in producing lively graphic displays. But take the sound section with a pinch of salt.

Roland Waddilove

Open up a new world

Electron Machine Code for Beginners by Ian Sinclair (Granada).



EVER been frustrated with sluggish Basic – fed up of waiting for your program to catch up?

Although the Electron uses BBC Basic, arguably the best and fastest around, it's not much good for smooth animation effects or efficient utilities as it's too slow and it occupies too much memory.

The simple answer is machine code, the language of the micro's processor. Unlike Basic, it doesn't have to be translated by the micro as it runs.

However machine code is just a series of meaningless numbers, so the simple answer is assembly language.

As the Electron already has an assembler on-board, all you need is a fair knowledge of Basic – and Ian Sinclair's book.

The text deals with everything from ROM and RAM to bits and bytes. It asumes no prior knowledge of assembly language, and explains the inner workings of the micro and the possibilities of assembly.

The later chapters cover the methods and principles involved in an example assembly listing, with all mathematical processes being kept in separate appendices at the back where they are easily found – or ignored.

Also included is a major section on checking and debugging assembly programs, as well as several pages about a machine code monitor – perhaps a little premature for beginners.

The book is well thought out and, apart from a few mistakes, well written.

I have one minor complaint about the layout. A vital section on saving and loading programs was placed in the middle of another chapter about data in assembly programs. Surely this would have been better as a separate chapter or appendix?

However, this is an excellent and easy to understand introduction to the art of machine code programming which will open up whole new fields of program writing.

Andrew Oldham

Valuable, but slow

Instant Arcade Games for the Electron by Jean Frost (Pan).

THIS has been written for people with little programming knowledge to help them create their own arcade games. There is also a listing for an adventure game and character generator.

The main control loop for an arcade game is listed. After typing this in you enter the procedures used.

Here you have a choice of several different versions of each procedure, all with the same line numbers and all of which work with the main control loop.

There are seven different backgrounds, 13 different aliens, 15 different players and various checking and scoring routines. You just choose which one you want and type it in.

As you can imagine quite a large variety of games can be produced. The games look quite reasonable, but are incredibly slow.

I fell asleep three times playing the example! This is a simple space invader type of game with just one invader. It takes well over a minute for your laser base to crawl from one side of the screen to the other.

The book is valuable in that it teaches how to structure games programs, explaining every procedure in detail, but the arcade type games themselves are not really playable as they are so slow.

A reasonably good programming book, but not suitable if you want to play some fast arcade games.

Roland Waddilove

NICE & EASY

ARE you confused between binary and decimal? Do you find you don't have enough fingers to count in hexadecimal? Do you go cold when you see a & in front of a number?

Never fear, because MARK FENTON has come to your aid with his intriguing utility Base.

It's completely menu-driven and couldn't be easier to use.

Just tell your Electron which conversion you want, enter the number and the program does the rest.

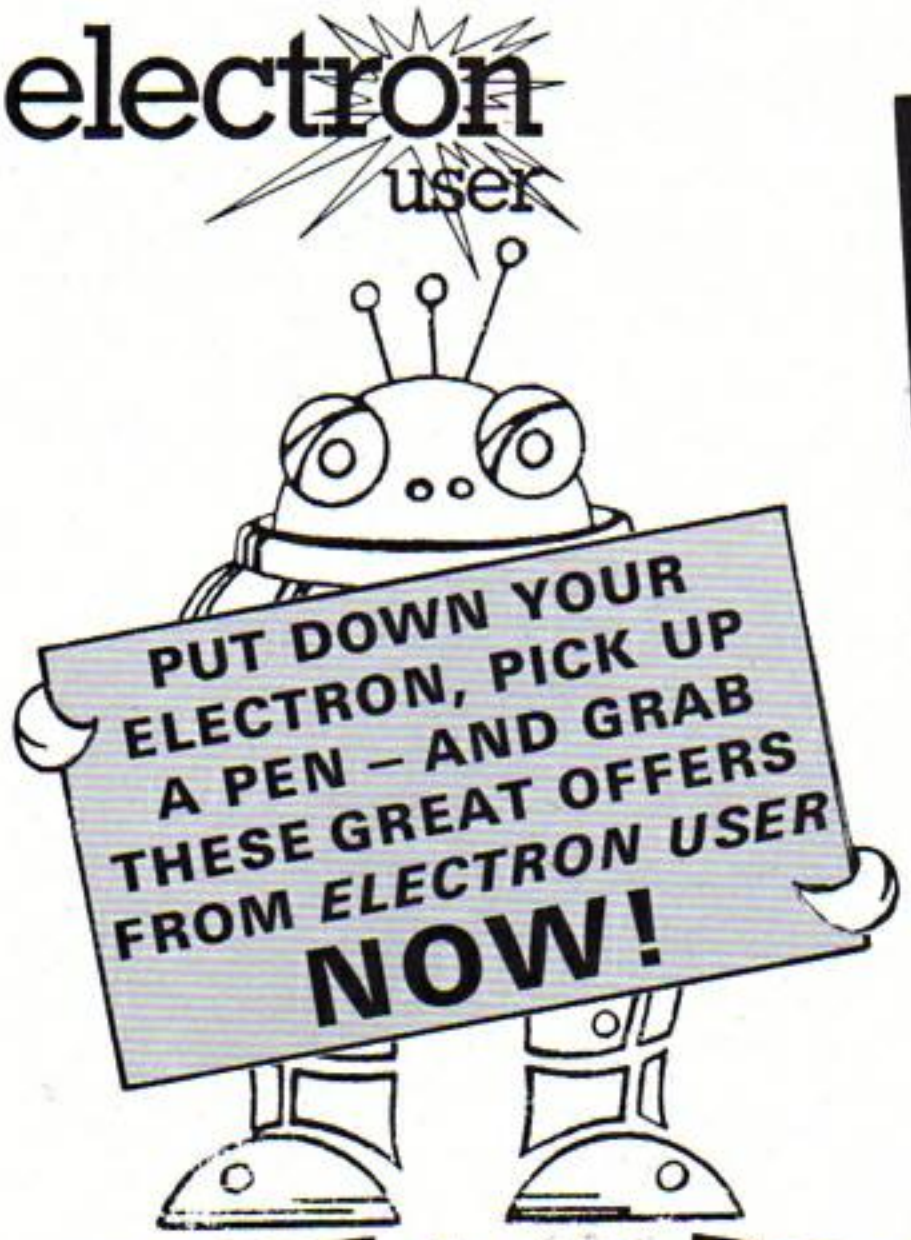
It's as easy as ABC. Or is it &ABC?

PROCEDURES

PROCinit	Sets up variables and shows instructions.	**PROChex_to_bi**	Shows hex number in eight bit binary.
PROCdisplay	Sets up main menu.	**PROCon**	Turns cursor on.
PROCact_on_it	Acts on user's choice.	**PROCoff**	Turns cursor off.
PROCbi_to_dec	Changes binary to decimal.	**FNanother_go**	Asks for another go.
PROCfill_in	"Pads out" binary numbers with leading zeros to make eight bits.	**PROCchoice**	Takes user's choice from main menu.
PROCbi_dec_work	Works out binary to decimal conversion.	**PROCassemble**	Assembles machine code for double height routine.
PROCbi_to_hex	Changes binary to hex.	**PROCdb1**	Uses machine code to produce double height letters.
PROCdec_to_hex	Changes decimal numbers to hex.	**FNcheck_binary**	Checks for a correct binary number.
PROCdec_to_bi	Gives binary representation of a decimal number.	**FNcheck_hex**	Validates hex input.
PROCdec_to_bi_work	Calculates decimal to binary conversion.	**FNcheck_decimal**	Validates decimal number input.
PROChex_to_dec	Displays hex numbers as decimals.	**PROC_B_R_E_A_K**	Restores program after Break has been pressed.

```
  10 REM BASE
  20 REM MARK FENTON
  30 REM (C) ELECTRON USER
1984
  40 REM
  50 DIMA%(8):PROCassemble
  60 *KEY10OLD|MMODE1|MPRO
C_B_R_E_A_K|M
  70 *FX4,1
  80 ONERRORGOTO1310
  90 MODE1:PROCoff:PROCini
t:CLS
 100 REPEAT
 110 PROCdisplay
 120 PROCchoice
 130 PROCact_on_it
 140 CLS:UNTIL0
 150 REM SHOWS INSTRUCTION
S AND SETS UP VARIABLES
 160 DEFPROCinit
 170 *FX11
 180 PROCdbl("**Base**",15
,1,2)
 190 PROCdbl("This is a sh
ort utility program that",1
,VPOS+2,1)
 200 PROCdbl("will change
numbers from:-",1,VPOS+2,1)
 210 PROCdisplay
 220 COLOUR1:PRINT''"Pressi
ng Escape Will Take You Bac
k To"''"The Main Menu"
 230 PRINT''"Press space to
 begin"
 240 REPEATUNTILNOTINKEY-9
9:REPEATUNTILINKEY-99
 250 ENDPROC
 260 REM SHOWS SCREEN DISP
LAY
 270 DEFPROCdisplay:PROCof
f
 280 PROCdbl("**Base**",15
,1,2):COLOUR3
 290 PRINTTAB(0,10);"(1) B
inary To Decimal"
 300 PRINT''"(2) Binary To
Hexadecimal"
 310 PRINT''"(3) Decimal To
 Binary"
 320 PRINT''"(4) Decimal To
 Hexadecimal"
 330 PRINT''"(5) Hexadecima
l To Decimal"
 340 PRINT''"(6) Hexadecima
l To Binary"
 350 ENDPROC
 360 REM ACTS ON CHOICE
 370 DEFPROCact_on_it
 380 CLS
 390 ON opt GOTO 400,410,4
20,430,440,450 ELSE 390
 400 PROCbi_to_dec:ENDPROC
 410 PROCbi_to_hex:ENDPROC
 420 PROCdec_to_bi:ENDPROC
 430 PROCdec_to_hex:ENDPRO
C
 440 PROChex_to_dec:ENDPRO
C
 450 PROChex_to_bi:ENDPROC
 460 ENDPROC
 470 DEFPROCbi_to_dec
 480 CLS:PROCdbl("Change B
inary To Decimal",1,2,1)
 490 PROCdbl("NUMBER ?",1,
VPOS+2,1):"FX15":INPUTLINE"
"A$
 500 IFNOTFNcheck_binary C
LS:VDU7:PROCdbl("ONLY ENTER
 BINARY NUMBERS",0,0,2):TIM
E=0:REPEATUNTILTIME>=300:GO
TO480
 510 SUM=0
 520 IF LENA$<8 PROCfill_i
n
 530 IF LENA$>8 VDU7:PROCd
bl("ONLY EIGHT BIT NUMBERS
(<=11111111)",1,VPOS+2,3):T
IME=0:REPEATUNTILTIME>=300:
GOTO480
 540 IFNOTFNcheck_binary V
DU7:PROCdbl("INCORRECT BINA
RY NUMBER",1,VPOS+2,3):TIME
=0:REPEATUNTILTIME>=300:GOT
O480
 550 PROCbi_to_dec_work
 560 Y=VPOS:PROCdbl("The f
ull eight bit number is ",1
,Y+2,1):PROCdbl(A$,POS+1,Y+
2,1):PROCdbl(A$,1,Y+4,1):PR
OCdbl(" in decimal is ",POS
+1,Y+4,1):PROCdbl(STR$(SUM)
,POS+1,Y+4,1)
 570 IF FNanother_go THEN4
80 ELSE ENDPROC
 580 REM FILLS UP BINARY N
UMBERS WITH 0'S UP TO 8 BIT
S
 590 DEFPROCfill_in
 600 LOCALW$
 610 W$=STRING$((8-LENA$),
"0")
 620 A$=W$+A$
 630 ENDPROC
 640 REM WORKS OUT BINARY
TO DECIMAL CONVERSION
 650 DEFPROCbi_to_dec_work
 660 FORI=1 TO 8
 670 IF MID$(A$,I,1)="1" S
UM=SUM+(1*2^(8-I))
 680 NEXT
 690 ENDPROC
 700 REM CHANGES BI TO HEX
 710 DEFPROCbi_to_hex
 720 CLS:PROCdbl("Change B
inary To Hexadecimal",1,VPO
S+1,1)
```

Turn to Page 50



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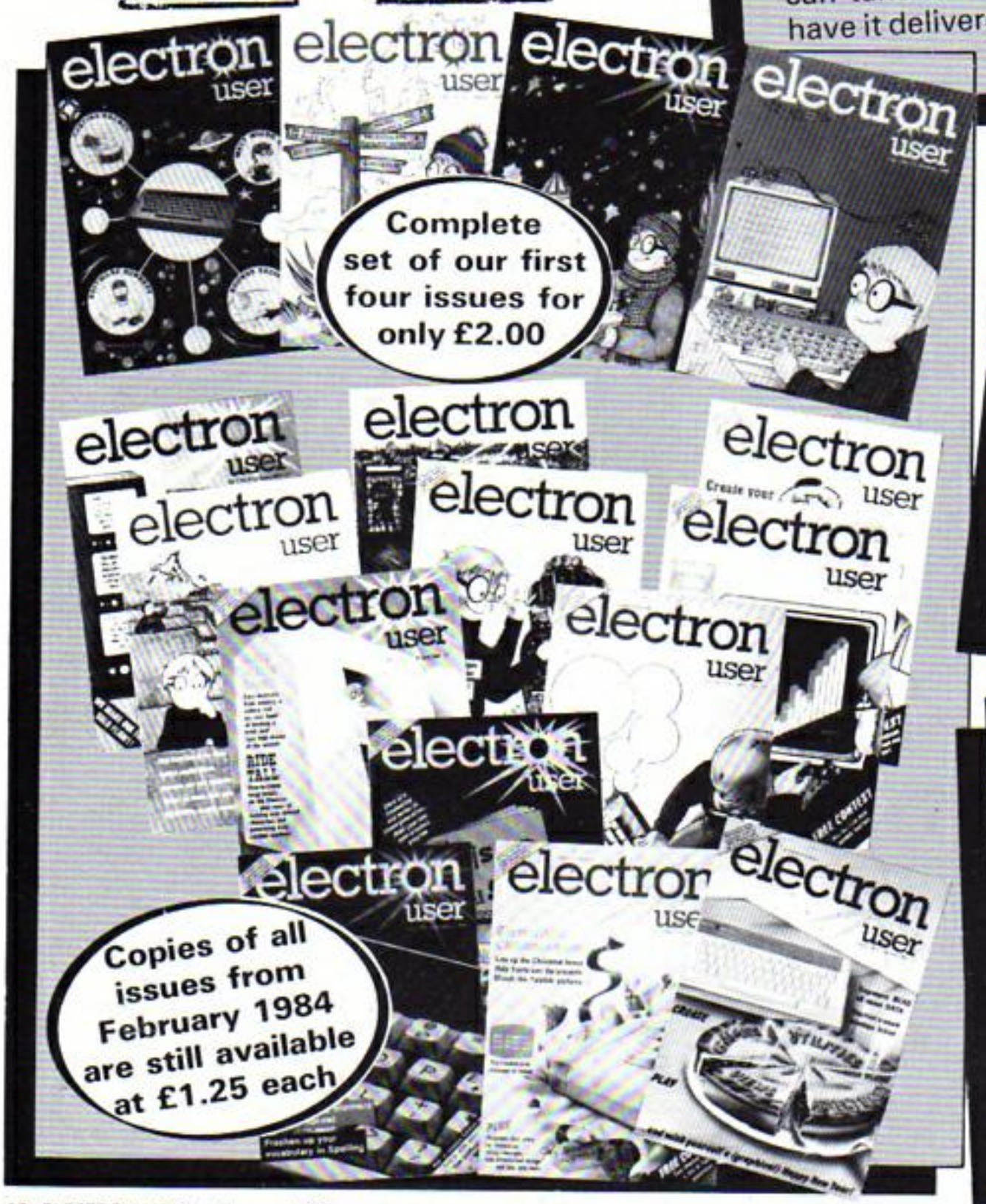
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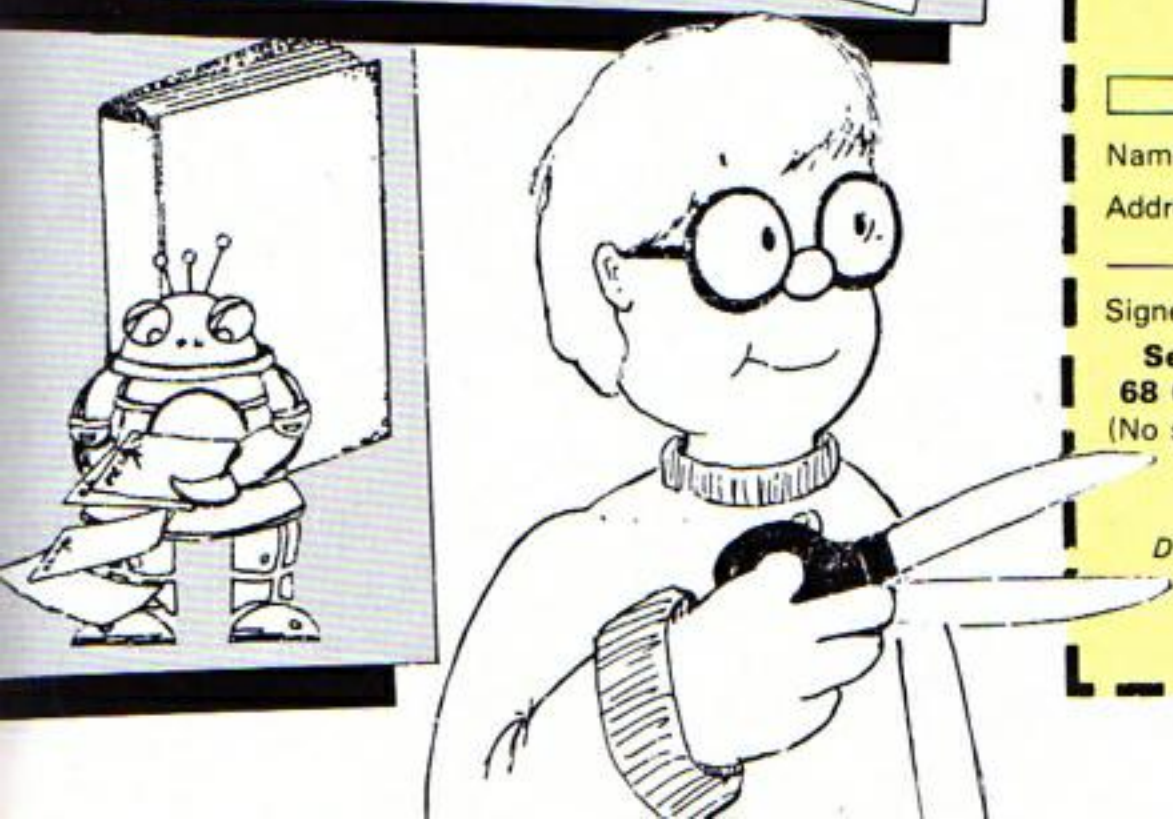

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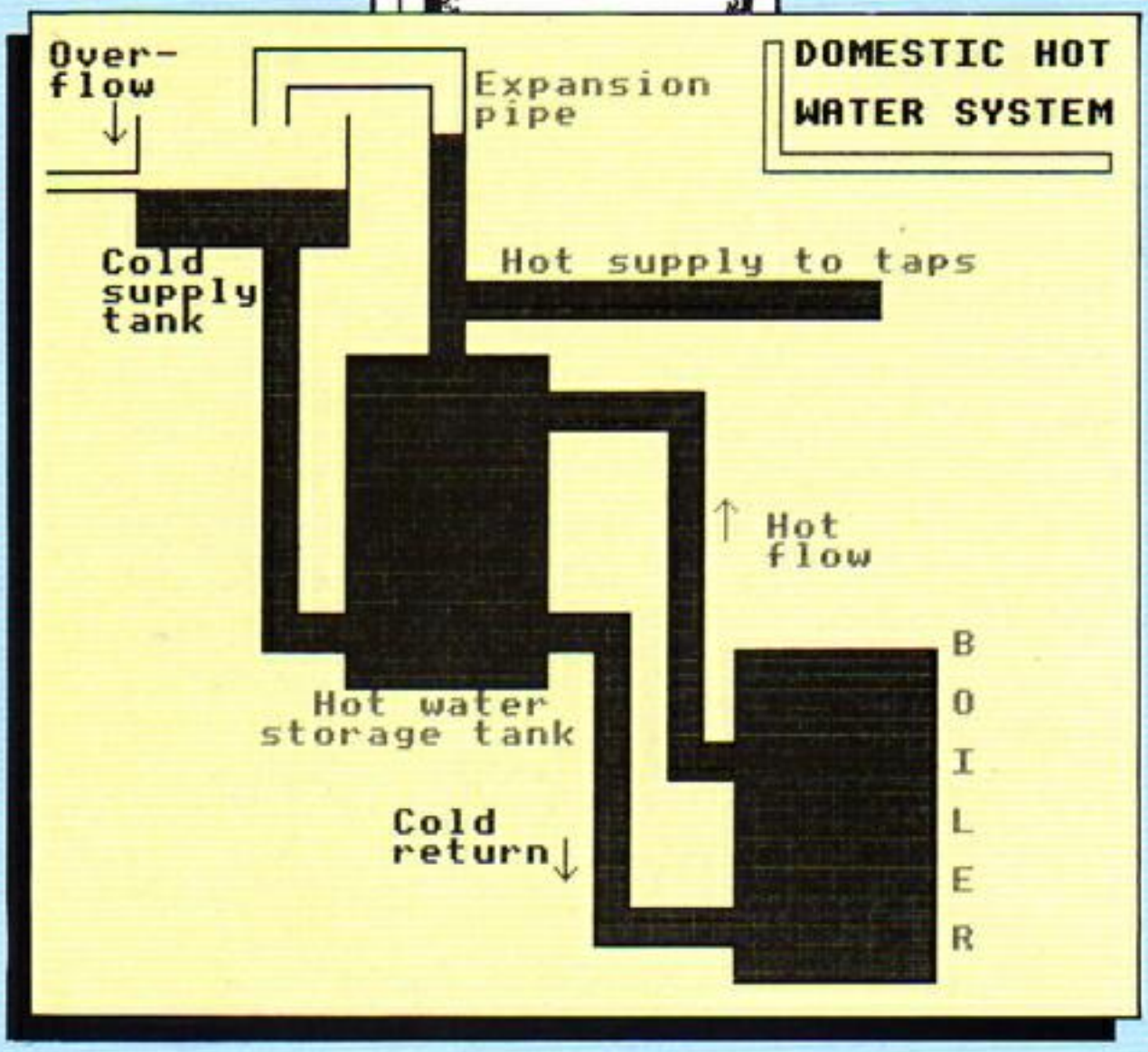


HOT Water makes use of the Electron's graphics commands to produce a coloured diagram of a domestic hot water system. It's simple yet effective, showing the Electron's design potential.

And we doubt whether it will stop at Hot Water. Here at *Electron User* we've noticed that a program we feature one month sparks off lots of ideas for other ones.

We wonder what will follow next. A diagram of a steam engine or a car piston? Maybe an animated electrical circuit diagram? You'd better send us some, or you'll be in hot water!

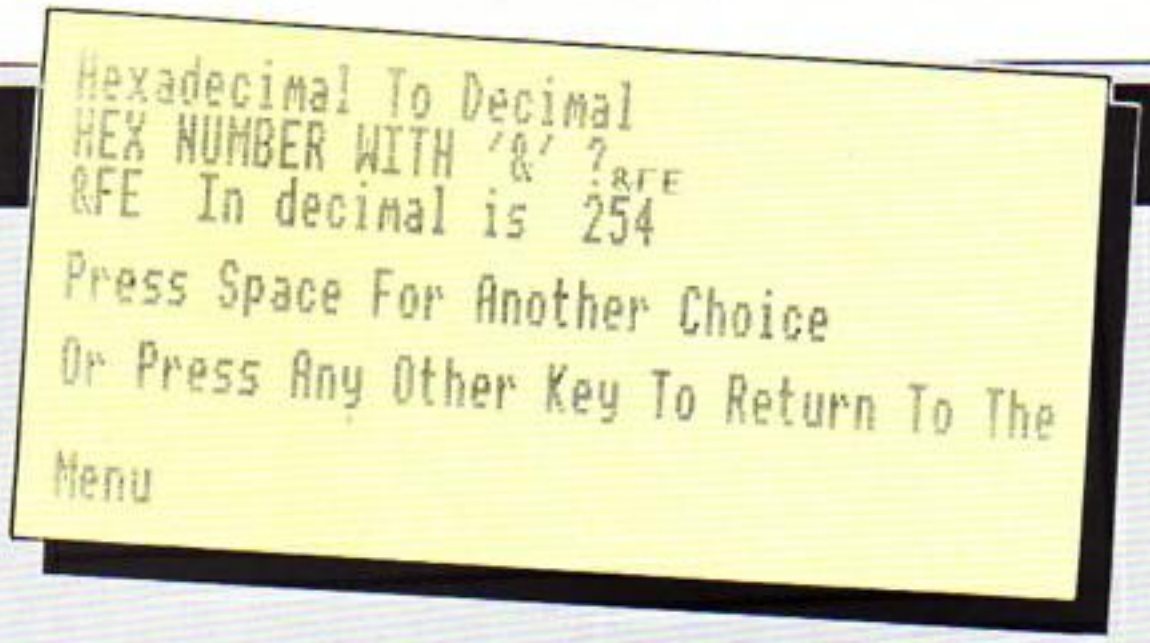
Hot Water listing

```
10 MODE 1
   :VDU 23,1,0;0;0;0;
   :VDU 19,2,6,0,0,0
   :PROCDRAW
   :PROCFILLUP
20 PROCLABEL
   :GOTO 20
30 DEF PROCDRAW
40 MOVE 250,1013
   :DRAW 500,1013
   :DRAW 500,763
   :DRAW 1000,763
   :MOVE 1000,723
   :DRAW 500,723
   :DRAW 500,683
   :DRAW 600,683
   :DRAW 600,643
   :DRAW 790,643
   :DRAW 790,263
   :DRAW 830,263
   :DRAW 830,363
   :DRAW 1070,363
   :DRAW 1070,0
   :DRAW 830,0
   :DRAW 830,40
   :DRAW 660,40
50 DRAW 660,360
   :DRAW 600,360
   :DRAW 600,320
   :DRAW 360,320
   :MOVE 830,80
   :DRAW 700,80
   :DRAW 700,400
   :DRAW 600,400
   :DRAW 600,603
   :DRAW 750,603
   :DRAW 750,223
   :DRAW 830,223
   :DRAW 830,80
   :MOVE 360,320
   :DRAW 360,360
   :DRAW 260,360
   :DRAW 260,800
   :DRAW 110,800
60 MOVE 360,400
   :DRAW 360,683
   :DRAW 460,683
   :DRAW 460,973
   :DRAW 290,973
   :DRAW 290,933
   :MOVE 250,933
   :DRAW 250,1013
   :MOVE 360,400
   :DRAW 300,400
   :DRAW 300,800
   :DRAW 360,800
   :DRAW 360,933
   :MOVE 110,800
   :DRAW 110,860
   :DRAW 0,860
   :MOVE 0,880
 70 DRAW 110,880
   :DRAW 110,943
   :MOVE 360,933
   :DRAW 360,943
 80 ENDPROC
 90 DEF PROCLABEL
100 VDU 23,224,0,0,0,0,8
   ,28,42,73
110 VDU 23,225,8,8,8,8,8
   ,8,8,8,
120 VDU 23,226,73,42,28
   ,8,0,0,0,0
130 COLOUR 1
   :PRINT TAB(17,7)"Hot
    supply to taps";
   TAB(27,16)"Hot";TAB(27
   ,17)"flow";TAB(25,16);
   CHR$ (225);TAB(25,15);
   CHR$ (224);TAB(34,20)
   "B";TAB(34,22)"O";
   TAB(34,24)"I";TAB(34
   ,26)"L";TAB(34,28)"E";
   TAB(34,30)"R"
140 VDU 19,2,6,0,0,0
150 COLOUR 2
   :PRINT TAB(2,7)"Cold";
   TAB(2,8)"supply";
   TAB(2,9)"tank";TAB(19
   ,27);CHR$ (225);TAB(19
   ,28);CHR$ (226);TAB(13
   ,26)"Cold";TAB(13,27)
   "return"
   :COLOUR 1
   :PRINT TAB(16,1)"Expansio
   n";TAB(16,2)"pipe";
   TAB(10,22)"Hot water";
   TAB(8,23)"storage tank"
160 COLOUR 2
   :PRINT TAB(0,0)"Over-";
   TAB(0,1)"flow";TAB(2
   ,2);CHR$ (225);TAB(2
   ,3);CHR$ (226)
   :COLOUR 3
   :PRINT TAB(28,0)"DOMESTIC
    HOT";TAB(28,2)"WATER
    SYSTEM"
   :MOVE 880,1023
   :DRAW 860,1023
   :DRAW 860,880
   :DRAW 1279,880
   :DRAW 1279,900
   :DRAW 880,900
   :DRAW 880,1023
170 ENDPROC
180 DEF PROCFILLUP
190 GCOL 0,2
200 MOVE 831,4
   :ED=1067
   :ST=832
   :FOR F=4 TO 359
   :DRAW ST,F
   :DRAW ED,F
   :NEXT F
210 MOVE 664,45
   :ED=830
   :ST=664
   :FOR F=45 TO 79
   :DRAW ST,F
   :DRAW ED,F
   :NEXT F
220 MOVE 664,80
   :ED=699
   :ST=664
   :FOR F=79 TO 360
   :DRAW ST,F
   :DRAW ED,F
   :NEXT F
230 MOVE 600,365
   :ED=699
   :ST=600
   :FOR F=365 TO 399
   :DRAW ST,F
   :DRAW ED,F
   :NEXT F
240 MOVE 753,224
   :ED=830
   :ST=753
   :FOR F=224 TO 258
   :DRAW ST,F
   :DRAW ED,F
   :NEXT F
250 MOVE 753,258
   :ED=787
   :ST=753
   :FOR F=258 TO 601
   :DRAW ST,F
   :DRAW ED,F
   :NEXT F
260 MOVE 600,605
   :ED=787
   :ST=600
   :FOR F=605 TO 639
   :DRAW ST,F
   :DRAW ED,F
   :NEXT F
270 MOVE 364,325
   :ED=599
   :ST=364
   :FOR F=325 TO 676
   :DRAW ST,F
   :DRAW ED,F
   :NEXT F
280 MOVE 464,682
   :ED=499
   :ST=464
   :FOR F=682 TO 920
   :DRAW ST,F
   :DRAW ED,F
   :NEXT F
290 MOVE 500,724
   :ED=1000
   :ST=500
   :FOR F=724 TO 757
   :DRAW ST,F
   :DRAW ED,F
   :NEXT F
300 MOVE 264,365
   :ED=360
   :ST=264
   :FOR F=365 TO 399
   :DRAW ST,F
   :DRAW ED,F
   :NEXT F
310 MOVE 264,400
   :ED=299
   :ST=264
   :FOR F=400 TO 801
   :DRAW ST,F
   :DRAW ED,F
   :NEXT F
320 MOVE 115,805
   :ED=358
   :ST=115
   :FOR F=805 TO 860
   :DRAW ST,F
   :DRAW ED,F
   :NEXT F
330 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

Base listing

From Page 45




```
  730 *FX15
  740 PROCdbl("NUMBER ?",1,
VPOS+2,1):INPUTLINE""A$
  750 IFNOTFNcheck_binary C
LS:VDU7:PROCdbl("ONLY ENTER
 BINARY NUMBERS",0,0,2):TIM
E=0:REPEATUNTILTIME>=300:GO
TO720
  760 SUM=0
  770 IF LENA$<8 PROCfill_i
n
  780 IF LENA$>8 VDU7:PROCd
bl("ONLY EIGHT BIT NUMBERS(
 <=11111111)",1,VPOS+2,2):T
IME=0:REPEATUNTILTIME>=300:
GOTO720
  790 IF NOT FNcheck_binary
 VDU7:PROCdbl("INCORRECT BI
NARY NUMBER",1,VPOS+2,2):TI
ME=0:REPEATUNTILTIME>=300:G
OTO720
  800 PROCbi_to_dec_work
  810 Y=VPOS:PROCdbl("The e
ight bit number is ",1,Y+2,
1):PROCdbl(A$,POS+1,Y+2,1):
Y=Y+2:A$=A$+" in Hex is &"+
STR$~SUM:PROCdbl(A$,1,Y+2,1
)
  820 IFFNanother_go THEN 7
20 ELSE ENDPROC
  830 REM CHANGES DECIMAL T
O HEX
  840 DEFPROCdec_to_hex
  850 CLS:PROCdbl("Decimal
To Hexadecimal",1,1,1):PROC
dbl("NUMBER ?",1,4,1):*FX15
":INPUTLINE""A$
  860 IF NOT FNcheck_decima
l CLS:PROCdbl("ENTER DECIMA
L NUMBERS ONLY",0,0,2):VDU7
:TIME=0:REPEATUNTILTIME>=30
0:GOTO850
  870 A$=A$+" In hex is &"+
STR$~VALA$:PROCdbl(A$,1,6,1
)
  880 IFFNanother_go THEN 8
50 ELSE ENDPROC
  890 REM CHANGES DEC TO BI
  900 DEFPROCdec_to_bi
  910 CLS:PROCdbl("Decimal
To Binary",1,1,1):SUM=0:PRO
Cdbl("NUMBER ?",1,4,1):*FX1
5":INPUTLINE""A$
  920 IF NOT FNcheck_decima
l CLS:PROCdbl("ENTER DECIMA
L NUMBERS ONLY",0,0,2):VDU7
:TIME=0:REPEATUNTILTIME>=30
0:GOTO910
  930 IF VALA$>255 OR VALA$
<0 OR ( VALA$=0 AND  A$<>"0
") VDU7:PROCdbl("ONLY EIGHT
 BIT( (=255)",1,6,2):TIME=0
:REPEATUNTILTIME>=300:GOTO9
10
  940 PROCdec_to_bi_work
  950 PROCdbl(A$,1,6,1):PRO
Cdbl(" In Binary is ",POS,6
,1):FORI%=8 TO 1STEP-1:PROC
dbl(STR$A%(I%),POS,6,1):NEX
T:PRINT
  960 IFFNanother_go THEN 9
10 ELSE ENDPROC
  970 REM WORKS OUT BI TO D
EC CONVERSION
  980 DEFPROCdec_to_bi_work
  990 B=VALA$
 1000 FORI=1 TO 8
 1010 A%(I)=B MOD 2
 1020 B=B DIV 2
 1030 NEXT
 1040 ENDPROC
 1050 REM CHANGES HEX TO DE
CIMAL
 1060 DEFPROChex_to_dec
 1070 CLS:PROCdbl("Hexadeci
mal To Decimal",1,1,1):PROC
dbl("HEX NUMBER WITH '&' ?"
,1,3,1):*FX15":INPUTLINE""A
$
 1080 IFFNcheck_hex CLS:PRO
Cdbl("ONLY ENTER HEX NUMBER
S",0,0,2):VDU7:TIME=0:REPEA
TUNTILTIME>=300:GOTO1070
 1090 PROCdbl(A$,1,5,1):PRO
Cdbl(" In decimal is ",POS+
1,5,1):PROCdbl(STR$EVALA$,P
OS+1,5,1)
 1100 IFFNanother_go THEN 1
070 ELSE ENDPROC
 1110 DEFPROChex_to_bi
 1120 REM CHANGES HEX TO BI
NARY
 1130 CLS:PROCdbl("Hexadeci
mal To Binary",1,1,1):PROCd
bl("HEX NUMBER WITH '&' ?",
1,3,1):*FX15":INPUTLINE""A$
 1140 IFFNcheck_hex CLS:PRO
Cdbl("ONLY ENTER HEX NUMBER
S",0,0,2):VDU7:TIME=0:REPEA
TUNTILTIME>=300:GOTO1130
 1150 IF EVAL A$>255 OR EVA
L A$<0 VDU7:PROCdbl("ONLY E
IGHT BIT ( (=&FF)",1,5,2):T
IME=0:REPEATUNTILTIME>=300:
GOTO1130
 1160 B$=A$:SUM=0:A=EVALA$:
A$=STR$A
 1170 PROCdec_to_bi_work
 1180 A$=B$:PROCdbl(A$,1,5,
1):PROCdbl(" In Binary is "
,POS+1,5,1):FORI%=8TO1STEP-
1:PROCdbl(STR$(A%(I%)),POS,
5,1):NEXT:PRINT
 1190 IFFNanother_go THEN 1
130 ELSE ENDPROC
 1200 REM 2 PROCEDURES TO T
URN THE CURSOR ON AND OFF
 1210 DEFPROCon:VDU23,1,1;0
;0;0;0;0;:ENDPROC
 1220 DEFPROCoff:VDU23,1,0;
0;0;0;0;:ENDPROC
 1230 REM CHECKS FOR ANOTHE
R GO
 1240 DEFFNanother_go
 1250 PROCdbl("Press Space
For Another Choice",1,VPOS+
2,1)
 1260 PROCdbl("Or Press Any
 Other Key To Return To The
",1,VPOS+2,1)
 1270 PROCdbl("Menu",1,VPOS
+2,1)
 1280 *FX15
 1290 REPEAT:a=INKEY0:IFINK
EY-1 OR INKEY-2 OR INKEY-65
 OR(a<>-1AND a<>32) THENUNT
ILTRUE:=0 ELSE IF a=32THENU
NTILTRUE:=-1 ELSE UNTILFALS
E
 1300 REM****** E R R O R
 H A N D L I N G  R O U T I
 N E*****
 1310 IF ERR=17 CLS:GOTO100
 1320 VDU7
 1330 IFERR=20CLS:PROCdbl("
Please Enter a Number Withi
n a",1,0,2):PROCdbl("reason
able range !!!",1,4,2):VDU7
:TIME=0:REPEATUNTILTIME>=30
0:PROCact_on_it:CLS:GOTO100
 1340 IFERR=28 ORERR=26CLS:
PROCdbl("Please Enter Corre
ct Numbers When",0,0,2):PRO
Cdbl("Prompted To Do So",0,
3,2):TIME=0:REPEATUNTILTIME
>=300:PROCact_on_it:CLS:GOT
O100
 1350 REPORT
 1360 PRINT" at line ";ERL:
*FX12
 1370 *FX4
 1380 PROCon:END
 1390 REM GETS USERS CHOICE
FOR MAIN MENU
 1400 DEFPROCchoice:*FX15
 1410 COLOUR1:PRINT''STRING
$(40,"=")TAB(0,8);STRING$(4
0,"="):PROCdbl("Your Choice
?",0,28,2)
 1420 REPEAT
 1430 opt=GET-48
 1440 UNTILopt>0 AND opt<7
 1450 ENDPROC
 1460 REM ASSEMBLES M/C FOR
 DBL HEIGHT( SEE ELECTRON U
SER JULY 1984)
 1470 DEFPROCassemble
 1480 FORI%=0TO2STEP2
 1490 P%=&D00
 1500 [OPTI%
 1510 STA&70:STX&79:STY&7A
 1520 LDA#10:LDX#&70:LDY#0:
JSR&FFF1
 1530 LDA#23:JSR&FFEE:LDA#2
55:JSR&FFEE:LDA&71:JSR&FFEE
::JSR&FFEE:LDA&72:JSR&FFEE:
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AHEAD WITH IDEAS

Design: STUDIO 59

Base listing

From Page 50

```
FEE:LDA#31:JSR&FFEE:LDA&79:
JSR&FFEE:LDA&7A:CLC:ADC#1:J
SR&FFEE:LDA#255:JSR&FFEE:RT
S
 1550 ]
 1560 NEXT
 1570 ENDPROC
 1580 REM USES ASSMEBLED M/
C TO PRODUCE DBL HEIGHT
 1590 DEFPROCdbl(a$,X,Y,C):
COLOURC
 1600 LOCALK%:FORK%=1TOLENa
$:A%=ASC(MID$(a$,K%,1)):X%=
X+K%-1:Y%=Y:CALL&D00
 1610 NEXT
 1620 ENDPROC
 1630 REM CHECKS FOR A CORR
ECT BINARY NUMBER
 1640 DEFFNcheck_binary
 1650 REPEAT:IFLEFT$(A$,1)=
" " A$=RIGHT$(A$,LENA$-1)
 1660 UNTILLEFT$(A$,1)<>" "
 1670 LOCALI%,L%:L%=-1
 1680 FORI%=1TOLENA$
 1690 IFMID$(A$,I%,1)<>"1"
ANDMID$(A$,I%,1)<>"0" L%=0
 1700 NEXT
 1710 =L%
 1720 REM CHECKS FOR A CORR
ECT HEX NUMBER
 1730 DEFFNcheck_hex
 1740 REPEAT:IFLEFT$(A$,1)=
" " A$=RIGHT$(A$,LENA$-1)
 1750 UNTILLEFT$(A$,1)<>" "
 1760 LOCALI%,A%
 1770 IFLEFT$(A$,1)<>"&"=-1
 1780 FORI%=2 TO LENA$
 1790 A%=EVAL("&"+MID$(A$,I
%,1))
 1800 NEXT
 1810 =0
 1820 REM CHECK FOR CORRECT
DECIMAL
 1830 DEFFNcheck_decimal
 1840 REPEAT:IFLEFT$(A$,1)=
" " A$=RIGHT$(A$,LENA$-1)
 1850 UNTILLEFT$(A$,1)<>" "
 1860 LOCALI%,L%:L%=-1
 1870 FORI%=1TOLENA$
 1880 IF ASCMID$(A$,I%,1)<4
8 OR ASCMID$(A$,I%,1)>57 L%
=0
 1890 NEXT
 1900 =L%
 1910 DEFPROC_B_R_E_A_K
 1920 DIMA%(8):PROCoff:PROC
assemble:ON ERROR GOTO 1310
 1930 *FX11
 1940 *FX4,1
 1950 CLS:PROCdbl("PLEASE T
RY NOT TO PRESS BREAK AS IT
",0,0,2):VDU7:PROCdbl("AS
IT COULD PROVE LETHAL",0,3,
2):VDU7:TIME=0:REPEATUNTILT
IME>=200:CLS:VDU7
 1960 GOTO100
 1970 ENDPROC
```

****Base****

This is a short utility program that will change numbers from:-

<1> Binary To Decimal
<2> Binary To Hexadecimal
<3> Decimal To Binary
<4> Decimal To Hexadecimal
<5> Hexadecimal To Decimal
<6> Hexadecimal To Binary

Pressing Escape Will Take You Back To The Main Menu

Press space to begin

This listing is included in this month's cassette tape offer. See order form on Page 47.

'EXCELLENT . . . . . thoroughly recommended'

D.P. Publications have built up a reputation for **low priced high quality** products. Don't miss **two** exciting **new products** which could be ideal for **YOU!!!**

Electron and BBC BASIC, Quick Reference Guide for Programmers (154 pages)

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*". . . It's **cheap**, but it's also **excellent**. What you get for your money is an alphabetical guide to over 200 reserved words and operating system commands. Elaborating on these are some extremely useful example programs and a brief note on the differences between the BBC Micro and the Electron. The main part of the book is taken up with the directory of keywords – **and what a treasure trove it is** . . . lucid, thorough and surprisingly readable . . . **thoroughly recommended**".*

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This coordinated package of cassette plus workbook runs on either the BBC or the Electron. If you are writing programs which need to have data **added, deleted, or retrieved** then this package should be a **must**. You are not alone in finding it difficult to **imagine** how your computer handles Data Structures (Linked lists; Hash tables; Binary trees etc). Our programs make it **visible** and the workbook provides exercises to ensure you can more quickly **understand** and then **use** Data Structures.

"It looks very useful"; It should help a lot of students grasp the concepts more readily"; "My students think it's fantastic" (Lecturers comments).

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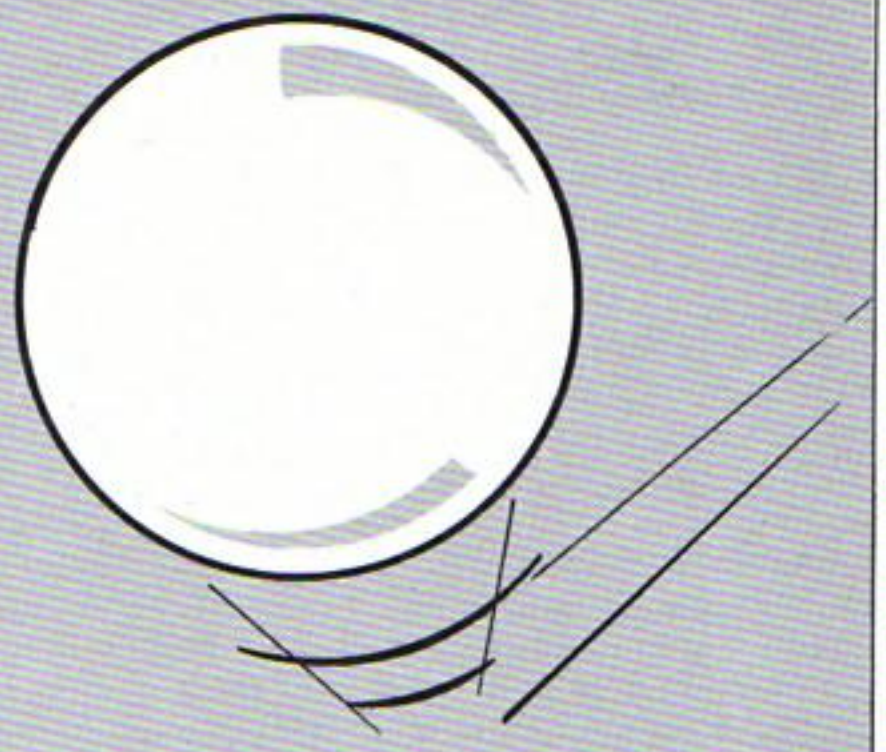
'NO BETTER VALUE'

Bouncy listing

From Page 16

```
   10 REM ***   BOUNCY   ***
*
   20 REM *By R.A.Waddilove
*
   30 ON ERROR IF ERR<>17 R
EPORT:END
   40 MODE 1
   50 PROCinstructions
   60 MODE 4
   70 PROCinitialise
   80 REPEAT
   90 PROCscreen
  100 FOR ball=1 TO 25
  110 PROCnew_ball
  120 PROCmove_ball
  130 NEXT ball
  140 PROCgame_over
  150 UNTIL INSTR("Nn",key$
)
  160 END
  170
  180 DEF PROCinitialise
  190 VDU 23,224,170,85,170
,85,170,85,170,85
  200 VDU 23,225,60,126,255
,255,255,255,126,60
  210 VDU 23,226,255,129,12
9,129,129,129,129,255
  220 best=500
  230 ENDPROC
  240
  250 DEF PROCscreen
  260 B%=0:CLS:VDU 19,1,3;0
;23,1,0;0;0;0;
  270 PRINT TAB(0,31);STRIN
G$(40,CHR$226);CHR$(30);CHR
$(11)''''STRING$(40,CHR$226
)
  280 FOR I%=5 TO 30
  290 PRINT TAB(0,I%);CHR$2
26;TAB(39,I%);CHR$226;
  300 NEXT
  310 COLOUR 129:COLOUR 0
  320 PRINT TAB(11,1);" Bes
t Score=";best;" "
  330 COLOUR 128:COLOUR 1
  340 PRINT''"Blocks:";B%;TA
B(30);"Ball:"
  350 ENDPROC
  360
  370 DEF PROCnew_ball
  380 PROCdelay(100):VDU 7
  390 PRINT TAB(35,3);ball
  400 REPEAT
  410 X%=RND(38):Y%=RND(25)
+5
  420 UNTIL POINT(32*(X%+1)
,1023-32*Y%)=0 OR POINT(32*
(X%-1),1023-32*Y%)=0 OR POI
NT(32*X%,1023-32*(Y%+1))=0
OR POINT(32*X%,1023-32*(Y%-
1))=0
  430 V%=1:H%=0:trapped%=FA
LSE
  440 PRINT TAB(X%,Y%)CHR$2
25
  450 ENDPROC
  460
  470 DEF PROCmove_ball
  480 REPEAT IF FNpoint PRO
Cbounce
  490 IF INKEY(-99) b$=CHR$
224:B%=B%+1:PRINT TAB(7,3);
B% ELSE b$=" ":PROCdelay(1)
  500 IF E% THEN *FX19
  510 PRINT TAB(X%,Y%);:X%=
X%+H%:Y%=Y%+V%:*FX19
  520 PRINT b$;TAB(X%,Y%)CH
R$225
  530 UNTIL H%+V%=0
  540 ENDPROC
  550
  560 DEF PROCbounce
  570 SOUND &10,-15,5,1
  580 ON RND(2) GOTO 590,61
0
  590 V%=0:H%=1:IF FNpoint=
0 ENDPROC
  600 V%=1:H%=0:IF FNpoint=
0 ENDPROC
  610 V%=0:H%=-1:IF FNpoint
=0 ENDPROC
  620 V%=-1:H%=0:IF FNpoint
=0 ENDPROC
  630 V%=1:H%=0:IF FNpoint=
0 ENDPROC
  640 V%=0:H%=1:IF FNpoint=
0 ENDPROC
  650 H%=0:V%=0:SOUND 1,-15
,0,10
  660 ENDPROC
  670
  680 DEF FNpoint=POINT(32*
(X%+H%),1023-32*(Y%+V%))
  690
  700 DEF PROCdelay(T%)
  710 TIME=0:REPEAT UNTIL T
IME>T%
  720 ENDPROC
  730
  740 DEF PROCgame_over
  750 PROCdelay(100)
  760 VDU 22,5,23,1,0;0;0;0
;
  770 COLOUR 129:COLOUR 3
  780 PRINT'STRING$(100," "
);TAB(4,3);"R A T I N G"
  790 COLOUR 128:COLOUR 2
  800 IF B%<best best=B%
  810 PRINT TAB(3,10);"Your
score:";B%
  820 PRINT TAB(3,15);"Best
score:";best
  830 IF B%>500 a$="Appalli
ng..."
  840 IF B%>400 AND B%<499
a$="Very poor..."
  850 IF B%>300 AND B%<401
a$="More practice needed"
  860 IF B%>200 AND B%<301
a$="Quite good"
  870 IF B%<201 a$="*** Exc
ellent ***"
  880 PRINT TAB((20-LEN a$)
DIV 2,23);a$
  890 COLOUR 129:COLOUR 3
  900 PRINT TAB(0,30);"   A
nother Game ?  ";
  910 MOVE 0,31:DRAW 0,992:
DRAW 1276,992:DRAW 1276,31:
DRAW 0,31
  920 MOVE 0,832:DRAW 1276,
832:MOVE 0,64:DRAW 1276,64
  930 *FX21,0
  940 REPEAT key$=GET$
  950 UNTIL INSTR("YyNn",ke
y$)
  960 VDU 22,4
  970 ENDPROC
  980
  990 DEF PROCinstructions
 1000 *KEY10 "OLD|MLIST07|M
|N|LLIST|M"
 1010 white$=CHR$17+CHR$3:b
lue$=CHR$17+CHR$2
 1020 VDU 19,1,4;0;19,2,6;0
;23,1,0;0;0;0;
 1030 COLOUR 129:PRINT STRI
NG$(120," ");TAB(7,1);"B O
U N C Y  -  B O U N C Y"
 1040 COLOUR 128:COLOUR 2
 1050 PRINT TAB(0,5);"This
is a very simple game in wh
ich you'''"have to trap a b
all bouncing around the'''"
screen. You can do this by
pressing the'''"space bar w
hich places a block just'''
"behind the ball."
 1060 PRINT''white$;"***";b
lue$;" Try to build a box a
nd trap the ";white$;"***"'
'"***";blue$;"  ball when i
t bounces into it.  ";white
$;"***"'''"***";blue$;" Use
as few blocks as possible.
 ";white$;"***"
 1070 PRINT''"Press..."
 1080 PRINT'"E";blue$;" for
 an easy game."''white$;"H"
;blue$;" for a hard game."
 1090 COLOUR 3:PRINT TAB(0,
31)"ESCAPE will return you
to this page.";
 1100 *FX21,0
 1110 REPEAT key$=CHR$(GET
OR 32)
 1120 UNTIL INSTR("eh",key$
)
 1130 IF key$="e" E%=TRUE E
LSE E%=FALSE
 1140 ENDPROC
```



This listing is included in this month's cassette tape offer. See order form on Page 47.

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```
  590 in=TRUE:PROCm(R%-1)
  600 PRINT' "You can see a
round you :-"
  610 F%=FALSE
  620 FOR I% = 1 TO N%
  630 IF o%(I%) <> R% THEN
GOTO 650 ELSE F%=TRUE
  640 GOSUB 1300
  650 NEXT I%
  660 IF NOT F% PRINT"Nothi
ng of interest."
  670 PRINT
  680 RETURN
  690 DATA 0,0,0,0
  700 DATA 3,9,0,0
  710 DATA 0,2,4,0
  720 DATA 0,0,5,3
  730 DATA 0,0,0,4
  740 DATA 0,7,0,0
  750 DATA 6,0,0,8
  760 DATA 0,0,7,9
  770 DATA 2,0,8,0
  780 DATA 0,0,0,0
  790 IF d%(R%,1) = 0 PRINT
 " Not allowed"': RETURN
  800 IF R% = 7 AND a% THEN
 PROCm(33):PRINT: RETURN
  810 R% = d%(R%,1)
  820 RETURN
  830 IF d%(R%,2) = 0 PRINT
 " Not allowed"': RETURN
  840 R% = d%(R%,2)
  850 RETURN
  860 IF d%(R%,3) = 0 PRINT
 " Not allowed"': RETURN
  870 IF d%(R%,3) = 8 AND f
% THEN PROCm(34):PRINT: f%=
FALSE
  880 IF d%(R%,3) = 7 AND o
%(7) = 0 THEN o%(7)=8: PROC
m(35):PRINT
  890 R% = d%(R%,3)
  900 RETURN
  910 IF d%(R%,4) = 0 PRINT
 " Not allowed"': RETURN
  920 R% = d%(R%,4)
  930 RETURN
  940 IF o%(z%)=1 PRINT"You
 already have it" : RETURN
  950 IF o%(z%)<> R% PRINT"
It's not here": RETURN
  960 IF z% < T% PRINT"You
can't take that" ELSE o%(z%
)=1
  970 RETURN
  980 IF o%(z%)=1 o%(z%) =
R% ELSE PRINT "You don't ha
ve it": RETURN
  990 ON (R%-1) GOSUB 1230,
1250,1240,1290,1240,1240,13
10,1240,1240
 1000 RETURN
 1010 h$="": FOR I% = LEN(o
$) TO 1 STEP -1
 1020 h$=h$+MID$(o$,I%,1)
 1030 NEXT I%
 1040 IF o$ = h$ THEN q% =
TRUE :PROCm(50): RETURN
 1050 PRINT "Okay," + CHR$(
34) + o$ +CHR$(34)
 1060 RETURN
 1070 PRINT ' "Your invento
ry contains:-"
 1080 F% = FALSE
 1090 FOR I%= T% TO N%
 1100 IF o%(I%)<>1 THEN GOT
O 1120 ELSE F%=TRUE
 1110 GOSUB 1300
 1120 NEXT I%
 1130 IF NOT F% PRINT"Nothi
ng at all."
 1140 PRINT
 1150 RETURN
 1160 IF o%(z%)<> R% PRINT"
It wasn't here to hit": RET
URN
 1170 IF o%(11)<>1 PROCm(36
): RETURN
 1180 IF z%<>6 AND z%<>3 PR
INT "This has no effect wha
tsoever."
 1190 IF z%=6 AND a% THEN a
%=FALSE: PROCm(37):PRINT: o
%(6)=0: RETURN
 1200 IF z%=3 AND s% = FALS
E THEN PROCm(38):PRINT".":
s% = TRUE: o%(8) = 2 : RETU
RN
 1210 IF z%=3 AND s% = TRUE
 PROCm(39): RETURN
 1220 RETURN
 1230 IF z% = 8 AND e% THEN
 PROCm(40):PRINT: o%(z%) =
0: e% = NOT e%:o%(11) = 1
 1240 RETURN
 1250 IF z% = 7 AND NOT b%
AND 1% THEN PROCm(41):PRINT
: 1%=FALSE
 1260 IF z%=9 PROCm(42): o%
(z%)=0:o%(12) = 3
 1270 IF z% = 10 THEN d% =
FALSE
 1280 RETURN
 1290 IF o%(7) = 5 AND o%(1
2) = 5 THEN PROCm(43): b% =
 FALSE: o%(12) = 0:o%(7) =
1
 1300 RETURN
 1310 IF z%<> 10 GOTO 1350
 1320 IFd% THEN PROCm(44):G
OTO 340
 1330 IF ( NOT 1%) OR (o%(7
)<>8 AND o%(7)<>1) THEN PRO
Cm(45): GOTO 340
 1340 IF o%(2)=0 PROCm(46):
o%(1)=0:o%(2)=8:o%(8)=8
 1350 IF z%=7 AND NOT b% TH
EN 1%=TRUE: PROCm(47):PRINT
 1360 IF z%=9 OR z%=12 THEN
 PROCm(48):PRINT:PROCm(49):
 GOTO 340
 1370 RETURN
 1380 PRINT "A "; j$(I%);"
";
 1390 IF I%=1 PROCm(10)
 1400 IF I%=2 PROCm(11)
 1410 IF I%=3 AND NOT s% PR
OCm(12)
 1420 REM IF I%=3 AND e% PR
OCm(13)
 1430 IF I%=3 AND s% PROCm(
14)
 1440 IF I%=4 PROCm(15):PRI
NT: PROCm(16):PRINT: PROCm(
17)
 1450 IF I%=5 PROCm(18)
 1460 IF I%=6 PROCm(19)
 1470 IF I%=7 AND NOT b% AN
D NOT 1% PROCm(21)
 1480 IF I%=7 AND NOT b% AN
D 1% PROCm(22)
 1490 IF I%=7 AND b% PROCm(
23)
 1500 IF I%=8 PROCm(20)
 1510 IF I%=9 PROCm(24)
 1520 IF I%=10 AND d% PROCm
(25)
 1530 IF I%=10 AND NOT d% P
ROCm(28)
 1540 IF I%=11 AND NOT a% P
ROCm(26)
 1550 IF I%=12 PROCm(27)
 1560 PRINT
 1570 RETURN
 1580 DATA iluh,;,sloh#ri#d
vkhv,3,yhqglqj#pdfklqh,5,pl
uuru,9,wuroo,8,gzdui,:,odps
,3,frlq,3,sdufkphqw,7,fxuwd
lq,<,vzrug,3,yrxfkhu,3
 1590 DATA "d#udwkhu#vsduvh
,#xqiulhqgo!##urrp#zlwk#wkh
#dssduhqwo!#lqh(solfdeoh###
vljq##Duprxu!##rq#wkh#zdool
"
 1600 DATA "d#ydvw#fdyhuq#z
lwk#d#odujh###srro#ri#zdwhu
1#D#sdwk#ohdqv#dorqj#lwv###
hgjh1"
 1610 DATA "dq#h(wuhpho!#wl
jkw,#Hdvw#0###Zhvw#wxqqho1"
 1620 DATA "d#vkrs1#Ryhu#wk
h#frxqwhu#lv#dvljq=#Hehqhh)
hu#v#Hqwhusulvhv1"
 1630 DATA "d#vpdoo#fkdpehu
,#lwv#zdoov###lulghvfhqw#zl
wk#vsdunolqj#fu!vwdov,vdyh#
rqh1"
 1640 DATA "d#udwkhu#jorrp!
#fdyh,########uhplqlvfhqw#r
i#roq#plqh#zrunlqjv1"
 1650 DATA "zkdw#orrnv#olnh
#d#khuplw#v###fhoo1"
 1660 DATA "dq#roq#qluw!#fk
dpehu#wkdw####orrnv#wr#kdyh
#ehhq#sloodjhq#orqj#djr1"
 1670 DATA "#wkh#zl)dug#v#f
kdpehu1#Dv#qr#rqh#kdv#hyhu#
vxuylyhg#wklv#h(shulhqfh,##
wkhuh#lv#qr#h(wdqw#ghvfulsw
lrql111"
 1680 DATA "exuqlqj#euloold
qwo!#lq#d#fruqhu1"
 1690 DATA "qrz#txlwh#frro1
"
 1700 DATA "zlwk#d#qrwlfh#+
qr#krw#prqh!#ru#frxqwhuihlw
#frlqv+1"
 1710 DATA "zlwk#d#qrwlfh#+
hpsw!+#rq#lw1"
 1720 DATA "lq#elwv#rq#wkh#
iorru1"
 1730 DATA "hqjudyhg="
 1740 DATA "*Vd!#pluuru#zru
g#wr#zl)duq#phhw,"
 1750 DATA "Eh#vxuh#!rx#kdy
h#wkh#jroq#wr#juhhw1*"
 1760 DATA "zlwk#d#exvlqhvv
#olnh#dlu1"
 1770 DATA "zhdulqj#gdun#jo
dvvhv1"
 1780 DATA "zruwk#lwv#zhljk
w#lq#jroq1"
 1790 DATA "qrw#!hw#olw1"
 1800 DATA "exuqlqj#euljkwo
!1"
 1810 DATA "lq#d#udwkhu#edw
whuhg#frqglwlrq1"
 1820 DATA "qu!#dv#d#erqh#d
qg#frpsohwho!eodqn1"
 1830 DATA "lq#txlwh#jrrg#f
```

```
rqglwlrq#00dqg#qrw#dw#doo#g
dps1"
 1840 DATA "fryhuhq#lq#eorr
g1"
 1850 DATA "uhdqlqj=#H{fkdq
jh#wklv#yrxfkhuwrjhwkhu#zlw
k#dq#roq#odps#dqg#!rx+oo###
#jhw#d#qhz#odps#iuhh$"
 1860 DATA ",#zulqjlqj#zhw1
"
 1870 DATA "Wkh#zl)duq+v#h!
hv#oljkw#xs1#Kh#wdnhv####!r
xu#frlq#wr#ex!#klpvhoi#d#qu
lqn#dqg####glvdsshduv1"
 1880 DATA "\rx#sxw#rq#wkh#
furzq#kh+v#ohiw#ehklqg###dq
g#ilqg#!rxuvhoi#edfn#lq#wkh
#sdodfh,###Nlqj#ri#Fuddo,#d
qg#kdss!#hyhu#diwhu1"
 1890 DATA "Rk#ghdu,#!rx+yh
#jrw#qr#prqh!##0#dqg#wkh##zl
)dug#zdv##krslqj##!rx+g#ex!
#klp#d#####slqw#ru#wzr1"
 1900 DATA"Qdwxudoo!#kh#nlo
ov#!rx1"
 1910 DATA "Wkh#qzdui#uhixv
hv#wr#ahw#!rx#sdvw1"
 1920 DATA "D#zruq#wr#wkh#z
lvh=#\rx+uh#jrlqj#wr#wkh#rq
o!#urrp#lq#wkh#sodfh#zlwkrx
w#lwv#rzq##qdwxudo#skrvskru
hvfhqfh1"
 1930 DATA "Dq#ludwh#qzdui,
#lqixuldwhq#e!#wkh#oljkw#!r
x+yh#ohw#lq,#wkurzv#klv#xqo
lw#odps#dw#!rx1#Lw#odqgv,#l
q#wkh#urrp#!rx+yh#mxvw##ohi
w,#vkdwwhuhg1"
 1940 DATA "\rx#kdyhq+w#jrw
#dq!wklqj#ghfhqw#wr#klw##zl
wk1#Jhw#d#vzruq1"
 1950 DATA "Wkh#qzdui#idoov
#qhdq,#wkhq#glvdsshduv#lqiu
rqw#ri#!rxu#h!hv1"
 1960 DATA "Wkh#yhqglqj#pdf
klqh#vkdwwhuv1#D#frlq####gu
rsv#rxw"
 1970 DATA "Judwxlwrxv#ylro
hqfh#grhvq+w#khos#dq!rqh1"
 1980 DATA "Wkh#frlq#idoov#
lqwr#wkh#vorw#lq#wkh#####yh
qglqj#pdfklqh1#\rx#duh#jlyh
q#d#vzrug1#Wkdw+v#zk!#lw+v#
fdoohq#wkh#Duprxu!$"
 1990 DATA "Xqiruwxqdwho!,#
!rxu#odps#jrhv#rxw1"
 2000 DATA "Lqwhuhvwlqj$#Vr
phwklqj+v#kdsshqlqj#wr###wk
h#sdufkphqw1#Wdnh#d#orrn111
1"
 2010 DATA "\rx+yh#jrw#d#qh
z#odps$"
 2020 DATA "Wkh#fxuwdlq#iod
uhv#xs1#\rx#glh#lq#wkh###ea
d}h1"
 2030 DATA "Wdnlqj#dgydqwdj
h#ri#wkh#vxgghq#soxqjh###lq
wr#gdunqhvv,#wkh#gzdui#iurp
#qh{w#grru#frphv#lq#dqg#sro
lvkhv#!rx#rii1"
 2040 DATA "Wkh#iluh#jrhv#r
xw1#\rx#vhh#d#frlq#lq#lwvdv
khv1"
 2050 DATA "\rxu#odps#oljkw
v1"
 2060 DATA "Lw#exuvwv#lqwr#
iodph$"
 2070 DATA "\rx#vxgghqo!#uh
dolvh#wkdw#lw#zdv#ylwdo##wr
#wkh#jdph1#Ryhufrph#zlwk#ju
lhi,#!rx###nloo#!rxuvhoi1"
 2080 DATA "Wkh#pluuru#glvv
royhv#dqg#!rx#ilqg#######!r
xuvhoi#sxoohq#wkurxjk#wkh#j
ds#lw+v####ohiw#lqwr#wkh#zl
)duq+v#urrp1"
 2090 DATA "Zkdw#d#vkdph##0
dqg#!rx#zhuh#grlqj#vr####zh
oo#wrr1#Gr#!rx#zdqw#dqrwkhu
#jrB#+\2Q)"
 2100 DEF PROCm(m)
 2110 hh$=m$(m):GOSUB 510
 2120 IF in PRINT"You are i
n ";oo$; ELSE PRINToo$;
 2130 in = FALSE
 2140 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

ELECTRON, BBC Model B
(any OS, BASIC I/II)

QUAL-SOFT

£9.95
(inc. VAT and p.p.)

"There is one fault though. I am going to lose a lot of sleep over it, it is so addictive". Steven Wiseman of Liverpool.

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- Team selection by names. (enter initials)
- Home/away bias, opposition tactical play
- Tactical substitutions

And many more features, but will take a full page advert if we are to continue, (That'll be O.K. Ad. Man).

The game will be posted on the same day as the receipt of order. ACCESS telephone authorisations should take no more than two days to arrive.

QUAL-SOFT
Dept. EU.
18, Hazlemere Rd.,
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Herts. SG2 8RX
Tel: (0438) 721936

Please supply a copy of SOCCER SUPREMO. I enclose a cheque, postal order, ACCESS card authorisation for £9.95
(Please state Electron or BBC)

Name: .....
Address: .....
.....
.....
CARD NO: .....

Catcher listing

From Page 33

```
0 TO 31:READ data:?(&3000+(
25+I%)*640+9*32+J%)=data:NE
XT:NEXT
 480 FOR I%=0 TO 5:I%?C%=2
55:NEXT
 490 ENDPROC
 500
 510 REM **** data for bir
d ****
 520 DATA 0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,65,130,195,19
4,65,65,65,194,194,130,193,
195,193,193,194,195,195,130
,193,193,193,193,130,130,19
5,0,0,0,0,0,0,0,65,0,0,0,0,
0,65,130,195,0,0,0,0,0,0,13
0,195
 530 DATA 195,65,0,0,0,0,0,0
,0,195,194,195,65,0,0,0,0,1
93,195,194,193,195,0,0,0,19
5,194,193,194,195,0,0,0,193
,195,192,195,195,0,0,0,195,
193,195,130,0,0,0,0,195,130
,0,0,0,0,0,0,195,0,0,0,0,0,
0,0
 540 REM **** data for man
 ****
 550 DATA 40,60,10,32,32,3
2,48,16,0,60,1,7,15,5,48,48
,0,60,2,11,15,10,48,48,20,6
0,5,16,16,16,48,32,0,0,0,0,
0,0,16,16,52,48,52,48,32,32
,32,32,56,48,56,48,16,16,16
,16,0,0,0,0,0,0,0,32,32
 560
 570 DEF PROCinitialise
 580 *FX16,0
 590 ENVELOPE1,1,4,0,16,4,
0,16,126,0,0,-126,126,126
 600 VDU 23,224,0,0,24,60,
60,24,0,0
 610 VDU 23,225,170,255,85
,255,170,255,85,255
 620 C%=&A00:D%=&A10:REM e
ggs coords.
 630 S%=0:level=0:E%=0
 640 ENDPROC
 650
 660 DEF PROCassemble
 670 from=&70:to=&72:count
er=&74
 680 number=&70
 690 FOR pass=0 TO 2 STEP
2
 700 P%=&900
 710 [ OPT pass
 720 .getadd
 730 LDX #2  \calculate ad
dresses
 740 .loop2
 750 LDA number,X:PHA
 760 LDY number+1,X
 770 LDA #&00:STA number,X
 780 LDA #&30:STA number+1
,X
 790 TYA:BEQ done_y
 800 .loop1
 810 CLC
 820 LDA number,X:ADC #&80
:STA number,X
 830 LDA number+1,X:ADC #&
2:STA number+1,X
 840 DEY:BNE loop1
 850 .done_y
 860 PLA:TAY
 870 BEQ done_x
 880 .loop1
 890 CLC
 900 LDA number,X:ADC #&20
:STA number,X
 910 LDA number+1,X:ADC #&
0:STA number+1,X
 920 DEY:BNE loop1
 930 .done_x
 940 DEX:DEX
 950 BPL loop2
 960 RTS
 970
 980 .mm  \move man
 990 LDA #31:STA counter
 1000 LDA from:CMP to:BEQ e
nd
 1010 .print
 1020 JSR getadd
 1030 LDX #2
 1040 .loop2
 1050 LDY counter \move cha
racter
 1060 .loop1
 1070 LDA (from),Y:STA (to)
,Y
 1080 LDA #0:STA (from),Y
 1090 DEY:BPL loop1
 1100 CLC   \next row
 1110 LDA from:ADC #&80:STA
from
 1120 LDA from+1:ADC #&2:ST
A from+1
 1130 CLC
 1140 LDA to:ADC #&80:STA t
o
 1150 LDA to+1:ADC #&2:STA
to+1
 1160 DEX:BNE loop2
 1170 .end
 1180 RTS
 1190
 1200 ]:P%=&75:[OPT pass
 1210
 1220 .mb   \move bird
 1230 LDA #63:STA counter
 1240 JMP print
 1250
 1260 .me   \move egg
 1270 JSR getadd
 1280 LDY #21
 1290 .loop1
 1300 LDA (from),Y:STA (to)
,Y
 1310 LDA #0:STA (from),Y
 1320 DEY:BPL loop1
 1330 RTS
 1340 ]
 1350 NEXT
 1360 ENDPROC
 1370
 1380 DEF PROCman
 1390 ?&70=Z%:?&71=25:Z%=Z%
+(INKEY(-98) AND Z%>0)-(INK
EY(-105) AND Z%<19):?&72=Z%
:?&73=25:CALL mm
 1400 ENDPROC
 1410
 1420 DEF PROCbird
 1430 ?&70=X%:?&71=Y%:IF X%
<18 X%=X%+1 ELSE X%=0:Y%=Y%
+1
 1440 ?&72=X%:?&73=Y%:CALL
mb:R%=RND(5):IF R%?C%=255 R
%?C%=X%:R%?D%=Y%+2:VDU 31,X
%,Y%+2,224:SOUND&13,-15,100
,1
 1450 ENDPROC
 1460
 1470 DEF PROCegg
 1480 ?&70=I%?C%:?&71=I%?D%
:I%?D%=I%?D%+1:IF I%?D%<25
?&72=I%?C%:?&73=I%?D%:CALL
me ELSE ?&72=0:?&73=32:CALL
 me:IF I%?C%=Z% E%=E%+1:SOU
ND&12,1,0,4:PRINT TAB(18,29
);E%:I%?C%=255 ELSE I%?C%=2
55:SOUND&13,-15,0,1
 1490 ENDPROC
 1500
 1510 DEF PROCanother
 1520 SOUND 1,-15,0,20
 1530 TIME=0:REPEAT UNTIL T
IME>300
 1540 S%=S%+E%*10
 1550 COLOUR 7
 1560 PRINT TAB(0,1);"Hard
luck..."
 1570 PRINT''"you only caugh
t"
 1580 PRINT'';E%;" eggs."
 1590 COLOUR 5
 1600 PRINT''"Your final sc
ore"
 1610 PRINT'"is ";S%;"."
 1620 *FX21,0
 1630 K%=INKEY(500)
 1640 COLOUR 3
 1650 PRINT'''"Another game
...?"
 1660 S%=0:E%=0:level=0
 1670 ENDPROC
 1680
 1690 DEF PROCinstructions
 1700 PRINT'TAB(15)"C A T C
H"
 1710 PRINT TAB(14)"-------
----"
 1720 COLOUR 2
 1730 PRINT'"Old farmer Bro
wn has been having a few"
 1740 PRINT'"problems with
his chickens lately. They"
 1750 PRINT'"just will not
stay still while he"''"coll
ects the eggs."
 1760 PRINT''"The chickens
fly to and fro - their eggs
"
 1770 PRINT "ending up ever
ywhere."
 1780 PRINT''"Help farmer B
rown catch the eggs as they
"
 1790 PRINT "fall. If you m
anage to catch over 50"
 1800 PRINT'"then you move
on to the next (harder),"''
"level."
 1810 COLOUR 3
 1820 PRINT''SPC(5);"Z = le
ft";SPC(14);"/ = right"
 1830 COLOUR 1
 1840 PRINT TAB(9,31)"Press
space to start...";
 1850 *FX21,0
 1860 REPEAT UNTIL GET=32
 1870 ENDPROC
 1880
 1890 DEF PROCerror
 1900 IF ERR=17 RUN
 1910 CLS
 1920 REPORT
 1930 PRINT " at line ";ERL
 1940 END
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

From Page 15

```
    ";first;" units
        "
1090 PRINT TAB(0,18)"Length
     of side ";second$;"
     is ";second;" units
                "
1100 ENDPROC
1110 DEF PROCanglesides
1120 CLS
     :PROCtriangle
1130 PRINT TAB(0,16)"Name
     the side known X,Y or
     Z....."
1140 INPUT TAB(33,16)" "side$
1150 PRINT TAB(0,18)"Name
     the angle known A or
     B......"
1160 INPUT TAB(33,18)" "angle$
1170 IF side$<"X"
     THEN PROCmistake
1180 IF angle$>"B"
     THEN PROCmistake
1190 CLS
     :PROCtriangle
1200 PRINT TAB(0,16)"Enter
     length of side ";side$;
1210 INPUT TAB(30,16)side
1220 IF side<=0
     THEN PROCtoosmall
1230 PRINT TAB(0,18)"Enter
     angle ";angle$;" in
     degrees
             "
1240 INPUT TAB(30,18)angle
1250 IF angle>=90
     THEN PROCtoobig
1260 IF angle<=0
     THEN PROCtoobig
1270 IF angle$="A"
     THEN PROCa
     ELSE PROCb
1280 DEF PROCa
1290 IF side$="X"
     THEN Y=SIN (RAD angle)*si
     de
     :Z=side*side-(Y*Y)
1300 IF side$="Y"
     THEN X=side/ SIN (
     RAD angle)
     :Z=X*X-(side*side)
1310 IF side$="Z"
     THEN X=side/COS (
     RAD angle)
     :Y=X*X-(side*side)
1320 B=90-angle
1330 IF side$="X"
     THEN PROCprintxa
1340 IF side$="Y"
     THEN PROCprintya
1350 IF side$="Z"
     THEN PROCprintza
1360 END
1370 ENDPROC
1380 DEF PROCprintxa
1390 CLS
     :IF angle<.5
     THEN PROCsure
     ELSE PROCtriangle
1400 PRINT TAB(0,16)"Length
     of side X is ";side;
     " units"
1410 PRINT TAB(0,18)"Length
     of side Y is ";Y;" units
     "
1420 PRINT TAB(0,20)"Length
     of side Z is ";SQR (Z);
     " units"
1430 PRINT TAB(0,22)"Angle
     A is ";angle;" degrees"
1440 PRINT TAB(0,24)"Angle
     B is ";B;" degrees"
1450 PROCagain
1460 ENDPROC
1470 DEF PROCprintya
1480 CLS
     :IF angle<.5
     THEN PROCsure
     ELSE PROCtriangle
1490 PRINT TAB(0,18)"Length
     of side Y is ";side;
     " units"
1500 PRINT TAB(0,16)"Length
     of side X is ";X;" units
     "
1510 PRINT TAB(0,20)"Length
     of side Z is ";SQR (Z);
     " units"
1520 PRINT TAB(0,22)"Angle
     A is ";angle;" degrees"
1530 PRINT TAB(0,24)"Angle
     B is ";B;" degrees"
1540 PROCagain
1550 ENDPROC
1560 DEF PROCprintza
1570 CLS
     :IF angle<.5
     THEN PROCsure
     ELSE PROCtriangle
1580 PRINT TAB(0,18)"Length
     of side Y is ";SQR (Y);
     " units"
1590 PRINT TAB(0,16)"Length
     of side X is ";X;" units
     "
1600 PRINT TAB(0,20)"Length
     of side Z is ";side;
     " units"
1610 PRINT TAB(0,22)"Angle
     A is ";angle;" degrees"
1620 PRINT TAB(0,24)"Angle
     B is ";B;" degrees"
1630 PROCagain
1640 ENDPROC
1650 DEF PROCb
1660 IF side$="X"
     THEN Z=SIN (RAD angle)*si
     de
     :Y=side*side-(Z*Z)
1670 IF side$="Z"
     THEN X=side/ SIN (
     RAD angle)
     :Y=X*X-(side*side)
1680 IF side$="Y"
     THEN X=side/COS (
     RAD angle)
     :Z=X*X-(side*side)
1690 A=90-angle
1700 IF side$="X"
     THEN PROCprintxb
1710 IF side$="Y"
     THEN PROCprintyb
1720 IF side$="Z"
     THEN PROCprintzb
1730 END
1740 ENDPROC
1750 DEF PROCprintxb
1760 CLS
     :IF angle<.5
     THEN PROCsure
     ELSE PROCtriangle
1770 PRINT TAB(0,16)"Length
     of side X is ";side;
     " units"
1780 PRINT TAB(0,18)"Length
     of side Y is ";SQR (Y);
     " units"
1790 PRINT TAB(0,20)"Length
     of side Z is ";Z;" units
     "
1800 PRINT TAB(0,22)"Angle
     A is ";A;" degrees"
1810 PRINT TAB(0,24)"Angle
     B is ";angle;" degrees"
1820 PROCagain
1830 ENDPROC
1840 DEF PROCprintyb
1850 CLS
     :IF angle<.5
     THEN PROCsure
     ELSE PROCtriangle
1860 PRINT TAB(0,18)"Length
     of side Y is ";side;
     " units"
1870 PRINT TAB(0,16)"Length
     of side X is ";X;" units
     "
1880 PRINT TAB(0,20)"Length
     of side Z is ";SQR (Z);
     " units"
1890 PRINT TAB(0,22)"Angle
     A is ";A;" degrees"
1900 PRINT TAB(0,24)"Angle
     B is ";angle;" degrees"
1910 PROCagain
1920 ENDPROC
1930 DEF PROCprintzb
1940 CLS
     :IF angle<.5
     THEN PROCsure
     ELSE PROCtriangle
1950 PRINT TAB(0,16)"Length
     of side X is ";X;" units
     "
1960 PRINT TAB(0,18)"Length
     of side Y is ";SQR (Y);
     " units"
1970 PRINT TAB(0,20)"Length
     of side Z is ";side;
     " units"
1980 PRINT TAB(0,22)"Angle
     A is ";A;" degrees"
1990 PRINT TAB(0,24)"Angle
     B is ";angle;" degrees"
2000 PROCagain?
2010 ENDPROC
2020 DEF PROCagain
2030 PRINT TAB(3,26)"PRESS
     SPACE TO ENTER ANOTHER
     SET OF"
2040 PRINT TAB(14,28)"MEASUREM
     ENTS"
2050 key=INKEY (20000)
2060 IF INKEY (-99)
     THEN PROCintro
     ELSE PROCgoodbye
2070 ENDPROC
2080 DEF PROCinfo
2090 PROCtriangle
2100 PRINT TAB(0,14)"TRIG
     by G.P.Hawkins"
```

From Page 57

```
2110 FOR T=1TO 4000
     :NEXT T
2120 PRINT TAB(0,13)"In any
     triangle the unknown
     sides and  angles can
     be calculated provided
     that  at least ONE side
     and ONE angle, OR TWO
     sides are known."
2130 PRINT TAB(0,18)"This
     program will calculate
     the unknowns with the
     minimum of information"
2140 PRINT TAB(6,29)"Press
     SPACE to continue."
2150 key=GET
2160 CLS
     :PROCtriangle
2170 PRINT TAB(0,13)"GUIDELINE
     S"
2180 PRINT TAB(3,15)"The trian
     gle must have a RIGHT
      ANGLE."
2190 PRINT TAB(3,17)"The side
     opposite the right angle
     is    the HYPOTENUSE,in
     this example side X"
2200 PRINT TAB(3,20)"In the
     example angle 'A'has
     side"
2210 PRINT TAB(7,21)"'Z'ADJACE
     NT and side'Y'OPPOSITE."
2220 PRINT TAB(6,29)"Press
     SPACE to continue."
2230 key=GET
2240 CLS
     :PROCtriangle
2250 PRINT TAB(0,13)"FORMULAE"
2260 PRINT TAB(2,15)"The formu
     lae used to find the
     unknownsare SINE,COSINE
     and TANGENT thus:"
2270 PRINT TAB(17,18)"OPPOSITE
     "
2280 PRINT TAB(11,19)"SIN
     = ----------"
2290 PRINT TAB(17,20)"HYPOTENU
     SE"
2300 PRINT TAB(17,22)"ADJACENT
     "
2310 PRINT TAB(11,23)"COS
     = ----------"
2320 PRINT TAB(17,24)"HYPOTENU
     SE"
2330 PRINT TAB(17,26)"OPPOSITE
     "
2340 PRINT TAB(11,27)"TAN
     = ----------"
2350 PRINT TAB(17,28)"ADJACENT
     "
2360 PRINT TAB(6,30)"Press
     SPACE to continue."
2370 key=GET
2380 CLS
     :PROCtriangle
2390 PRINT TAB(0,13)"EXAMPLE"
2400 PRINT TAB(2,15)"SINES
     COSINES and TANGENTS
     are usually obtained
     from books of tables."
2410 PRINT TAB(1,17)"To find
     angle B given Y=2.67
     and Z=4.80"
2420 PRINT TAB(2,19)"Would
     be written :"
2430 PRINT TAB(17,21)"2.67"
2440 PRINT TAB(9,22)"TAN B
     = -----"
2450 PRINT TAB(17,23)"4.80"
2460 PRINT TAB(15,25)"=0.556"
2470 PRINT TAB(0,27)"from
     tables INVERSE TAN =
     29.08 =B"
2480 PRINT TAB(6,30)"Press
     SPACE to continue."
2490 key=GET
2500 ENDPROC
2510 DEF PROCreturn
2520 PRINT TAB(0,26)"DO NOT
     FORGET:  Press
       after each
            entry"
2530 FOR FLASH=0TO 500
     STEP 10
2540 PRINT TAB(22,26)"
     "
2550 PRINT TAB(22,26)"RETURN"
2560 NEXT FLASH
2570 ENDPROC
2580 DEF PROCgoodbye
2590 CLS
2600 PRINT TAB(16,16)"GOODBYE"
2610 PRINT TAB(0,31)"PRESS
     SPACE TO RE-RUN PROGRAM"
2620 key=INKEY (20000)
2630 IF INKEY (-99)
     THEN PROCintro
     ELSE PROCgoodbye
2640 FOR T=1TO 5000
     :NEXT T
     :CLS
2650 END
2660 DEF PROCpythagoras
2670 CLS
     :PROCtriangle
     :PROCburp
2680 PRINT TAB(5,16)"According
     to Pythagoras :The squar
     eof the hypotenuse is
     equal to the sum ofthe
     squares of the other
     two sides."
2690 PRINT TAB(4,20)"Therefore
     the length of side X
     must always be greater
     than Y or Z."
2700 PROCre_enter
2710 ENDPROC
2720 DEF PROCtoobig
2730 CLS
     :PROCtriangle
     :PROCburp
2740 PRINT TAB(2,16)"The sum
     of the angles of a trian
     gle        equal 180
     degrees."
2750 PRINT TAB(2,20)"Therefore
     "angle$;" must be less
     than 90 and       greate
     r than 0 degrees."
2760 PRINT TAB(5,23)"Please
     check your entry."
2770 PROCre_enter
2780 ENDPROC
2790 DEF PROCtoosmall
2800 CLS
     :PROCtriangle
     :PROCburp
2810 PRINT TAB(2,16)"REMEMBER:
     a triangle has THREE
     sides."
2820 PRINT TAB(2,18)"Please
     check your entry figures
     and     re-enter a POSIT
     IVE number."
2830 PROCre_enter
2840 ENDPROC
2850 DEF PROCre_enter
2860 PRINT TAB(6,26)"PRESS
     SPACE TO RE-ENTER YOUR
      "
2870 PRINT TAB(14,28)"MEASUREM
     ENTS"
2880 key=INKEY (20000)
2890 IF INKEY (-99)
     THEN PROCintro
     ELSE PROCgoodbye
2900 ENDPROC
2910 DEF PROCburp
2920 ENVELOPE 3,2,-25,-80
     ,-6,15,0,0,126,0,0,-126
     ,126,126
2930 SOUND 1,3,156,27
2940 ENDPROC
2950 DEF PROCsure
2960 CLS
2970 PRINT TAB(0,8)"**********
     **************************
     ****"
2980 PRINT TAB(0,5)" As you
     have entered a measureme
     nt of    less than .5
     will you please check
          that your entry
     was correct."
2990 PRINT TAB(0,4)"**********
     **************************
     ****"
3000 ENDPROC
3010 END
3020 DEF PROCtitle
3030 VDU 23,1,0;0;0;0
3040 COLOUR 7
3050 COLOUR 129
3060 CLS
3070 PRINT TAB(6,5)"T R I
     G"
3080 PRINT TAB(6,10)"for the"
3090 PRINT TAB(7,15)"Acorn"
3100 PRINT TAB(5,20)"Electron.
     "
3110 FOR PITCH=0TO 200
     STEP 4
3120 SOUND 1,-15,PITCH,2
3130 NEXT PITCH
3140 CLS
3150 PRINT TAB(4,5)"A program
     to"
3160 PRINT TAB(6,8)"work out"
3170 PRINT TAB(2,11)"all the
     unknowns"
3180 PRINT TAB(7,14)"in any"
3190 PRINT TAB(4,17)"TRIGONOME
     TRY"
3200 PRINT TAB(6,20)"problem."
3210 FOR PITCH=200TO 0
     STEP -4
3220 SOUND 1,-15,PITCH,2
3230 NEXT PITCH
  40 ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

Education Castle listing

From Page 35

```
E 70,460:SOUND1,-15,10,3:VDU
224:MOVE140,500:SOUND1,-15,2
0,3:VDU224:MOVE230,530:SOUND
1,-15,30,3:VDU224
 1230 MOVE 240,530:DRAW230,5
30:DRAW230,600:MOVE300,530:D
RAW290,530:DRAW290,600
 1240GCOL0,2:MOVE290,600:MOV
E230,600:PLOT85,290,700:PLOT
85,230,700
 1250GCOL0,3:X%=260:Y%=725:R
%=25:FOR I%=Y%+R% TO Y%-R% S
TEP -4:J%=SQR(ABS(R%*R%-(I%-
Y%)*(I%-Y%))):MOVE X%-J%,I%:
DRAW X%+J%,I%:SOUND1,-15,I%,
1:NEXT
 1260 GCOL0,0:MOVE 500,300:D
RAW 600,300:DRAW600,400:DRAW
500,400:DRAW500,300:MOVE550,
300:DRAW550,400:MOVE600,350:
DRAW500,350
 1270 GCOL0,2:PLOT69,250,730
:PLOT69,270,730
 1280 MOVE 320,740:GCOL0,7:D
RAW200,740
 1290 MOVE 280,741:MOVE240,7
41:PLOT85,280,750:PLOT85,240
,750
 1300 MOVE 290,700:DRAW 310,
700:DRAW 310,650:MOVE230,700
:DRAW210,700:DRAW210,650
 1310 MOVE 290,620:DRAW 230,
620:MOVE230,600:DRAW290,600
 1320 MOVE 360,690:DRAW360,7
00:DRAW310,640
 1330 MOVE 410,700:DRAW310,6
40
 1340 GCOL0,4:MOVE 1079,0:MO
VE 1279,0:PLOT85,1079,250:PL
OT85,1279,250
 1350 VDU28,0,5,19,0:VDU4:CO
LOUR129:COLOUR0:CLS
 1360 VDU23,1,0,0;0;0;0;
 1370 PROCFLAG
 1380 SOUND1,-15,RND(55)+100
,5
 1390 PRINTTAB(0,2)"  THANK
YOU FOR"
 1400 SOUND1,-15,RND(55)+100
,5
 1410 TIME=0:REPEAT UNTIL TI
ME>200
 1420 PRINTTAB(0,2)"S A V I
N G  M E."
 1430 SOUND1,-15,RND(55)+100
,5
 1440 TIME=0:REPEAT UNTIL TI
ME>200
 1450 SOUND1,-15,RND(55)+100
,5
 1460 PRINTTAB(0,2)"G  O  O
D  B  Y  E"
 1470 SOUND1,-15,RND(55)+100
,5
 1480 TIME=0:REPEAT UNTIL TI
ME>300
 1490 SOUND1,-15,RND(55)+100
,5
 1500 end%=1
 1510 ENDPROC
 1520 DEF PROCFLAG
 1530 VDU 23,235,127,191,223
,239,247,251,253,254
```

```
 1540 VDU 23,236,254,253,251
,247,239,223,191,127
 1550 FLAG$=CHR$235+CHR$236+
CHR$8+CHR$8+CHR$10+CHR$236+C
HR$235
 1560 MOVE 600,800:VDU5:GCOL
0,4:PRINT FLAG$
 1570 VDU4:CLS:ENDPROC
```

This listing is included in this month's cassette tape offer. See order form on Page 47.

BBC/ELECTRON PROFESSIONAL SOFTWARE

Our educational software is used in thousands of schools and homes throughout Great Britain.

EDUCATIONAL 1 *BBC/ELECTRON* *Tape £8.00 Disc £10.00*
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It is VERY IMPORTANT INDEED purchasers take note that **'IMAGE'** is for sale strictly for making **BACK-UPS** of your own software for your own use, for protecting your own programs, or as an aid to putting software on disk. Any person found using the program for illegal purposes runs the risk of being prosecuted.

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Micro Messages

Help! Take pity on a poor adventurer

HELP! Take pity on an inexperienced, eager adventurer!

I have had my Electron for a couple of months now and I am learning all the time, but one thing I cannot master is adventures or to be precise one adventure (I've only tried one!).

Having had a go at an adventure of my cousin's I thought that adventures were fun (though obviously not easy) and I decided on getting one. The one I chose was Program Power's Adventure.

Trouble is I cannot seem to get very far with it, in fact I have come to a dead end.

I have searched the forests (and got lost) and the cavern (by typing in "Open Sesame") but that's it. I seem to have been everywhere, but I know I have not, so where to now?

I have picked up a scarf, a lamp, a green frog (which when killed turns into a princess and runs away, but the princess cannot be followed!), a wicker cage, a glass slipper and oil.

The computer does not understand WAVE so I have tried rubbing everything but the answer is NOTHING HAPPENS, except on the lamp where the answer is NOTHING HAPPENS HERE, which I suspect means: 'nothing will happen here but it might elsewhere'. Am I right?

By the way, I have occasionally found the axe in the forest but I am not always successful.

So please, please, please help me on my way. I just want you to help me to get to the next stage, find the next place to go, please help me Merlin, I am thinking of chucking the game out! – **Jenny Tremlett, Tadworth, Surrey.**

● Merlin will be notified, Jenny.

Complete recovery

MANY thanks for Dave Robinson's superb Recover program. (Electron User, December). *As a person prone to taping over the end of saved programs I was delighted to find that this program could bring back what was left of it and the program could be resurrected.*

It came in very useful only today when I taped over the end of the Xmas Carol program, which I am using as part of a compilation of programs I'm sending to a friend instead of a Christmas card. – **Graham McCann, Callander, Perthshire.**

Joy – what joy?

WITH reference to Micro Messages in the August edition of Electron User – "Joy for First Byte interface owners ... can now use it with all Acornsoft games ..." This is just not so!

It will not work with Chess, Draughts, Reversi and so on, in fact any game relying upon operation by the use of two coordinates to indicate a particular spot on the screen.

Can any genius suggest a procedure that will so operate? – **J. Clewson, Stauton.**

● None of our resident genii can come up with a program that would work for every occasion. Over to the readers.

Turning to the Electron

YOU recently reviewed a copy of Practical Programs for the Electron by the Bishops, but have you seen the cover?

Among the letters and numbers there is distinctly of DIVIDE ÷ SIGN!

Surely everyone who uses a computer knows that there is no such sign, just a / for divide.

Having ordered all the back-copies of Electron User I have watched with interest the correspondence about not being able to get the top line of text on television screens.

Readers may be interested to hear my experience.

I recently bought a Philips 2006 and was very disappointed when I too lost the top line, but I contacted an engineer who adjusted the set with no trouble.

He dropped the picture area down low enough to get the top line on, without showing the teletext lines when used normally.

It may be that more people can do this without resorting to programming techniques?

Electron User seems to be growing up faster, especially by including a review of the Mushroom-Printer/User port add-on.

I could not afford a BBC and decided on the Electron, but regret not having any interfacing facilities.

This interface gives the chance of having the user-port and allowing the computer to control something.

I bought Bruce Smith's book but I must admit, I find it very difficult to follow.

I work in research, and several colleagues who have family financial restrictions are turning to and buying the Electron.

We are not games players and want to learn serious programming and start doing some interfacing.

I write to ask if you would start a series on "Interfacing with the Electron", using say, the user port as the Mushroom unit.

This may give the more technically minded user a new insight into what the Electron can do. – **C.M. Hawkes, Runcorn, Cheshire.**

● We hope to start an interfacing series soon, but it would be based on the Plus 1 interface.

Get down to training

RECENTLY I spent one week's holiday at my cousin's, who owns a BBC Micro. One of the programs which he showed me was one which just played well known tunes.

Maybe you could show how this is done – translating written or staved music, into

→

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.

The address is:

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

Micro Messages

From Page 61

sound commands? It could appear in your "noise and music" feature.

Finally, in your request on Micro Olympics, I am doing quite abysmally. My best event is the javelin, in which I have thrown 87.95m.

I have beaten my computer at the 100m, three times, but literally given up at the 1500m.

I'm pathetic at all the jumps, especially the long jump (I'm not telling my best).

I think it is an original game, but isn't there a better way of controlling the man than banging the keys? I must admit, I can't think of one. – **A. Manning, Huddersfield, Yorks.**

● It is impossible to do well at the Olympics if you "bang" the keys. Use finger rather than wrist movement and quickly tap the keys. Using this method, the world record can be beaten in all events.

As with the real Olympics, plenty of training is necessary. Good luck.

A jump too far

I RECENTLY received a First Byte joystick interface and a Quickshot II joystick. I found playing games much, much easier but I later discovered that Micro Olympics is not convertible.

Can you convert the program by any other means rather than using the conversion tape? If so how?

By the way, Micro Olympics is a brilliant game, but is it actually possible to beat the computer at the long jump? I have tried time and time again, but without success. – **Liam Ruddock (aged 12).**

● Micro Olympics is not designed to be used with joysticks, because as they are all different it would have been impossible to set a standard for them.

If you run fast enough the long jump (and all the other events) are possible.

Don't miss out!

HAVING missed the December edition of Electron User, I think you should print the date of publication for the coming edition, as those of us with sieve-like memories forget to subscribe. – **Jonathan Mercer, South Woodham-ferrers.**

● You don't know what you missed! But you can make sure it doesn't happen again by turning to Page 47.

High-score plea

I MUST say how grateful I am to Electron User. It has helped my programming methods to improve greatly. The magazine caters for those who do not have an 'O' level in BBC Basic!

The VDU characters are great but could you tell me what happened to them in the December issue, I am mystified.

After reading the Claim to Fame by David Thompson in Micro Messages in December issue, it has come to my attention that a high-score table would be a great idea.

I'm sure there's hundreds more that agree with Dave and I. Please, please add another PAGE!

I can't really boast about my high-scores but at least it's a start.

Chuckie Egg 336,400
Felix/Factory.....14,300
Croaker.....14,360
Pengi.....68,000
Twin Kingdom Valley completed...1,024
Starship Command ..480

How about using screen photographs as proof of high score? – **No name, but address in Bridlington, East Yorks.**

Marks out of ten

I MUST tell you of the excellent service I have received since I bought my Electron in August.

I bought it from Micro Power. I paid the standard price of £199, but also received a cassette recorder. The package was delivered in only 36 hours.

However, I found that the cassette player was faulty. I returned it, and received a replacement in only five days. I would recommend Micro Power to anyone.

I also purchased a game by Durell Software called Mineshaft – the game is superb, please review it – from a shop in Gloucestershire.

I had difficulty loading it and returned it to Durell. I received a replacement also in five days. I would like to thank the company for their excellent service.

Could you please give marks out of 10 for each game for, say, graphics, sound and so on and include the price in your reviews?

Keep up the good work! – **Nigel Jacques, Loughborough, Leics.**

● The trouble with a score table is that it's very hard to get standardisation on the scores. One man's 10 would be another's 5 and so on. We feel it's better to get a general assessment of the game.

To change the subject, it's nice to hear of good service. All we usually hear about are the complaints.

Elite warning

A GRIM warning to future buyers of Elite for the Electron who have seen it on the BBC Micro and read the reviews.

It is not quite the same on the Electron.

I found that after saving my credits, where I bought my Galactic Hyperdrive, I could not use it.

There is no colour, less enemy ships and it's drastic flashing.

Acornsoft's spokesperson said: "There are no plans at the moment to debug the program as the faults do not interfere with the playing of the game". – **D. Fiveash, Tolworth, Surrey.**

Comments from afar..

GREETINGS from Swaziland. First let me congratulate you all for a most useful magazine which really does assist the first-timer, and especially those of us who are a little longer in the tooth.

I bought my Electron after the delivery hoo-ha in April this year and on my return to Swaziland I decided to buy in all copies of your magazine – a most wise decision which has allowed me to follow feature articles in sequence as a training course.

Now for one or two comments. Could your book reviewers please give fuller details, such as the name of the publisher and the ISBN?

There are no well-known booksellers in the High Street here in which to browse and by the time Books In Print catches up with a title the details have been forgotten.

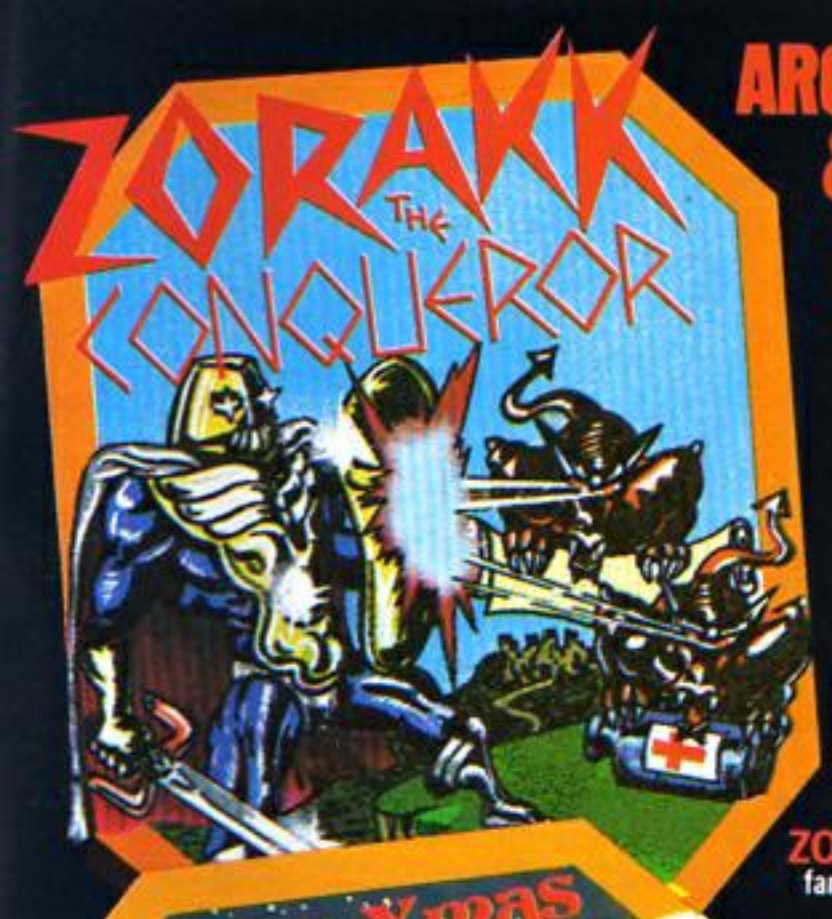
As to your listings – yes, they do cause problems from time to time, although they are better than other magazine listings I have seen.

Needless to say, more, and yet more, educational programs would be my suggestions for the future.

May I close by also thanking you for the prompt delivery service – I may be 7,000 miles away, but the December issue has been thoroughly enjoyed.

My good wishes to all your staff. – **W.L. Roberts, Mbabane, Swaziland.**

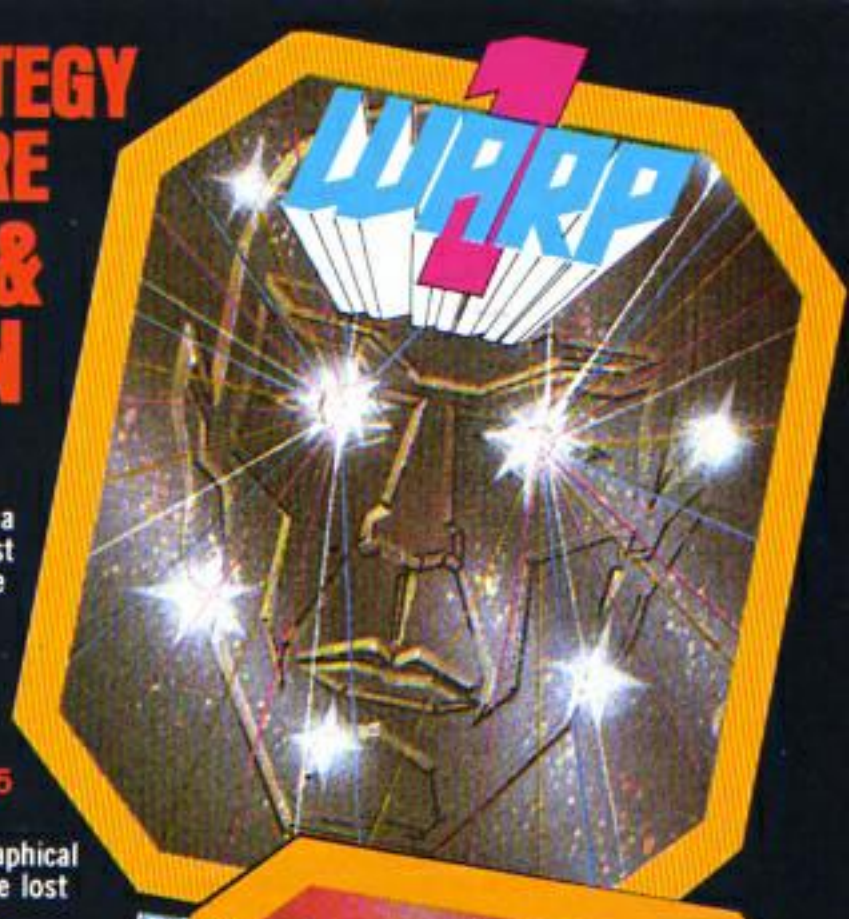
ARCADE, STRATEGY & ADVENTURE FOR BBC & ELECTRON



WARP 1...command a federation starship...seek out a fellow space captain who is lost in space and boldly go where no man has gone before.

"It's like no other game I've played before . . . screen layout is excellent - It's different". Electron User.
"Stylish graphics and a splendid hyper-space display". Pop. Comp. Weekly

BBC £7.95. Electron £7.95



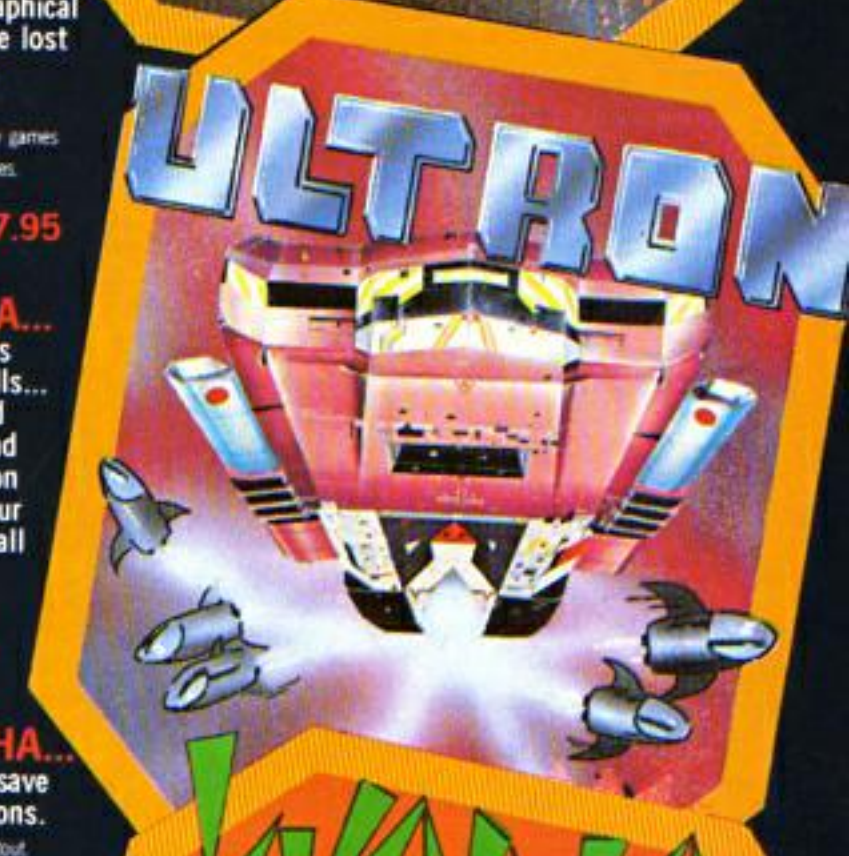
ZORAKK the conqueror...a graphical fantasy adventure in search of the lost crown of ultimate darkness.

"frustratingly addictive strategy game" "utterly compulsive", better than most of the strategy games available for the beeb". Personal Computer Games.

BBC £7.95
Electron £7.95 Dragon £7.95

Merry Xmas, SANTA... arcade fun as Santa delivers presents. Jump flying snowballs... dodge falling icicles...avoid hostile snowmen and eat and drink as much as possible on the way . Excellent full colour action which can be enjoyed all the year round.

BBC £7.95
48K Spectrum £5.95



Space Station ALPHA... a graphical space battle to save the earth from invading cylons.

"flying colours and realistic sounds" Printout.

BBC £7.95. Electron £7.95

ULTRON...Super fast, super smooth, 'zap-em' game, blast the swarms of invading aliens to reach the mother ship ...multi screen.

- BBC £7.95
Electron £7.95

WONGO...bounce along the Great Wall of China to diffuse sizzling bombs avoiding arrows, boulders and gremlins on the way. Multi screen increasing in difficulty and speed.

BBC £7.95 Electron £7.95

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