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```

Source: Advanced Disc FS - B Software ROM slot4
-----
| DIR | R/W | DIR | R/W | DIR | R/W | DIR | R/W | DIR | R/W | DIR | R/W |
|-----|
| 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W |
| 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W |
| 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W |
| 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W |
| 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W |
| 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W |
| 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W |
|-----|
Target: Advanced Disc FS - B Software ROM slot4
-----
| DIR | R/W | DIR | R/W | DIR | R/W | DIR | R/W | DIR | R/W | DIR | R/W |
|-----|
| 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W |
| 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W |
| 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W |
| 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W |
| 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W |
| 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W |
| 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W |
| 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W | 1770 | R/W |
|-----|
Change: 00 00 00 00 00 00 00 00 00 00 00 00
00 noted for copying to Advanced Disc FS - B Software ROM slot4
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00 noted for copying to Advanced Disc FS - B Software ROM slot4
00 noted for copying to Advanced Disc FS - B Software ROM slot4
  
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Screen picture shows AFM in Copy mode on Master Turbo

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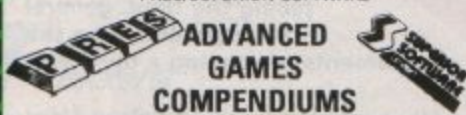
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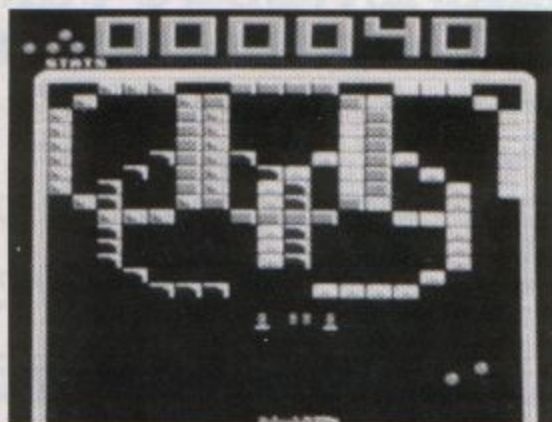


Archimedes E-Type soon to be converted for the Electron

ELECTRON owners who have coveted the excellent Archimedes car racing game E-Type will soon have their own version from The 4th Dimension (0742 700661).

"Currently under conversion by Gordon Key, E-Type is a sure fire hit for Electron and BBC Micro", said 4th Dimension's Steve Botterill.

"Gordon will squeeze in every available feature to make this possibly the best car racing game for the Electron. Multi loading will be used to increase the available memory". Aimed at an early May release, E-Type on cassette for the Electron will cost £9.95.



Screen shot from Hyperball



Slay the dinosaur: One of the many monsters in Barbarian II

Two new Electron games are featured in Sam's latest compilation

TWO new Electron games feature in Play It Again Sam 13, the latest offering in Superior Software's long-running compilation series.

Hyperball is billed as "the best version ever of the classic bat and ball game". On six levels with a total of 120 screens, special features include infra-red scanners, eight ball splitters, aliens, cannons, weapon purchase, bonus rounds and screen-jump options.

"This is a completely new game and is so good that we considered making it a full price release", said Steve Hanson of Superior (0652 58585). "The only reason we have not put it out at full price is that there have been similar ones before like Arcanoids.

"Despite that, Hyperball has many new features and we think it is much better than its predecessors".

Previously only available for the BBC Micro, Pandemonium has now been converted to the Electron for Sam 13. A Top Ten game by Peter Scott, it features teleporters, lifts, springs and weird aliens to shoot on 80 screens.

Star game is Barbarian II, the classic challenge to reach the Dungeon of Drax with 20 monsters to fight through an 80 screen maze.

Old Superior favourite Percy Penguin rounds off Sam 13.

Percy must kill the Snobeas in a frozen maze by hurling ice cubes at them, but deadlier breeds then appear. Price, £9.95.

Chance buy that paid off

PROGRAMMING a game is hard enough, but learning how to program at the same time calls for real dedication. Two years of hard work have paid off for 19-year-old Stephen Parkinson of Colchester who has emerged as one of the latest bright sparks of the Electron world.

He taught himself programming while writing a completely new game for the Acorn machine and has had it snapped up by Superior Software for its latest Sam compilation.

Stephen chose the Electron four years ago by pure chance. On a shopping trip to his local Boots store he fancied buying a micro but did not know which to get.

It was Hobson's choice. The store only had one - and that was an Electron.

"I used to use a 6502 at

school and I suddenly realised that I could program at home", he said. "I originally intended to call the game Speedball, but when that name was used for the ST and Amiga game I changed it to Hyperball.

"I am now working on another game which is going very well. It will be a shoot-'em-up combined with a certain amount of strategy".

Having left college last year, Stephen now works in

the microprocessing department of Crompton Instruments in Witham.

Superior boss Steve Hanson said: "Stephen actually wrote the Electron version of his new game Hyperball first rather than taking the more usual course of writing it for the BBC Micro first then converting it.

"He takes the Electron to its limits, is an excellent programmer and is also very easy to work with".

A NEW cartridge adaptor designed to increase the expansion capabilities of the Master Compact is good news for Electron owners who want to upgrade. It is compatible with both Master and Electron cartridges.

The printed circuit board plugs into the side expansion connector and includes a switch to select whether Master or Electron cartridges - which have slightly

Adaptor way to an upgrade

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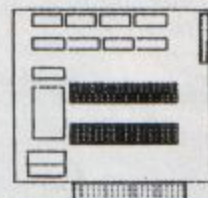
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GALLUP

SOFTWARE CHART

THIS MONTH	LAST MONTH	TITLE (Software House)	COMMENTS	PRICE
1	●	SUPERIOR SOCCER <i>Superior</i>	Brilliant – worth every penny. Whether you want to play football or just manage your favourite team, you can't go wrong with this.	£9.95
2	▲ 20	STORMCYCLE <i>Atlantis</i>	Save Earth from imminent invasion and disaster by finding five diodes, killing the enemy and beating the clock.	£1.99
3	▲ 4	JOE BLADE 2 <i>Players</i>	The graphics are good and the game very playable. The puzzle screens are wicked and will keep you busy for hours.	£1.99
4	▲ 10	CODENAME: DROID <i>Blue Ribbon</i>	Good old Stryker is off again, this time on his own and at a budget price. Easily one of the best of the arcade adventures.	£2.99
5	●	QUEST <i>Superior</i>	Another arcade adventure from Superior. Not as special as some of the earlier releases, but well implemented for all that.	£9.95
6	●	SPOOKSVILLE <i>Blue Ribbon</i>	Almost a budget offering of Citadel featuring Gaston the Intrepid and Count Drakula. Doesn't quite come up to scratch though.	£2.99
7	●	G. GOOCH TEST CRICKET <i>Alternative</i>	With the West Indies behind them, England won't need this simulation. You will only if you are an ardent cricket fan.	£1.99
8	●	TOMCAT <i>Players</i>	Superb graphic loading screens and some of the best game screens seen on the Electron yet. The parallax scrolling will delight turbo owners.	£1.99
9	●	FRUIT MACHINE <i>DK Tronics</i>	If you don't want to lose your money you can watch for the bars and cherries in your own home. Doesn't quite work as a concept though.	£9.99
10	●	SPELLBINDER <i>Superior</i>	Another original from the Superior stable. Arcade adventure but with a little more to offer than some of its contemporaries.	£9.95
11	●	CREEPY CAVE <i>Atlantis</i>	Budget time with a chilly underground arcade adventure. Why the ghost wants your house key is beyond me. But you better get to him quickly.	£1.99
12	●	FRANKENSTEIN 2000 <i>Atlantis</i>	An interesting mix of Inner Space, Fantastic Voyage and a sprinkling of Mrs Shelley. Definitely worth the money.	£1.99
13	●	GOLDEN FIGURINE <i>Atlantis</i>	Very simple graphics but there are some interesting puzzles as you progress from screen to screen and level to level.	£1.99
14	▲ 18	JOE BLADE <i>Players</i>	The original adventure for community conscious Joe. Nice use of two colour graphics; a game to keep your interest.	£1.99
15	▼ 12	STRIKE FORCE HARRIER <i>Alternative</i>	Now a budget label, you can take off with this excellent Mirrorsoft flight simulator at a bargain price.x	£1.99
16	▼ 13	YIE AR KUNG FU <i>Hit Squad</i>	There have been many clones and any combat game is invariably compared to it. A nice trip into meaningless violence if you like that sort of thing.	£2.99
17	▼ 2	COMMANDO <i>Encore</i>	Rambo-style adventure-cum-kill 'em all. You can also buy this as part of the Play it Again Sam 3 compilation.	£2.99
18	●	RAVENSKULL <i>Blue Ribbon</i>	Another Superior classic now appearing on the Blue Ribbon budget range. A must if you haven't already got a copy.	£2.99
19	●	OLYMPIC SPECTACULAR <i>Alternative</i>	Back in the charts again is this budget offering. It's ideal if you want to practice for the Olympics without too much exertion.	£1.99
20	▼ 1	PAPERBOY <i>Encore</i>	Still hanging in the charts but it's a big drop for this one. It's a pity about the flicker and slow speed. Get a turbo to improve matters.	£2.99

ADVENTURES

By *Pendragon*

Since I last held forth, responses to my request for readers to write in and tell me about the most irksome or baffling situations they have come across in Electron text adventures have continued to flood in.

Louise Mills of London writes to say that no problem has foxed her more greatly than trying to map the coloured rooms and iron passages maze in Sphinx Adventure.

When I first played the old timer I, too, struggled for many hours – often totally lost – to discover routes through that maze. The greatest hardship was the perennial problem in Sphinx Adventure, that you can't save your position.

However, by using the drop and explore method of mapping – explained in the July 1987 edition of my column – it is possible to fully map all the passages and rooms, and discover routes to and from the Bear's Cave and the foot of Castle Hill.

George Smith of Mochdre states quite categorically that the most difficult problem she has encountered was in making and sailing the raft in Savage Island I.

Some years ago I highlighted this adventure as being particularly tricky because of a random factor which operated within it. Making the raft isn't such a chore, providing

you are patient and scrupulous in your search for building materials.

However, sailing it is another matter entirely. Four ocean locations are randomly accessible by paddling the raft. An atoll, a tidepool and a beach may all also be reached. But the random factor operating for the latter is so high that it makes success almost impossible.

Tony Garnier of Plymouth reckons that taking the correct photographs in Terrormolinos is the most difficult task he has faced in any Electron adventure.

Getting the timing of each photograph right is certainly a headache, but as long as you take one photo after each major event of your holiday you shouldn't go far wrong.

If my memory and maps serve me well, the following locations provide you with good photographic platforms: The beach (three different photographs), the island, the plaza, the nightclub, the seat in the bull ring, the Bell Tower of the monastery and the dusty cellars at the vineyard

However, Chris Parker of Canterbury writes to say that every other problem pales into insignificance when compared to mapping the Antarctic and solving the meteorite puzzle in Tynesoft's Oxbridge.

I had to dig deep into my vaults to even begin to answer this one. You must visit each of the 20 locations only once, and there are many possible routes to achieve this.

Locations are uniquely identifiable. Weather conditions indicate which ring of latitude you are on, and the weather box colour gives you your longitudinal bearing.

South always takes you inwards towards the building at the Pole, North takes you outwards and East and West move you round in a clockwise and anti-clockwise direction.

The puzzle is, in fact, directly equivalent to the classical problem of visiting each vertex of a dodecahedron, by moving along the connecting edges.

So as in other points in this adventure, a little mathematical knowledge is a great help.

So while you are all still scratching your heads, I begin a new series of maps to some of the most difficult adventure games ever released for the Electron.

We start with what is perhaps the finest release from the Adventuresoft stable, Kayleth.

● *That's it for this month, so until darkness is no longer a virtue, happy adventuring.*



electron
user

Kayleth Map 1

Readers' Hall

Colossal Adventure *Sheila Beattie*

There are a few points you should note for your log before you start this epic voyage into long forgotten caverns.

Dwarves appear at random, but the first one you meet will drop his axe. You must take this axe to kill any future dwarves who may attack you.

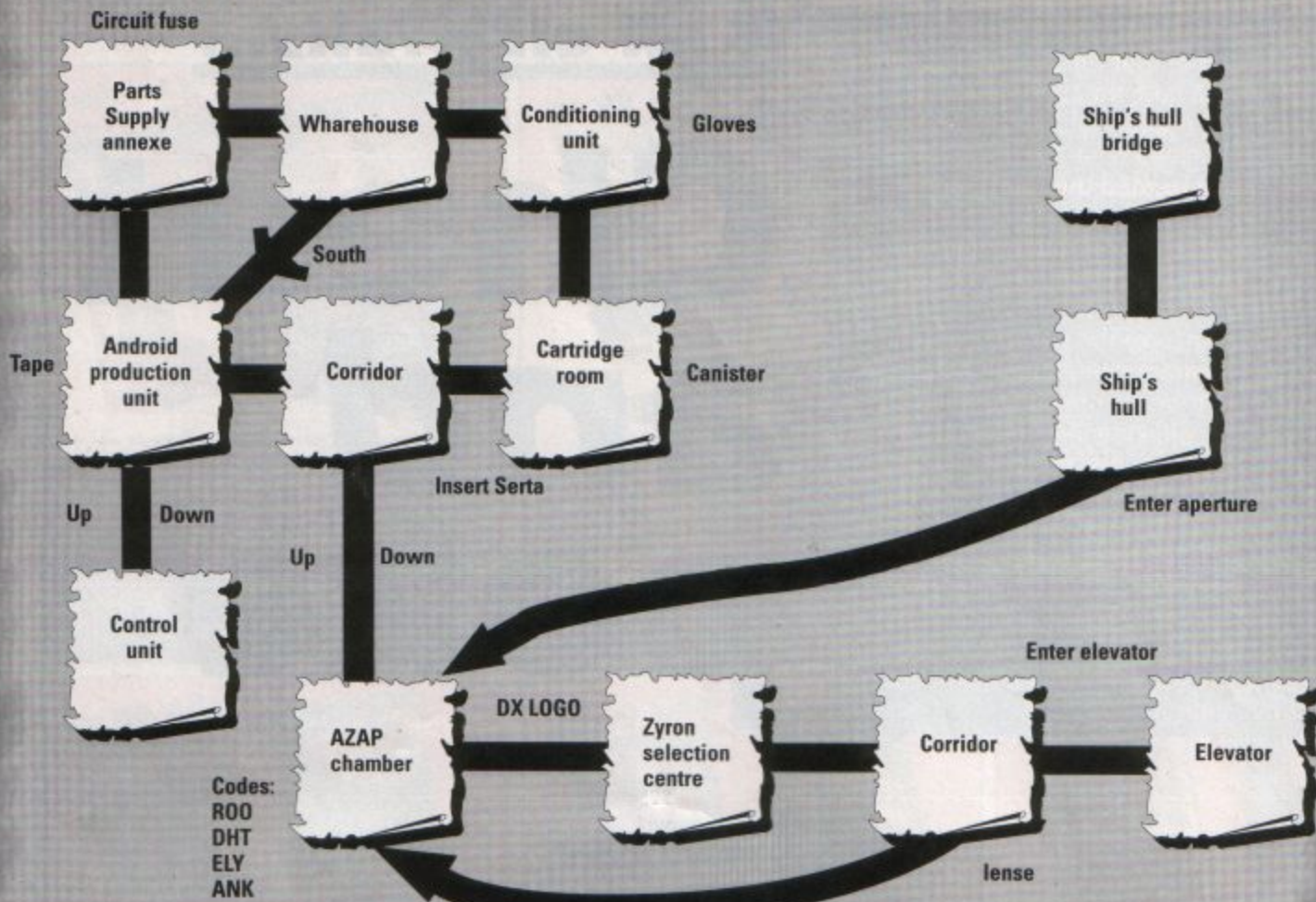
The pirate will appear near the cross-over area, and he will steal any treasure you are carrying. However, you can retrieve any stolen treasure when you find his chest.

If the lamp flickers you must replenish its batteries. Rush back to the building, via the Y2 room and the well. Then GET COINS, SAY PLUGH and go South, South, West, West, South, Down, Down, DROP COINS, and go North and Up. Once accomplished, you can return to where you were before.

Now begin your quest in earnest. But remember that though riches await you, the Colossal cave also holds many dangers. Go East into the building, GET LAMP and GET KEYS. This is your temporary repository, and you will return here to drop some items of

OXBRIDGE





of Fame

treasure. In the meantime, return West and you will find yourself back outside the building again.

Travel South to the valley with the stream, and South again to the valley with the trees. Continue South into the 20 foot depression, OPEN GRATING, and go down into the rock cave.

Journey West along a low passage, and remember to switch on your lamp. GET CAGE and go West into the room full of debris - don't get rid of the rod yet.

Continue West along the East/West sloping canyon and into the splendid chamber. GET BIRD, and go West to the end of the passage.

Go Down into the East end of the Hall of Mists and DROP KEYS.

Now go South into the long low room and GET NUGGET. Travel North into the Hall of Mists, then Down into the Hall of the Mountain King. DROP BIRD, DROP CAGE, go South and GET JEWELRY.

Journey North twice, GET SILVER bars, and go North again into the huge room. SAY PLUGH and you will find yourself back inside the building. Now drop the nugget, silver

and jewelry, and GET BOTTLE. SAY PLUGH again.

(To be continued next month)

Super Gran Steve Gray

During the adventure you will regularly need to MAKE PORRIDGE to regain lost powers. You will therefore need a bowl, a box of porridge oats and a bottle of milk from the milk float - which you will find travelling around town.

But in order to achieve this state of affairs you must follow these explicit instructions: GET MILK, MAKE PORRIDGE, EAT PORRIDGE, EAT PORRIDGE, GET BOWL.

To begin with KICK the BALL until you have scored three goals. This will make the magician's top hat appear for later use. Once you have done this KICK the POSTS and GET POST, go South and POLE VAULT.

You will find yourself in a hospital bed and you'll have to find out what has happened during your hospital stay and to try to regain your lost powers. To begin with, EXAMINE TABLE, EAT the PORRIDGE you find twice and then GET the BOWL. Now you feel bet-

ter you should GET UP, leave the hospital by taking the only available exit.

Go East, ENTER the sweet SHOP, EXAMINE the DARTBOARD, and GET the DART. Leave the shop by going North and proceed East, East, North and ENTER HOUSE, EXAMINE the CUPBOARD and GET the BOX of porridge oats.

Leave by going South, South, West, North and GET the magician's HAT. Leave the football pitch by going North, North and ENTER the Town Hall. Now go South, East and ENTER the MUSEUM. You will discover what has been stolen in your absence and what you have to retrieve while you try to regain your powers.

Leave the museum by proceeding South, West, West and ENTER the THEATRE. GET the magician's WAND, ENTER his CABINET, READ the NOTE you find there and follow the instructions given. GET the ROPE and go UP.

Follow the instructions on the note twice more to produce part of the Ray Machine. GET the part of the RAY machine, DROP the WAND and DROP the HAT.

(To be continued next month)

When you're really stuck in a text adventure you can do one of four things. You may either take a peep at a hint sheet (the most popular option) write to me for help (often a better choice) simply give up, or cheat.

To date, I have treated the fourth option with the contempt it deserves, but due to an ever-growing demand for pokes and routines to help various adventurers on their way, I have at last relented.

In doing so I answer the paradox of why clever programmers should have an unfair advantage over wearisome adventure buffs. Not that a wise old king like me would ever stoop to cheating for his own sake, you understand - tee hee!

In consequence, this section contains useful pokes, procedures and tips to help you get into the innards of a number of Electron text adventures. This month I begin with a compendium of cheats which have appeared in the pages of this column during the past five years:

If all else fails...

Cheat and poke

AdventureSoft games:

In any of the earlier AdventureSoft games - up to number 12 - type QUIT at any point, and when you are asked if want another game type NO. Now enter the following short program:

```
1 VDU 14
2 FOR X=&E00 TO &FFFF
3 IF ?X>31 AND ?X<127 01 = THEN
PRINT CHR$ ?X;
4 NEXT
```

RUN the program and hey presto, the Electron's memory will be printed to screen. Enable your printer if you want a hard copy.

A more specific version of the above cheat will print out purely the program memory - in most cases - if you enter this alternative routine:

```
1 VDU 14
2 FOR X=&E00 TO &5A00
3 IF ?X>31 AND ?X<127
THEN PRINT CHR$ ?X;
4 NEXT
```

The following OS calls will re-run most Adventuresoft games after pressing Break. Try each to see which works in each case:

```
CALL &1E2E
CALL &1D9B
CALL &1902
CALL &1901
```

Classic Adventure

The following short procedure will poke the game's memory and reveal new locations and exits, especially in the forest, and around Witts End and the Bedquilt areas:

```
*LOAD CLASSIC
?&1770 = 64
```

To start the game type:

```
CALL &E00
```

Kayleth is currently being featured in our map section, but if you want to cheat in the adventure read on. LOAD the loader program and hit Break. Now *LOAD KAYLETH, and upon loading, type NEW. Now type:

```
10 FOR F=&F00 TO &6000
20 IF ?F>31 AND ?F<127 VDU ?F
30 NEXT
```

Press Control N before running the program. Press Shift to scroll and read all the text and vocabulary in the game.

Sphinx Adventure

When the game has loaded, press Control V, then press 6, and type the following routine:

```
CALL &D01
*FX200,0
LIST
```

This will list the program contents. Then to disable that pesky dwarf, do the following to the program listing: alter line number 194 to: PRINT "It misses"

An alternative way to list the innards of Sphinx Adventure is to press the " key and type the following:

```
?&5774=&FF
*FX200,0
LIST
```

● Next month I will poke about with *Dodgy Geezers, Valley of the Kings and Sadim castle*.

Philosopher's Quest

To gain a list of all location descriptions in this classic adventure, simply exit the game by pressing Escape or Quit, enable your printer and enter the following:

```
WIDTH 80:FOR a=1 TO 294:PROC(a):NEXT a
```



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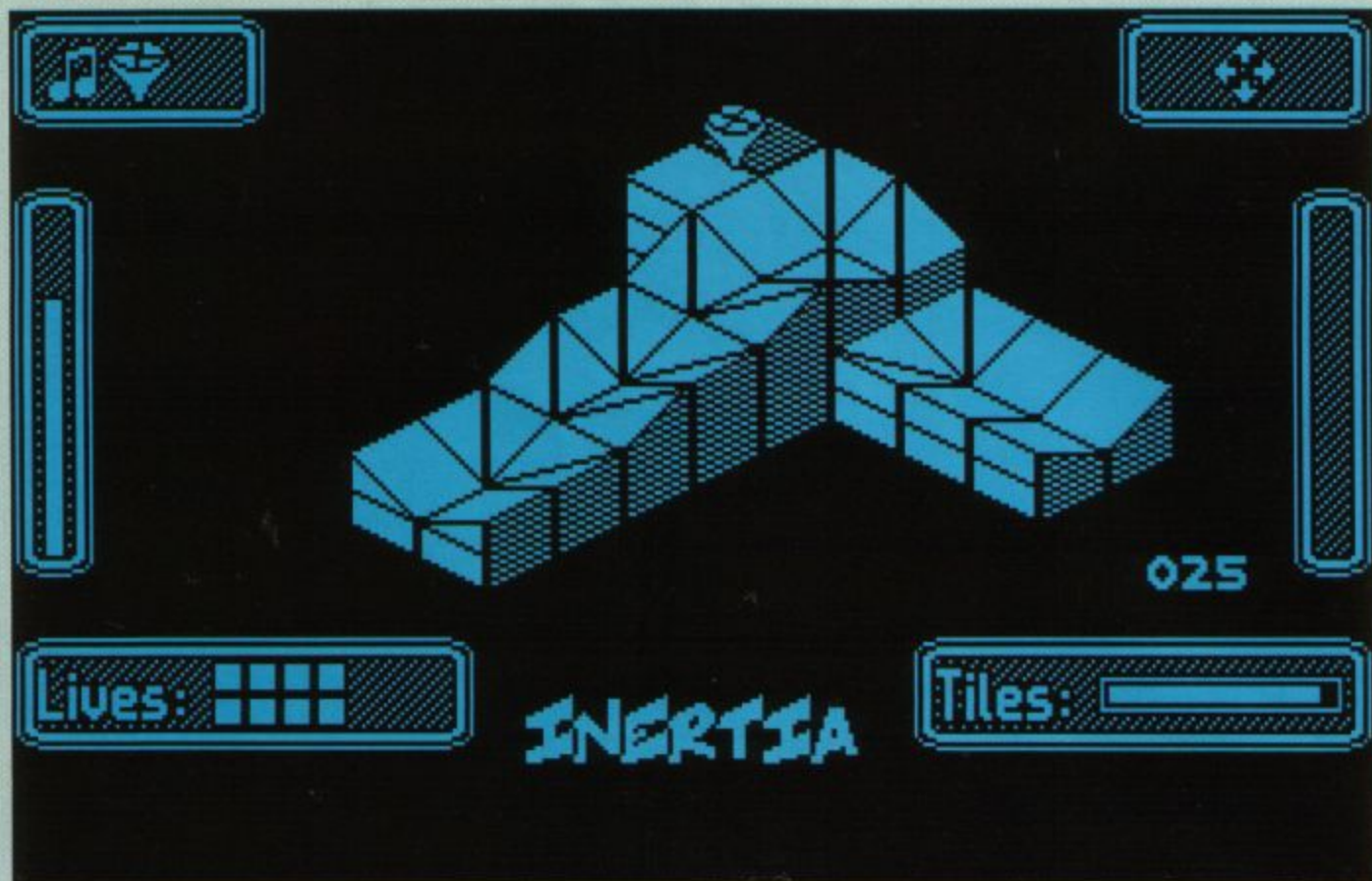
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INERTIA

...in a spin

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Tel: 0742 700661

A NEW idea in Electron software? Well, not quite, there have been games like it in the past. *Inertia*, however, is vastly superior to earlier attempts on a similar theme.

The aim is simple. You steer your craft, a kind of spinning top, through a series of three dimensional landscapes, the surfaces of which are covered in tiles and you must collect the shaded ones.

The problem is that this world has edges and it is all too easy to lose control of your vehicle and land up in the nether regions. This involves the loss of a life.

At first the task seems fairly easy: The paths are wide and simple to negotiate. But after a few screens problems crop up.

Shaded tiles need to be collected from very narrow passages with no walls to prevent a disaster occurring.

At other points ramps send your vehicle spinning into space with only a hope that it will make a soft landing. It is fortunate that

you are equipped with first rate brakes as well as controls to move you up, down, left and right.

These have to be used in tandem when diagonal movement is required. When you do have the misfortune to fall off the edge of the world you restart from the point where you last found a shaded tile.

When you feel you have mastered these basic problems other troubles will start to afflict you. Jump tiles throw the spinning top into the air.

With luck, you won't land on a direction square which reverses the operation of your control keys.

Ice is another hazard. This causes the craft to skid and it is essential to be heading in the correct direction before attempting to cross this slippery surface.

Other tiles make the brakes fail or the steering defective. Again, great care is needed before these are crossed. One other

interesting idea is the transformation tile. This alters your craft from a light, fast mover into a slow, lumbering but more controllable device. This is certainly an aide to crossing awkward surfaces.

Inertia is an arcade adventure with a difference. Players without superb memories will probably need to produce a map if they hope to find every shaded tile.

You start the quest with three lives, but an extra one is gained for each tile collected. This can easily build up to the maximum of 12, but they are lost all too easily while trying to set a straight course along an ice floe. Each tile also gains you five points while losing a life reduces your score by three.

The graphics are very good. Mode 4 has been chosen which limits the screen to two colours, but rapid scrolling means that the colours change frequently.

The craft can move swiftly – you won't need a turbo – and it does so smoothly and

electron
user

Golden
game



Jumping is the only way to reach some of the tiles



Maximum lives, but there's still a lot of tiles to collect



Be quick: Time is running out



A tricky bend to negotiate

without flicker.

The playing area is a window in the middle of the screen which is surrounded by neat status icons.

Along the top of the display you get an indication of sound status, which of the craft types is in use, whether the keys are normal or reversed and whether the pause option has been selected.

At the bottom is the useful game information – lives left, score and tiles still to be found. The sides of the screen have the time indicators.

A tile must be found before the time runs out or a life is lost. Each time you do collect a shaded tile, the timer is reset.

The sound is fairly basic – a few beeps when the craft hits a wall.

It can be turned off, although it's not particularly intrusive.

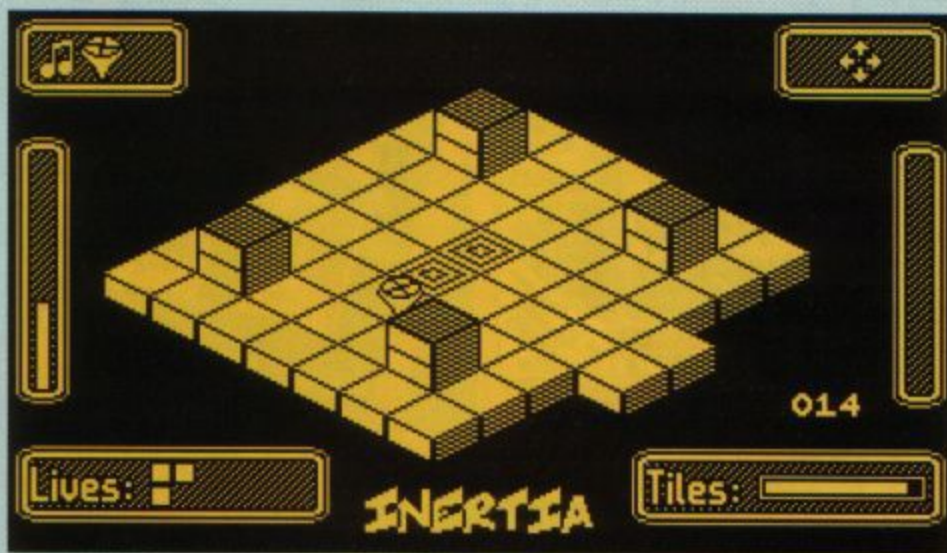
We have come to expect quality software from The Fourth Dimension and the company has not let us down with Inertia.

This is a first rate game with just the right mix of ingredients.

It requires close control and thought and has enough of a frustration factor to call for yet another go. Recommended.

Rog Frost

Sound	4
Graphics	8
Playability	10
Value for money	10
Overall	9



Not all the tiles are as easy to collect as these two

Second Opinion

From the loading screen onwards you have the impression of quality. And once the game's loaded you won't be disappointed. The 3D effect is excellent with quite realistic movement of the top around the maze and up and down the slopes. The controls are responsive and you're never left in the position of feeling that you pressed a key and it was ignored. The idea is simple, but it is well implemented and capable of keeping you hooked for hours. I like it.

Louise Colinson

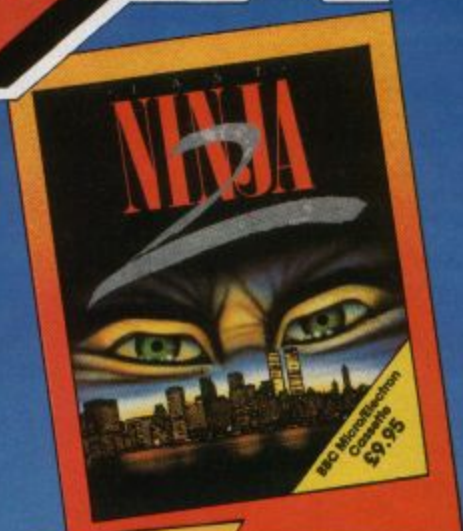
SUPERIOR SIX



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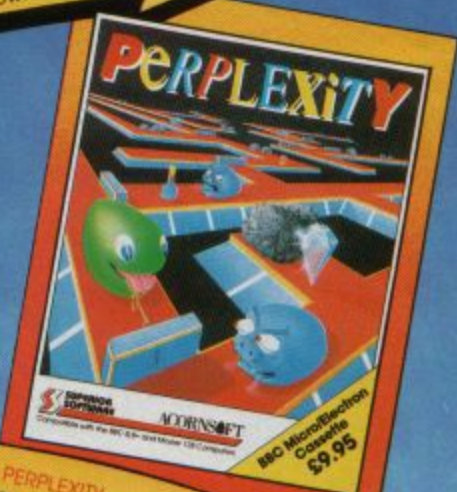
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SUPERIOR SOCCER
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Barry Woods steps back into the past and files his history reports from May 1984

THE WAR 1984

OLD computer users will no doubt be saying to their offspring: "When I was a lad all I had was 1k of ram to program in, a plastic keyboard and a micro that got so hot you could fry an egg on it - kids don't know they're born these days".

That was the old Sinclair ZX81 of course (built in 1981), superseded by the Spectrum a year later. One year after that the Electron was unveiled, and what a fantastic technological leap forward that was. A proper full sized keyboard, 32k of ram and a superb Basic that probably still hasn't been bettered.

By May 1984 the new Electron had really taken off, with new software and peripherals being released almost daily. *Electron User's* headlines on the news pages proclaimed in big bold type: Electron utilities start to pour on to the market... and add-ons are on the increase too.

The first phase of software releases consisted of games, followed by educational titles, and then the market got its third wind with utility programs.

From Superior Software came the Electron Disassembler, one of the few utilities it produced. The company is now better known for games, particularly Repton and Play it Again Sam.

Dynabyte released Electron Aid for creating multicoloured characters and sound effects and Slamander produced the Graphics System, an advanced art package.

Releases were coming thick and fast on the hardware front, too.

Derbyshire-based First Byte Computers was quick off the mark to produce a joystick

interface - the Plus 1 was still just a twinkle in the designer's eye at Acorn - and from Broadway Electronics of Bedford came a combined printer and user port on one interface. Screen dump software was bundled with it, too.

There was also the news that Acorn had signed a "cast iron" contract to supply British Telecom with several thousand Electron motherboards. They were to be incorporated into the new Merlin Healthnet Workshop which was designed to provide an electronic mail link between health centres and hospitals. Whatever happened to it?

Have any readers come across this in health centres or hospitals? Drop me a line if you have.

It's embarrassing looking back at those early days of *Electron User*. You only had to mention the word ram (random access

memory) and the artroom lads drew a male sheep on the page - look at Mike Cook's technical article below!

Mention the 8 bit data bus and electrical conductors and you were likely to get a bright red number 9 bus complete with conductor that looked like an inhabitant of Camberwick Green.

Heading the software charts were Killer Gorilla, Centbug, Alien Dropout, Invaders, Super Hangman, Kingdom of Klein, Positron Invaders, Diamond Mine and Bed Bugs. Some of these are now reappearing on compilations - a real blast from the past.

● *It's fascinating looking back through the years, comparing early magazines with the latest, looking at what was making the news headlines - it's surprising how much has changed.*

Next month I'll take a trip back to June 1985. See you soon...

Look out for ROMs... and RAMs

It's the first of the series (RAM) we looked at when we discussed a memory system. Most memory systems address either RAM or ROM, so this article has to talk about what they are.

Each memory location contains a single bit of information. We need one byte of memory to store one character of data.

ROM stands for Read Only Memory. The address locations that contain ROM cannot be changed by the program. They are used for the data to be read.

The advantage of ROM is that the data is permanent. It is not affected by power loss. It is also very fast to access.

The disadvantage of ROM is that it is not flexible. It is not possible to change the data stored in ROM.

RAM stands for Random Access Memory. It is used for data that is being processed by the program. It is very fast to access and can be changed by the program.

RAM is volatile. That means that the data stored in RAM is lost when the power is removed. It will forget whatever was stored in it.

As it is used to store your program, you'll see that it will need to be loaded in every time the Electron is switched on.

This is why there is a high resolution display on every computer of which programs to be loaded rapidly.

This makes it ideal for storing programs and data which form the backbone of the computer system. It is also used for the data to be read.

In the Electron, the ROM is the program which allows the computer to understand the program instructions as well as data which is the program and appears through a word "channel" before you could get it.

This was the days of large machines, computers which only had ROM programs for permanent data. They were not interactive like the Electron.

So you can see that the word RAM describes the sort of memory which can be changed by the user.

RAM is volatile. That means that the data stored in RAM is lost when the power is removed. It will forget whatever was stored in it.

As it is used to store your program, you'll see that it will need to be loaded in every time the Electron is switched on.

This is why there is a high resolution display on every computer of which programs to be loaded rapidly.

When RAM is first switched on, it will contain a collection of zeros and ones known as "noise". This is because they have no significance and the signals cannot be predicted.

It is now that any individual byte needs to be given up with the same rubbish every time and with different patterns the noise is different.

The Electron usually clears out most of its memory on power-up. But the memory which contains the program, user program variables, such as the 256, 256 is left unchanged. In addition, there will be some RAM.

Due to the nature of the type of memory used you will need to get the value of zero and one in the RAM.

There are two types of RAM: static and dynamic.

Static RAM can be thought of as containing a number of buckets, either containing water or empty (zero one or zero).

The buckets can be locked into to see what they contain when the memory location is read. When the power is switched off, they all get jiggled about and the water splashes all over the place.

Now dynamic RAM, the type in the Electron, works in the same way except that the buckets are full, and they have to be constantly refilled.

If the memory were not refreshed by a certain time it "loses" its data.

You may ask, "Why bother with dynamic RAM with its need to be constantly refreshed when static RAM is available?"

Well if you think about it, it is not so simple.

Static RAM is much slower than dynamic RAM. It takes about 100 times a second and it is known as slow memory.

Dynamic RAM is much faster. It takes about 10 times a second and it is known as fast memory.

Each change requires one bit of information. To get a byte you would need eight persons.

However, the way it gives you bits of memory and you have already said, the RAM occupies 32k of the total RAM available memory locations. To get round this the

Electron has only the equivalent of RAM, and each one is available before it is used up.

Static RAM is much slower than dynamic RAM. It takes about 100 times a second and it is known as slow memory.

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However, the way it gives you bits of memory and you have already said, the RAM occupies 32k of the total RAM available memory locations. To get round this the



WHAT'S THAT WHEN IT'S AT HOME?

MIKE COOK explains the inner workings of the Electron

There has been a lot of talk about the Electron's memory system. It's time to look at what's going on inside the computer.

The Electron has 32k of memory. This is divided into two parts: ROM and RAM.

ROM is Read Only Memory. It contains the program which allows the computer to understand the program instructions as well as data which is the program and appears through a word "channel" before you could get it.

RAM is Random Access Memory. It is used for data that is being processed by the program. It is very fast to access and can be changed by the program.

RAM is volatile. That means that the data stored in RAM is lost when the power is removed. It will forget whatever was stored in it.

As it is used to store your program, you'll see that it will need to be loaded in every time the Electron is switched on.

This is why there is a high resolution display on every computer of which programs to be loaded rapidly.

Cheat it again, Joe

Volume 4

THE first three volumes of Cheat it Again, Joe from Impact Software have been very popular. However the company has no plans to release any more.

So in this three-part series, we present the 18 cheats which would have been on a fourth disc or tape. This month there are cheats for the Sam versions of Bug Blaster, Commando, Frack! and Cosmic Camouflage – plus updates for the original Clogger and Exile games.

Type in the listings and save them to your own blank disc or tape – not the one carrying the original software.

Then run them and follow the on-screen instructions for more enjoyment from your favourite games.

The first of a three part series in which Mark Gidley, author of the Cheat it again series, helps you get those high scores that were previously out of reach

Bug Blaster Cheat

Bug Blaster cheat

Number of lives (001-100) : 45
Infinite Lives (Y/N) : Yes

OK - Insert Bug Blaster tape and press play ...

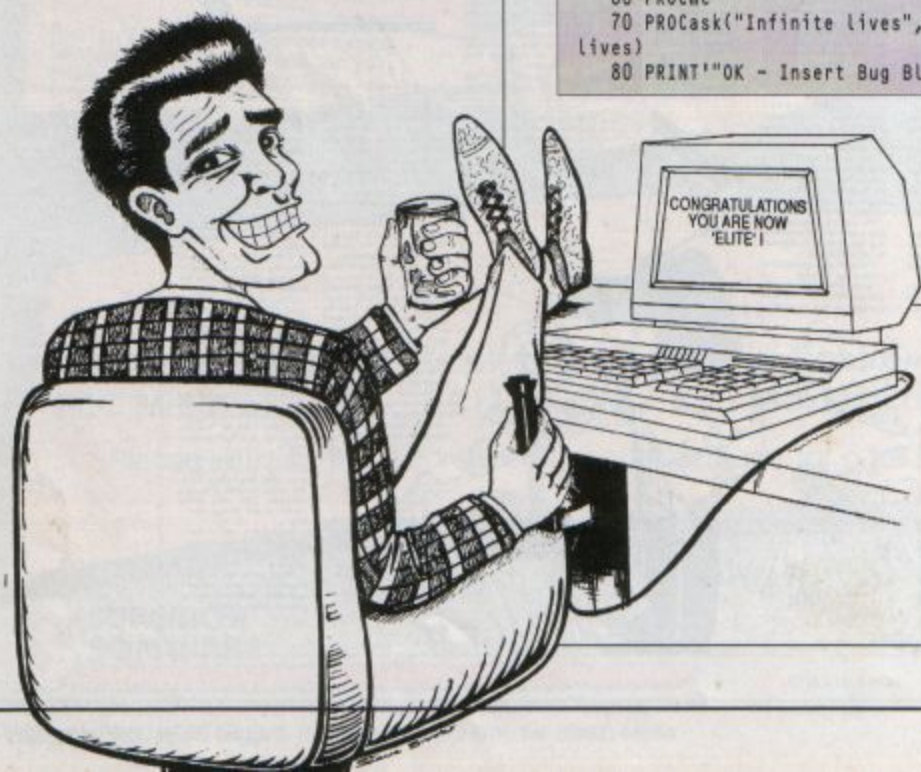
Next month

You can look forward to coverage of:

- Galaforce 2
- Hopper (Sam version)
- Hunchback (Sam version)
- Imogen (Sam version)
- Joe Blade 1
- Joe Blade 2

```
10 REM Bug Blaster cheat
20 REM Electron (Sam) version
30 :
40 MODE4:PRINT"Bug Blaster ch
eat"
50 lives=FNnum("Number of live
s",1,100,"001","100")
60 PROCmc
70 PROCask("Infinite Lives",in
lives)
80 PRINT"OK - Insert Bug Blas
```

```
ter tape and press play ...
"
90 *K.1 PAGE=&E00|MNEW|NLOAD"B
UG#1"|F|M171CALL&900|MCLS:RUN|F|M
100 VDU21:*FX138,0,129
110 END
120 DEFPROCask(AS,AX)
130 PRINT;AS;STRINGS(26-LENAS,"
");(Y/N) : ";AS=GETS:IF AS="Y"
THEN PRINT;"Yes" ELSE PRINT;"No"
:AX=&60
140 ENDPROC
150 DEFFNnum(AS,LX,MX,LS,MS)
160 PRINT;AS;STRINGS(22-LENAS,"
");(";"LS;"-"MS;") : ";
170 INPUT"aX:IF aX<LX OR aX>MX
THEN GOTO160 ELSE =aX
180 DEFPROCmc
190 FORIX=0 TO 2 STEP2
200 PX=&900
210 COPTIX
220 LDA#lives:STAB&486B
230 JSRinlives
240 RTS
250 .inlives LDA#&AD:STA&49F3:R
TS
260 J:NEXT
270 ENDPROC
```



Clogger Cheat

```

10 REM Clogger cheat
20 REM Electron version
30 :
40 MODE4:PRINT" Clogger cheat"

50 lives=FNnum("Number of lives",1,99,"001","099"):lives=EVAL("&"+STR$lives)
60 PRINT"Number of cuts per":cuts=FNnum("drill",1,255,"001","255")
70 PRINT"Maximum accumulated":time=FNnum("minutes",1,99,"001","099"):time=EVAL("&"+STR$time)
80 PROCmc
90 PROCask("Immortal to grass",immg)
100 PROCask("Infinite time",intime)
110 PROCask("Disable right springs",drsp)
120 PROCask("Disable left springs",dlsp)
130 PRINT"OK - Insert Clogger tape and press" play ..."
:VDU21

```

```

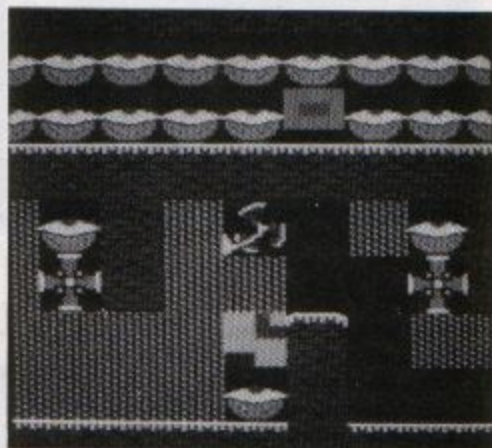
140 *FX18
150 *K.1 LOAD"CLOGGER"|F|M250PA
GE=84000:*FX138,D,130|MRUN|M
160 *K.2 LOAD"CLOGLD"|M41CALL&2
FOO|MRUN|M
170 *FX138,D,129
180 END
190 DEFPROCask(AS,AX)
200 PRINT;AS;STRINGS(26-LENAS,"");"(Y/N) : ";:AS=GETS:IF AS="Y"
THEN PRINT;"Yes" ELSE PRINT;"No"
?:AX=&60
210 ENDPROC
220 DEFNnum(AS,LX,MX,LS,MS)
230 PRINT;AS;STRINGS(22-LENAS,"");"(;L$;-;MS;)" : ";
240 INPUT"aX:IF aX<LX OR aX>MX
THEN GOTO230 ELSE =aX
250 DEFPROCmc
260 FORI=0TO2 STEP2
270 PX=&2F00
280 COPTIX
290 LDA#cuts:STA&E44
300 LDA#time:STA&24D2:STA&24DB
310 LDA#lives:STA&F2D
320 JSRimmg:JSRdlsp:JSRdrsp
330 JSRintime
340 RTS
350 .img LDA#&FF:STA&2494:RTS
360 .dlsp LDA#&FF:STA&1A35:RTS
370 .drsp LDA#&FF:STA&1A42:RTS
380 .intime LDA#&AD:STA&F62:LDA
#&18:STA&1070:LDA#&EA:STA&1071:ST
A&1072:RTS
390 J:NEXT
400 ENDPROC

```

Clogger cheat

Number of Lives	(001-099) : 3
Number of cuts per drill	(001-255) : 10
Maximum accumulated minutes	(001-099) : 99
Immortal to grass	(Y/N) : Yes
Infinite time	(Y/N) : Yes
Disable right springs	(Y/N) : No
Disable left springs	(Y/N) : No

OK - Insert Clogger tape and press play ...



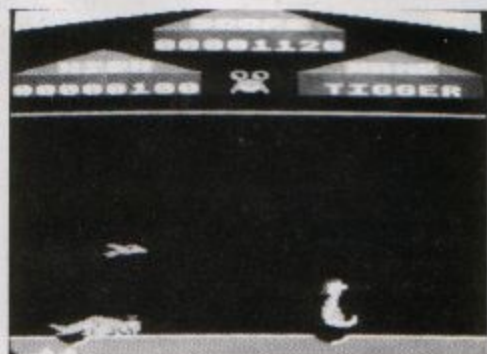
Frak!

Cheat

Frak! cheat

Infinite lives	(Y/N) : Yes
Immortal to nasties	(Y/N) : Yes
Mega jumping	(Y/N) : Yes
Infinite yoyo	(Y/N) : Yes
Fall long distances	(Y/N) : No

OK - Insert Frak tape, forward to FRAK3 and press play ...



```

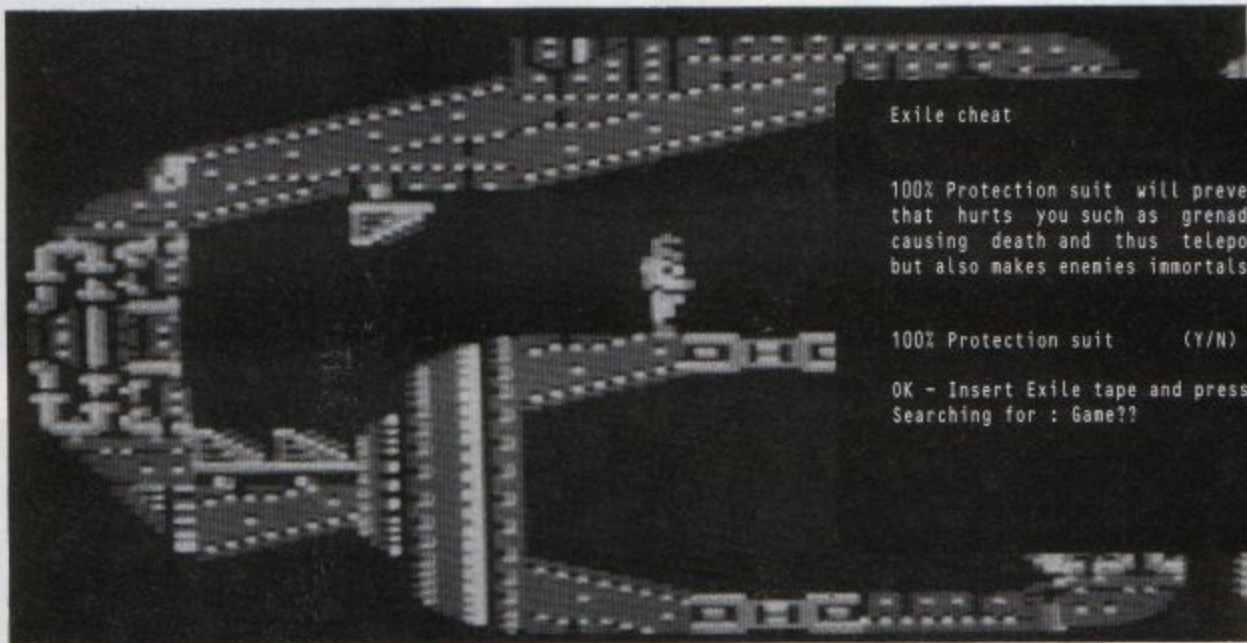
10 REM Frak! cheat
20 REM Electron version
30 :
40 *FX13,4
50 MODE4:PRINT"Frak! cheat"
60 PROCmc
70 PROCask("Infinite lives",inlives)
80 PROCask("Immortal to nasties",imm)
90 PROCask("Mega jumping",jump)
100 PROCask("Infinite yoyo",yoyo)
110 PROCask("Fall long distance",fall)
120 PRINT"OK - Insert Frak tape, forward to" FRAK3 and press play ..."
:VDU28,0,29,20,26
130 CALLmc
140 *RUN FRAK3
150 END
160 DEFPROCask(AS,AX)
170 PRINT;AS;STRINGS(26-LENAS,"");"(Y/N) : ";:AS=GETS:IF AS="Y"
THEN PRINT;"Yes" ELSE PRINT;"No"
?:AX=&60
180 ENDPROC
190 DEFPROCmc

```

```

200 FORI=0TO2 STEP2
210 PX=&7000
220 COPTIX:mc
230 LDA#0:STA&2000
240 LDA#in MOD 256:STA&220:LDA#
in DIV 256:STA&221:LDA#14:LDX#4:J
SR&FFF4
250 RTS
260 .in
270 PHP:PHA:TXA:PHA:TYA:PHA
280 LDAB&2000:CMPI#&11:BNEout
290 JSRinlives:JSRfall
300 JSRimm:JSRjump:JSRyoyo
310 LDA#13:LDX#4:JSR&FFF4
320 .out PLA:TAY:PLA:TAX:PLA:PL
P:RTS
330 .inlives
340 LDA#&A9:STA&1F4D:LDA#&D1:ST
A&1F4E:RTS
350 .fall LDA#&A9:STA&267E:RTS
360 .imm LDA#&A9:STA&276B:RTS
370 .jump LDA#&4C:STA&2559:RTS
380 .yoyo LDA#0:STA&2466:RTS
390 .load
400 J:$PX="L.FRAK3 1100"+CHRS13
:NEXT
410 ENDPROC

```



Exile cheat

100% Protection suit will prevent all that hurts you such as grenades from causing death and thus teleportation but also makes enemies immortals.

100% Protection suit (Y/N) : Yes

OK - Insert Exile tape and press play ..
Searching for : Game??

Exile

Cheat

```

10 REM Exile cheat
20 REM Electron version
30 :
40 MODE4:PRINT"Exile cheat"
50 PRINT"100% Protection suit
will prevent all that hurts
you such as grenades from causin
g death and thus teleportation
but also makes enemies immortals
"
60 PROCmc
70 PROCask("100% Protection su
it",suit)
80 PRINT"OK - Insert Exile ta
pe and press play .."
90 VDU28,0,29,30,27:PRINT"Sear
ching for : Game??" +CHR$13+CHR$11
100 CALL&900
110 END
120 DEFPROCask(A$,A%)
130 PRINT:A$;STRING$(26-LEN A$, "
");"(Y/N) : ";A$=GET$:IF A$="Y"
THEN PRINT;"Yes" ELSE PRINT;"No"
:A%=&60
140 ENDPROC
150 PROCmc
160 DEFPROCmc
170 FOR I%=0 TO 2 STEP 2
180 PX=&900
190 [OPTIX
200 .gocheat
210 LDY#exl DIV 256:LDX#exl MOD
256:JSR&FFF7
220 LDY#0:LDX#&4B:LDA#&3F:STAB7

```

```

0:STA&71
230 LDA#&94:STA&72
240 .loop1 LDA&2C00,Y:EOR&70:DE
C&71:EOR&71:EOR&72:STA&2C00,Y
250 INC&72:LDA&72:SEC:SBC#&5F:E
OR&71:STA&72:EOR&70:STA&70:EOR#&E
4:STA&71:EOR&72:INY:BNEloop1:INCL
oop1+2:INCloop1+13:DEX:BNEloop1
260 LDA#inter MOD 256:STA&220
270 LDA#inter DIV 256:STA&221
280 LDA#14:LDX#4:JSR&FFF4
290 JMP&75F9
300 .exl EQU$("LOAD GAME"+CHR$&
84+CHR$&7F+" 2C00"+CHR$13)
310 .inter PHP:PHA:TXA:PHA:TYA:
PHA
320 LDA&5A00:CMPI#&C4:BNEout
330 LDA#nb MOD 256:STA&4FB1
340 LDA#nb DIV 256:STA&4FB2
350 LDA#&4C:STA&4FB0
360 LDA#13:LDX#4:JSR&FFF4
370 .out PLA:TAY:PLA:TAX:PLA:PL
P:RTS
380 ]:PX=&A10:[OPTIX
390 .nb
400 LDA#7:JSR&FFEE
410 LDY#exb DIV 256:LDX#exb MOD
256
420 JSR&FFF7
430 LDY#0:LDX#&69:LDA#&D9:STA&7
0:STA&71
440 LDA#&43:STA&72
450 .loopb LDA&1000,Y:EOR&70:DE
C&71:EOR&71:EOR&72:STA&1000,Y

```

```

460 INC&72:LDA&72:SEC:SBC#&5F:E
OR&71:STA&72:EOR&70:STA&70:EOR#&E
4:STA&71:EOR&72:INY:BNEloopb:INCL
oopb+2:INCloopb+13:DEX:BNEloopb
470 CLI
480 LDA#13:LDX#4:JSR&FFF4
490 LDA#in MOD 256:STA&220
500 LDA#in DIV 256:STA&221
510 LDA#14:LDX#4:JSR&FFF4
520 LDA#40:STA&7850
530 JMP&789A
540 .exb EQU$("LOAD Game2"+CHR$
&85+CHR$&7F+" 1000"+CHR$13)
550 .in PHP:PHA:TXA:PHA:TYA:PHA
560 LDA&7200:CMPI#&20:BNEo
570 LDA#&51:STA&71EB
580 JSRsuit
590 LDY#0:.res LDASTack,Y:EOR#&
AA:STA&7850,Y:INY:CPY#21:BNEres
600 JMP&774F
610 LDA#13:LDX#4:JSR&FFF4
620 .o PLA:TAY:PLA:TAX:PLA:PLP:
RTS
630 .suit LDA#&A9:STA&34E9:RTS
640 .stack
650 ]:NEXT
660 RESTORE 670:FOR J%=0 TO 20:REA
DJX?PX:NEXT
670 DATA &A9,&44,&E9,&D2,&07,&89
5,&D2,&63,&3D,&7A,&49,&07,&EA,&D2
,&63,&DB,&7A,&76,&E6,&8A,&C8
680 ENDPROC

```

Cosmic Camouflage

Cheat

Cosmic Camouflage cheat

Infinite lives (Y/N) : No
 Infinite warp drives (Y/N) : Yes
 Infinite radiation bombs (Y/N) : No
 Infinite camouflage cover (Y/N) : No
 Enable jump to all levels (Y/N) : Yes

OK - Insert Cosmic Camouflage tape and press play ...

```

10 REM Cosmic Camouflage cheat
20 REM Electron version
30 :
40 MODE4:PRINT"Cosmic Camouflage cheat"
50 PROCmc
60 PROCask("Infinite Lives",in
lives):PROCask("Infinite warp dri
ves",inwd):PROCask("Infinite radi
ation bombs",inrb):PROCask("Infin
ite camouflage cover",incc):PROCa
sk("Enable jump to all levels",ju
mps)
70 PRINT"OK - Insert Cosmic C
amouflage tape and press pl
ay ..."
80 VDU28,0,20,20,18,7
90 CALL&900
100 END
110 DEFPROCask(AS,AX)
120 PRINT;AS;STRINGS(26-LENAS,"
    
```

```

");"(Y/N) : ";AS=GETS:IF AS="Y"
THEN PRINT;"Yes" ELSE PRINT;"No"
:?AX=&60
130 ENDPROC
140 DEFPROCmc
150 FORIX=0 TO 2 STEP2
160 PX=&900
170 COPTIX
180 LDA&220:STAbyte:LDA&221:STA
byte+1
190 LDA#inter MOD 256:STA&220:L
DA#inter DIV 256:STA&221
200 LDA#14:LDX#4:JSR&FFF4
210 LDY#load DIV 256:LDX#load M
OD 256
220 JSR&FFF7
230 LDA#13:LDX#4:JSR&FFF4
240 LDAbyte:STA&220:LDAbyte+1:S
TA&221
250 JSRinlives
260 JSRinwd:JSRincc:JSRinrb:JSR
jumps
270 JMP&2000
280 .inlives LDA#0:STA&35B7:RTS
290 .inwd LDA#&EA:STA&2FC0:STA&
2FC1:RTS
300 .incc LDA#&EA:STA&302A:STA&
302B:RTS
310 .inrb LDA#&EA:STA&2FF8:STA&
2FF9:RTS
320 .jumps LDA#&EA:STA&3B63:LDA
#&A9:STA&3B64:LDA#&01:STA&3B65:RT
S
330 .inter LDA&3CA:AND#254:STA&
3CA:RTS
340 .byte NOP:NOP
350 .load
360 J:$PX="LOAD SB3"+CHR$13:NEX
T
370 ENDPROC
    
```

Commando

Cheat

```

10 REM Commando cheat
20 REM Electron (Sam) version
30 :
40 MODE4:PRINT"Commando cheat
"
50 PROCmc
60 PROCask("Infinite lives",in
lives)
70 PROCask("Infinite grenades"
,ingrens)
80 PROCask("Immortal to bullet
s",imbull)
90 PROCask("Immortal to grenad
es",ingrens)
100 PROCask("Walk over trenches
",trenches)
110 PRINT"OK - Insert Commando
tape and press play ..."
120 *FX18
130 *KEY1 LOAD"COMMAND2"|F|M250
CALL&900|MRUN|M
140 VDU7,21:*FX138,0,129
150 END
160 DEFPROCask(AS,AX)
    
```

Commando cheat

Infinite lives (Y/N) : Yes
 Infinite grenades (Y/N) : No
 Immortal to bullets (Y/N) : Yes
 Immortal to grenades (Y/N) : No
 Walk over trenches (Y/N) : No

OK - Insert Commando tape and press play ...

```

170 PRINT;AS;STRINGS(26-LENAS,"
");"(Y/N) : ";AS=GETS:IF AS="Y"
THEN PRINT;"Yes" ELSE PRINT;"No"
:?AX=&60
180 ENDPROC
190 DEFPROCmc
200 FORIX=0 TO 2 STEP2
210 PX=&900
220 COPTIX
230 LDA#un MOD 256:STA&220:LDA#
    
```

```

un DIV 256:STA&221:LDA#14:LDX#4:J
SR&FFF4
240 LDY#load DIV 256:LDX#load M
OD 256
250 JSR&FFF7
260 LDA#13:LDX#4:JSR&FFF4
270 JSRinlives:JSRingrens
280 JSRinbull:JSRingrens:JSRtre
nches
290 JMP&5800
300 .inlives LDA#0:STA&23BB:RTS
310 .ingrens LDA#0:STA&3C13:RTS
320 .imbull LDA#0:STA&4011:LDA#
&F0:STA&4014:RTS
330 .ingrens LDA#0:STA&3CDC:LDA
#&F0:STA&3CDF:RTS
340 .trenches LDA#0:STA&2D55:RT
S
350 .un LDA&3CA:AND#254:STA&3CA
:RTS
360 .load
370 J:$PX="LOAD TGAME"+CHR$13:N
EXT
380 ENDPROC
    
```

Egg Mania

Can you help
Pug reorganise the
Easter mess in this
game by Sherk Clawin?

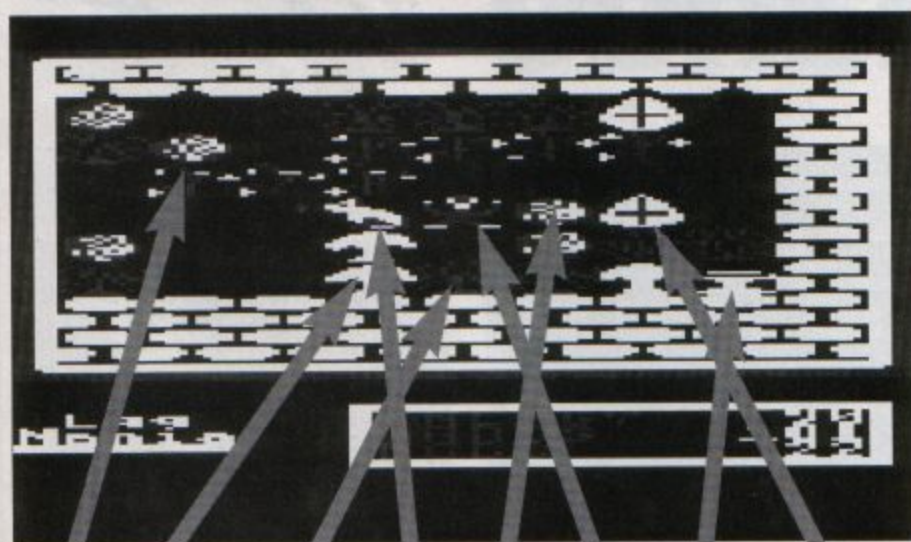
EASTER is over, the grass is growing and Warren Rabbit has been around and upset the order that had been set up by Pug - The Logical Egg Puzzler. Poor Pug now has to wander the maze, clear all the grass, and put the eggs back on the egg cups.

But Warren's friends are annoyed at Pug's tidiness and will try to stop him at any cost. They've even placed boulders and planted poisonous mushrooms around the maze.

Can you help Pug with his task? Control him with these keys:

Z Left
X Right
: Up
/ Down

The program relocates itself in memory if necessary and contains a substantial chunk of machine code. This means that it's more important than ever to save before you run it.



<i>Trees:</i> Just an obstacle that gets in your way	<i>Magic Mushrooms:</i> Not to be eaten if you want to retain your energy	<i>Grass:</i> Every blade must be cared if you want to succeed	<i>Warren:</i> Watch out for him or your energy will go down	<i>Boulders:</i> Push them out of the way but take care not to block your route	<i>Pug: The Logical Easter Egg Puzzler</i>	<i>Egg cup:</i> Just put the eggs in these - it's not as easy as it sounds	<i>Eggs: With a bit of pushing they can be placed on the cups</i>
---	--	--	---	---	--	---	---

Machine code modules

.left	Moving left
.right	Moving right
.up	Moving up
.down	Moving down
.loopcode	Checks keys and acts on them
.moveb	Moves eggs if they must drop
.distributee	Stores egg positions in memory
.show	Displays scrolling playing area

```

10 REM Egg Mania
20 REM By S.Clark and a Bunny
Rabbit
30 REM (c) Electron User
40 ON ERROR GOTO1090
50 IF PAGE>=E00 GOTO1100
60 MODE6
70 PROCsprites
80 PROCinit
90 REPEAT
100 MODE6:PRINTTAB(13,5)"Please
Wait...":PROCdata
110 MODE5:PROCsetup:HIMEM=&4B00
:PROCmove:UNTIL0:END
120 DEFPROCsetup
130 VDU23,1,0;0;0;0;
140 VDU19,3,2,0,0,23,255,240,
240,240,240,240,240,240,240,23,25
4,255,255,255,255,0,0,0,23,253,
255,255,255,255,248,240,240,240,2
3,252,255,255,255,255
150 VDU31,15,15,15,23,251,240,2
40,240,248,255,255,255,255,23,250
,15,15,15,31,255,255,255,255
160 COLOUR3:COLOUR130:FORBX=3 T
O 20:VDU31,0,BX,255:NEXT:COLOUR2:
COLOUR131:FORBX=3 TO 20:VDU31,19,
BX,255:NEXT:FORBX=1 TO 18:VDU31,B
X,21,254:NEXT:COLOUR3:COLOUR130:F
ORBX=1 TO 18:VDU31,BX,2,254:NEXT
170 COLOUR3:COLOUR130:VDU31,0,2
,253,31,19,2,252,31,0,21,251,31,1
9,21,250:FORBX=8 TO 18:COLOUR129:
COLOUR0:VDU31,BX,23,254:COLOUR1:C
OLOUR128:VDU31,BX,27,254:NEXTBX
180 FORBX=24 TO 26:COLOUR129:CO
LOUR0:VDU31,7,BX,255:COLOUR1:COLO
UR128:VDU31,19,BX,255:NEXTBX:COLO
UR129:COLOUR0:VDU31,7,23,253,31,7
,27,251,31,19,23,252,31,19,27,250
190 COLOUR3:COLOUR128:PRINTTAB(
8,24)"ENERGY"TAB(8,25)"GRASS"TAB(
8,26)"EGGS":COLOUR2:PRINTTAB(17,2
4)"99"TAB(16,25)"181"TAB(17,26)"2
2"TAB(1,24)"Egg"TAB(0,25)"Mania":
COLOUR1:COLOUR128
200 FORBX=0 TO 4:VDU31,BX,26,25
4:NEXTBX:COLOUR2:ENVELOPE1,129,-1
,2,-3,1,-7,-14,126,0,0,-126,126,1
26:ENDPROC
210 DEFPROCinit:FORpass=0 TO 2

```

```
STEP2:PX=&4300:add=&A02:nadd=&A50
:LOPpass:.show:JSRdec:LDA#&D0:ST
A&88:LDA#&5B:STA&89:LDA#&80:STA&8
4:LDA#&4D:STA&85:LDA#9:STA&82:.s1
:LDA#9:STA&83:.s2:LDY#0:LDA(&80),
Y:STA&8A:.s3:LDA&84:CLC:ADC#64:ST
A&84
```

```
220 LDA&85:ADC#0:STA&85:DEC&8A:
BNEs3:LDA&88:STA&86:LDA&89:STA&87
:JSRshow1:LDA&86:CLC:ADC#32:STA&8
6:LDA&87:ADC#1:STA&87:JSRshow2:LD
A&80:CLC:ADC#1:STA&80
```

```
230 LDA&81:ADC#0:STA&81:LDA&88:
CLC:ADC#32:STA&88:LDA&89:ADC#0:ST
A&89:LDA#&8D:STA&84:LDA#&4D:STA&8
5:DEC&83:BNEs2:LDA&88:CLC:ADC#96:
STA&88:LDA&89:ADC#1:STA&89:LDA&80
:CLC:ADC#24:STA&80:LDA&81:ADC#0:S
TA&81:DEC&82:BNEs1:RTS
```

```
240 .show1:LDY#0:.sh1:LDA(&84),
Y:STA(&86),Y:INY:CPY#32:BNEsh1:RT
S:.show2:LDY#32:.sh2:LDA(&84),Y:S
TA(&86),Y:INY:CPY#64:BNEsh2:RTS
```

```
250 .distributeb:LDA#&BF:STA&72
:LDA#&53:STA&73:LDX#0:.db1:LDY#0:
LDA(&72),Y:CMP#3:BEQdb4:.db2:LDA&
72:CLC:ADC#1:STA&72:LDA&73:ADC#0:
STA&73:LDA&72:CMP#&FF
```

```
260 BEQdb3:BNEdb1:.db3:LDA&73:C
MP#&57:BNEdb1:RTS:.db4:LDA&72:STA
&B00,X:INX:LDA&73:STA&B00,X
```

```
270 INX:STX&8A:JMPdb2
280 .moveb:LDX#0:STX&77:.mb1:LD
X&77:LDA&B00,X:STA&72:INX:LDA&B00
,X:STA&73:LDY#33:LDA(&72),Y:CMP#1
:BEQmb3:.mb2:LDX&77:INX:INX
```

```
290 STX&77:CPX#98:BNEmb1:RTS:.n
b3:LDA#1:LDY#0:STA(&72),Y:LDA&72:
CLC:ADC#33:STA&72:LDA&73:ADC#0:ST
A&73:STA&B00,X:DEX
```

```
300 LDA&72:STA&B00,X:LDY#0:LDA#
3:STA(&72),Y:JMPmb2:.distributee:
LDA#&BF:STA&72:LDA#&53:STA&73:LDX
#0:.db1e:LDY#0:LDA(&72),Y
```

```
310 CMP#5:BEQdb4e:.db2e:LDA&72:
CLC:ADC#1:STA&72:LDA&73:ADC#0:STA
&73:LDA&72:CMP#&FF:BEQdb3e:BNEdb1
e
```

```
320 .db3e:LDA&73:CMP#&57:BNEdb1
e:RTS:.db4e:LDA&72:STA&B00,X:INX:
LDA&73:STA&B00,X:INX:STX&8A:JMPdb
2e:.movee:LDX#0:STX&77
```

```
330 .me1:LDX&77:LDA&B00,X:STA&7
2:INX:LDA&B00,X:STA&73:LDY#33:LDA
(&72),Y:CMP#1:BEQme3:CMP#6:BEQme4
:.me2:LDX&77:INX:INX
```

```
340 STX&77:CPX#44:BNEme1:RTS:.m
e3:LDA#1:LDY#0:STA(&72),Y:LDA&72:
CLC:ADC#33:STA&72:LDA&73:ADC#0:ST
A&73:STA&B00,X:DEX:LDA&72
```

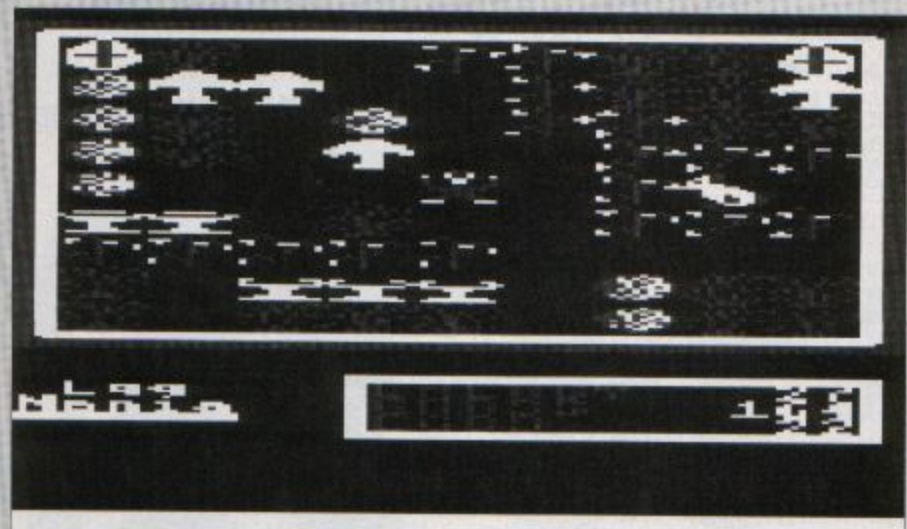
```
350 STA&B00,X:LDY#0:LDA#5:STA(&
72),Y:JMPme2:.ne4:LDA#1:STA(&72),
Y:LDA&72:CLC:ADC#33:STA&72:LDA&73
:ADC#0:STA&73:LDA#&53
```

```
360 STA&B00,X:DEX:LDA#&BF:STA&B
D0,X:LDY#0:LDA#10:STA(&72),Y:LDA&
72:SEC:SBC#33:STA&72:LDA&73:SBC#0
:STA&73:LDA#1:LDY#0:STA(&72),Y:DE
C&7D
```

```
370 LDA#1:STA&92:JMPme2:.delete
:LDY#0:LDA#1:STA(&8E),Y:RTS:.char
acter:LDY#0:LDA#11:STA(&8E),Y:JSR
moveb:JSRmovee:JSRrabbits:JSRshow
```

```
380 RTS:.up:LDA&8E:SEC:SBC#33:S
TA&72:LDA&8F:SBC#0:STA&73:LDY#0:L
DA(&72),Y:STA&76:CMP#1:BEQU:CMP#4
:BEQU:CMP#2:BEQU:CMP#9:BEQU:CM
P#5:BEQLift:RTS:.ug:LDA#1:STA&91
```

```
390 .u:LDA&72:STA&8E:LDA&73:STA
```



```
&8F:RTS:.hu:LDA&7C:SEC:SBC#9:STA&
7C:LDA#1:STA&90:RTS:.lift:LDA&72:
SEC:SBC#33:STA&74:LDA&73:SBC#0
```

```
400 STA&75:LDY#0:LDA(&74),Y:STA
&76:CMP#1:BEQL1:CMP#6:BEQL6:RTS:.
l1:LDA#5:LDY#0:STA(&74),Y:LDA&72:
STA&8E:LDA&73
```

```
410 STA&8F:LDX#0
420 STX&77:.l2:LDA&B00,X:CMP#8E
:BEQL3:.l4:LDX&77:INX:INX:STX&77:
CPX#44:BNEl2:RTS:.l3:INX:LDA&B00,
X:CMP#8F:BEQL5:BNEl4
```

```
430 .l5:LDA&75:STA&B00,X:DEX:LD
A&74:STA&B00,X:RTS:.l6:LDY#0:LDA#
10:STA(&74),Y:LDA&72:STA&8E:LDA&7
3:STA&8F:LDX#0:STX&77
```

```
440 .l7:LDX&77:LDA&B00,X:CMP#8E
:BEQL8:.l9:LDX&77:INX:INX:STX&77:
CPX#44:BNEl7:RTS:.l8:INX:LDA&B00,
X:CMP#8F:BEQL10:BNEl9:.l10:LDA#&5
3:STA&B00,X:DEX:LDA#&BF:STA&B00,X
:DEC&7D
```

```
450 LDA#1:STA&92:RTS:.dec:LDA&8
E:SEC:SBC#136:STA&80:LDA&8F:SBC#0
:STA&81:RTS
```

```
460 .down:LDA&8E:CLC:ADC#33:STA
&72:LDA&8F:ADC#0:STA&73:LDY#0:LDA
(&72),Y:STA&76:CMP#1:BEQd:CMP#4:B
EQdg:CMP#2:BEQdu:CMP#9
```

```
470 BEQdu:RTS:.dg:LDA#1:STA&91:
.d:LDA&72:STA&8E:LDA&73:STA&8F:RT
S:.du:LDA&7C:SEC:SBC#9:STA&7C
```

```
480 LDA#1:STA&90:RTS
490 .left:LDA&8E:SEC:SBC#1:STA&
72:LDA&8F:SBC#0:STA&73:LDY#0:LDA(
&72),Y:STA&76:CMP#1:BEQLet:CMP#4:
BEQLe1g:CMP#2:BEQhit:CMP#9:BEQhit
:CMP#5:BEQle2:CMP#3:BEQle2:RTS:.l
e1g:LDA#1:STA&91
```

```
500 .le1:LDA&72:STA&8E:LDA&73:S
TA&8F:RTS:.hit:LDA&7C:SEC:SBC#9:S
TA&7C:LDA#1:STA&90:RTS:.le2:LDA&7
2:SEC:SBC#1:STA&74:LDA&73:SBC#0:S
TA&75:LDY#0:LDA(&74),Y:STA&77:LDA
&76
```

```
510 CMP#3:BEQLe3:CMP#5:BEQLe8:.
le3:LDA&77:CMP#1:BEQLe4:RTS
520 .le4:LDA&72:STA&8E:LDA&73:S
TA&8F:LDY#0:LDA#3:STA(&74),Y:LDX#
0:STX&77:.le5:LDX&77:LDA&B00,X:CM
P#8E:BEQLe6:.lee:LDX&77:INX:INX:S
TX&77:CPX#98:BNEle5:RTS:.le6:INX:
LDA&B00,X:CMP#8F:BEQLe7:BNElee
```

```
530 .le7:LDA&75:STA&B00,X:DEX:L
DA&74:STA&B00,X:RTS:.le8:LDA&77:C
```

```
MP#1:BEQLe9:CMP#6:BEQLed:RTS:.le9
:LDA&72:STA&8E:LDA&73:STA&8F:LDY#
0:LDA#5:STA(&74),Y:LDX#0:STX&77:.
lea:LDA&B00,X:CMP#8E:BEQLeB
```

```
540 .lee2:LDX&77:INX:INX:STX&77
:CPX#44:BNElea:RTS:.leeB:INX:LDA&B
D0,X:CMP#8F:BEQLec:BNElee2:.leC:L
DA&75:STA&B00,X:DEX:LDA&74:STA&B0
0,X:LDY#0:LDA#5:STA(&74),Y
```

```
550 RTS:.leD:LDA&72:STA&8E:LDA&
73:STA&8F:LDY#0:LDA#10:STA(&74),Y
:LDX#0:STX&77:.leeE
```

```
560 LDA&B00,X:CMP#8E:BEQLef:.le
10:LDX&77:INX:INX:STX&77:CPX#44:B
NElee:RTS:.lef:INX:LDA&B00,X:CMP#
8F:BEQLel1:BNEle10:.le11:LDA#&53:
STA&B00,X:DEX:LDA#&BF:STA&B00,X:D
EC&7D
```

```
570 LDA#1:STA&92:RTS
580 .right:LDA&8E:CLC:ADC#1:STA
&72:LDA&8F:ADC#0:STA&73:LDY#0:LDA
(&72),Y:STA&76:CMP#1:BEQri1:CMP#4
:BEQri1g:CMP#2:BEQrit:CMP#9:BEQri
t:CMP#5:BEQri2:CMP#3:BEQri2
```

```
590 RTS:.ri1g:LDA#1:STA&91
600 .ri1:LDA&72:STA&8E:LDA&73:S
TA&8F:RTS:.rit:LDA&7C:SEC:SBC#9:S
TA&7C:LDA#1:STA&90:RTS:.ri2:LDA&7
2:CLC:ADC#1:STA&74:LDA&73:ADC#0:S
TA&75:LDY#0:LDA(&74),Y:STA&77:LDA
&76
```

```
610 CMP#3:BEQri3:CMP#5:BEQri8:.
ri3:LDA&77:CMP#1:BEQri4:RTS
620 .ri4:LDA&72:STA&8E:LDA&73:S
TA&8F:LDY#0:LDA#3:STA(&74),Y:LDX#
0:STX&77:.ri5:LDX&77:LDA&B00,X:CM
P#8E:BEQri6:.rii:LDX&77:INX:INX:S
TX&77:CPX#98:BNEri5:RTS:.ri6:INX:
LDA&B00,X:CMP#8F:BEQri7:BNErii
```

```
630 .ri7:LDA&75:STA&B00,X:DEX:L
DA&74:STA&B00,X:RTS:.ri8:LDA&77:C
MP#1:BEQri9:CMP#6:BEQriB:RTS:.ri9
:LDA&72:STA&8E:LDA&73:STA&8F:LDY#
0:LDA#5:STA(&74),Y:LDX#0:STX&77:.
ria:LDA&B00,X:CMP#8E:BEQriB
```

```
640 .rii2:LDX&77:INX:INX:STX&77
:CPX#44:BNEria:RTS:.riB:INX:LDA&B
D0,X:CMP#8F:BEQriC:BNErii2:.riC:L
DA&75:STA&B00,X:DEX:LDA&74:STA&B0
0,X:LDY#0:LDA#5:STA(&74),Y
```

```
650 RTS:.riD:LDA&72:STA&8E:LDA&
73:STA&8F:LDY#0:LDA#10:STA(&74),Y
:LDX#0:STX&77:.rie
```

```
660 LDA&B00,X:CMP#8E:BEQriF:.ri
```


7 good reasons why YOU should read

THE MICRO USER

★ **Listings:** Many type-in programs – from exciting games to time saving utilities – that are featured in *The Micro User* will work on your Electron.

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PLUS

Considering changing your Electron for another micro? A BBC Master or Archimedes should be your logical choice, letting you retain the friendly environment you've become used to. Keep up to date with the latest developments with *The Micro User*.

Game

Cheshire Cat

HERE'S a solo game designed to test your logic skills. The basic idea is to match the cat's face on the left of the screen to the empty boxes. The spaces on the right contain exactly the same faces as shown on the left, but they are mixed up.

You can search which box and which face you want to test against each other – the decision about you press **ENTER** to perform the check depends on which face you are playing up and which parts match.

There are two different ways in which the faces can be used and connected.

In Levels 1 and 2 a face matches a box if it has either exactly the same facial components – the eyes, the ears, the nose, the mouth, the whiskers, the ears.

The difference on Levels 3 and 4 is that a face matches a box either if it is exactly the same or if the box has less parts than the face.

With Levels 1 and 2, three matching figures show that an exact fit has been found, making the game easier than on the other two levels where the word **NOT** only means a genuine fit but could also mean the exact fit. On all levels, three crosses indicate an incorrect fit – the wrong fit for the particular level has not been met.

Once you know which faces are better, what boxes, press **ENTER** and match them up. Once all are matched, you will be shown how many were correct.

So open it if the listing, check you have entered it easily as it is printed using the characters and remember to save it before you set it to test your powers of mental reasoning.

And be out the match!



Some examples of faces. Arrange the top of Cheshire Cat.

One of two great games – ideal for you to type into your Electron – from the April issue of *The Micro User*.

NOW ON SALE AT YOUR NEWSAGENTS

Sounds quick

... and so it is.
David Ingleby-Oddy
presents a speedy
routine to define
and check envelopes

DEFINING envelopes on an Electron can be a time consuming task. You enter the parameters, type the appropriate SOUND command and then its back to the envelope for those fine adjustments.

The utility presented here allows you to move around and change the various parameters quickly within the allowable range using the cursor keys and then try the sound by just pressing T. It makes defining sounds on your Electron fast and fun.

The last six parameters of the envelope have no effect on an unexpanded Electron, so unless you have a Complex Software Systems Sound Expansion - reviewed in this issue - they are set to the recommended values and can't be altered. With the expansion fitted all the parameters can be adjusted.

Listing I is a Mode 4 version of the program and operates in black and white. If you make the changes shown in Listing II the display will be in Mode 1 and colour, but it runs rather slowly on a non-turbo Electron.

So that's all there is to it - key in the listing and start experimenting.

ENVELOPE MAKER V1

```
SOUND N,1,255,5
```

```
ENVELOPE 1.120. 15. 0. 0.10.
      1A,1A,12A,A,A,-12A,
      12A,12A
```

```
←→ = Select Number
↑↓ - Alter +/- 1
↑↓+SHIFT - +/- 10
T - Try SOUND
```

```
Sound Exp V3:W0
```

```
(C) 9A Electron User By D Ingleby-Oddy
```

Listing I

```
10 REM ENVELOPE MAKER V1
20 REM (C) ELECTRON USER
30 REM by D.Ingleby-Oddy
40
50 MODE4
60 DIM ENX(12)
70 ONERROR MODE6:REPORT:PRINT;
" at line ";ERL:END
80 PROCscreen
90 PROCinit
100 REPEAT
110 PROCmain
120 UNTILO
130 END
140
150 DEFPROCscreen
160 VDU23,1,0;0;0;0;
170 PX=8COO:FORNX=0TO2STEP2:COPTNX:
LDA#858:STA#91:LDA#0:STA#90:L
DY#0:LD#85:STA(&90),Y:INY:LDA
#170:STA(&90),Y:INY:BNEL:CLC:LDA#
91:ADC#1:STA#91:LDY#0:CMPI#80:BNEL:
RTS:J:NEXT:CALL&COO
180 VDU19,0,7;0;19,3,0;0;
190 PROCwin(336,912,912,976)
```

```
200 PRINTTAB(11,2)"ENVELOPE MAK
ER V1"
210 PROCwin(48,752,688,816)
220 PRINTTAB(2,7)"SOUND"
230 PROCwin(48,496,1264,688)
240 PRINTTAB(2,11)"ENVELOPE"
250 PROCwin(48,176,656,432)
260 VDU23,252,0,8,56,255,56,8,0
,0,23,253,0,16,28,255,28,16,0,0,2
3,254,16,16,56,56,124,16,16,16,23
,255,16,16,16,124,56,56,16,16
270 PRINTTAB(2,19);CHRS(252);CH
RS(253);" = Select Number"
280 PRINTTAB(2,21);CHRS(254);CH
RS(255);" = Alter +/- 1"
290 PRINTTAB(2,23);CHRS(254);CH
RS(255);"+SHIFT = +/- 10"
300 PRINTTAB(3,25)"T = Try SOUN
D"
310 PROCwin(720,368,1264,432)
320 PRINTTAB(23,19)"Sound Exp V
3:";
330 PX=8COO:COPTO:LDX#F4:LDA#13
:STA#F4:STA#F05:LDA#A0FF:STA#90:
LDA#A900:EOR#FF:STA#91:STA#A900:
LDA#A900:STA#92:STX#F4:STX#F05:R
TS:J
340 CALL&COO
```

```
350 IF?&90=1AND(?&91=?&92) RE#
1:PRINT;"YES" ELSE RE#0:PRINT;"N
0"
360 PROCwin(16,48,1264,112)
370 PRINTTAB(1,29)"(C) 90 Elect
ron User By D Ingleby-Oddy"
380 VDU26:ENDPROC
390
400 DEFPROCwin(X1X,Y2X,X2X,Y1X)
410 EX=12:FX=8
420 VDU24,X1X;Y2X;X2X;Y1X;16:MO
VEX1X,Y2X:DRAWX2X,Y2X:DRAWX2X,Y1X
:DRAWX1X,Y1X:DRAWX1X,Y2X:MOVEX1X,
Y2X+EX:DRAWX1X+EX,Y2X+EX:DRAWX1X+
EX,Y2X:MOVEX2X,Y2X+EX:DRAWX2X-EX,
Y2X+EX:DRAWX2X-EX,Y2X:MOVEX2X,Y1X
-EX:DRAWX2X-EX,Y1X-EX:DRAWX2X-EX,
Y1X
430 MOVEX1X,Y1X-EX:DRAWX1X+EX,Y
1X-EX:DRAWX1X+EX,Y1X:MOVEX1X+EX,Y
2X+FX:DRAWX2X-EX,Y2X+FX:MOVEX2X-F
X,Y2X+EX:DRAWX2X-FX,Y1X-EX:MOVEX2
X-EX,Y1X-FX:DRAWX1X+EX,Y1X-FX:MOV
EX1X+FX,Y1X-EX:DRAWX1X+FX,Y2X+EX:
ENDPROC
440
450 DEFPROCinit:CX=1:VX=1:PX=25
5:DX=5:PROCdumpS:PROCclenv:PROcEn
```

```

vALL: CX=8: CY=7: POX=0
460 FORNX=0 TO 2STEP2: PX=&900: [OP
TNX: LDY#0: .p LDA(&90), Y: EOR#&FF: S
TA(&90), Y: INY
470 CPY#8: BNEp: LDY#11: LDA(&90),
Y: BEQy: CLC: LDA&90: ADC#8
480 STA&90: LDA&91: ADC#0: STA&91:
LDY#0: BEQp: .y RTS: J: NEXT: P% = 255: P
ROChi: ENDPROC
490
500 DEFPROCdumpS: PRINTTAB(8,7);
CX," ", VX," ", PX," ", DX;: PROCspac
e(20): ENDPROC
510
520 DEFPROCdumpE1: PRINTTAB(11,1
1); "1,"; ENX(0); " "; ENX(1); " "; ENX
(2); " "; ENX(3); " "; ENX(4); " ";: PR
OCspace(36): ENDPROC
530
540 DEFPROCdumpE2: PRINTTAB(11,1
3); ENX(5); " "; ENX(6); " "; ENX(7); "
"; ENX(8); " "; ENX(9); " "; ENX(10);
" ";: PROCspace(38): ENDPROC
550
560 DEFPROCdumpE3: PRINTTAB(11,1
5); ENX(11); " "; ENX(12);: PROCspace
(21): ENDPROC
570
580 DEFPROCmain
590 *FX21,0
600 IFINKEY=26 GOTO660
610 IFINKEY=122 GOTO680
620 IFINKEY=42 GOTO700
630 IFINKEY=58 GOTO770
640 IFINKEY=36 PROCinp: OSCLI("F
X21,"+STR$(CX+4)): SOUNDX,VX,PX,0
X: IFINKEY=36 FORNX=0 TO 100: NEXT EL
SE ENDPROC
650 ENDPROC
660 POX=POX-1
670 PROCisit2: ENDPROC
680 POX=POX+1
690 PROCisit: ENDPROC
700 IFPOX>=4 PROCenvUD(0): IFINK
EY=42 GOTO700
710 IF?&25A AND 64=64 IX=10 ELS
E IX=1
720 IFPOX=0 AND CX<>0 CX=CX-1
730 IFPOX=1 AND VX<>-15 VX=VX-1
740 IFPOX=2 AND PX-IX>=0 PX=PX-IX
750 IFPOX=3 AND DX-IX>=0 DX=DX-IX
760 PROCdumpS: IFINKEY=42 GOTO72
0 ELSE PROCChi: ENDPROC
770 IFPOX>=4 PROCenvUD(1): IFINK
EY=58 GOTO770
780 IF?&25A AND 64=64 IX=10 ELS
E IX=1
790 IFPOX=0 AND CX<>3 CX=CX+1
800 IFPOX=1 AND VX<>-1 VX=VX+1
810 IFPOX=2 AND PX+IX<=255 PX=PX+
IX
820 IFPOX=3 AND DX+IX<=255 DX=DX+
IX
830 PROCdumpS: IFINKEY=58 GOTO79
0 ELSE PROCChi: ENDPROC
840
850 DEFPROCenvUD(BX)
860 IFPOX=4 PROCdumpE1: ENDPROC
870 IFPOX>=12 AND REZ=0 GOTO136
0
880 RX=POX-4: ONRX GOTO900,890,89
0,890,900,900,900,910,910,920,920
,930,930
890 PROCrange(-128,127): ENDPROC
900 PROCrange(0,255): ENDPROC
910 PROCrange(-127,127): ENDPROC
920 PROCrange(-127,0): ENDPROC
930 PROCrange(0,126): ENDPROC
940
950 DEFPROCfind: PROCChi: QX=FNadr

```

```

960 WX=11: RX=1
970 IFWX?QX=0 GOTO 990
980 WX=WX+8: RX=RX+1: GOTO970
990 CX=(CX+1)+RX: PROCChi: ENDP
ROC
1000
1010 DEFPROCChi: !&90=FNadr
1020 CALL&900: ENDPROC
1030
1040 DEFPROCspace(QX)
1050 IFPOS<>(QX+1) PRINT; " ";: GO
TO1050 ELSE ENDPROC
1060
1070 DEFPROCfind2: PROCChi: QX=FNadr:
WX=-13: RX=1
1080 IFWX?QX=0 GOTO 1100
1090 WX=WX-8: RX=RX+1: GOTO1080
1100 CX=CX-RX: PROCChi: ENDPROC
1110
1120 DEFFNadr:=((CX*8)+(CY*814
0))+85800
1130 DEFPROCisit: IFPOX<=3 PROCfi
nd: ENDPROC
1140 IFPOX=4 PROCnext(11,11): EN
DPROC
1150 IFPOX=10 PROCnext(11,13): EN
DPROC
1160 IFPOX=16 PROCnext(11,15): EN
DPROC
1170 IFPOX=18 POX=0: PROCnext(8,7
): ENDPROC
1180 PROCfind: ENDPROC
1190
1200 DEFPROCisit2: IFPOX<=2 AND POX
>=0 PROCfind2: ENDPROC
1210 IFPOX=3 PROCmove(8,7,0): EN
DPROC
1220 IFPOX=-1 POX=17: PROCmove(11
,15,16): ENDPROC
1230 IFPOX=15 PROCmove(11,13,10)
: ENDPROC
1240 IFPOX=9 PROCmove(11,11,4): E
NDPROC
1250 PROCfind2: ENDPROC
1260
1270 DEFPROCmove(KX,LX,MX): PROCCh
i: VDU31,KX,LX: MX=POX-MX: CX=X: CY
X=LX: KX=2: QX=FNadr: LX=11
1280 IFLX?QX=0 MX=MX-1

```

```

1290 IFMX=0 CX=CX+KX: VDU31,CX
,CY: PROCChi: ENDPROC
1300 LX=LX+8: KX=KX+1: GOTO1280
1310
1320 DEFPROCnext(KX,LX): PROCChi: V
DU31,KX,LX: CX=X: KX=CX: CY=LX: PROCChi: E
NDPROC
1330 DEFPROCrange(KX,LX): RX=POX-
5: IF?&25A AND 64=64 IX=10 ELSE IX
=1
1340 IFBX=1 AND (ENX(RX)+IX)<=LX E
NX(RX)=ENX(RX)+IX
1350 IFBX=0 AND (ENX(RX)-IX)>=KX E
NX(RX)=ENX(RX)-IX
1360 IFCY=11 PROCdumpE1
1370 IFCY=13 PROCdumpE2
1380 IFCY=15 PROCdumpE3
1390 ENDPROC
1400
1410 DEFPROCenvALL: PROCdumpE1: PR
OCdumpE2: PROCdumpE3: PROCinp: ENDP
ROC
1420
1430 DEFPROCclev: RESTORE1440: FO
RNX=0 TO 12: READENX(NX): NEXT: ENDP
ROC
1440 DATA129,-15,-8,-3,10,10,10,
126,0,0,-126,126,126
1450
1460 DEFPROCinp: ENVELOPE1, ENX(0)
, ENX(1), ENX(2), ENX(3), ENX(4), ENX(
5), ENX(6), ENX(7), ENX(8), ENX(9), EN
X(10), ENX(11), ENX(12): ENDPROC

50 MODE1
170 ?&358=15: CLS: ?&358=0

```

Listing II

```

470 CPY#16: BNEp: LDY#27: LDA(&90)
,Y: BEQy: CLC: LDA&90: ADC#16
960 WX=27: RX=1
1090 WX=WX-8: RX=RX+1: goto1080
1120 DEFFNadr:=((CX*16)+(CY*82
80))+83000

```

ADVICE ARENA

Tips for every Electron user, from beginner to expert

TRACKING logical errors is often far more tricky than finding syntax ones as there's no error report. So which line printed that sprite in the wrong place? The following is a simple way to single step through your routine providing it's not too long.

- Define key 0 using:

```
*KEY0 REPEAT UNTIL GET|M
```

- Ensure your program is numbered in steps of 10 (You can use RENUMBER 100,10 if necessary)
- Enter:

```
AUTO 105,10
```

- Hold down function key 0 until REPEAT UNTIL GET is inserted between each of your program lines.

Now when you run the program it will only move to the next of your own instructions if a key is pressed to pass the GET statement. If you enter TRACEON before running you can now see where you're up to quite easily.

Pressing Escape at any time will reveal which line you are on.

Speed-up listing

```

10 REM Speed up
20 REM by Stephen Bennett
30 REM (c) Electron User
40 MODE6
50 *FX13,4
60 FORpass=0 TO 2 STEP 2
70 PX=8900
80 COPTpass
90 SEI
100 LDA#int MOD 256:STA&220
110 LDA#int DIV 256:STA&221
120 CLI
130 RTS
140 .int
150 CMP#4:BEQhere
160 RTS
170 .here
180 PHA:PHP:TXA:PHA:TYA:PHA
190 LDA#129:LDX#230:LDY#&FF:JSR
&FFF4
200 TYA
210 BEQnext1
220 LDA#178:LDX#0:LDY#0:JSR&FFF
4
230 LDA#&B0:STA&F07:JMPout
240 .next1
250 LDA#129:LDX#134:LDY#&FF:JSR
&FFF4
260 TYA
270 BEQout
280 LDA&282:STA&F07
290 LDA#178:LDX#&FF:LDY#0:JSR&F
FF4
300 .out PLA:TAY:PLA:TAX:PLP:PL

```

```

A:RTS
310 J:NEXT:CALL&900:*FX14,4
320 *FX4,2

```

Spiral listing

```

10 REM Spiral
20 REM by Stephen Bennett
30 REM (c) Electron User
40 OSCLI"FX178"
50 AX=163:XX=128:YX=1
60 XZ=128
70 YZ=1
80 CALL&FFF4
90 DIMsin(360),cos(360)
100 FORAX=0 TO 360 STEP 4
110 sin(AX)=SIN(RAD(AX))
120 cos(AX)=COS(RAD(AX))
130 NEXT
140 MODE2
150 VDU23,1,0;0;0;0;
160 ?&F07=&B0
170 VDU29,640;512;
180 CZ=0
190 FORBZ=928T0824STEP-8
200 IF CZ=0 OR CZ=8 CZ=CZ+1
210 R=BZ
220 MOVE640,BZ
230 GCOL0,CZ
240 CZ=CZ+1
250 AX=0
260 REPEAT
270 AX=(AX+4) MOD 360
280 R=R-(112/90)
290 DRAW sin(AX)*R,cos(AX)*R
300 UNTILR<2
310 NEXT
320 AX=23

```

```

330 ?&F07=?&282
340 DX=-1
350 SX=0
360 REPEAT
370 IF INKEY-98 DX=-1 ELSE IF I
NKEY-67 DX=1
380 IF INKEY-73 AND SX>0 SX=SX-
4 ELSE IF INKEY-105 AND SX<500 SX
=SX+4
390 IF AX=16 OR AX=24 AX=AX+DX
400 VDU19,AX,0;0;19,AX-8,1;0;
410 AX=AX+DX
420 IF AX<16 AX=AX+16 ELSE IF A
X>31 AX=AX-16
430 FORTX=OTOSX
440 NEXT
450 UNTILO

```

ADVICE ARENA

*Tips for every Electron user,
from beginner to expert*

USING the INPUT command can be a problem if the characters to be entered include a comma – everything after it becomes the next item to be input.

While it's always best to write your own input routine, if you want a quick solution there is a command that is equivalent to INPUT but reads any character – INPUT LINE.

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**Straighten it up with
this machine code
memory editor by
Mark Davidson**

EXPLORING and editing your micro's memory can be both fun and educational. You can discover facts such as why your Basic program has suddenly reported *Bad Program* and even recover the original.

Medit is a machine code memory editor which runs in Mode6. It is designed to assemble just below HIMEM - &5A00 - where its operation will not interfere with most Basic programs.

It can be set to run elsewhere - even in sideways ram if you initialise it properly - but the setting provided will probably be the one most commonly used.

Although it has a variety of uses, it has been designed primarily as a tool to repair defective Basic programs and provides both Ascii and hex input and the ability to move with ease

throughout the whole of the micro's memory

The keys used and their function are:

Arrow keys	move cursor and scroll if it is going off screen.
Copy	Ascii/hex toggle.
Delete	Enter address to jump to - terminated by the fourth digit or Return if address is less than four digits long.
Escape	Exit from program.

Type in and run the program. You will be asked:

Display size ? L(arge)/S(mall)

This selects how many rows are on screen. You can choose either 8 or 16, the former scrolling faster than its larger counterpart.

Pressing L or S will assemble and save the completed program.

This can be run directly from tape or disc by typing:

*MEDIT

if you have a disc system, or:

*RUN MEDIT

from tape. If the code is already in memory just type:

CALL &5A00

This line is programmed into function key zero, so if Control+Break has not been pressed, pressing f0 will call up the program.

Badly buckled Basic?

*** Memory Editor ***

```

1900 0b 00 0a 0b f4 20 4b 45 ..... ME
1908 44 49 54 0b 00 14 17 f4 DIT.....
1910 20 28 43 29 20 45 4c 45 (C) ELE
1918 43 54 52 4f 4e 20 55 53 CTRON US
1920 45 52 0b 00 1e 16 f4 20 ER.....
1928 42 79 20 4b 61 72 6b 20 By Mark
1930 44 61 76 69 64 73 6f 6e Davidson
1938 0b 00 28 06 eb 36 0b 00 ..(..6..

```

Address : 1900

Type : A

The small display showing the Basic program in memory

*** Memory Editor ***

```

1900 0b 00 0a 0b f4 20 4b 45 ..... ME
1908 44 49 54 0b 00 14 17 f4 DIT.....
1910 20 28 43 29 20 45 4c 45 (C) ELE
1918 43 54 52 4f 4e 20 55 53 CTRON US
1920 45 52 0b 00 1e 16 f4 20 ER.....
1928 42 79 20 4b 61 72 6b 20 By Mark
1930 44 61 76 69 64 73 6f 6e Davidson
1938 0b 00 28 06 eb 36 0b 00 ..(..6..
1940 32 28 f1 27 27 27 22 20 2+.!!!
1948 44 69 73 70 6c 61 79 20 Display
1950 73 69 7a 65 20 3f 20 4c size ? L
1958 28 61 72 67 65 29 2f 53 (arge)/S
1960 28 6b 61 6c 6c 29 20 22 (mall) "
1968 3b 0b 00 3c 1b f5 3a 41 ;..<.:A
1970 24 3b be 3a fd 41 24 3b $=.:AS=
1978 22 4c 22 20 84 20 41 24 "L" . AS

```

Address : 1900

Type : A

The large display showing the same area

```

10 REM MEDIT
20 REM (C) ELECTRON USER
30 REM By Mark Davidson
40 MODE6
50 PRINT"" Display size ? L(
arge)/S(mall) ";
60 REPEAT:AS=GETS:UNTILAS="L"
OR AS="s"
70 PRINT;AS
80 IFAS="L" top=4:height=15 EL
SE top=6:height=7
90 PRINT"" Assembling ..."
100 *K.O CALL &SAODJM
110 PROCass
120 PRINT"" Saving now ...""
130 *SAVE MEDIT 5A00 +480
140 PRINT"" Finished."
150 END
160
170 DEFPROCass
180 FORI=0 TO 2 STEP 2
190 PX=&SAOD:COPTI
200
210 LDA#22:JSR&FFEE:LDA#6:JSR&F
FEE
220 LDX #(mess MOD 256):LDY #(m

```

```

ess DIV 256):JSR print
230 LDA#4:LDX#1:JSR&FFF4
240 LDA#85A:STA 7
250 JSRnblise
260 JSR hex_screen
270 JSRshow_type
280 JSRxy
290 .again
300 LDA#21:LDX#0:JSR&FFF4
310 JSR &FFED
320 BCC ok:LDA#4:LDX#0:JSR&FFF4
330 LDA#12:JSR&FFEE
340 RTS:.ok
350 CMP#135:BNE n_sw:LDAtype:EOR
#&FF:STAType:JSRshow_type:JSRxy:J
MPagain:.n_sw
360 CMP#127:BNE skip
370 JSRaddress:JSRxy:JMPagain:.
skip
380 JSRinput
390 .ap2 JSR edit_keys
400 JMP again
410
420 .print
430 STX P+1:STY P+2:LDX#0
440 .P LDA &FFF,X:CMP#255:BEQ E

```

```

P:JSR&FFEE:INX:JMP P:.EP RTS
450
460 .edit_keys
470 CMP#135:BCS edkeys
480 .e_exit
490 RTS
500 .edkeys
510 CMP #139:BNE en1
520 .L
530 LDA yc:CMP #0:BNE n_scr1
540 JSRup_line:RTS
550 .n_scr1 JSR d1pos:DEC yc:JM
Psub1
560
570 .en1 CMP #138:BNE en2
580 .r
590 LDA yc:CMP #height:BNE n_sc
r2
600 JSRdown_line:RTS
610 .n_scr2 JSR d2pos:INCyc:JMP
sub1
620
630 .en2 CMP#136:BNE en3
640 LDApos:BNEok3:DECpos+1:.ok3
DECpos
650 LDA xc:CMP #0:BEQ up
660 DEC xc:JMPsub1:.up
670 JSRend_line:JMPL
680
690 .en3 CMP #137:BEQ go3:RTS:.
go3
700 INCpos:BNE ok4:INC pos+1:.o
k4
710 LDAxc:CMP #7:BEQgo2:INCxc:J
MPsub1
720 .go2 JSRstr_t_line:JMPr
730
740 .d1pos
750 LDA pos:SEC:SBC#8:STA pos:B
CS d12:DEC pos+1:.d12 RTS
760
770 .d2pos
780 LDA pos:CLC:ADC#8:STA pos:B
CC d22:INC pos+1:.d22 RTS
790
800 .up_line LDA addr:SEC:SBC#8
:STAaddr:BCS u_p:DECaddr+1:.u_p J
SR d1pos:JSR hex_screen:JSR sub1:
RTS
810
820 .down_line LDAaddr:CLC:ADC#
8:STAaddr:BCC d_p:INCaddr+1:.d_p
JSR d2pos:JSR hex_screen:JSRsub1:
RTS
830
840 .str_t_line LDApos:SEC:SBC#8
:STA pos:BCS str_t_p:DECpos+1:.str
t_p LDA# 0:STAXc:RTS
850
860 .end_line LDApos:CLC:ADC#8:
STApos:BCCe_p:INCpos+1:.e_p LDA#7
:STAXc:RTS:.et EQU80
870
880 .hex_screen
890 SEI
900 JSR z_store
910 JSR curs
920 LDX #height
930 .h_outer LDY #0
940 JSR side
950 .h_inner LDA (&70),Y:JSR he
x_it
960 LDA#32:JSR&FFEE
970 INY:CPY #8:BNE h_inner
980 .a_outer LDY #0
990 LDA#32:JSR &FFEE
1000 .a_inner LDA (&70),Y

```

*** Memory Editor ***

```

4F13 00 00 00 00 00 00 00 00 .....
4F1B 00 00 00 00 00 00 00 00 .....
4F23 00 00 00 00 00 00 00 00 .....
4F2B 00 00 00 00 00 00 00 00 .....
4F33 00 00 00 00 00 00 00 00 .....
4F3B 00 00 00 00 00 00 00 00 .....
4F43 00 00 00 00 00 00 00 00 .....
4F4B 00 00 00 00 00 00 00 00 .....
4F53 00 00 00 00 00 00 00 00 .....
4F5B 00 00 00 00 00 00 00 00 .....
4F63 00 00 00 00 00 00 00 00 .....
4F6B 00 00 00 00 00 00 00 00 .....
4F73 00 00 00 00 00 00 00 00 .....
4F7B 00 00 00 00 00 00 00 00 .....
4F83 00 00 00 00 00 00 00 00 .....
4F8B 00 00 00 00 00 00 00 00 .....

```

Address : 4F13

Type : A

*** Memory Editor ***

```

4F13 00 00 00 00 00 00 00 00 .....
4F1B 00 00 00 00 00 00 00 00 .....
4F23 00 00 00 00 00 00 00 00 .....
4F2B 00 00 00 00 00 00 00 00 .....
4F33 00 00 00 00 00 00 00 00 .....
4F3B 00 00 00 00 00 00 00 00 .....
4F43 00 00 00 00 00 00 00 00 .....
4F4B 00 00 00 00 00 00 00 00 .....

```

Address : 4F13

Type : A

The two possible displays of the memory editor when it is called.
Press delete followed by four digits to view any area you want.

```

1010 CMP #32:BCC a_not_ok
1020 CMP #128:BCS a_not_ok
1030 JSR &FFEE:BNE a_spaces
1040 .a_not_ok
1050 LDA #46:JSR &FFEE
1060 .a_spaces
1070 INY:CPY #8:BNE a_inner
1080 JSR &FFEE7
1090 LDA #70:CLC:ADC #8
1100 STA #70:BCC h_pass
1110 INC #71
1120 .h_pass
1130 DEX:BPL h_outer
1140 JSR z_rstore
1150 JSRsub1
1160 CLI
1170 RTS
1180
1190 .display
1200 LDY#0:LDA(&70),Y:PHA:LDXxc:
LDYyc
1210 LDA#31:JSR&FFEE:LDA#x,X:JSR
&FFEE:LDA#y,Y:JSR&FFEE:PLA:PHA:JS
R_hex_it
1220 LDA#31:JSR&FFEE:LDA#x,X:JSR
&FFEE:LDA#y,Y:JSR&FFEE:PLA:JSRlim
1:CPY#0:BEQdis_ok
1230 LDA#46:.dis_ok JSR&FFEE:JSR
xy:RTS
1240 .dt EQU0D
1250
1260 .enter
1270 JSRnbler:STAent:LDY#0:LDA(&
70),Y
1280 ASL A:ASL A:ASL A:ASL A
1290 ORAent:STA(&70),Y:JSRdispla
y:RTS
1300 .ent EQU0D
1310
1320 .chk_hex
1330 CMP#48:BCChno:CMP#71:BCShno
1340 CMP#58:BCChk_ok:CMP#65:BCS
chk_ok
1350 .hno SEC:RTS:.chk_ok CLC:RT
S
1360
1370 .nbler
1380 CMP#65:BCSnblter:SEC:SBC#48
:RTS
1390 .nblter SEC:SBC#55:RTS
1400
1410 .hex_it
1420 STA htemp
1430 AND #&FO:LSR A:LSR A:LSR A
1440 LSR A:STA htemp2
1450 JSR digit
1460 LDA htemp
1470 AND#&F:STA htemp2
1480 .digit
1490 CMP #10:BCS select_letter
1500 LDA#48:BNE hprint
1510 .select_letter
1520 LDA #55
1530 .hprint
1540 CLC:ADC htemp2:JSR &FFEE:RT
S
1550
1560 .input
1570 LDX type:BMI type_hex
1580 .type_ascii
1590 CMP#127:BCCinp_ok:RTS:.inp_
ok
1600 PHA
1610 LDApos:STA&70:LDApos+1:STA&
71:LDY#0:PLA:STA(&70),Y:JSRdispla
y:JSRsub1
1620 JSRgo3
1630 RTS
1640
1650 .type_hex
1660 JSRchk_hex:BCct_ok:RTS
1670 .t_ok
1680 PHA
1690 LDApos:STA&70:LDApos+1:STA&
71
1700 PLA
1710 JSRenter
1720 RTS
1730
1740 .lim1`LDY#0
1750 CMP#32:BCSfok1:LDY#&FF:RTS:
.fok1
1760 CMP#127:BCciok2:LDY#&FF:RTS
:.fok2
1770 RTS
1780
1790 .type EQU0B1
1800
1810 .z_store
1820 LDX#0:.zlp1 LDA c_off,X:CMP
#13:BEQ z1_done:JSR&FFEE:INX:JMP
zlp1:.z1_done
1830 LDA #70:STA z1:LDA #71:STA
z1+1
1840 LDA addr:STA #70
1850 LDA addr+1:STA #71
1860 RTS
1870
1880 .show_type
1890 LDAtype:BMIstp:LDA#65:STAmb
:BNEsp:stp:LDA#72:STAmb:.sp
1900 LDX#mtype MOD256:LDY#mtype
DIV256:JSR print:RTS
1910
1920 .mtype EQU0B31:EQU0B31:EQU0B(h
eight+top+2):EQU0B"Type : ".mb EQ
UBD:EQU0B255
1930
1940 .c_off EQU0B 23:EQU0B 1:EQU0D0
:EQU0D0:EQU0B13
1950 .c_on EQU0B 23:EQU0B 1:EQU0B 1
:EQU0D0:EQU0D0:EQU0B0:EQU0B13
1960
1970 .z_rstore
1980 LDX#0:.zlp2 LDA c_on,X:CMP#
13:BEQ z2_done:JSR&FFEE:INX:JMP z
lp2:.z2_done
1990 LDA z1:STA #70:LDA z1+1:STA
#71
2000 RTS
2010
2020 .side
2030 LDA #71:JSR hex_it:LDA #70:
JSR hex_it:LDA #32:JSR &FFEE:JSR
&FFEE:RTS
2040
2050 .curs
2060 LDA#31:JSR&FFEE:LDA#0:JSR &
FFEE:LDA#top:JSR &FFEE
2070 RTS
2080
2090 .sub1
2100 LDA#31:JSR&FFEE:LDA#0:JSR&F
FEE:LDA #height+top+2:JSR &FFEE
2110 LDX#txt MOD256:LDY#txt DIV2
56:JSR print
2120 LDA pos+1:JSR hex_it:LDA po
s
2130 JSR hex_it
2140 .xy
2150 LDX xc:LDY yc:LDA #31:JSR &
FFEE:LDA dx,X:JSR &FFEE:LDA dy,Y:
JSR &FFEE:RTS
2160
2170 .nblise
2180 LDX#3:.nblp LDA b4,X
2190 CMP#65:BCC number
2200 SBC#55:STA w4,X:JMP n
2210 .number SBC#47:STA w4,X
2220 .n DEX:BPL nblp
2230 LDA w4:ASL A:ASL A:ASL A:AS
L A
2240 ORA w4+1:STA pos+1:STA addr
+1
2250 LDA w4+2:ASL A:ASL A:ASL A:
ASL A
2260 ORA w4+3:STA pos:STA addr
2270 LDA#0:STAXc:STAYc
2280 RTS
2290
2300 .address
2310 LDA#21:LDX#0:JSR&FFF4
2320 LDX#mess2 MOD256:LDY#mess2
DIV256
2330 JSRprint:LDX#0
2340 .addr_lp
2350 DEX:STXxt:INX
2360 JSR&FFEE0:CMP#27:BEQ ignore_
addr:CMP#13
2370 BEQrearrange:JSRchk_hex:BCS
addr_lp
2380 STAd4,X:JSR&FFEE:INX:CPX#4
2390 BNEaddr_lp:INCxt
2400 .rearrange
2410 LDXxt
2420 LDA#48:LDY#3:.cl_lp STAb4,Y
:DEY:BPL cl_lp
2430 LDY#3:.rearr_lp LDA d4,X:ST
Ab4,Y
2440 DEY:DEX:BPLrearr_lp
2450 JSRnblise:JSRhex_screen
2460 .ignore_addr
2470 LDA#31:JSR&FFEE:LDA#0:JSR&F
FEE:LDA#(height+top+4):JSR&FFEE
2480 LDX#20:LDA#32:.sp_lp JSR&FF
EE:DEX:BPLsp_lp:RTS:.xt EQU0D
2490
2500 .b4 EQU0B "4F13":EQU0B13
2510 .w4 EQU0B "****"
2520 .d4 EQU0B "****":EQU0B13
2530
2540 .x EQU0B 6:.y EQU0B top
2550
2560 .xc EQU0B 0:.yc EQU0B 0
2570
2580 .htemp EQU0B 0:.htemp2 EQU0
B
2590 .z1 EQU0D
2600 .addr EQU0B AX
2610 .pos EQU0B AX
2620 .mess EQU0B12:EQU0B31:EQU0B8:E
QU0B1:EQU0B"*** Memory Editor ***"+
CHR$255
2630 .mess2 EQU0B31:EQU0B0:EQU0B(to
p+height+4):EQU0B"Enter address :
":EQU0B255
2640 .txt EQU0B "Address : "+CHR$
255
2650 .dx OPT FNxx
2660 .dy OPT FNyy
2670 .x1 OPT FNxe
2680
2690 J:NEXT
2700 ENDPROC
2710
2720 DEFFNxx
2730 FORJX=0 TO 7:[OPTI:EQU0B 6+J
X*3]:NEXT:=I
2740
2750 DEFFNyy
2760 FORJX=0 TO height:[OPTI:EQU0
B top+JX]:NEXT:=I
2770
2780 DEFFNxe
2790 FORJX=0 TO 7:[OPTI:EQU0B 31+
JX]:NEXT:=I

```


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DTP

ELECTRON owners are always striving to expand their micros to reach the capabilities of the BBC Micro. There have been upgrades for items like memory, speed and Mode 7 in the past but until now there's been no sound add-on that does anything more than allow the volume to be altered or headphones to be connected.

Now that's changed, with the release of Complex Software's Sound Expansion which gives the Electron the same sound capabilities as a BBC Micro.

This means that Electron owners can now enjoy hearing effects like more than one note playing at a time – chords – and volume adjustments – fades. Added to this the unit also has a volume control and sockets for headphones and connection to a hi-fi.

The Sound Expansion cartridge plugs into the Plus 1 or Rombox+. It has a built-in speaker for slight volume and quality increase and comes complete with a one page user guide and demonstration tape or disc – remember to state which you want if you order one.

The single sheet user guide is sufficient to get you started and use the unit with current software, but a more detailed description of how the SOUND and ENVELOPE commands work would have been useful. A good source of information is the BBC Micro User Guide.

Installing the unit is easy merely involving plugging the cartridge into an expansion slot. Then entering *HELP SD gives a list of the three new star commands shown below.

Demonstration programs supplied with the unit show off its capabilities well and even though they're not of a very high musical standard they illustrate what's possible.

As the whole idea is to give the Electron the sound capabilities of a BBC Micro, the next logical test was to see if some of the programs written for that micro work.

I tried several games from *The Micro User* and found that if they worked but only gave dull beeps with the Sound Expansion switched off, they gave the effect the programmer had intended with the unit on.

One particular program – jingles from the December 1989 issue – has never been

- *SDON** Turns the Sound Expansion on and redirects all further SOUND and ENVELOPE commands to the software built in to the unit.
- *SDOFF** Turns the Sound Expansion off and returns control of the sounds to the Electron's own sound chip.
- *ENV** Displays all current ENVELOPE definitions.

Eloquent Electron

Pete Davidson tries out a new add-on that gives the Electron's sound quality a boost



worth considering for the Electron before, but with the new expansion the micro became a tuneful keyboard. Many Electron games are cut down versions of BBC Micro ones. As the Electron ignores the last six parameters of the ENVELOPE command, they are often left in but have no effect.

This means that some games suddenly produce great new sounds when the unit is connected. Unfortunately not all games give the desired effect, because some use different methods and others may just have the last few envelope set to, say, zero on the Electron version.

I tried the unit with *Perplexity*, which was reviewed last month. The first problem is that some Superior games will not work with the Plus 1 attached and as the Sound Expansion plugs into it the unit can't be removed.

The cure – and this is a useful tip for running most recent Superior games on an Electron with Plus 1 – is to LOAD the first program on the tape rather than CHAINING it. Then type 30 to remove line 30 and RUN

the program. When I did this with *Perplexity* things appeared to go wrong a couple of times as the tape loaded and there was a high pitched beep from the expansion – the volume control was handy here. However, once the game had loaded it worked well.

The tune on the BBC Micro version has been removed but the sounds that are there have a much better depth to them. As I'd hoped, the game still appears to have the BBC Micro sound commands in it.

Another game that is vastly improved by the unit is *Elite*. Electron owners can now hear the three channels and the fading of sounds that were previously only heard on the BBC Micro.

The unit is claimed to operate with Superior Software's *Speech!* but I couldn't get this working. Complex Software Systems assures me that, to work on an Electron, *Speech!* just needs a small change and a routine to do this will be on the utilities disc or tape in the future. The unit seemed to function with other Electron add-ons like the *Slogger Master Ram Board* 64k memory

Extra ENVELOPE parameters

The Electron User Guide gives details of ENVELOPE parameters one to eight but for nine to 14 it just says:

These parameters must be put into the ENVELOPE command, but their values will have no effect on the effect produced by the Electron's ENVELOPE command.

In order to keep the command compatible with the BBC Micro these values should be 126,0,0,-126,126,126

Using an Electron program with these parameters on a BBC Micro will sound similar, but with a Sound Expansion Electron users can now put meaningful values in to these last six parameters.

Their functions (starting at the ninth ENVELOPE parameter) are:

Parameter	Range	Function
9	-127 to 127	Amplitude change per step during attack phase.
10	-127 to 127	Amplitude change per step during decay phase.
11	-127 to 0	Amplitude change per step during sustain phase.
12	-127 to 0	Amplitude change per step during release phase.
13	0 to 126	Target level at end of attack phase
14	0 to 126	Target level at end of decay phase

expansion and didn't seem to clash with any software I tried.

Apart from the lack of a good manual I've only one minor niggle. With a disc drive connected to the rear cartridge slot of my Plus 1 and this in the front one there's no room to plug in more cartridges.

I consider this unit so useful that it should be left in all the time – as should the disc drive – so I've now nowhere to plug cartridges that are occasionally used.

Sound Expansion is worthwhile, even if it's only used to increase the sound capabilities of your Electron. Add to that the fact that it gives you a better speaker control of the volume together with headphone and hi-fi sockets and the unit almost becomes essential.

Product: Sound Expansion (mail order only)

Price: £54.99

Supplier: Complex Software Systems,
Trehaverne House, Kenwyn Rd, Truro,
Cornwall

HOWEVER much effort is put into the sounds of a game on the Electron, the effect will never make the house reverberate. Screams, bangs and explosions all sound like squeaks through the micro's tiny speaker.

Now, from Siren Software comes a neat way to boost the volume – Sound Blaster. It consists of a small amplifier with power supply, two loudspeakers and a pair of headphones – in case the neighbours want to sleep.

Setting up the kit is a piece of cake: Just remove the cover from your Electron, unplug the speaker and plug in a new lead.

This can then be fed out of the case through either the UHF TV or video socket cutout – whichever you aren't using. Then replace the cover.

The lead now coming from your micro is connected to the amplifier, as are the speakers and power supply. You're then ready to run your favourite game with something new in sound.

There are two volume controls on the wedge of cheese-shaped amplifier, one for each speaker.

I don't know what the unit's power output is, but turning the volume up to one quarter of maximum is very loud indeed. There is certainly enough power to fill the largest of domestic rooms.

You won't be disappointed by the quantity of sound, but what about the quality? The one channel Electron sound isn't hi-fi, but the added volume certainly gives a bet-

ter effect on games. However, I wouldn't recommend the unit – or an unexpanded Electron – for musical applications.

There's always a slight hum from the Electron's speaker (hardly noticeable on the small built-in one) and although this is amplified by Sound Blaster it isn't a distraction.

A version of Sound Blaster is also available to plug in to Complex System's Sound Expansion – also reviewed in this issue of *Electron User*.

The connection is even easier than to an unexpanded Electron, the amplifier just plugging into the phono plug on the cartridge.

The Sound Expansion alone gives more volume than a standard Electron, but using the two expansions together gives excellent results – four channel sound at a high volume with very little background noise.

Another use for the Sound Blaster is as an amplifier for the Hybrid music system. The quality of sound obtained using these two units together with your Electron is superb. Whether used alone or with another Electron add-on dedicated to sound, the Sound Blaster is a doddle to set up and is well worth the money.

Product: Sound Blaster

Price: £44.99

Supplier: Siren Software, 84-86 Princess

Street, Manchester M1 6NG

Tel: 061-228 1831

Now hear this...

Barry Woods sounds out a peripheral which gives your Electron a bigger voice



Write your own arcade smashes using the

ARCADE GAME Creator

Arcade Game Creator is a suite of programs for the Electron and BBC Micros. Taken from the pages of *Electron User*, it lets you into the secrets of writing fast-action arcade games, and provides you with a number of utilities to make design and programming easier.

Among the programs are:

- A Mode 5 sprite editor that lets you design your own multi-coloured characters.
- A selection of fast print routines that will move sprites both in front or behind other objects on the screen.
- Map generators that will squeeze a Mode 5 screen into 8 bytes!
- Scrolling maps.
- Score update and printing routines. . . . and much, much more.

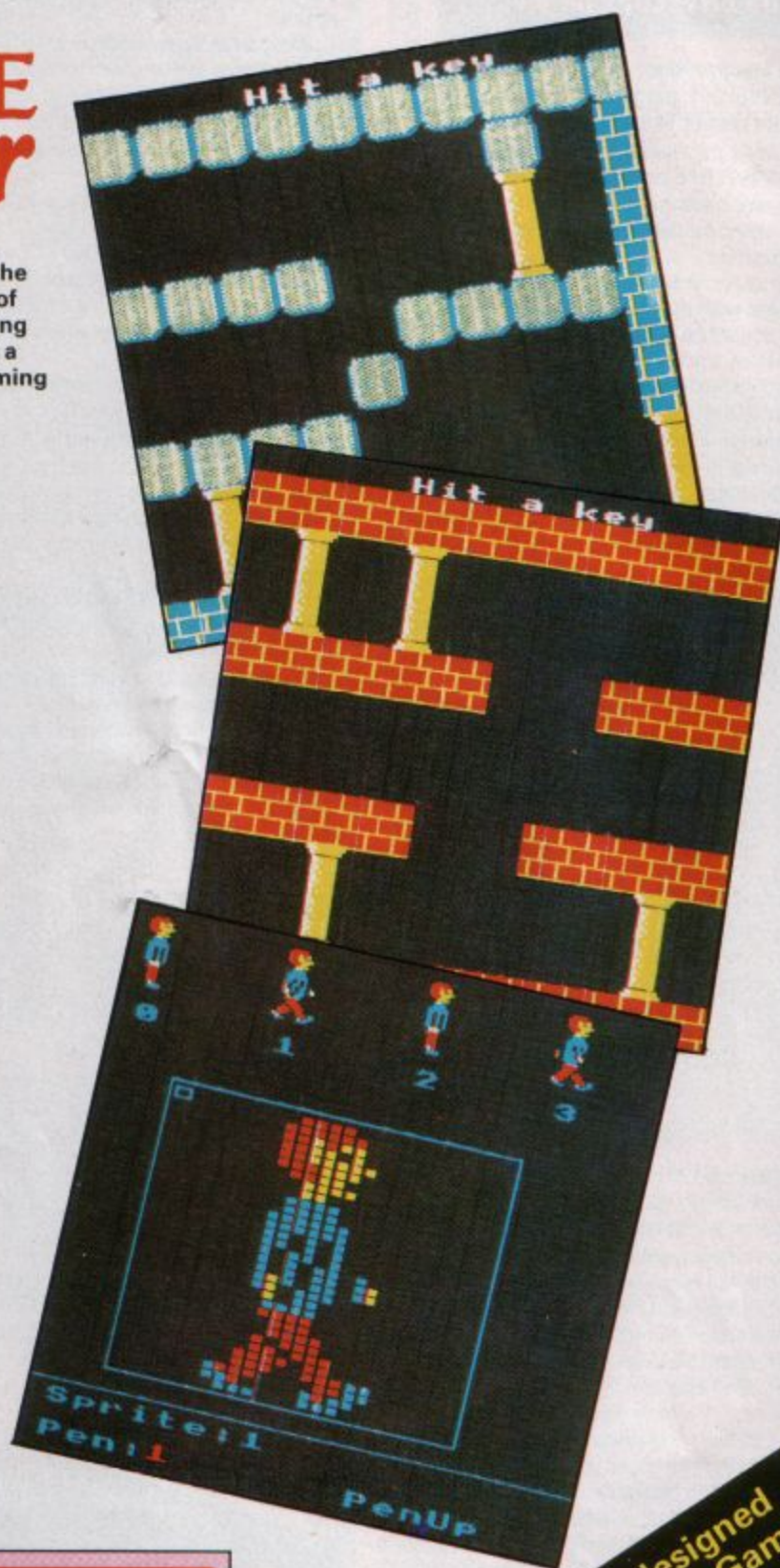
To help you make the most of the Arcade Game Creator, you will also get a comprehensive manual based on the original series.

Written in an easy to read style and with many illustrations and screen shots, it contains all the information you need to create and animate sprites, to design backgrounds and to link the two together into a complete arcade game.

If you are an aspiring games programmer, this is an offer you simply cannot afford to miss!

Arcade Game Creator

Tape + manual£9.95
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Creator

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Tuck a tiger in your micro

**Stephen Bennett
presents a time saving
routine to make your
Electron work faster**

SPEED-UP is a short interrupt-driven utility that can make an unexpanded Electron work much faster. It operates in any mode but the effect is most noticeable in Mode 2 where the increase is about 40 per cent.

When it's active the keyboard is turned off and the screen display is turned to Mode 6. This does not affect the screen image in memory but it does, while active, scramble the picture on your monitor.

The cursor left and right keys can be used to toggle the utility on and off at any time. Although the keyboard is disabled when it is active, every 50th of a second the micro checks these keys and responds if they have been pressed.

This routine is independent of the program currently running. Just load and run it then use your micro as before, switching speed-up on and off when necessary.

As cursor keys are used to activate the routine, Copy is unfortunately rendered useless if the code is active in your micro. But this is not a major problem when running your program.

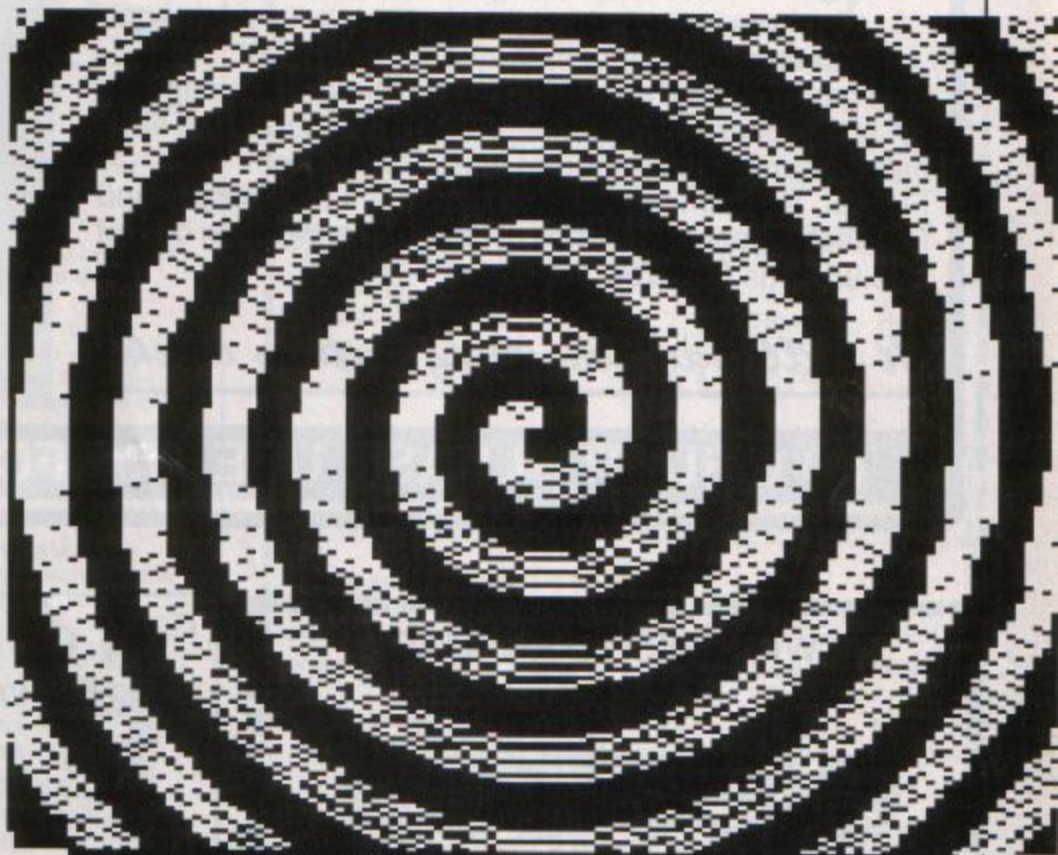
To try it out write a small Mode 2 program which draws 100 random triangles of random colour. Put VDU 7 at the end to make a short BEEP when finished – otherwise you may not notice the end of the program while the screen is scrambled.

Time it, both with and without the utility active. You'll find results something like those shown in the table below.

Alternatively you can use the spiral program shown on the right as a test.

You can toggle the speed-up routine on and off as the circles draw but make sure you toggle it off at the end to see the stunning effect.

MODE	Speed increase
0 or 2	40%
3	30%
4 or 5	3%
6	2%



Palette switching causes the spirals to give an amazing dynamic effect

Speeding spiral

Spiral is a short program uses palette switching in Mode 2 to create a spinning disc display.

It is listed overleaf and you can use it alone or as a test for the speed-up utility. A series of circles of lessening radius are drawn creating spiral shapes. When all 14 are completed – this takes about five minutes without Speed-up – the micro continually switches the colour palette to give the impression of rotation.

The movement is controlled by these keys:

Z Rotate left
X Rotate right
: Rotation speed up
/ Rotation speed down

Warning: This type of dynamic screen display can upset some people. If you are susceptible to flickering screens we recommend you do not try it.

Save on batteries!

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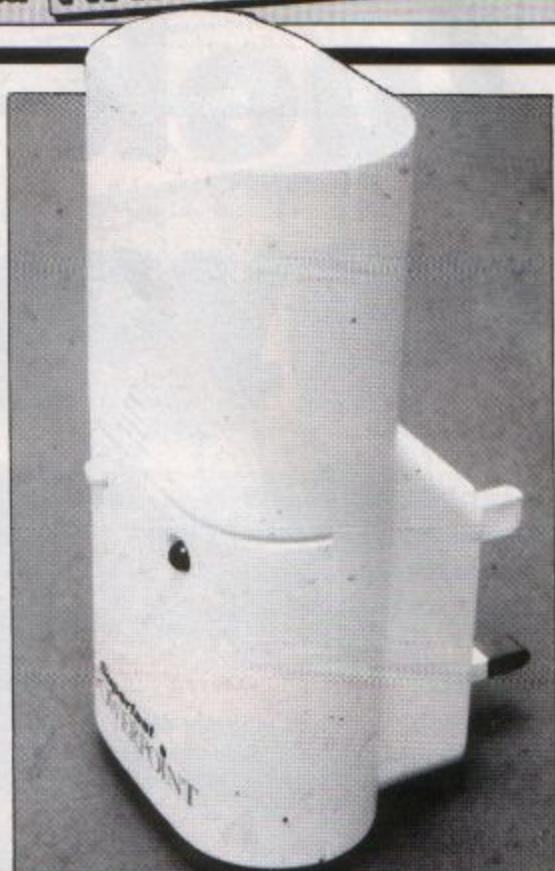
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Don't miss out on the mass of material that's appeared in *Electron User* over the past few months. Bring yourself up to date with this back issue bundle, packed with games, utilities, features and programming tutorials.

Here's what you'll find in the November 1989 – April 1990 bundle:

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Printing pictures from Elkpaint

I REALLY look forward to receiving my Electron User and tape every month and find it has increased the use I make of my Electron both for games and more serious purposes.

However, the more I learn the more I am frustrated by my lack of basic knowledge. I would like to use items like the screen dump and printer driver that you published, but although I have typed these in and saved them, I don't know how to use them.

For example, how can I print pictures from Elkpaint? If I load the dump first then work on Elkpaint, how can I call up the dump to print without breaking from the Elkpaint program?

Similarly if I load the driver before typing a letter in View how do I switch back to the driver to print it out? Could you please give some really simple instructions on how to use them.

I am also having problems with the Ceemags program from the September 1989 issue of Electron User. I copied it to disc from the tape supplied with my subscription but when I tried to run it I got the message No such variable at line 5480.

I checked the spelling as you suggested in the reply to my letter in December's issue, but my listing is the same as that in the magazine. When I deleted line 5480 the program would run but when I started to enter the headings I got the message String at line 2540.

This also happened when I tried the PROCshorted and PROCfast save lines. This program would be invaluable, as I sent for a bundle of backnumbers and am often searching for items, especially in the Micro Message pages.

Some of the early back numbers I have

MiCRO MESSAGES

refer to articles in magazines which are no longer available. Would it be possible for you to produce a series of Helpsheets which readers could send for with the most popular articles? Again I ask for simple instructions.

Many thanks for an excellent magazine, which I must add appeals to the whole family from the eager eight-year-old who grabs it first to see what games are listed and reviewed, to the not so young who enjoy more "improving" material. — Nan McGhee, Glasgow.

● The screen dump routine published in the August 1989 issue of Electron User must be run before you load the program that you want to dump to the printer. It assembles a machine code program that is stored in an unused part of memory — &C00. This means that you can then proceed to load another program without overwriting it.

Insert into the program a line like:

```
IF INKEY$(0)="D" THEN CALL &C00
```

and place it where it is likely to be called often, such as in the main program loop, so whenever you press the D key the screen will be dumped to the printer.

We have published instructions for the View Printer Driver program several times,

most recently in the February 1990 issue.

The spelling mistake in line 5480 was the only mistake in Ceemags, and that only occurred on the monthly cassette — the magazine was correct.

We like the idea of producing helpsheets and will bear it in mind.

Using an Electron in business

I own an Electron and was wondering if it is possible to buy programs to cover my accounts? To date I have only ever seen and heard of the View word processor disc and its associated spreadsheet.

It seems I purchased the incorrect machine for business and secretarial use, when its only use seems to be for games — P.Sherwood, V.T. Lifts and Stairchairs, Thirsk, North Yorkshire.

● The Electron is a very versatile machine and can be used for most things — games, education, control applications and business included. However, there can be no doubt that, while it may be ideal for home accounts, it was never designed as a full business machine and there is very little business software for it.

Mini Office is ideal for home and beginners but the View series is probably the best you'll find for more serious applications.

Help needed with Ninja 2

I HAVE owned my Electron for several years and have upgraded it with Slogger's Rombox Plus, Pegasus 400 disc system, Starword rom, Master Ram Board, T2PEG400 rom, Viewsheet and a Panasonic KX-PI0801 printer.

When I am not using it for homework, I enjoy playing games, my favourite being The Last Ninja, Holed Out! and Elite.

I have completed the Last Ninja and when The Last Ninja 2 was released I bought it.

I was stuck on my first few goes, but then I managed to get on to Level 6 and began

Making do without a Tab key

AFTER receiving a lot of hardware at Christmas, I am now the proud owner of an Electron, Panasonic KX-P1180 printer, Pegasus 400 disc system, and among other things, a Dump Out 3 rom from Watford Electronics. This is really for the BBC Micro, but it works well on my Electron except for one thing.

Dump Out 3 has many attributes and among them is a facility to box the part of the screen which you would like to print. The problem is that in order to move the box around you need the use of a Tab key, which is something the BBC Micro has but the Electron hasn't.

Please could you tell me if there is any way I can overcome this problem. Can I type in some codes or something before I use the dump to enable me to use some other key such as Z instead of Tab? Or could you even publish a small program to overcome this problem? — Peter Wood, Sale, Cheshire

● On some programs you can use Control+I in place of Tab — it depends how the software scans the keyboard. Unfortunately this doesn't work on Dump Out 3.

As you say, the software is still very useful even without this feature and you can, in fact, still dump a portion of the screen by defining the area as part of the *GIMAGE command.

Do this using the X <min><max> and Y<min><max> parameters. The X value is measured from left to right — 0 to 1279 — and Y is measured from bottom to top — 0 to 1023. So to dump an area at the top left of the screen quickly you would use the command:

```
*GIMAGE EPS F X 0 600 Y 500 1023
```

Note that the F for a fast dump must come before the X and Y definitions or the effect is cancelled.



hoping to complete the game. I started the level without any problems, killed the guards and then I came to a room which was pitch black. I went back out, and in the previous room found a box on the wall.

I guessed this was a switch to turn the lights on, so I tried everything hoping to succeed. Nothing worked, so I began to wander around the level but I still could not turn the lights on. Can anyone please help me?

I know that Pres is bringing some of Superior's older games out on disc, but will it bring out the new games on disc? I'm sure that I'm not the only person who gets bored while waiting for very long games to load on tape.

Finally, I should like to support Simon Tarry and everyone else who has written in asking for games to be converted to run on the Electron. — **Carl Nicholson, Billericay, Essex.**

School Electrons available

I am writing to you as the last line of help. Recently, I upgraded our school equipment. I have now four perfectly serviceable Electrons, all with AP3/4s, for sale.

I have advertised them in the local press but with no success. I know that you do not run a classified advertisements column, but I would ask you to print this letter and for any interested readers to contact me.

I hope to hear from someone — **Christopher Price, Merton Court School, Knoll Road, Sidcup, Kent. DA14 4QU.**

The key to Submarine

ABOUT 18 months ago the down cursor key on my family's Electron ceased to function. This caused only minor problems as most of the programs we own don't use them, or they allow the use of alternative keys.

Finally a program has cropped up in your magazine at which we can only stare and admire — Submarine. My four children's ages range between three and 17 and they all enjoy the programs in Electron User

But now the three youngest are screaming at me to either repair the micro — which I don't know enough about yet — or send it away to be repaired — which I can't afford.

Alternatively they'd like me to change the program to use other keys to drive the submarine. I've searched through the program superficially, but I haven't got time to work it out this time. I have in the past converted your listing to accommodate the differing ages of my children.

I used to learn a lot (in fact, everything I know) by searching for my typing errors after keying in your listing, and I could convert it myself if I had weeks of nights to sort

MiCRO MESSAGES

it out — but I haven't! Please, is there a simple way, or at least quicker way of converting the keys?

I still like to read the program listings but I am also extremely grateful for the free tapes.

Both aspects mean I can still learn and save time.

Thank you for the education and pleasure we derive from your magazine. — **Tina Wall, Swaffham, Norfolk.**

● Line 340 reads the keyboard and lines 350 to 380 test for the cursor keys using a line like:

```
If key=138 ...
```

All you need to do is to change the numbers 136, 137, 138 and 139 — these are the codes produced by the cursor keys. Substitute with 65 (the A key), 66 (the B key), 67 (the C key and so on, or whatever keys you want to use.

Turbo tapes possible?

I own an Electron and was wondering if you could please tell me if it is possible to buy a cartridge for the Plus 1 to speed up games' loading time? If so, could you please state

Path to an Electron upgrade

I OWN an Electron with Plus 1, Plus 3 and a KX-PI081 printer. Your magazine is excellent and I hope you keep up the good work.

I wish to increase the speed and the memory of my Electron, however I am unsure which products do what, and would be grateful if you could help me out.

I know a Turbo speeds up the Electron, but where can I buy one?

Also, what does Advanced Battery-Backed Ram do? Can I combine these two products and get the desired effect? Does a second processor do both these, and where can I obtain one? — **Mark Chambers, Shiremoor, Newcastle Upon Tyne.**

● The Slogger Turbo is no longer available, as Slogger has ceased trading. A Battery Backed Ram cartridge will allow you to load and run rom images, such as View and Viewsheets. It won't provide more memory for programming.

how much it would cost. — **K. Woodley, Haverhill, Suffolk.**

● The only way to speed up tapes' loading would be to increase the speed they are saved at in the first place and then load back at the new higher rate.

Unfortunately, more speed means less reliability.

There is no way to get a game that is recorded at a certain speed into your micro faster without designing new hardware as well — a tape deck that plays twice as fast for example.

Documented routines

IN the September, October and November 1988 editions of Electron User there was a series called A matter of routine which documented some of the subroutines in the Basic Rom, such as getlna, plnum0 and pto-ken.

Can you please advise where I can get a full list of these routines with their input and output parameters? They are not listed in the Advanced User Guide. Are they in a 6502 manual?

If you have a full list can you please provide me with a copy? — **D. A. Fidler, Calne, Wilts.**

● We can't supply you with a full list of rom routines — that would fill a whole magazine. However, you can find a list in the Basic Rom User Guide by Mark Plumley, and The Advanced Basic Rom User Guide For The BBC Micro by Colin Pharo.

Printing out pools facts

I WOULD like to congratulate you on your program Football Pools Predictor.

I have typed it in and I enjoy using it on a Sunday typing in the teams and having the percentage at the end. But unfortunately I have to write down all the teams and percentages.

As I am disabled and meet some friends of mine who are also disabled once a week, we compare our draws from different pools predictions.

I was wondering if you have a program so that I could have a printout of all the teams and percentages.

If you have such a program, or know any other way I can achieve the desired result, could you please publish it? — **G. Barber, Shadoxhurst, Nr., Ashford, Kent.**

● Any program's screen output can also be output to the printer by inserting a simple VDU 2 command.

This is best placed immediately before the section which prints the information that you want on the screen. Also, don't forget to

switch off the printer with VDU 3 when you don't need it, otherwise it will turn out reams of paper when your program draws or prints anything onscreen.

Running out of data

PLEASE could you help me – I typed in a game called Pea Shot and when I came to run the program it came up with out of data at line 100. I checked back in the magazine and I hadn't made a mistake. Line 100 said:

```
READ data
```

Could you please help me as I copied the program from the February 1986 edition of Electron User. Could you also explain what out of data means. – Smanatha Ship, Aysham, Norfolk.

● The out of data error is caused because the READ in line 100 cannot find enough data. So line 100 is correct and you've missed something out from the DATA lines elsewhere in the program.

Look for missed commas, or full stops in place of them, in the lines. If you've made either error as you typed in the program the micro will read two items as one and you'll be one short at the end.

Tracing those cool crashes

I HAVE been a reader of Electron User for five years and have upgraded my micro to AP3 MkII. It is in use daily and gives me invaluable help with my work, as well as providing my children with endless entertainment.

I was interested to see in the January 1990 issue, a letter from Ann Dunn regarding a fault on her Electron when it keeps resetting after switching on.

I have the same fault on my machine and I have checked the power supply, finding no obvious faults.

As Mrs Dunn has discovered, leaving the micro switched on for some time seems to cure the fault. I now leave mine switched on permanently to avoid having to wait up to three hours for it to stop resetting!

The problem seem to start if the micro is allowed to cool.

If any of your readers have had the same problem and managed to find a cure for it, I would be extremely pleased to hear from them.

Thanks for a very interesting magazine. I shall

MiCRO ESSAGES

remain an avid reader, – Richard Down, Bordon, Hants.

● You may be able to track down the fault using a freeze spray – available from an electronic component supplier. Using it on your warm micro you can cool individual components to see which one is causing the problem when it is cold.

Educational software

I HAVE an Electron which I have gradually expanded to include an AP1, AP3 View, Viewsheets and a Citizen 180 printer. However because my children use BBC Micros at school – a BBC B and Master 128 – I am wondering if it is possible to upgrade my Electron still further so that I can access educational software, such as that supplied by 4mation.

Pres informs me that an AP4 mod – plus a second disc drive – will let me have access to BBC B disc filing system, but as I see it there is still the problem that most BBC software is in Mode 7. How do I overcome this?

In addition, my husband would like to add a CAD system to the micro, such as Technomatics' Novacad. Would this be viable? – L.J. Ross, Crafhole, Nr. Torpoint, Cornwall.

● Often, the Mode 7 screens look OK in Mode 6 – there's just no colour and the double height text is duplicated single height. However, the only way to see if various pieces of software work, are acceptably fast and have a reasonable display, is to try them. No CAD packages are available for the Electron. Your best bet could be to sell your Electron and look for a second-hand

BBC Micro or Master in the classified advertisements of *The Micro User*. Then your children would be able to run educational software and your husband could run Novacad.

While this CAD package is good on a BBC Micro and ideal for home use, remember that for serious applications a more powerful machine like one of the Archimedes series is needed.

Generating random numbers

I WRITE simple programs for my children but I have come to a halt because I need to READ a random number. I want the number to be different each time the program runs. I would be grateful if you could solve this problem for me. – Mr. D. Smith, Birstall, West Yorkshire. WF17 ODT.

● To set the variable *number* to a random value just use a command like:

```
number = RND(20)
```

This sets *number* to an integer between 1 and 20. Each time you switch on your micro the same series of "random" numbers is followed and you can prevent this by seeding it first use:

```
X = RND(-TIME)
```

You'll find more details of RND in your micro's User Guide.

Copying from tape to disc

I AM the owner of a Plus 1 and Cumana disc drive. As a result, I cannot put a lot of my commercial games that are on cassette on to disc. Do you know of a good tape to disc program which isn't too expensive? Could you please inform me of programs that will do most games? Thanks – Paul

Hammersley, Milton Keynes, Bucks.

● Copying games without the publisher's permission is an infringement of the copyright regulations, even if the duplicates are for yourself. Suppliers protecting games against copying is an indication that they wouldn't give permission even if you asked. We can't recommend programs designed to help Electron users break the law.

That's Life...

I THOUGHT that any of your readers that are fascinated by the great game of Life, as described in John Geraghty's article in the February edition, would be interested in the following pattern:

```
.....  
.....  
..00000000..  
..00000000..  
..00000000..  
.....  
.....
```

This goes through several apparently different forms, but returns to itself after 15 generations. It is the longest periodicity repeating structure that I have yet found.

I am currently searching for a form that undergoes binary fission to produce two identical colonies after a number of generations. This really would be life. – Andrew Pillidge, Woking, Surrey.

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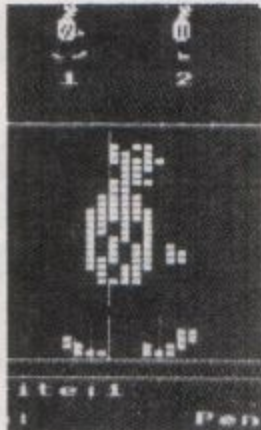
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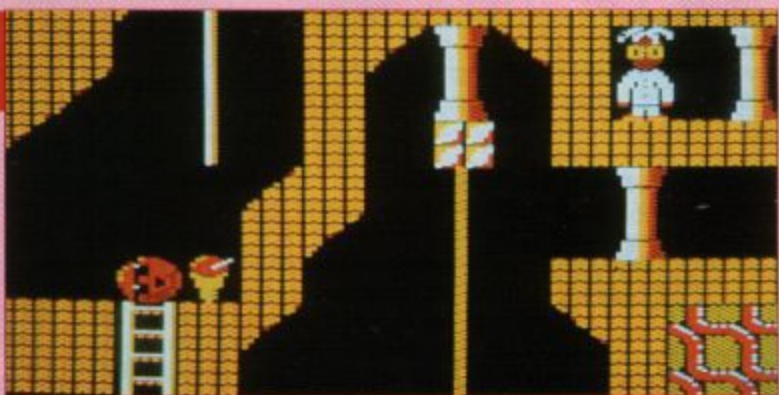


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RICOCHET

You control Sprat — the small partially robotic alien time traveller — in his quest to collect the five hour-glasses from the five worlds of Ricochet. Sprat can roll left and right, and can roll up and down ladders and ropes. But his unique ability is that he can jump to different heights and in different directions. You have to control this fast moving alien as he ricochets through the levels and solves the many clever puzzles.



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THREE GREAT NEW TITLES FROM SUPERIOR SOFTWARE

PERPLEXITY

3-Dimensional Strategy Game with Brilliant Graphics

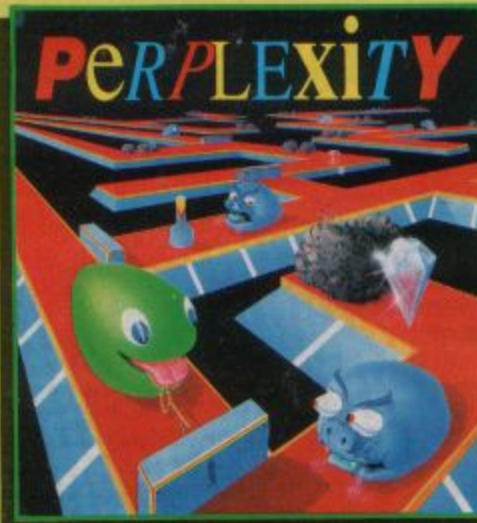
PERPLEXITY consists of 16 increasingly difficult levels, each a puzzling maze with one of four different 3D background themes. Collect the diamonds by pushing together the boulders scattered about the maze and push the keys to the correct doors to open them.

But watch out for the monsters who will chase you around the maze. And watch out also for the 'mystery boulders', which may give you a bonus score or a magic potion, but may also reverse some or all of the movement controls...then you've really got problems!

On-screen information includes a constantly up-dating scanner/map, which allows you to plan your route, a score-line and timer/status icons. Passwords allow you to skip completed levels.

PERPLEXITY combines the best puzzling features of REPTON games with superb 3D graphics, to give a highly addictive and visually brilliant game. Are you ready to face the challenge?

(The Electron version has the same graphics as the BBC Micro version.)



Unlock the Door



Beware the Monster

PLAY IT AGAIN SAM 13 A New Top-Hit Four-Game Compilation

BARBARIAN II

Have you the skill and strategy to reach the Dungeon of Drax? Twenty gruesome monsters to defeat in an 80 screen maze.

"The monsters are spectacular in size and design. A most impressive and playable game"....Acom User

PERCY PENGUIN

The classic and highly addictive game by Superior. Percy must kill the Snobees in the frozen maze by hurling ice cubes at them, but deadlier breeds then appear!

"Enjoyable to play with good graphics and sound"....A & B Computing

HYPERBALL

A brand-new release by Superior. The best version ever of the classic 'bat-and-ball' game, with 6 levels and a massive total of 120 screens. Special features include: infra-red scanners, 8-ball splitters, aliens, cannons, weapons' purchase, bonus rounds and screen-jump options.

PANDEMONIUM

A brilliant 'Top Ten' game by Peter Scott, featuring teleporters, lifts, springs, weird aliens to shoot, and lots, lots more, as you attempt to construct the core.

"Eighty screens of fun make this game my favourite"....Micro User

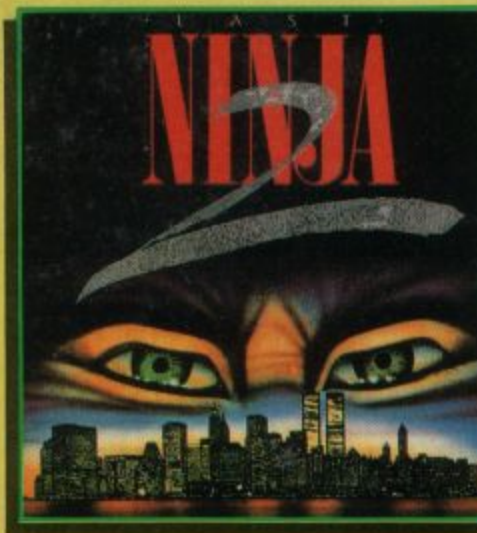


Barbarian II



Hyperball

PLAY IT AGAIN SAM 13



A Thug in the Cellar



Mugged on the Street

LAST NINJA 2 - Back with a Vengeance!

Born in a time of peace, lived in a time of war; the shadow warrior returns. Leaping the abyss of time he comes to fulfil his destiny!

DATELINE: 1990 **THE PLACE:** Downtown New York
THE QUEST: To destroy the eternal evil.....Kunitokil

Lots more fiendish adversaries, more colourful screens with superb graphics, a score-line, a timer... and lots and lots more exciting Ninja action. Are you ready for the thrills and skills of the Ninja in crime-filled Manhattan? Can you survive the six action-packed levels?

You start in the notorious CENTRAL PARK, with thugs, police and bees to get past, and shuriken stars and hamburgers to collect. Now to THE STREET, littered with down-and-outs and meths bottles. Take care in THE SEWERS to avoid the darkness and the crocodile. On to the forbidding opium factory in THE CELLAR and then to THE OFFICE and a secret computer code. Finally to KUNITOKI CASTLE with its immortal adversaries and the trickiest puzzle of all!

BBC Micro Cassette.....\$9.95 each BBC Micro 5 1/2" Disc.....\$11.95 each

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BBC Master Compact 3 1/2" Disc.....\$14.95 each Electron Cassette.....\$9.95 each

(The screen pictures show the BBC Micro versions of the games.)

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