

A Database Publication

electron

user

Vol. 6 No. 8 May 1989 £1.25

Hands off!

How to protect
your programs
and data

GAME

*Play Eliminator:
Type-in fun listing*

REVIEWS

*Mode 7 simulator, Superman,
Barbarian II, Circus Games*

UTILITIES

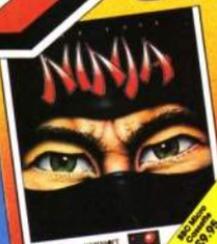
*Write your own disc formatter
Add 26 extra function keys
Explore recursive fractals
Invent new party cocktails*

FEATURES

*Designing your own 3D landscapes
Sorting Electron data files into order*



SUPERIOR SIX



BBC Master Compact
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The Last Ninja
The State of the Martial Arts. All the thrills and
awe of the Ninja, fighting with bare hands,
swords and ninjabras. Tossing shuriken and
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PLAY IT AGAIN SAM



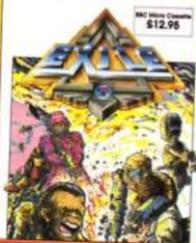
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Play It Again Sam 7
A superb New Four-Game Compilation -
featuring New Zealand's and two great classic
FORECAST, BONECHUNCHED, SQUARED, GHOULE.



BBC Master Compact
\$9.95

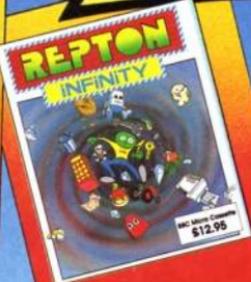
Barbarian II
The Barbarian and Moriana Fight the Monsters in
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objects to collect and 30 treasure markers to
bead.



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Exile
A Completely New and Stunning Concept in Computer
Games - Does you enter the World of Exile?
It's a desolate, the best game this year. I recommend
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INFINITY



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The Ultimate Repton - Four dazzling new games, with
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OF SPORT

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The Home Computer Version of the Most Popular Sports
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Great Games for Easter - Don't Miss These Top Hits!

The Last Ninja
Play It Again Sam 7
Barbarian II

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Repton Infinity
A Question of Sport

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Back to
school

10 educational
games for the
Electron for just £5.95

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.

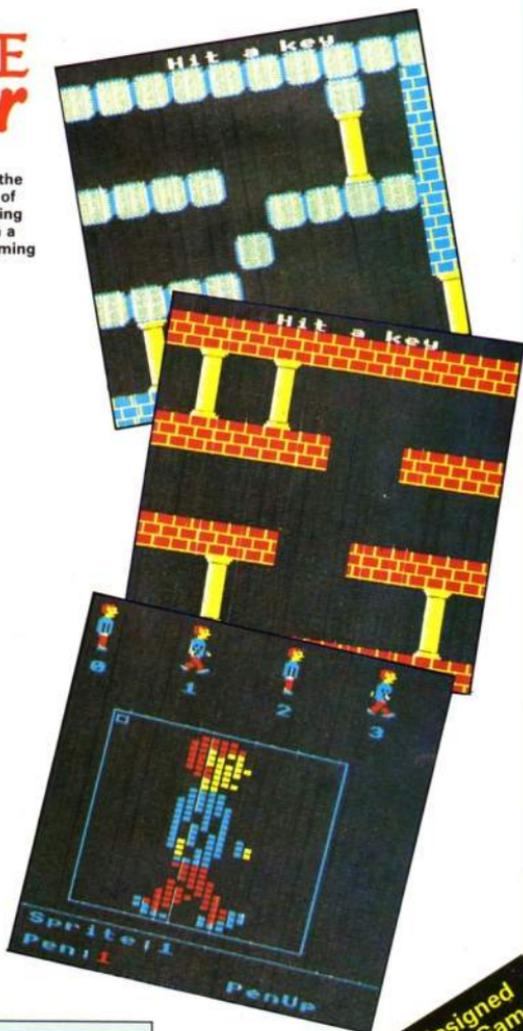
To help you make the most of the Arcade Game Creator, you will also get a comprehensive manual based on the original series.

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



Screens designed
using Arcade Game
Creator

TO ORDER PLEASE USE THE FORM ON PAGE 51

electron user NEWS

Flower folk like their Electrons

ELECTRON-based keyboards used by 2,800 Interflora florists in the UK face strong opposition this summer. Interflora has plans to replace them with PCs and will put them into 40 of their shops on a trial basis.

If the experiment works, Interflora expects to have all its members using PCs for the

flowers-by-wire services in four years time.

Before the trial *Electron User* carried out a mini survey which has resulted in a strong vote of confidence for the Electron in smaller businesses.

Most of the small florists contacted said they were quite happy with the machines they



Champers proof keyboards

CHAMPAGNE corks popped recently at the Welsh headquarters of Kador (0443 740281) but it didn't matter if the bubbly overflowed.

Staff were celebrating the launch of the 150th version of the firm's Seal'n Type keyboard protectors. The Electron cover sells for £7.50.

Ride 'em cowboy

TYNESOFT (091-414 4611) has jumped the Atlantic with its next offering for the Electron. After taking players inside the big top with Circus Games, the latest title has gone outdoors to let Electron fans try their hands at Rodeo Games.

Events including bronco riding, steer wrestling, calf roping, trick shooting and knife throwing.

"Rodeo Games is similar to Circus Games but takes the theme a step further", said Tynesoft's Colin Courtney. "It is set in the outdoors at a typical rodeo show".

Due out on May 19, Rodeo Games will cost £9.95 for the cassette and £14.95 on disc.

A HIGH speed parallel-serial and serial-parallel protocol converter with internal 8k and 32k buffer is now available from Worthing-based Ringdale Peripherals (0903 213131). It will drive remote parallel printer plotters over distances of up to 100m.

Priced at £98, the Ringdale high speed buffer converter supports all common baud rates and serial interface protocols from 300 to 38,400 baud and offers high data rates of up to 40,000 bytes a second.

Its principal applications are as a protocol converter or a parallel line driver.

Six on a budget

BLUE Ribbon (0302 21134) has released more Superior titles at budget prices for the Electron.

Marketing manager Mal Thomas said: "These titles sold extremely well at full price and are expected to do equally well at budget".

Now selling for £2.99 are *Galaforce*, *Ravenskull*, *Repton*, *Repton 2*, *Thrust* and *Karate Combat*.



It's the Plus 3+

THE Advanced Plus 3 disc upgrade proved so popular among Electron users that Surrey-based Pres (0276 72046) ran out of stocks at the end of February.

It is now bringing out Advanced Plus 3, Mark 2 with a double sided disc to replace the single sided version.

Pres boss John Huddleston told *Electron User* he hoped to launch the new upgrade by the end of April, but was still formulating a price.

"The response to the Plus 3 was amazing", he said. "Depending on different formats, we sold more than 3,000. The Mark 2 will be good news for Electron users. On a single disc it will provide 640k as opposed to 320k on the previous model".

Speedy speller

SLOGGER (0272 237496) has notched up a first with Starspell, a spell checker produced specifically for the Electron.

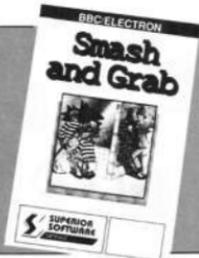
Designed to work with Starword or View word processing packages, Starspell is the result of popular demand and three months work by Slogger's Andrew Hildig.

Its main claim to success is its speed - it can check a 400 word document in a few seconds.

"Electron users have been asking for a spell checker for their machines for some time", said Chris Rudge of Slogger. "They also wanted one that was compatible with Starword".

Just released, Starspell costs £29.95 with an extra £2.50 for versions to be used on machines without rom sockets. If Electron users return their view cartridge to Slogger both View and Star Spell can be put on the one cartridge for £34.95.

Gallup Software Chart



THIS MONTH	LAST MONTH	TITLE (Software House)	COMMENTS	PRICE
1	1	SMASH AND GRAB <i>Blue Ribbon</i>	Making a second and successful bid for the top. Give this budget title a go if you are feeling especially villainous. Very playable.	1.99
2	4	TRIPLE DECKER <i>Alternative</i>	These games were originally listings in <i>Electron User</i> and <i>The Micro User</i> . There can be no argument about their value for money.	1.99
3	11	RAVENSKULL <i>Blue Ribbon</i>	An excellent arcade adventure which was a classic on its original label. At this price it has to be a bargain.	2.99
4	5	JOE BLADE 2 <i>Players</i>	The graphics are good and the game very playable. The puzzle screens are difficult, and this superb sequel will keep you busy for hours.	1.99
5	7	CITADEL <i>Blue Ribbon</i>	A great way to start a collection of arcade games if you are new to the Electron. A classic in its own right - Citadel is superb.	2.99
6	•	STAR FIGHT <i>Alternative</i>	Back in the charts is this extraterrestrial shoot-'em-up. There's nothing like a bit of harmless extermination when you want to relax.	1.99
7	8	STRYKER'S RUN <i>Blue Ribbon</i>	An old Superior title rebadged under the Blue Ribbon label. Well worth buying this arcade-style mission and also its sequel, Codename: Droid.	2.99
8	17	VIDEO CLASSICS <i>Firebird</i>	A budget collection of some simple and fun games. This set keeps reappearing in the charts - cheap, cheerful and good value.	1.99
9	•	THRUST <i>Firebird</i>	A deceptively simple game, Thrust has been keeping people glued to their screens on many formats for years. One for the skillful manoeuvre.	1.99
10	14	GRAHAM GOOCH TEST CRICKET <i>Alternative</i>	Originally released by ASL, it is more suited to its budget price. Only recommended if you cannot wait for the British season to start.	1.99
11	•	PLAY IT AGAIN SAM 3 <i>Superior</i>	One of the better Sam compilations featuring a good selection of full-priced games: Commando, Killer Gorilla, Killer Gorilla 2 and Palace of Magic.	9.95
12	15	JOE BLADE <i>Players</i>	The original mission for the community-conscious Joe. You don't need to buy this to enjoy Joe Blade 2, but it is worth it.	1.99
13	•	REPTON 2 <i>Blue Ribbon</i>	Not often seen on its own since its original release. If you like completeness then this should certainly be added to your collection.	2.99
14	•	WALK THE PLANK <i>Mastertronic</i>	Harking back to when Mastertronic was the top budget house. Little from them for the Electron these days, so worth snapping up.	1.99
15	•	KARATE COMBAT <i>Blue Ribbon</i>	As with sports simulations, martial arts never die. This is a better than average implementation and good armchair exercise.	2.99
16	6	COMMANDO <i>Encore</i>	Excellent value and one you should add to your collection immediately. A shoot-'em-up which is everything you would expect.	2.99
17	•	ROCKFALL <i>Alternative</i>	You are trapped and must escape from your captivity as soon as possible. Unluckily you are not alone. Enjoyable and addictive.	1.99
18	•	REPTON INFINITY <i>Superior</i>	A full-priced and innovative title from Superior - not just four superb Repton-like games but also a programming language called Reptol.	12.95
19	12	CHUCKIE EGG <i>A&F</i>	Enter the chicken house for this ladders and levels game. Fall and you'll be scrambled. Avoid disaster and collect all the riches.	9.95
20	19	SNAPPER <i>Acornsoft</i>	A blast from the past, though I would wait and buy it as part of Play it Again Sam 7 - you will get three other games too.	9.99

SOFTWARE

Bargains

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Felix and The Evil Weevils
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WE have had many interesting graphic utilities in *Electron User*, but this one must be the most unusual yet. *Landscape Designer* enables you to create your own world of land and sea. An infinite variety of landscapes can be constructed and you can view them from any angle. The results resemble volcanic islands, or sometimes the rocky coast at Land's End in Cornwall.

Rolling hills, craggy peaks, deep valleys, islands, inlets and natural harbours are all possible by altering a few simple variables. The illustrations show just two of the many possibilities.

When you run the program you'll be presented with a menu. You can simply press 9

Create your own islands and land masses with this fascinating Basic utility from the inventive David Odd

to draw a landscape, but it is best to set the various landscape parameters first. With option two you can decide from which direction to view the landscape by setting the angle of view.

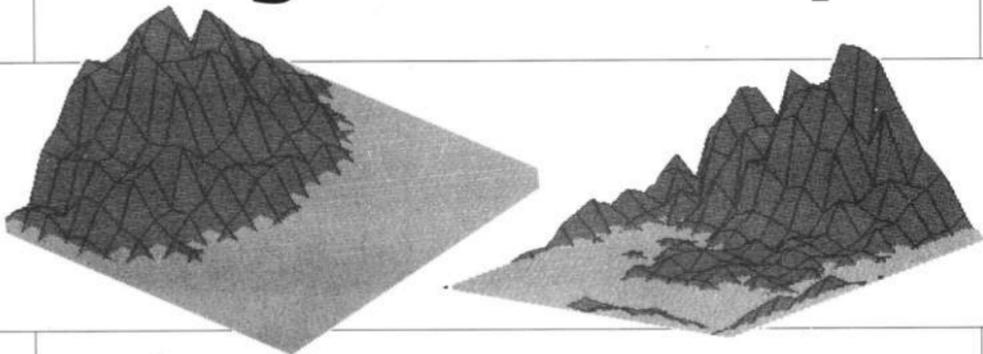
The elevation is the height from which it is viewed. With option three you can look from

a point just above sea level, or soar above it for a bird's eye view. The sea level is alterable with option four and can be used to show the effects of tides and floods.

The roughness factor, option five, decides whether you have smooth hills or rocky cliffs and mountains. As you can guess, the height - option six - sets the height of the landscape, raising hills and mountains out of the sea.

The amount of detail sets the number of plates that are used to construct the landscape. By choosing less detail in option eight the picture is drawn faster. The random numbers option seven sets a series of factors which affect the landscape in subtle ways. There isn't a way of predicting their effect.

Designer landscapes



```

10 REM Landscape Designer
20 REM By D. Odd
30 REM (c) Electron User
40 MODE6: *FX16
50 OS="AZ":PS="BZ":R=RZ/50
60 DIMX(16,16),Y(16,16),ZX(16,
16),Y(16,16)
70 MODE4
80 VDU28,1,30,38,1
90 VDU19,3,0,0,0,0
100 VDU19,0,3,0,0,0,0
110 PROCboarder
120 PRINT"TAB(14)"MENU"
130 PRINT" 1. Change all sta
tistics"
140 PRINT" 2. Change Angle of
view"
150 PRINT" 3. Change Elevatio
n"
160 PRINT" 4. Change Water Le
vel"
170 PRINT" 5. Change Roughnes
s"
180 PRINT" 6. Change Height S
eed"
190 PRINT" 7. Change Random N
os."
200 PRINT" 8. Change Amount o
f Detail"
210 PRINT" 9. Print Landscape
"
220 REPEAT:A=GET:UNTILA>4BANDA<
58:SOUND1,-10,200,1
230 COLOUR131:COLOUR0:PRINTTAB

```

```

2,((A-4)*2)+3):CHR$(A):TIME=0:RE
PEAT:UNTILTIME>75:*FX21
240 COLOUR128:COLOUR3:CLS:A=A-4
8
250 IF A=2 PROCang:CLS:GOTO80
260 IF A=3 PROCele:CLS:GOTO80
270 IF A=4 PROCwat:CLS:GOTO80
280 IF A=5 PROCdet:CLS:GOTO80
290 IF A=6 PROChe:CLS:GOTO80
300 IF A=7 PROCran:VDU30:GOTO80
310 IF A=8 PROCsvar:CLS:GOTO80
320 IF A=9 THEN 460
330 PROCran:PROCsvar
340 PROCang:PROCele:PROCwat:PRO
Cdet:PROChe:CLS:GOTO80
350 DEFPROCran:XI=RND(360):YI=R
ND(360):SI=RND(360):CI=RND(360):O
I=RND(360):PI=RND(360):NI=RND(360)
360 DEFPROCele:DI=FNinput("elev
ation",30,5,30):ENDPROC
370 DEFPROCang:AI=FNinput("rotat
ion(0=0,1=90,2=180,3=270)"*CHR$
13+CHR$(10,3,0,0):IFAI=0THENOS="AZ
":PS="BZ"
380 IFAX=3THENOS="16-BZ":PS="AZ
"
390 IFAX=1THENOS="BZ":PS="16-AZ
"
400 IFAX=2THENOS="16-AZ":PS="16
-BZ"
410 ENDPROC
420 DEFPROCwat:WX=FNinput("wate
r level",500,0,30):ENDPROC

```

```

430 DEFPROCsvar:TX=FNinput("det
ail",2,1,2):ENDPROC
440 DEFPROCdet:IX=FNinput("roug
hness",100,0,50):R=RZ/100:ENDPROC
450 DEFPROChe:HX=FNinput("heigh
t seed",100,1,50):ENDPROC
460 MODE5
470 VDU23,1,0,0,0,0
480 PRINT TAB(5,15)"Thinking"
490 FORAX=0TO16STEPTX:FORBZ=0TO
16STEPTX
500 X(AZ,BZ)=((AZ*40)+(BZ*40))+
10
510 Y(AZ,BZ)=((BZ*DX)-(AZ*DX))+
(520-WX)-(300-(10*DX))
520 XI(AZ,BZ)=X(AZ,BZ):YI(AZ,BZ
)=Y(AZ,BZ)
530 NEXT:NEXT
540 FORAX=0TO16STEPTX
550 FORBZ=0TO16STEPTX
560 JX=((HX*(2-R))+RND(HX)*R)
570 SI=SIN(RAD(XI-(AZ*11.25)))*
(SIN(RAD(YI-(BZ*11.5)))*JX*5):IFS
1<4THENSZ=0
580 S2=SIN(RAD(SI-(AZ*11.25)))*
(SIN(RAD(CI-(BZ*11.5)))*JX*5):IFS
2<4THENSZ=0
590 S3=SIN(RAD(OI-(AZ*11.25)))*
(SIN(RAD(PI-(BZ*11.5)))*JX):IFS3<
4THENSZ=0

```

Turn to Page 10 ▶

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```

600 S4=SIN(RAD(MX-(AX*11.25)))*(
SIN(RAD(NX-(BX*11.5)))*(JX*2)):IFS
4<4THEN$4=0
610 I=S1+S2+S3+S4
620 OX=EVAL(OS):PX=EVAL(PS)
630 Y(OX,PX)=Y(OX,PX)+I
640 NEXT:NEXT:PROCdraw:VDU7:*FX
21
650 A=GET:GCOLD,3:MOVE100,604:D
RAM1179,604:DRAW1179,400:DRAW100,
400:DRAW100,604
660 GCOLD,0:FORAX=4TO196STEP8:M
OVE108,600-AX:DRAW1171,600-AZ:MOV
E108,604+AX:DRAW1171,604+AX:NEXT
670 PRINTTAB(3,14)" Press 'S' t
o"
680 PRINTTAB(2,15)**SPOOL the L
and"
690 PRINTTAB(3,16)** Any other k
ey"
700 PRINTTAB(3,17)" to return t
o"
710 PRINTTAB(3,18)" the menu"
720 AS=GETS:IFAS=""S"THENPROCsp
ol
730 GOT070
740 DEFPROCdraw
750 VDU23,1,0,0,0,0:GCOLD,1:PR
OCboarder:VDU19,0,6,0,0,0:VDU19,1
,4,0,0,0:VDU19,3,0,0,0,0:VDU19,2,
2,0,0,0
760 PROCwater2
770 FORAX=0TO16-TXSTEPX
780 FORBX=16-TXTO0STEP-TX
790 GCOLD,2

```

```

800 IFY(AX,BX)<YX(AX,BX)+WIOXY(
AX+TX,BX)<YX(AZ+TX,BX)+WIOXY(AZ,B,
X)+TX)<YX(AZ,BX+TX)+WIOXY(AZ+TX,BX
+TX)<YX(AZ+TX,BX+TX)+W1THENPROCwa
ter:GOT0880
810 MOVEX(AX,BX),Y(AX,BX):MOVEX
(AZ+TX,BX),Y(AZ+TX,BX):PLOT85,X(A
Z,BX+TX),Y(AZ,BX+TX):PLOT85,X(AZ+
TX,BX+TX),Y(AZ+TX,BX+TX)
820 GCOLD,3
830 MOVEX(AX,BX),Y(AX,BX)
840 DRAWX(AZ+TX,BX),Y(AZ+TX,BX)
850 DRAWX(AZ+TX,BX+TX),Y(AZ+TX,
BX+TX)
860 DRAWX(AZ,BX+TX),Y(AZ,BX+TX)
870 DRAWX(AZ,BX),Y(AZ,BX)
880 NEXT:NEXT:GCOLD,0:MOVEKX(16
,0),YX(16,0)+WX:MOVEKX(16,0),0:PL
OT85,XX(0,0),YX(0,0)+WX:PLOT85,0
890 MOVEX(16,0),YX(16,0)+WX:M
VEXX(16,0),0:PLOT85,XX(16,16),YX(
16,16)+WX:PLOT85,1279,0
900 ENDPROC
910 DEFPROCwater1:GCOLD,2:MOVEX
(AZ,BX),Y(AZ,BX):MOVEX(AZ+TX,BX),
Y(AZ+TX,BX):PLOT85,X(AZ,BX+TX),Y(
AZ,BX+TX):PLOT85,X(AZ+TX,BX+TX),Y
(AZ+TX,BX+TX)
920 GCOLD,3
930 MOVEX(AZ,BX),Y(AX,BX):DRAWX
(AZ+TX,BX),Y(AZ+TX,BX):DRAWX(AZ+T
X,BX+TX),Y(AZ+TX,BX+TX):DRAWX(AZ,
BX+TX),Y(AZ,BX+TX):DRAWX(AZ,BX),Y
(AZ,BX)
940 GCOLD,1:MOVEX(AZ,BX),YX(AZ
,BX)+WX:MOVEX(AZ+TX,BX),YX(AZ+TX

```

```

,BX)+WX:PLOT85,XX(AZ,BX+TX),YX(AZ
,BX+TX)+WX:PLOT85,XX(AZ+TX,BX+TX)
,YX(AZ+TX,BX+TX)+WX
950 ENDPROC
960 DEFPROCwater2
970 GCOLD,1:MOVEX(0,0),YX(0,0)
+WX:MOVEX(16,0),YX(16,0)+WX:PLOT
85,XX(0,16),YX(0,16)+WX:PLOT85,XX
(16,16),YX(16,16)+WX:ENDPROC
980 DEFFNinput($H,$L,$X)
990 COLOUR3:PRINT" Enter the a
mount for "":AS:"":LX:"-":HX
:"":
1000 INPUTBS;
1010 IFLEN(BS)=0THEN AX=BX:GOTO1
030
1020 AX=VAL(BS)
1030 IFAX>HXORAX<LITHENCOLOUR1:P
RINT" Number not in proper range
":SOUND1,-10,200,1:GOTO990
-1040 =AX
1050 DEFPROCboarder:SX=8
1060 VDU23,1,0,0,0,0;
1070 MOVEO,0:DRAW1279,0:DRAW1279
+1023
1080 MOVE28,28:DRAW1251,28:DRAW1
251,995
1090 FORAX=0TO28STEP8:MOVEAX,AX
:DRAMAX,1023-AX:DRAM1279-AX,1023-
AX:NEXT
1100 MOVE1251,28:DRAM1279,0
1110 VDU24,32,32;1247;991;
1120 ENDPROC
1130 DEFPROCspool:CLS:VDU26:*SPO
OL LAL
1140 CLS:PROCdraw:*SPOOL
1150 ENDPROC

```

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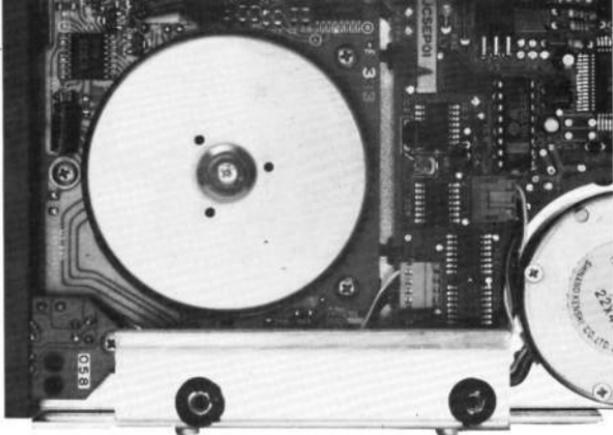
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On the right track



We have looked at a wide variety of disc operations in this series of articles exploring the Electron's DFS and ADFS disc systems. One vitally important task we have yet to examine is the process of formatting a blank floppy disc, something which must be performed on every new disc before it can be used.

The operation is surrounded by a little mystery, as the process appears to verge on the magical. It makes new discs usable and recovers corrupt ones that might otherwise be consigned to the waste paper bin.

The formatter you have used so far is probably either stored on a utilities or Welcome disc like that supplied with the Plus 3, or on rom like the DFS' built in FORM40 and FORM80 commands. All are pure 6502 machine code programs. They can, however, be just as easily written in Basic, as we shall see.

To keep things simple, and to continue our examination of osword calls that we started last month, we'll ignore the ADFS for the moment and concentrate on the DFS used in Slogger's Pegasus and the Pres Plus 4.

The ease with which we can format a

Writing your own disc formatter is easy, as Roland Waddilove shows in Part 7 of his series on the Electron's floppy disc system

floppy disc is due to the built-in format command of the original BBC Micro's 8271 disc controller. Although the 8271 is no longer used in the Electron, the 1772 disc controller and DFS now incorporated in modern disc interfaces will emulate this command in order to prevent software incompatibility problems.

What this means is that effectively the WD1772 disc controller in our Electron disc interface has a built-in format command. This is implemented as an osword call. Whole tracks can be formatted in one operation and all we need to do is write a simple FOR ... NEXT loop running from 0 to 39 for 40 track disc drives or 0 to 79 for 80 track ones.

The osword &7F call to format a track -

function number &63 - requires several items of data which must be passed to it in a parameter block. The table shows the structure:

Byte	Function
0	Drive number
1-4	Address of sector table
5	Number of parameters (5)
6	Function number (&63)
7	Track number
8	Gap three (21)
9	Sector size/number (&2A)
10	Gap five (0)
11	Gap one (16)
12	Result stored here (0-0K)

The number of parameters, drive and track are all fairly straightforward and should not require explanation. Byte nine in the parameter block tells the disc controller the size

Turn to Page 12 ▶

***** Electron User Fast Formatter *****

40 OR 80 Tracks?40

Insert disc and press Return

Track:

0
1
2
3
4
5
6

1
2
3
4
5
6

2
3
4
5
6
7
8

3
4
5
6
7
8

Done...

Formatting
a 40 track
DFS disc

◀ From Page 11

of each sector and how many to squeeze into each track. DFS discs require a value of &2A which means 10 sectors per track, each 256 bytes long.

The sector table consists of a four byte entry for each sector to be created in the track. The standard DFS disc has 10 sectors per track so there must be 10 four-byte entries.

The first byte is the track number, byte three is the sector number and the last byte is the data size – a value of one specifies 256-byte sectors. Byte two is the head number and a value of zero is normally used for this. Double sided disc drives have two read/write heads – the top is numbered zero and the bottom is one.

The sector table needs updating with each track formatted, as the track number alters. The rest of the parameters are the same.

When executing the format command the disc controller first moves the read/write head to the precise position on the disc where the

track is to be created. It writes the sector identification fields using the data in the sector table and calculates and stores a cyclic redundancy checksum.

It then fills in the gaps between the sectors and identification and data fields. Finally the 256-byte data area is filled with the value &E5 and a data CRC is calculated and stored immediately following the data.

The accompanying program shows how a disc formatter can be written in Basic and how the osword call is implemented. Enter it, save it and run it to format a disc. You are prompted to input the size – either 40 or 80 track – and then off it goes, formatting the disc.

One essential task which you must not forget once you have formatted the disc is to create the directory. Fortunately this is quite simple, as apart from two bytes the whole directory covering the first two sectors on the disc is filled with zero bytes. The two non-zero ones – bytes six and seven in sector one – hold the total number of sectors on the disc.



"He's the high performance mini floppy discs chef"

Soft sectors

Floppy discs have a very large capacity to store data. In order to make the process of writing data to the disc more easily managed the disc is divided up into tracks and each track is further divided into a number of small sectors. When you save a program it is divided up into 256-byte chunks and each chunk is saved in separate sectors.

The Electron uses a soft sectoring technique, which means that special identification marks are recorded in the magnetic film on the disc to show where each sector starts. These identifiers are put there by a program called a formatter.

A sector's identification field starts with six special sync bytes to enable the controller to synchronise with the rotational

speed of the disc. These are followed by the sector identification mark showing where the sector starts.

Following this is the track and head number. The latter indicates whether it is the top side of the disc or the bottom. Next is the sector number, followed by a code specifying the amount of data in the sector's data field. Finally in this identification field comes a two-byte cyclic redundancy checksum (CRC).

There is a gap between the identification field and the data field holding the data. Sync bytes precede the data mark which shows where the 256 bytes of data are held. There is a CRC for the data sector.

Another gap filled with special bytes separates one sector from the next within each track. Two final gaps fill the rest of the track starting from the last sector and running to the end.

```
10 REM DFS Formatter
20 REM By R.A.Waddilove
30 REM (c) Electron User
40
50 MODE 4
60 COLOUR 0:COLOUR 129
70 PRINT TAB(0,2)***** Electr
on User Fast Formatter *****
80 COLOUR 1:COLOUR 128
90 PRINT
100 REPEAT
110 INPUT "40 OR 80 Tracks";TX
120 UNTIL TX=40 OR TX=80
130 PRINT
140 INPUT "Insert disc and pres
s Return"AS
150 PRINT
160 PRINT "Track:"
170
180 DIM block 16
190 DIM sectab 40
200 DIM dir 512
210
220 FOR track=0 TO TX-1
230 PRINT track;
240
250 REM Set up parameter block
260 ?block=0 : REM Drive
270 block1=sectab : REM sector
table
280 block?5=5 : REM No. paramet
ers
290 block?6=&B3 : REM Command n
umber
300 block?7=track
310 block?8=21 : REM Gap 3
320 block?9=&2A : REM 10 256-by
te sectors
330 block?10=0 : REM Gap 5
340 block?11=16 : REM Gap 1
350 block?12=0 : REM result
360
370 REM Set up sector table
380 FOR s=0 TO 9* STEP 4
390 sectab?s=track
400 sectab?(s+1)=0 : REM head
410 sectab?(s+2)=s DIV 4 : REM
sector
420 sectab?(s+3)=1 : REM 256-by
te sector
430 NEXT
440
450 REM call osword &F
460 AI=&7F
470 XI=block MOD 256
480 YI=block DIV 256
490 CALL &FFF1
500
510 NEXT
520
530 REM Create directory in ram
540 FOR i=0 TO 511
550 dir?i=0
560 NEXT
570 dir?8106=track*10 DIV 256 :
REM No. sectors hi byte
580 dir?8107=track*10 MOD 256:
REM No. sectors lo byte
590
600 REM write directory
610 ?block=0 : REM Drive
620 block1=dir : REM data addr
ess
630 block1?5=3 : REM No. paramet
ers
640 block!6=&4B : REM command
650 block!7=0 : REM Track
660 block!8=0 : REM Sector
670 block!9=&22 : REM 2 256-byt
e sectors
680 AI=&7F
690 XI=block MOD 256
700 YI=block DIV 256
710 CALL &FFF1
720 PRINT
```

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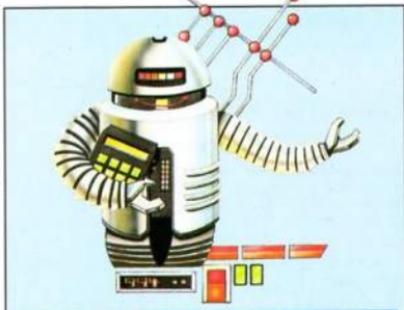
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2

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TO ORDER, PLEASE USE THE FORM ON PAGE 51

SOFTWARE

Product: Circus Games
 Price: £9.95 (tape) £14.95 (disc)
 Supplier: Tynesoft, Addison Industrial Estate,
 Blaydon, Tyne & Wear NE21 4TE.
 Tel: 091-414 4611



Big top

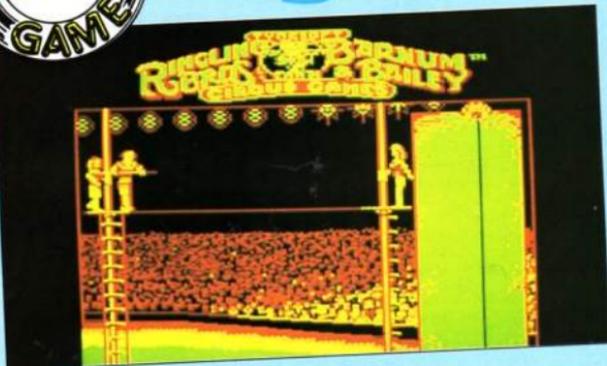
DONNING sequined tights and a lurex leotard, I step flamboyantly into the circus ring. Stefan Brookolini, master of the high wire and tamer of big stripy pussy cats, is ready to take part in the circus spectacular of the year, Circus Games, courtesy of Tynesoft.

Up to four players can compete in the big top tournament – a four event extravaganza that includes tiger training, tightrope walking, trapeze and trick horse riding. I suggest you take advantage of the practice option – at least there will be no audience to laugh as you plummet to your three deaths.

The tiger training event was quite puzzling – according to the instructions the ring should have contained an obstacle course over which the tiger was to be guided, a tiger-head cursor, a tiger and me. All of the aforementioned items were present except for one – me. I was nowhere to be seen.

I hope my absence was not due to cowardice on my sprite's part. Although this is an interesting game section, the big cat's colours were very poor indeed and he looked like a mottled tabby rather than a striped tiger. That apart it's great fun.

Old timers who remember Superior Software's Hunchback will have a distinct advantage when playing event number two,



Tightrope walking

the trapeze. You stand there high above the ring and as the rope swings towards you you jump and grab hold. By moving your legs at the correct time you can increase the height of your swing – one of the most critical factors affecting your success. Swing too high and you will soar into the lights, too low and you will plummet like a falling trapeze artist. As if swinging wasn't enough to cope with,

you must time your release so that the far trapeze is within your reach as you complete your graceful arc across the ring. And if you intend scoring any points at this event you had better perform an assortment of twists and somersaults to impress the judges.

The tightrope event employs a dual view display as the walker is seen both from the side and above. The top view allows you to

Brutal cut'em-up

Product: Barbarian II
 Price: £9.95
 Supplier: Superior Software, Regent House,
 Skinner Lane, Leeds LS7 1AX.
 Tel: 0532 459453



THE original Barbarian from Superior Software/Palace was a smash hit in 1988 with its exciting hand-to-hand combat, superb graphics and grunts, groans and clanging of sword against sword. Two features made it stand out from the crowd – the scantily clad Maria Whittaker on the box and adverts (though nothing was said of the equally scantily clad male), and the graphic depiction of the unfortunate warriors being decapitated. In the

sequel, Barbarian II: The Dungeon of Drax, both features are retained.

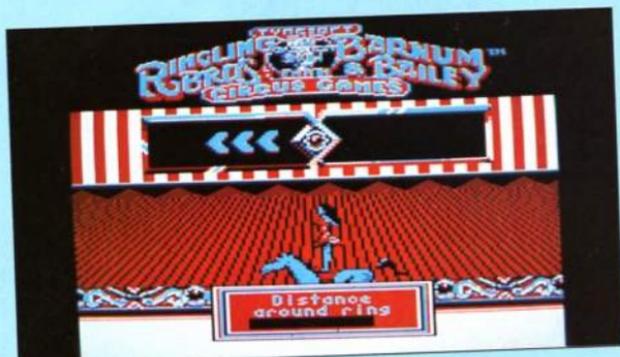
Load up the game and you'll be presented with a picture of a dungeon with two warriors standing either side of a burning brazier. This screen heralds the first of the changes from the original game – you can choose to be either the barbarian of the title or the Princess Mariana. I tried both, but couldn't distinguish any difference in combat ability.

After choosing your warrior the rest of the game is loaded. The action takes place in the bottom half of the screen while a large Barbarian II banner lies just above the play area and an information strip is at the very bottom. In this a sword on top of a shield always points north and a scroll shows the current level plus your score.

Each of the first three levels consists of around 28 screens and you can walk left or

REVIEWS

extravaganza



Trick horseback riding

see when you are beginning to overbalance to the left or right, a state of affairs which can be corrected using the appropriate keys.

A remarkable degree of realism has been programmed into this event. Just as in the real discipline, there is a tendency for the inexperienced walker to make a dash for the far podium - this invariably finishes with the artiste providing an involuntary demonstra-

tion of Newton's laws of gravity.

The final event is the easiest of the four. Sitting and standing on a galloping white charger you have to perform a series of somersaults and handstands. Once again the left and right keys are used to maintain your balance while the fire key initiates any of the four breathtaking stunts. All events are realistically animated and respond well to the

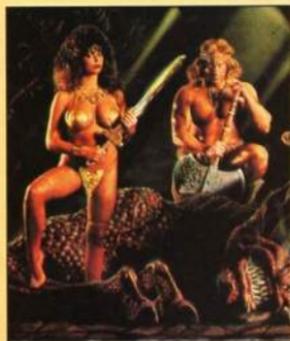
right or through a cave to the next location. There's no scrolling, and each new screen flicks up fairly rapidly. The first level is the wastelands, the second the caverns and the third the dungeon.

The object is to make your way to a certain location on one of the 28 or so screens. Your first problem is to hack and slash your way through the monsters which inhabit each screen. These include dinosaurs, furry two legged beasts, cavemen, chickens and other creatures which defy description.

Apart from the monsters, the other main obstacle is the way the screens are mapped. For instance, if you walk left off one screen you can either appear on the right of the next or at the mouth of a cave also on the right. In the heat of the battle it's very easy to become confused about which way you are facing. The sword-compass always shows which direction is north.

There are objects to collect which will help you in your mission to destroy Drax. An axe increases your strength, a globe guards against Drax's magic, a potion increases your strength, a shield guards against the demon's firey breath and so on.

The number of fighting moves has been reduced to four and I found that just one or



two were required to kill the opponents. The hard part is finding the right location to take you to the next level and the fighting aspect takes up a smaller proportion of the action.

The graphics and animation are excellent, and the gory decapitation scene is still here. The sound effects add to the atmosphere and the whole game is professionally produced.

controls, but the sound is limited to a few beeps.

Circus Games is a new and interesting variation on the decathlon type of program that has proved so successful over the years. I see no reason why this game should be any different.

Steve Brook

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

Second Opinion

Circus Games is another blockbuster of a package from Tynesoft. If you've got a disc drive then the disc version is an absolute must as loading time is cut to seconds. You can practise events and chop and change as much as you like.

The graphics are excellent, and though the attempt at digitised sound at the start is interesting, it doesn't quite work. Overall it's a superb compilation of unusual and interesting games.

Roland Waddilove

Barbarian II is an excellent sequel to the original hack and slash cut-'em-up combat game as this version has more depth, better graphics and improved sound. If you liked Barbarian you'll like this too.

Roland Waddilove

Sound	5
Graphics	9
Playability	9
Value for money	9
Overall	9

Second Opinion

I was disappointed by Barbarian II's lack of fighting manoeuvres - it's what made the original so good. However, I welcome the new exploring and mapping aspect, plus the collectible objects, and these features add more depth of gameplay.

If you're on the lookout for a new combat challenge Barbarian II fits the bill quite nicely.

Janice Murray

Up, up and away!

Is it a bird? Is it a plane? No, it's Superman, the Man of Steel. TyneSoft now brings that hero of the comic book on to your Electron. The software comes on what looks like a C90 cassette – it's a massive program. This is a multi-part game like many of TyneSoft's latest packages, but unlike some, each section must be completed before you are allowed to progress to the next.

The story so far: Mysterious earthquakes and volcanoes threaten to devastate the Earth. Lois Lane and the Governor have been taken aboard a hi-jacked yacht by terrorists and what's more, two of Superman's most dangerous enemies are being held hostage.

The playing screen is divided into two areas. On the left is a control panel showing the currently active super power, your strength, score and so on. The right hand side contains the window where all the action takes place.

Adopting the role of Superman, you first have to meet Professor Corwan at Star Laboratories, but on the way you encounter the Parademons. In this first stage you must kill the demons with your laser eyes or by thumping the living daylight out of them with your superhuman strength. A quick blast of super breath helps keep them at bay while you gather strength.

Select Superman's mode of assault by pressing the Shift key. Icons on the left of the screen will display what mode you are in. As soon as you kill a couple of Parademons more are born through the Boom Tube which drifts down from the sky just when you think you have wiped them out.

Some of the demons ride concussion cannon firing concussion clouds as they ap-

Product: *Superman*
Price: £9.95 (cassette)
Supplier: TyneSoft, Addison Industrial Estate,
Blaydon, Tyne & Wear.
Telephone: 091-414 4611

proach. Come into contact with one and your energy level quickly falls. If you manage to polish off enough demons within the time limit another scene will load. You must now immediately go to the SS Atlantis, the yacht where Lois and the governor are being held hostage.

Using your super-strength kick, breath, punch and fight your way along the deck of the Atlantis dispatching any terrorists on the way. Free the governor and fly off with Lois to Star Laboratories. If only it was this easy – the bad news is that the terrorists are equipped with laser cannon and seem to have the strength of 10 men, so venture cautiously.

On arriving at Star the professor tells you that he must go to the laboratory in a space shuttle to gather important data concerning the seismic activity of the planet. You have to guide the shuttle through an asteroid storm riddled with Kryptonite. Again using your super-powers, punch the asteroids and zap the kryptonite with your laser vision.

After hours of practice this third stage is the furthest I have reached. The goal is to battle through five more stages and reach

the end where you must destroy the geo-destructor situated in the core of the Lexcorp Satellite station.

The game, although very playable, is by no means easy and the first stage may leave you somewhat frustrated after a while. Once you have got through it and on to the next level you'll be curious as to what lies ahead on future levels, making you all the more determined.

There is one annoying fault with this otherwise excellent game. When you die you have to rewind the tape almost back to the beginning and reload virtually the whole lot. Apart from that Superman is super.

David McLachlan

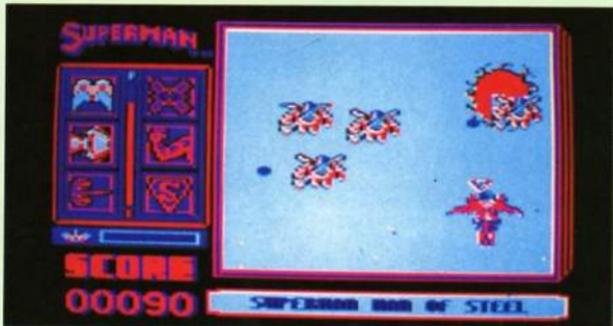
Sound	6
Graphics	9
Playability	8
Value for money	9
Overall	8

Second Opinion

Superman could have made Golden Game this month, but for two things – it's difficult and you have to reload every time you get killed.

The graphics are superb and the gameplay is exciting and addictive. The sound is minimal, but this wasn't really noticeable. It's a pity you can't practice any section you want as this would have made the game far more enjoyable.

Roland Waddilove



Alien invasion



THE Earth is under threat of alien invasion once again, and as ever, it's up to you to beat off an attack by Krellian bug-eyed monsters. Alien spaceships appear out of hyper space and line up in attack formation above the planet's surface. One by one they swoop down, guns ablaze. You control an advanced laser base blessed with an unlimited supply of rapid-fire missiles and your task is to completely wipe out the alien threat.

The keys Z and X move your base left and right while pressing Return fires a missile.

Defend or die in this fast action arcade game devised by Anthony Houghton

Several can be fired in rapid succession by constantly tapping Return, and the best tactic is to move left and right spraying missiles

non-stop at the alien attack formation above. If you manage to wipe out the first wave a new one will appear and more ships will swoop down the screen on bombing runs. Keep clear of these if you can.

The game features a high score table set against a scrolling star background to record the top 10 players. A large proportion of the listing is assembly language so enter it with care. The machine code is used to speed up the action and implement fast moving multi-coloured sprites.

```

10 REM Eliminator
20 REM by A.Houghton
30 REM (c) Electron User
40 IF PAGE>8000 GOTO 1300
50 ONERRORIFERR=17GOTOBOELSEMO
DE6:REPORT:PRINT" at line ";ERL:END
60 ENVELOPE1,1,-5,-3,-1,100,10
0,100,126,0,0,-126,126,126:ENVELO
PE2,1,12,-12,6,1,10,10,126,0,0,-1
26,126,126
70 MODE5:PROCassem:flagZ=0
80 !score=0:sheet=1:tdiff=210:
?lives=5:PROCtitle
90 PROCinrv
100 PROCscreen:CALLmain:IF?shot
=26PROCbonus ELSEPROCkill
110 IF?shot=26GOTO9ELSEIF?live

```

```

>0G0T0100
120 VDU28,4,18,15,16,12,17,3:PR
INT!" GAME OVER":VDU26:IFscore?1
>h!score?150R(score?1+h!score?15AND
?score+h!score?14)PROCshufffle:flag
Z=TRUE
130 PROCwait(200):GOTO80
140 DEFPROCkill:SOUND0,-15,4,8:
SOUND0,-10,5,8:SOUND0,-5,6,8:XX=?
shpx:YZ=27:CALLcalc:FORN1=1TO64:
os!ad:lod=85000:XS=3:YZ=24:FX19
150 CALLprnt:VDU19,0,NZMOD2,0:
:NEXT:?lives=?lives-1:PROCwait(10
0):ENDPROC
160 DEFPROCwait(t):TIME=0:REPEA
TUNTILTIME>t:ENDPROC
170 DEFPROCbonus:VDU28,0,19,19,
15,12,17,3:PRINT"ALL aliens dest

```

```

royed"!TAB(5)"BONUS:";VDU26:shee
t=sheet+1:PROCdiff
180 bonZ=400*sheet:PROCdbon:PRO
Cwait(50):REPEAT:SOUND810,0,0,0:b
onZ+bonZ-40:CALLinc:CALLinc:SOU
ND0,-15,4,1:PROCdbon:CALLpsc:UNTI
LbonZ=0:PROCwait(100):ENDPROC
190 DEFPROCdbon:COLOUR1:PRINTTA
B(11,18)RIGHTS("0000"+STR$bonZ,5)
:ENDPROC
200 DEFPROCdiff:IF?diff>120 ?di
ff=?diff-30:ENDPROC
210 IF?diff>60 ?diff=?diff-20:EN
DPROC
220 IF?diff>30 ?diff=?diff-15:EN

```

Turn to Page 19 ▶

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- ★ Play an exciting game in Hey Diddle Diddle.



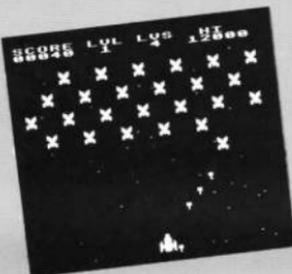
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◀ From Page 19

```

AscCore:JSRByte:LD#48:JMP&FEE: .b
yte TAX:LSRA:LSRA:LSRA:LSRA:JSR#1
b:TXA:AND#F
980 .nib CLC:ADC#48:JMP&FEE
990 .phis LDAscCore:STAR#50:LDAsc
ore+1:STAB#1:LDAB#52:STAScore:LDAB
53:STAScore+1:JSR#isc:LDAB#50:STAs
core:LDAB#1:STAScore+1:RTS
1000 .lives EQU00:lvh EQUB17:E
QUB2:EQUB31:EQUB11:EQUB1
1010 .pliv LD#00:lvhd LDAlvh,
X:JSR&FEE:INX:CMP#1:BNELvhd:LDAl
lives:CLC:ADC#47:JMP&FEE
1020 .bomb LDY#19:.sboLp LDAbomy
,Y:CMF#30:BCS#nus:DEY:BP#sboLp:RT
S:.fnus LDACurr:STABomy,Y:TAX:LDAC
ury:CLC:ADC#2:STAbomy,Y:TAY
1030 JSRcal:LDAd:STAs:LDAd+1:
STAs+1:LDAB#50:STAod:STAod+1:LD
X#1:LDX#18:JMP#rint
1040 .mboms LDA#19:STABuls:.mbo
lp LDYbuls:LDAbomy,Y:CMF#30:BCS#x
tbo
1050 LDAB#50:STAod:STAod+1:STAnd
:STAod+1:LDAbomy,Y:TAX:LDAbomy,Y
:TAY:JSRcal:LDAd:STAs:LDAd+1:ST
As+1
1060 LDAbuls:INCbomy,X:LDAs:CLC
:ADC#40:STAs:LDAs+1:ADC#1:STAn
s+1:LDX#1:LDY#8:JSR#prite
1070 LDAbuls:LDAbomy,X:CMF#27:BC
C#xtbo:LDAbomx,X:SEC:SBChpx:CMF#
3:BCS#xtbo:LDAB#FF:STAdend
1080 .nxtbo DECbuls:BP#lboLp:RTS
1090 JNEXT
1100 DI#names 96,hiscor 16:FORN#
=0T07:S(names+12*N#):CHR#17+CHR#3
+*Tomy:scz=12-N#:hiscor?(N#*2+1)
=ac#MOD10+16*(ac#DIV10):hiscor?(N
#*2)=0:NEXT
1110 ENDPROC
1120 DEFPROCd(AS,XX,YY):VDU31,XX

```



```

,YX:AX=10:XX=856:YY=0:FORN#X=1TOLE
NAS:7856=ASC(MIDS(AS,NX)):CALL&FF
F1:VDU23,224,7857,7857,7858,7858,
7859,7859,785A,785A,224,8,10,23,2
24,785B,785B,785C,785C,785D,785D,
785E,785E,224,11:NEXT:ENDPROC
1130 DEFPROCd(Addr):7852=Ta
d#rX:7853=Addr#11:CALL#his:ENDPROC
1140 DEFPROctitle:VDU22,5,23,1,0
;0;0;0;19,3,4;0:*FX12
1150 COLOUR1:PROCd("ELIMINATOR",
5,1):VDU31,3,4,90,8,10,88,8,10:PR
INT"RETURN":COLOUR3:PRINTTAB(5,4)
"....."TAB(5,5):....."TAB(10,6
)....."
1160 COLOUR2:PRINTTAB(13,4)"Left
"TAB(12,5)"Right"TAB(13,6)"Fire"
1170 COLOUR3:PRINTTAB(2,8)"Extra
ship every"SPC(6):COLOUR1:PRINT
"10000":COLOUR3:PRINT"points"
1180 COLOUR2:PROCd("HI-SCORES",5

```

```

,11):FORN#T07:COLOUR3:PRINTTAB
1,N#*2+14):N#*1":COLOUR2:PROCd
his(hiscor+N#*2)
1190 COLOUR1:PRINT"$(names+N#*
12):NEXT:IFFlag#PROCinput:flag#X#0
1200 COLOUR2:PROCd("Press SPACE
to play",0,30):PROCstara:UNTILINKEY(2)
=32:OSCLI"FX11":ENDPROC
1210 DEFPROCinput:VDU23,1,1,0;0;
0;:N#*1:REPEAT:N#*1:UNTIL$(na
mes+N#*12)="":VDU31,9,N#*2+14,17,
2
1220 I850=names+N#*12:7852=11:78
53=32:7854=126:OSCLI"FX21":AX=0:X
Y=850:YY=0:CALL&FF1:VDU23,1,0;0;
0;0:ENDPROC
1230 DEFPROCshuffl:hiscor?14=7s
core:hiscor?15=score#1:$(names+84
)"":FORN#T01STEP#1
1240 a#hiscor?(N#*2)+256*hiscor
?N#*2+1)b#hiscor?(N#*2-2)+256*
hiscor?(N#*2-1):Ifa>b#PROCswap
1250 NEXT:ENDPROC
1260 DEFPROCswap:hiscor?(N#*2)=b
#MOD256:hiscor?(N#*2+1)=b#DIV256:
hiscor?(N#*2-2)=a#MOD256:hiscor?(
N#*2-1)=a#DIV256
1270 a#S=(names+N#*12):$(names+N
#*12)=S(names+N#*12-12):S(names+N
#*12-12)=S:ENDPROC
1280 DATA,10100000,EOED4000,FEF
40E0,0,0,1C141410,1E1E1E1C,4FDF
4FE,FOF4FEFE,60404000,EOED0E06,1C1C
1E1E,81C,44E4E4,EOFO
1290 DATA600E0E,206,4D04D04D,4A
44444A,EA4EA4EA,4D04D04D,6B0E0C0B
34347A7A,C20E0602,8484CACA,3C3D3
530,CTC3C,86868480,60686
1300 REM LOAD
1310 K.O *T.MIX#PAGE=8E00:FORJ
3#PAGE TO TOP STEP4:(J#JX)=!JX:
NEXT:PAGE=8E00:LD#NRUN
1320 *FX136,0,128

```

electron user

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electron user

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Pretty as a picture

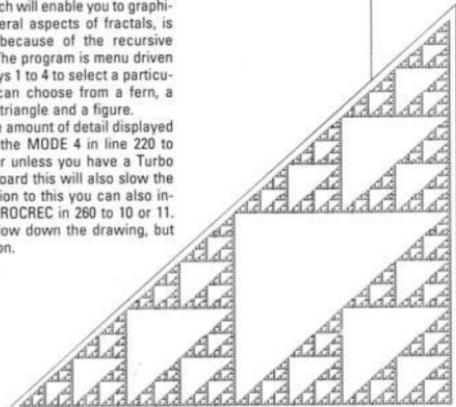
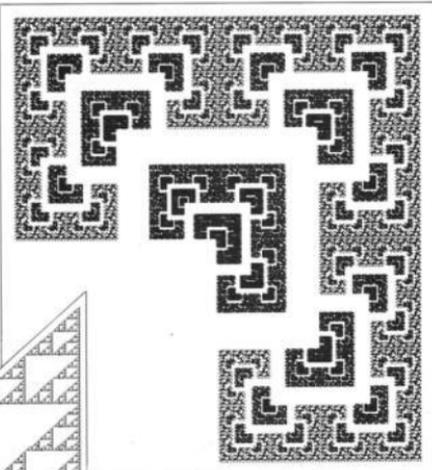
Michael Rozdoba shows how to draw impressive fractals making use of a clever recursive technique

THE subject of fractals has been explored in *Electron User* several times, but like the very nature of fractals itself, the closer you look the more interesting details you see.

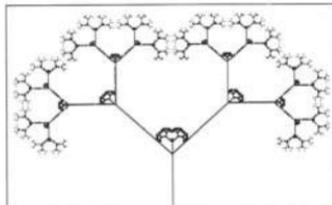
This listing, which will enable you to graphically explore several aspects of fractals, is extremely short because of the recursive technique used. The program is menu driven - simply press keys 1 to 4 to select a particular picture. You can choose from a fern, a tree, a Sierpinski triangle and a figure.

To increase the amount of detail displayed you can change the MODE 4 in line 220 to MODE 0, however unless you have a Turbo or Master Ram Board this will also slow the program. In addition to this you can also increase the 9 in PROCREC in 260 to 10 or 11. Again, this will slow down the drawing, but increase resolution.

A figure drawn using a recursive technique



A Sierpinski triangle



A fractal tree



The fern

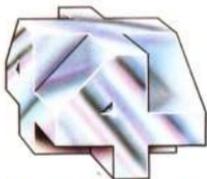
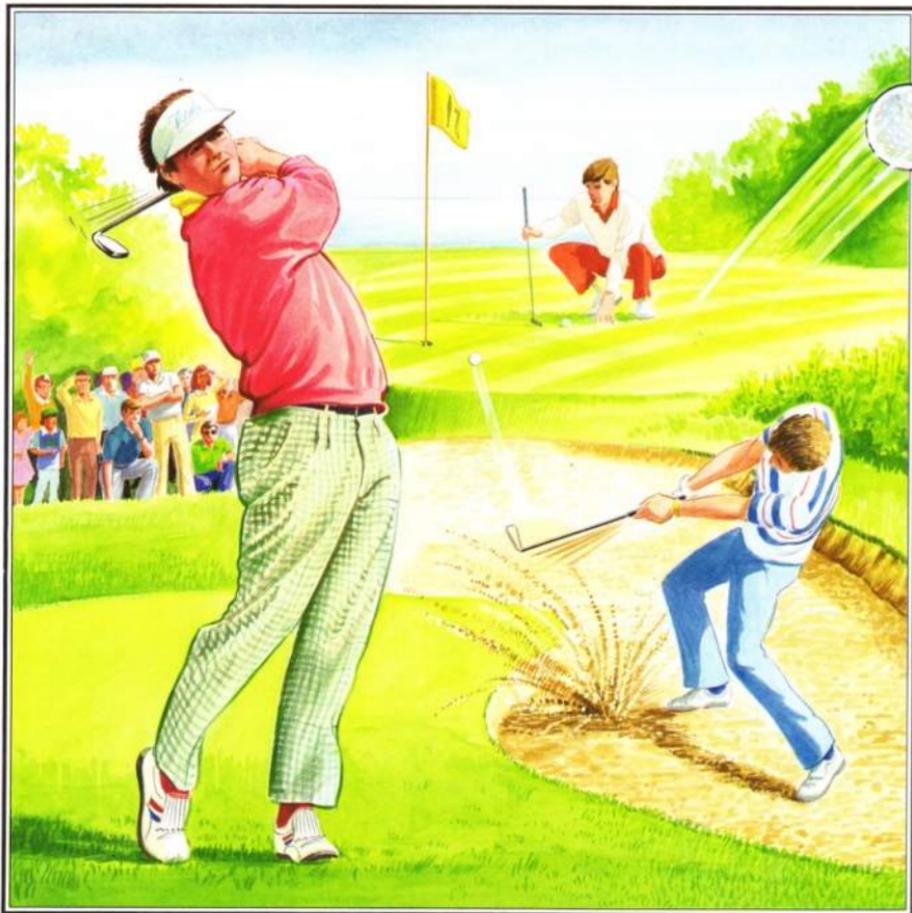
```

10 REM Deterministic fractal
20 REM generation by recursive
30 REM programming
40 REM By Michael Rozdoba
50 REM (c) Electron User
60 REM Fern
70 DATA 4,120,520,0,0,0,0,16,
0,0,.85,.04,-.04,.85,0,1.6,.2,-2
6,.23,.22,0,1.6,-.15,.28,.26,.24,
0,.44
80 REM Tree
90 DATA 4,2000,600,0,0,0,5,
0,0,.42,-.42,.42,.42,0,.2,.42,.42
,-.42,.42,0,.2,1,0,0,1,0,2
100 REM Sierpinski triangle
110 DATA 3,10,0,0,5,0,0,5,1,1
,5,0,0,5,1,50,5,0,0,5,50,50
120 REM Figure
130 DATA 4,1024,0,0,0,-5,5,0,
-5,0,-5,0,0,5,0,5,0,5,-5,0,5,
1,333,0,0,333,333,333
140 MODE 6
150 PRINT
160 PRINT"Which fractal?":PRINT
"1. Fern":PRINT"2. Tree":PRINT"3.
Sierpinski triangle":PRINT"4. F
igure"
170 K$=GET$

180 RESTORE 70
190 IF K$="2" RESTORE 90
200 IF K$="3" RESTORE 110
210 IF K$="4" RESTORE 130
220 MODE 4
230 VDU 23,1,0;0;0;0;
240 VDU 19,0,7;0;19,1,0;0;CLS
250 PROCINIT
260 PROCREC(9,0,0)
270 END
280 DEF PROCREC(L,X,Y)
290 IF L=1 PLOT 69,SC*X+XS,SC*Y
+YS:ENDPROC
300 LOCAL QX
310 FOR QX=0 TO NX
320 PROCREC(L-1,X*A(QX)+Y*B(QX)
+E(QX),X*C(QX)+Y*D(QX)+F(QX))
330 NEXT
340 ENDPROC
350 DEF PROCINIT
360 READ NX,SC,XS,YS,NX=NX-1
370 DIM A(NX),B(NX),C(NX),D(NX)
,E(NX),F(NX)
380 FOR QX=0 TO NX
390 READ A(QX),B(QX),C(QX),D(QX)
,E(QX),F(QX)
400 NEXT
410 ENDPROC
    
```

**BBC MICRO
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Holed



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Whether you're young or old, male or female, beginner or professional, Holed Out has been designed especially for you. You can play alone or use the varying skill levels to allow up to 4 players of differing abilities to be more equally matched against each other. The game controls have been carefully selected for simplicity so that even the youngest or inexperienced computer user can play Holed Out.

Included with the game is a well thought-out instruction manual giving all the information you will require and individual maps of all the 36 holes.

OUT !!

**BBC MICRO
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Driving off the 1st tee - a dogleg to the right.



Using a 7 Iron to clear the trees.



A good lie in the rough but there's a strong wind.



A long put with a tricky slope to the left.



A long bunker shot soars through the air to the green.



A left-handed player aims to clear the canal with a 3 Wood.



A high Wedge shot from a bad lie in the rough.



The Electron version is identical to the BBC version.

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- 1 **Two Contrasting 18 Hole Courses** - Once you've mastered the easier first course you should be ready for the greater challenge ahead.
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- 5 **Excellent Sound Effects** - Several effects have been added to give extra atmosphere to the game. Hear the ball rattle as you Hole Out. (An Eagle seems to sound a lot better than a Dogie).
- 6 **Full Instruction Manual** - This features easy to follow guidelines, general rules of golf and detailed scale maps of all 36 holes.
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- 9 **Variable Wind on Each Hole** - Wind varies significantly and can be blowing from any direction. Every round you play will be unique.
- 10 **Slice and Hook Capabilities** - You can use slice or hook to swerve your ball around the various hazards that you will encounter.
- 11 **Full Set of Clubs** - You carry 14 clubs. Woods 1, 3 and 5; Irons 1 to 9; Wedge and Putter.
- 12 **Accurately Defined Club Performances** - Each club's performance has been accurately simulated. You must consider your lie, the distance required, the wind conditions, the height required and the degree to which the ball will bounce and run along the ground.
- 13 **Bunkers, Trees, Water and Variable Rough** - These are best avoided as the consequences of an encounter have been 'lovingly' recreated.
- 14 **Authentic Greens** - Hazards, such as 'protecting' bunkers, will require you to plan your approach to each green carefully. Once made, the greens can be sloped in any direction and the gradients vary greatly. Putting is an art that will need mastering in its own right.
- 15 **Constantly Updated Full Scoreboard** - You can check your progress with a full record of all the players' performances on each hole.
- 16 **Matchplay or Strokeplay Options** - Play to win the most holes or try to get the lowest overall number of shots.
- 17 **Designed by a Team of Golf Enthusiasts** - as if you haven't guessed.
- 18 **All Versions Programmed by the Highly Acclaimed Programmer Gordon Kay** - The above screenshots are taken from the BBC & Electron versions.

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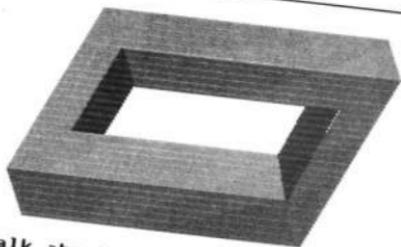
The Fourth Dimension

LINERS

THIS month's double helping of 10 liners consists of a collection of optical illusions created by Jim Proctor of Louth, Lincolnshire. These mini programming marvels are very compactly written and make good use of the Electron's superb graphics.

Three are written in four colour Mode 1 and the other two are monochrome Mode 4. The programs make heavy use of READ and DATA, as the coordinates for plotting the shapes are stored at the end of the listings.

Has anyone created any other optical illusions?

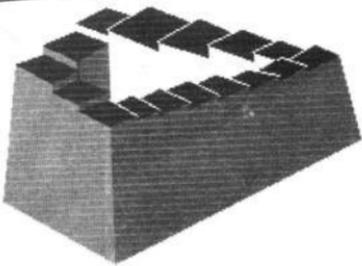


Talk about knickers in a twist!

```

1 REM The Escher Rectangle
2 MODE1:VDU5,19,1,2,0;19,2,5;
0;19,3,4;0;23;8202;0;0;0:PROCCrec
:REPEATUNTILINKEY=74:RUN
3 DEFPROCrec
4 FORP=1TO3:READcx,jx,ix:GCO
LO,cx
5 FORIX=1TO IX:READmx,my,dx
x,dx:MOVEmx,my:DRAWdx,dy
6 FORJ=1TO JX:READpx,py:PL
OTBS,px,py:NEXT:NEXT
7 VDU4:PRINTTAB(3,28)"Talk ab
out knickers in a twist!":ENDPROC
8 DATA,6,1,1005,690,1050,600
,295,690,350,600,100,300,250,400,
800,300,770,400
9 DATA,4,1,150,200,100,300,8
50,200,800,300,1050,600,910,520,3
50,600,390,520
10 DATA3,2,2,350,600,390,520,2,
50,404,330,404,800,300,770,400,90
0,516,820,516

```



Maybe it will sell for jogging practice

```

1 MODE1:VDU19,1,4;0;19,2,6;0;
19,3,7;0;23;8202;0;0;0:RESTORE4:
FORM=1TO9:PROCplot:NEXT:PROCLine(
5,1):PROCLine(0,13):VDU4:PRINTTAB
(1,28)"Maybe it will sell for
jog
ging practice":REPEATUNTILINKEY=7
4:RUN:REM Escher Stairway
2 DEFPROCline(cx,jx):GCOLD,cx
:FORIX=1TO IX:READmx,my,dx:dy
:MOVEmx,my:DRAWdx,dy:NEXT:END
PROC
3 DEFPROCplot:READcx,jx,ix:GC
OLO,cx:FORI=1TO IX:READmx,my,dx
x,dx:MOVEmx,my:DRAWdx,dy:FOR
J=1TO JX:READpx,py:PL0TBS,px,p

```

```

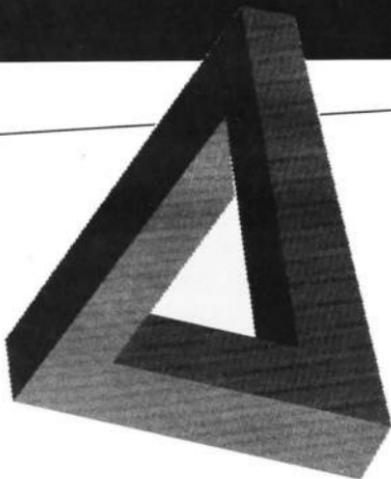
yz:NEXT:NEXT:ENDPROC
4 DATA1,8,1,400,220,400,535,1
30,370,325,570,325,585,130,370,26
0,615,260,635,130,370,175,680,1,2
,1,240,700,325,660,240,720,325,68
0,0,2,1,325,770,400,740,325,750,4
00,720
5 DATA2,23,1,1020,480,975,675
,400,220,895,640,895,655,400,220,
825,620,825,635,400,220,750,600,7
50,615,400,220,675,580,665,595,40
0,220,600,565,600,580,400,220,525
0,555,525,570,400,220,470,545,470,
555,400,220,400,535
6 DATA2,5,1,400,720,400,610,3
25,680,325,640,325,660,260,615,26

```

```

0,635,2,2,1,325,570,400,595,325,5
85,400,610,3,2,4,325,570,400,535,
3,400,595,470,555,260,615,325,585,3
25,640,400,610,175,680,260,635,24
0,700,325,660,240,720,325,750,325
,680,400
7 DATA720,3,3,11,400,740,325,
770,400,755,400,800,460,780,525,7
00,400,755,525,720,505,800,610,76
0,650,680,525,720,650,710,630,770
720,730,760,670,650,710,760,690,
735,740,815,710,895,640,975,675,8
95,655,915,700,850,670
8 DATA825,640,895,655,825,635,
,835,675,770,645,750,600,825,635,
,750,615,750,650,700,630,675,580,7
50,615,675,595,670,640,620,620,60
0,565,675,595,600,580,600,630,540
,610,525,555,600,580,525,570,525,
615,480,595
9 DATA470,545,525,565,470,555
,460,600,420,585,3,4,1,820,670,76
0,690,835,675,825,715,850,670,890
,690,325,680,325,640,400,755,505,
800,820,670,835,675,525,720,630,7
70,650,710,735,740,760,690,825,71
5,850,670,915,700
10 DATA835,675,895,655,750,650
,825,635,670,640,750,615,600,630,
675,595,530,615,600,580,460,600,5
25,565,400,595,470,555

```

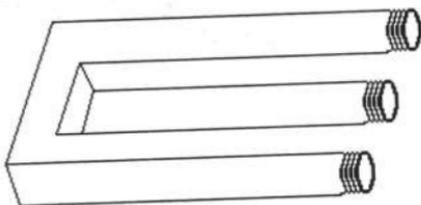


```

1 REM The Escher Triangle
2 MODE1:VDU23;8202;0;0;0;:PRO
  Ctri:REPEATUNTILINKEY-74:RUN
3 DEFPROctri
4 MOVE100,100:DRAW250,60:DRAW
  1200,480:DRAW1200,600:DRAW250,950
  :DRAW100,900:DRAW100,100
5 MOVE250,60:DRAW250,700:DRAW
  730,520:DRAW920,580:DRAW100,900:M
  OVE390,650:DRAW390,300:DRAW1200,6
  00:MOVE390,400:DRAW730,520
6 VDU4:PRINTTAB(23,26)"Feel in
  g twisted!"TAB(16,28)"- it's wors
  
```

```

e in colour!"TAB(25,30)"Press spa
  ce...":REPEATUNTILINKEY-99:VDU19,
  1,4;0;19,2,5;0;19,3,6;0;5,16
  7 GCOLD,1:MOVE250,60:DRAW100,
  100:PLOT85,250,700:PLOT85,100,900
  :PLOT85,730,520:PLOT85,920,580
  8 GCOLD,3:MOVE100,900:DRAW250
  :PLOT85,920,580:PLOT85,1200,6
  00:PLOT85,390,400:PLOT85,390,300
  9 GCOLD,2:MOVE390,650:DRAW250
  :PLOT85,1200,600:PLOT85,1200,480
  10 ENDPROC
  
```



I knew that CAD program was no good!

```

1 REM A peg too many
2 MODE4:VDU23;8202;0;0;0;:19,1
  28,132;0;19,1,3;0;:PROcpeg:REPEAT
  UNTILINKEY-74:RUN
3 DEFPROcpeg:VDUS
4 VDU23,230,228,27,18,18,54,3
  6,36,109,23,231,147,111,76,76,220
  ,152,152,184,23,232,192,224,48,48
  ,56,24,24,28
5 VDU23,233,73,219,219,219,21
  9,219,219,73,23,234,48,112,112,11
  
```

```

2,112,112,112,48,23,235,12,12,12,
  12,12,12,12,12
6 VDU23,236,109,36,36,54,18,1
  8,27,228,23,237,184,152,152,220,7
  6,76,111,147,23,238,28,24,24,56,4
  8,48,224,192
7 MOVE928,319:DRAW128,319:DR
  A96,415:MOVE928,415:DRAW96,415:DR
  A224,735:DRAW1056,735:MOVE1056,6
  39:DRAW288,639:DRAW224,479:DRAW99
  2,479:MOVE288,479:DRAW320,575:DR
  
```

```

W288,639:MOVE992,575:DRAW320,575
  8 RESTORE10:FORnX=1103:READnX
  ,yX:MOVExX,yX:VDU230,231,232,10,8
  ,8,8,233,234,235,10,8,8,8,236,237
  ,238:NEXT
9 VDU4:PRINTTAB(1,28)"I knew
  that CAD program was no good!" :EN
  DPROC
10 DATA1056,735,992,575,928,41
  5
  
```

IS IT A VASE...?



OR TWO FACES...?

```

1 REM Two-faced vase
2 MODE4:OSCLI("FX9,200"):OSCL
  I("FX10,200"):VDUS,19,1,0;0;23;82
  02;0;0;0;:PROcVase:REPEATUNTILIN
  KEY-74:OSCLI("FX9,25"):OSCLI("FX10
  ,25"):RUN
3 DEFPROcVase
4 MOVE350,800:RESTORE10:FORnX
  =11023:READnX,yX:DRAWnX+80,yX:NEX
  T
5 MOVE929,800:RESTORE10:FORnX
  =11023:READnX,yX:DRAW1199-nX,yX:NEX
  T
6 MOVE350,800:DRAW929,800:MOV
  E270,150:DRAW1009,150
7 FORyX=154T0796STEP4:PLOT77,
  640,yX:NEXT
8 VDU4,19,128,132;0;19,1,8;0;
  :PRINTTAB(12,3)"IS IT A VASE...?"
  TAB(12,29)"OR TWO FACES...?"
9 ENDPROC
10 DATA00,700,440,660,470,620
  ,480,400,480,550,470,530,480,500,
  500,460,530,430,520,410,460,410,4
  50,380,460,360,430,354,430,346,46
  0,340,420,300,430,270,430,240,410
  ,220,250,200,200,170,190,150
  
```

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Adventures

By Pendragon

The rites of spring

SUNSHINE is washing against the battlements, the deer are courting in the forest and I really must clean my armour. With spring upon us we once more hold forth and impart that which is new. From Labyrinth Software comes news of a new release with the breathtaking title Quest for the Pendragon. It was written using Incentive's Adventure Creator with a patch introduced by the author, Michael Cargill, to allow the game to also run from disc on Electrons fitted with the Pres Plus 4 DFS interface.

This also means that Michael is now able to release his earlier adventure, Plane Crash, on disc for the Electron.

Quest for the Pendragon is a real Arthurian taster – it certainly had me foxed at one or two points. The game allows multi-statement lines and also includes a novel feature of a random

chance of capture. Watch for a review in a coming issue.

It is pleasing to see more and more games emanating from dedicated adventurers who have used experience gained in solving adventures to write new and exciting romps. Casting an eye over recent releases I gain the clear impression of player, programmer, product and machine maturing alongside each other.

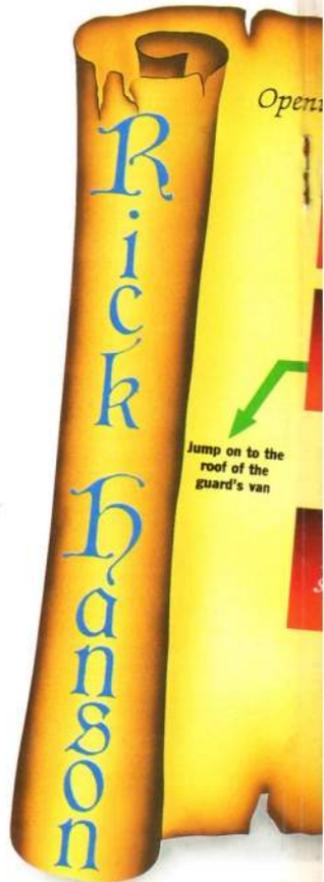
Further to my ramblings in the March issue I have received a number of letters from readers asking whether The Quill is still available for the Electron. My investigations have brought no reward, so can any reader or company help with the name of a supplier who may still have stocks of Gilsoft's superb adventure writing aid?

I would also be grateful for any pictorial maps of any of the Level 9 series of adventures – particularly Colossal Adventure. I already have logical routes for all its titles, but due to the personal nature of logical routes they are often difficult to transcribe on to the page for all readers to understand.

Suitable software prizes also await the senders of the first full maps to Scott Adams' Adventureland or Micro Power's Adventure.

Finally, this month's featured map is of the opening scenario to Robico's Rick Hanson. This should help many adventurers who are stuck at the outset of this classic spy adventure. Next month I'll continue this series with a guide to the openings to Woodbury End.

● That's it for this month, so until the sun goes down on the dungeons, happy adventuring.



Wadi: A place to drink in the desert. Fill your bottle here.

Wand: Try waving it.

Wardrobe: Remember Narnia? Well try entering it.

Water: If you don't want to die two feet from the well, take a plentiful supply of this commodity.

Web: Don't get caught in it. You may need a sharp knife or sword to escape.

Well: A place to get water, but also try climbing down the rope or getting someone to lower you down in a bucket.

Werewolf: A silver bullet or wolfsbane will put paid to his tricks.

Adventurer's Glossary

Wights: Carry a cross and a crucifix to keep off these evil creatures.

Will o'wisp: Try taking it.

Windlass: The part of the well on which the rope is coiled.

Windmill: Will need careful exploring. The sails, grain store and machinery housing are all of importance.

Winshurst generator: This is an early device, consisting of two spinning discs, for generating very large voltages. Used by Professor Frankenstein.

Witch: Beware she is devious and may try to

appear as something she isn't.

Witts End: In Classic and Colossal adventures you must leave something here for a bonus.

Woodcutter: He is an honest sort of chap but has a violent temper, so take care if you try to pinch his axe.

Worm: Perhaps the one that turned, or even the one in paradise.

Wraith: Best left alone unless your magic is strong enough.

Ygor: Professor Frankenstein's loyal assistant. Can be quite a nasty adversary.

Zombie: You must find some way of killing or avoiding it. On the whole they don't enjoy having their heads smashed in.

ing gambit map number 4

electron user



Readers' Hall of Fame

Kingdom of Hamil - Mike Campbell

This is a continuation of last month's solution which involves help with specific sections of the adventure rather than a step by step audit trail.

The Plains: This is the least agonising of the mazes in this adventure. Drop the well-fed Hexapod and follow him South West, South West, South East, South West and South East. You will receive some pearls as a reward from his worried mother.

Return across the plains North West, North East, North West, North East and North East - logical really.

The treasures:

Tapestry: It is very heavy and can be found in the Tapestry room. Get the bottle and open it so the djinn can carry the tapestry for you.

Documents: Kill the vampire and you will find these in his sinister chamber.

Bust: Found in the cave at the end of your trek through the Lost World.

Pearls: Given to you by mummy Hexapod after returning her son to her waiting arms.

Ruby: In the cupboard at the back of the fish room. Use the password *Opreh* to open the door.

Folio: In the cave in the forest. Follow the forest

instructions to get into the cave.

Painting: Found in the field of maize.

Helmet: In the cave, east of the orbicular chamber. Throw water at the wall of fire to enter the cave.

Sapphires: At the bottom of the snark tunnels.

Emeralds: In the enchantress' room. Eat the garlic to avoid her embraces.

Ring: Kill the jackdaw by hurling the Boomerang at it. He will then oblige by dropping the ring.

Boomerang: Can be found in the courtyard.

Status: Is in the North room of the museum. Call

Turn to Page 30 ►

◀ From Page 29

Adric and the statue will walk to the vault for you.

Crozier: Will be found just beyond the pit.

Goblet: Must be retrieved from the inhuman room.

Crown: In the Quaternion room. Can be collected after completing the Maze of Hamil.

Other objects

Steak: Found in the chapel. Use it to feed the baby Hexapod.

Cheese: Will be discovered North West of the pit. Eat it to dream of Adric.

Garlic: Found in the vault. Eat it to discourage the enchantress.

Rod: Found at the starting location. Must be used to lift the slab.

Lamp: Again will be found at the start. Use the word *On* to light it.

Bottle: Will be found South East of the enchantress. The djinn lives in it, but it is also useful for carrying water.

Egg: In the west area of the museum's entrance.
Talisman: Can be picked up in the middle of the museum. Useful to ward off the evil spirits in the field of maze.

Whistle: Found after returning from the Lost World. Blow it in the inhuman room and a large dog will deal with the hobgoblin.

Poison: All over the floor in the white dust room. Drop the dead jackdaw in it, then throw the poisoned bird to the beast in the pit.

Documents: Not only a treasure, but your pass to and from Castle Hamil.

Problems Solved

I begin by offering a smidgen of help to Jonathan Hollingsworth who is having difficulties with Epic's oldie, *The Quest for the Holy Grail*. The following few tips may help Jonathan and others stuck in this adventure— which remains one of my favourites.

At the woodcutter's cottage, ensure you hide the stolen axe under your tunic or you will meet a nasty end.

Match the colour of your sword to the colour of the knight you need to fight. The Black Knight, however, can't be beaten so it is best to avoid him. Don't forget to cut the rope when you make the raft or you will have nothing left to tie it up with when you reach the island. Beware of the damsel in distress, as appearances can be deceptive and fatal.

Ian Jackson writes to ask how to get into Part Two of *The Lost Crystal*. Entry is quite easy really, Ian, just keep climbing down the rope until it snaps.

He also asks for some help with *The Incredible Hulk*. To pull the ring, remember what Dr Strange told you. Also *The Hulk* has a strong stomach, so examine the egg.

To get the ants to free the Ant Man, you can deflect the beams with the mirror. To get the big gem without the natter egg exploding, try eating the egg. Meanwhile Jack Greenaway asks for some advice on how to make progress in *Mordon's Quest*. You start in the

master bedroom.

Take the blanket, go South, West and North and take the newspaper. Now travel East, North, East and climb the drainpipe. Now go North, South, West, South and Mordon will appear and explain your quest.

Say Yes, and journey North and East, take the transporter, take the torch and light it then continue North, North, North. That should get any adventurer started.

Phil Booth asks how to get to the castle from the Blue room in *Sphinx Adventure*. This is a question which I have answered on numerous occasions in the past, so for one last time: The quickest route is to go to the spice room then travel West, East, West, South, Down, Down and Up.

You will find the boat at the foot of Castle Hill, and in the castle itself you will meet a vampire who is dying for a stake and a cute mouse which can be tempted by a morsel of cheese.

Finally, Julia Gates asks me to explain the significance of the frame in the church in *Robico's Rick Hanson*.

This gives you the numbers to be used to operate the keypad in the computer alcove. Another point is that the razor has a few different uses. Use it to cut the rope in the church, to give you a close shave and to kill Garantz in the final conflict.



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TO ORDER PLEASE USE THE FORM ON PAGE 51

This John Geraghty utility will help cut down on the typing toil when entering those long listings

Keyboard short cuts

ELECTRON users have a tremendous advantage over BBC Micro owners when it comes to typing in programs, whether they are your own home grown efforts or magazine listings, thanks to the Electron's single keypress Basic keyword entry system.

Hold down the Func key, tap a letter and up pops a Basic command on screen just as if you had typed in the whole word. It makes entering listings that much easier and quicker than typing everything in letter by letter.

However, what it can't do is speed up entry of the non-Basic words like commonly used variables, or even frequently used strings. This is where EZ-Type comes in. It enables you to define any word or string and call it up with the minimum number of key presses.

To use it, enter and save the listing. Run the program to assemble the machine code and store it in memory. CALL &B00 to activate the utility. Now type NEW as you don't need the Basic listing any longer.

You can ask EZ-Type to store strings of characters, such as variables, in memory by typing a plus sign followed by the string like:

```
+"LENGTH"  
+"width"  
+"PRINT TAB("
```

If all is well you'll see the message OK on the screen. If you change your mind you can delete a string or variable by preceding it with a minus sign like:

```
-"width"
```

To enter the variable *LENGTH* simply type L and press Shift+spacebar and the rest of the word will appear. Similarly, *width* is typed by pressing W followed by Shift+spacebar, and PRINT TAB by P followed by Shift+spacebar.

As you can see, you just type the first letter of the string or variable and hit



Shift+spacebar to fill in the rest of the letters. Once the word is printed you carry on typing as usual. It's just like using the Func key Basic keyword expansions.

One problem that may have occurred to you is what will happen if two or more variables or strings start with the same letter. In this case the first one found by the utility is the one that will be printed.

However, if you keep pressing Shift+spacebar the next one starting with that letter will be printed, then the next and so on. Eventually there will be no more, so the first one will be printed again, then the second and so on. So the solution is to keep pressing Shift+spacebar until the right variable or

string is displayed.

Several problems can occur and these are highlighted by error messages. You are limited to strings 16 characters long and if you try to define one that is longer a *String too long* message comes up.

If the string doesn't start with a letter you'll get *Syntax error*. There is a limit to the number of strings that can be stored and if too many are defined you'll get *No room*. If you try to delete a string and the program can't find it a question mark will be displayed.

When you have finished with the utility press the Break key to clear the memory - but don't forget to save the program you have been typing in first.

```
10 REM EZ-Type Source  
20 REM BY John Geraghty  
30 REM (c) Electron User  
40 MODE6  
50 PROCAssemble  
60 PRINT"Press <RET> to save  
EZTYPE"  
70 REPEAT UNTIL GET=13  
80 *SAVE EZ BOD B00  
90 CALL intercept  
100 END  
110 :  
120 DEF PROCAssemble  
130 topv=#70  
140 string=#72  
150 temp=#74  
160 letter=#76  
170 flag=#77  
180 len=#78  
190 acc=#79  
200 brkv=#202  
210 insv=#22A
```

```
220 input=#700  
230 pointers=#880-2*ASC"A"  
240 basic=#8AF3  
250 err1=#8CB7  
260 err2=#9C03  
270 osasc=#FFE3  
280 osbyte=#FFF4  
290 :  
300 FOR pass=0 TO 2 STEP2  
310 PZ=#B00  
320 [OPT pass  
330 .intercept  
340 \topv will point to top of  
list  
350 LDA #809  
360 STA topv+1  
370 LDA #0  
380 STA topv  
390 STA letter  
400 :  
410 \880 to 8F3 reserved for  
set of 2-byte pointers, one per L
```

```
etter  
420 LDX #8F3  
430 .clear  
440 STA #800,X  
450 DEX  
460 BMI clear  
470 :  
480 \brk_trap manipulates Linke  
d list, ins_trap inserts appropri  
ate string into keybuff  
490 .trap_vectors  
500 SEI  
510 LDX #brk_trap MOD#100  
520 LDY #brk_trap DIV#100  
530 STX brkv  
540 STY brkv+1  
550 LDX #ins_trap MOD#100  
560 LDY #ins_trap DIV#100  
570 STX insv  
580 STY insv+1  
590 CLI
```

Turn to Page 33 ▶

Here's how you can get the very best out of your Electron

Within the pages of these three books you'll find ALL the information you need to fully harness the power of your Electron. They cover Basic, machine-code programming and the operating system, and between them they also show how to combine all three to create more powerful and effective programs.

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The Electron Assembly Language reference guide will help you get to grips with machine code in next to no time. Whether you're a beginner or are already fairly proficient, there is something for you in this book.

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600 RTS	t top of list) into link of last	2240 CMP #822
610 :	item	2250 BEQ len_chk
620 .brk_trap	1410 LDY #0	2260 CMP #80D
630 PHP	1420 LDA topv	2270 BNE slloop
640 PHA	1430 STA (stringv),Y	2280 .bad_syntax
650 TXA	1440 INY	2290 !flag fail condition
660 PHA	1450 LDA topv+1	2300 SEC
670 TYA	1460 STA (stringv),Y	2310 RTS
680 PHA	1470 :	2320 :
690 \check if syntax error	1480 \reset topv to new top	2330 .len_chk
700 LDY #0	1490 LDA len	2340 CPY #813
710 LDA (&FD),Y	1500 CLC	2350 BCS too_long
720 CMP #810	1510 ADC topv	2360 LDA #80D
730 BEQ list_chk	1520 STA topv	2370 STA input,Y
740 .out	1530 BCC lout	2380 CLC
750 PLA	1540 INC topv+1	2390 RTS
760 TAY	1550 .lout	2400 .too_long
770 PLA	1560 JMP ok	2410 JMP err2
780 TAX	1570 :	2420 :
790 PLA	1580 .minus_chk	2430 .alph_chk
800 PLP	1590 CMP #ASC"--"	2440 GRA #820
810 JMP !brkv AND &FFFF	1600 BEQ minus_chk2	2450 CMP #ASC"a"
820 :	1610 JMP out	2460 BCC fail
830 .list_chk	1620 .minus_chk2	2470 CMP #ASC"z"+1
840 \check for LIST\$	1630 JSR string_chk	2480 RTS
850 LDA input,Y	1640 BCS out	2490 .fail
860 CMP #BC9	1650 TXA	2500 SEC
870 BNE plus_chk	1660 JSR start_addr	2510 RTS
880 INY	1670 :	2520 :
890 LDA input,Y	1680 \move along links looking f	2530 .transfer
900 CMP #ASC"\$"	or match between string in input	2540 \enough memory?
910 BNE out	and string in list	2550 TYA
920 :	1690 .minus_loop	2560 ADC topv
930 LDY #ASC"A"-1	1700 LDA stringv	2570 LDA topv+1
940 .next_list	1710 STA temp	2580 ADC #0
950 INX	1720 LDA stringv+1	2590 CMP #80B
960 CPX #ASC"z"+1	1730 STA temp+1	2600 BNE memory_ok
970 BEQ done	1740 JSR inc_sv	2610 \rom error message
980 CPX #ASC"Z"+1	1750 \z set means no more items	2620 JMP err1
990 BNE caps	1760 BEQ not_found	2630 :
1000 LDY #ASC"a"	1770 LDY #2	2640 .memory_ok
1010 .caps	1780 .mloop	2650 \reserve two bytes for pointer to next item in linked list
1020 TXA	1790 LDA (stringv),Y	2660 LDA #0
1030 JSR start_addr	1800 CMP input+1,Y	2670 STA input+1
1040 :	1810 BNE not_yet	2680 STA input+2
1050 \stringv contains pointer to	1820 CMP #80D	2690 TAY
o start of list for letter	1830 BEQ match_found	2700 .tloop
1060 .next_string	1840 INY	2710 LDA input+1,Y
1070 JSR inc_sv	1850 BNE mloop	2720 STA (topv),Y
1080 BEQ next_list	1860 .not_yet	2730 INY
1090 \stringv contains address of	1870 JMP minus_loop	2740 CMP #80D
f 1st string on list; 1st char not	1880 :	2750 BNE tloop
t stored, therefore...	1890 .match_found	2760 STY len
1100 TXA	1900 \temp holds address of string	2770 RTS
1110 JSR osasc	before matching string; put li	2780 :
1120 :	nk address of letter into former	2790 .start_addr
1130 INY	1910 LDY #0	2800 ASL A
1140 .print_string	1920 LDA (stringv),Y	2810 CLC
1150 INY	1930 STA (temp),Y	2820 ADC #pointers MOD8100
1160 LDA (stringv),Y	1940 INY	2830 STA stringv
1170 JSR osasc	1950 LDA (stringv),Y	2840 LDA #pointers DIV8100
1180 CMP #80D	1960 STA (temp),Y	2850 ADC #0
1190 BNE print_string	1970 .ok	2860 STA stringv+1
1200 BEQ next_string	1980 BRK	2870 RTS
1210 .done	1990 EQUB 99	2880 :
1220 JMP basic	2000 EQUB "OK"	2890 .inc_sv
1230 :	2010 BRK	2900 LDY #1
1240 .plus_chk	2020 :	2910 LDA (stringv),Y
1250 CMP #ASC"+"	2030 .not_found	2920 BEQ isend
1260 BNE minus_chk	2040 BRK	2930 PHA
1270 \check syntax and length	2050 EQUB 99	2940 DEY
1280 JSR string_chk	2060 EQUB "?"	2950 LDA (stringv),Y
1290 BCS out	2070 BRK	2960 STA stringv
1300 \move from input to top of	2080 :	2970 PLA
list	2090 .string_chk	2980 STA stringv+1
1310 JSR transfer	2100 \check for opening quote	2990 .isend
1320 TXA	2110 INY	3000 RTS
1330 JSR start_addr	2120 LDA input,Y	3010 :
1340 :	2130 CMP #822	3020 .ins_trap
1350 \get address of last item in	2140 BNE bad_syntax	3030 PHP
n list	2150 INY	3040 STA acc
1360 .ploop	2160 LDA input,Y	3050 TXA
1370 JSR inc_sv	2170 TAX	3060 BNE not_key
1380 BNE ploop	2180 \check for letter	3070 PHA
1390 :	2190 JSR alph_chk	3080 TYA
1400 \put address of new item (a	2200 BCS bad_syntax	
	2210 .stloop	
	2220 INY	
	2230 LDA input,Y	

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◀ From Page 33

```

3090 PHA
3100 LDA acc
3110 CMP #ASC" "
3120 BEQ shift_chk
3130 :
3140 LDX #0
3150 STA letter
3160 JSR alph_chk
3170 BCC set_flag
3180 !not in alphabet, so store
zero
3190 .not_letter
3200 STX letter
3210 .set_flag
3220 STX flag
3230 .insv_out
3240 PLA
3250 TAY
3260 PLA
3270 .not_key
3280 TAX
3290 LDA acc
3300 PLP
3310 JMP !insv AND &FFFF
3320 :
3330 .shift_chk
3340 LDY #&FF
3350 LDX #0
3360 LDA #BCA
3370 JSR osbyte
3380 TXA
3390 AND #&40
3400 TAX
3410 BEQ not_letter
3420 :

```

```

3430 !shift+spacebar are pressed
; was previous char a letter?
3440 LDA letter
3450 BEQ set_flag
3460 :
3470 !if flag<=0 means you're st
eping through the linked list
3480 LDX flag
3490 BNE address_ok
3500 :
3510 !get start address of list
for that letter...
3520 LDA letter
3530 JSR start_addr
3540 JSR inc_sv
3550 !Z set means no strings
3560 BEQ not_letter
3570 :
3580 .address_ok
3590 lde_intercept
3600 LDX #?!insv
3610 LDY #?(insv+1)
3620 SEI
3630 STX insv
3640 STY insv+1
3650 CLI
3660 LDX flag
3670 !nothing to delete first i
me
3680 BEQ insert
3690
3700 LDA #BSA
3710 .delete
3720 DEC len
3730 BMI insert
3740 LDY #&7F
3750 LDX #0

```

```

3760 JSR osbyte
3770 JMP delete
3780 :
3790 .insert
3800 LDY #2
3810 STY flag
3820 .iloop
3830 LDA (stringv),Y
3840 CMP #&0B
3850 BEQ end
3860 STY temp
3870 TAY
3880 LDA #BSA
3890 LDX #0
3900 JSR osbyte
3910 LDY temp
3920 INY
3930 BNE !loop
3940 .end
3950 DEY
3960 DEY
3970 STY len
3980 :
3990 !if last string inserted, r
eturn to start of list
4000 JSR inc_sv
4010 BNE retrap
4020 LDA letter
4030 JSR start_addr
4040 JSR inc_sv
4050 .retrap
4060 JSR trap_vectors
4070 !throw away space
4080 LDY #0
4090 STY acc
4100 JMP insv_out
4110 !:NEXT:ENDPROC

```

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MODE 7 has always been an Electron owner's dream. When the micro first appeared many people, including most reviewers, complained about the fact that it wasn't in the specification. The missing mode allows the creation of attractive screen displays in only 1k of memory, so most BBC Micro programs use it whenever possible to display text. The generally makes the programs incompatible with the Electron.

Without Mode 7 Electron owners can't create their own displays or see BBC Micro programs in their true colours. The only solution until now has been to buy the Jafa Systems Mode 7 adaptor. Unfortunately, its price placed it beyond the reach of some owners.

Now, however, Jafa has released a Mode 7 simulator rom very reasonably priced at £25.

Owing to their nature, software simulations can never be as good as their hardware counterparts. Although this simulation isn't as good as the original adaptor it performs extremely well. The software works by simulating a Mode 7 screen in Mode 2 - which leads to some problems, but more of them later.

The rom comes with an 18 page manual, screen designer software on either 3.5in disc or cassette, manual and a sheet noting differences between the Electron and BBC Micro versions of the screen designer software.

With the rom installed and the machine in Mode 7 typing *HELP MODE 7 brings up a nicely coloured screen which gives a short description of each command in the simulator and also tells you which function key and screen update mode you are in.

Type *MODE7ON to switch on the rom and a Mode 7 startup screen then appears; it is very similar to the normal startup display.

If you type *HELP BARS coloured bars from

'The characters are pretty good, even if they seem a little square'

black through the palette to white are displayed to allow you to set the brightness and contrast on your TV. After this Mode 7 is then ready for use although you can switch between it and other modes using Basic's standard MODE command.

The characters are pretty good, even if they seem a little square. As the simulation is in Mode 2 the teletext character set has gone,

but the new one is a pleasant change.

Both upper and lower case letters are good, but capital N and both versions of W and M look a little strange. Symbols suffer most, with characters such as the ampersand, hash and dollar taking a bit of getting used to.

Reason for the characters' strange appearance is that two have to squeeze into the space normally occupied by one Mode 2 character. In Mode 7 the screen is 40 by 25,

The software solution

Stephen Cusack adds a Mode 7 simulator to his Electron and finds it compares well with the real thing

with each character 10 pixels high, while Mode 2 is 20 by 32, with each character eight pixels high. This means that each simulated Mode 7 character is only four Mode 2 pixels wide, with one being used for spacing, thus limiting the resolution.

The worst problem with the simulator is scrolling, which is extremely slow, even with a Slogger Master Ram Board. As hardware scrolling is impossible the complete Mode 2 screen has to be moved in memory.

During scrolling the machine switches to Mode 6, where the Electron is fastest, to speed up the process. It makes scrolling quite painful to watch, with the screen first blanked then displaying the scrolled display. Very offputting, especially in BBC Micro adventures which run under the simulator if you have a 64k machine.

If you are scrolling a listing, for instance, holding down Control will show just one line on the screen so you can see where you are. When you are at the required place you release the button and the rest of the screen will fill in.

The screen is quite cleverly stored in memory. For the simulator to be able to respond correctly to Mode 7 screen pokes the original display area is still at &7C00 to &7FE8. The Mode 2 screen memory is between &2800 and &7800. The Mode 7 store is read and

then transferred to the Mode 2 area for display.

Two rates of transfer can be chosen, *MNDRMAL and *MRAP. The first takes about five seconds for data to transfer, while the rapid one zaps it over in about 1.5 seconds. This is why Mode 7 screens take time to build up although they are almost instantaneous on a BBC Micro. If you have a Master Ram Board then the rapid rate is selected by default; without one, if you select *MRAP keyboard response is delayed.

Control of function keys is not altered. Keys under the numbers (Q-P) when held down with Func correspond to Shift+Control+0 to Shift+Control+9. Those with Func (ASDF...) are the same as pressing Control and a function key. Those on the bottom row are the same as pressing Shift and a function key.

The only problem here is that it halts the operation of the Electron's one-touch Basic keyword entry system. This can be cured by typing *EFN, which restores the Electron's keywords and disables the above effect. *BFN

switches it back again.

All the teletext control codes are supported. Unfortunately the manual assumes that you have had previous Mode 7 experience, as it offers only a very limited summary of the codes. Chapter 28 of the BBC Micro User Guide gives the necessary information.

If you type *MCOMM when in Mode 7 you are put into the Prestel terminal which is supplied on the same rom. As far as the Electron goes this is a relatively unexplored field.

Another useful command included is *TV which allows the screen display to be moved up or down - a great boon for TV owners.

The screen editor software provided is flexible and easy to use, but owing to the fact that it is a converted BBC Micro program it

'Mode 7 screens take time to build up although they're almost instantaneous on a BBC Micro'

only works if you have a 64k Electron. Screens are designed as pages with eight pages making up a book. Books can then be cycled, looked at or strung in a long line with other disc-bound books to provide a memo or information board. An obvious use for this is in

Turn to Page 38 ▶

◀ From Page 37

an educational environment.

The software is 3.5in disc only. If you have DFS and a 5.25in disc drive the software is supplied on cassette with a tape-to-disc conversion on the cassette.

The accompanying manual is excellent. It is easy to read and explains clearly how everything works. It even has sections telling you how to use Wordwise and the ATS (teletext adapter) rom with the simulator.

Wordwise is perhaps the best selling BBC Micro word processor and is great to use. The manual was written on an Electron with Wordwise – as was this review. Again, it is best used with a 64k Electron, as very little memory is left free on a normal Electron.

Conclusion

Although some characters may look a little strange and the scrolling is not too impressive this is a quite remarkable piece of software. It performs well at a reasonably low price. Master Ram Board owners will benefit most as this gives them 1k more free memory than the BBC Micro has in Mode 7. It also allows you to use the editor software and applications such as Wordwise.

Although it is still very useful on a normal Electron, there is only about 6k free (ADFS or DFS) compared to 28k on a 64k Electron. Most BBC Micro Mode 7-dependant software that can fit into the free space – which is most of

them if the Electron has a Master Ram Board – should operate normally, albeit more slowly than they would on a BBC Micro.

As it has both communications and screen editor software this package is very hard to fault. Most of the better BBC Micro Mode 7 software, even on rom, worked on my 64k machine. This therefore means an increased level of BBC Micro/Electron compatibility, which is indeed very welcome.

My advice to any Electron owner who has

always envied Mode 7, or even the casual user, is to buy it. Although it is at its best on a 64k machine it can still be used to great effect on a normal one. This is truly Electron Mode 7 for all.

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THERE are several basic laws that govern the universe and one of them is that a computer will never have enough memory. The first computer I made had 256 bytes – not kilobytes, just bytes. At that time I remember saying that 4k was enough memory for anyone.

But by today's standards the Electron is not overly blessed with memory, so I would like to look at the problem of sorting large data files and see how to squeeze a quart into a pint pot.

The problem is that to sort a file efficiently you have to have the whole of that file in memory at the same time. True, you can do sorts with random access files, but that involves a lot of disc access and can be very slow.

It is perfectly possible to have files much larger than the amount of memory you have available. However, sorting a file of such a size can be a problem. I am not going to give you a sample program to do this, as virtually every application involves a different set of constraints. What I want to do is to show you how to go about writing such a program.

A technique of sorting large files was developed for mainframe computers many years ago, but I have never seen any mention of it in micro circles. It's known as a tournament sort, and is quite easy to follow.

Let's call the file we want to sort FRED and suppose it's too large to fit completely into memory at any one time. So we make temporary files or "sons" of FRED, each one able to fit completely into memory as shown below. We must make the number of sons of FRED a

Tournament for big files

Mike Cook applies a mainframe technique to a micro problem

power of two, in other words two, four, eight or however many we need.

The sons are simply a part of the whole, so if we are creating four sons each file will have a quarter of the original records in it. Once these are created the original file FRED can be deleted to save disc space.

Then each son of FRED is placed wholly into memory, sorted with whatever technique you like and written back to disc, giving us four sorted sons, which are our candidates for the tournament.

Reading the first record of each file, we fill the first four buffers, which we'll call semi-finals – a buffer is simply a variable or set of variables in your program representing the data record you want to sort.

We compare two of them, take the smaller – or larger if we are sorting in descending order – and place it into the final buffer. We

then do the same for the other two so that both final buffers are full. The winning record from each semi-final buffer is replaced from the appropriate son of FRED file.

Now on to the final. Take the smallest entry in the buffer and write it out to a new file called Sorted FRED. Replace the missing finalist from the appropriate semi-final and replace the successful semi-finalist, again from the appropriate son of FRED file.

You can see that if you continue this until all the sons of FRED files are empty you will have sorted the whole file.

Remember that some sons will run out of data before others. When this happens you must pad the buffers with dummy data which will be lost in any tournament. As soon as all buffers contain dummy data your sort is at an end. You can now delete all the sons of FRED files and rename your sorted file FRED.

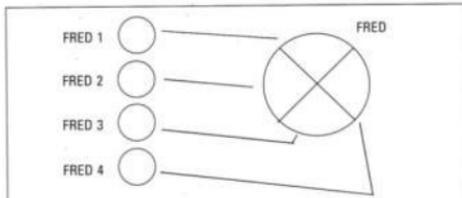
This technique can cope with any size of large file, as each stage buffer only represents one record, and so will not take up much space.

I think you can see how this can be easily extended to using eight sons of FRED by incorporating a quarter-final stage in your tournament. To cope with really large files, the sons may even be on different discs.

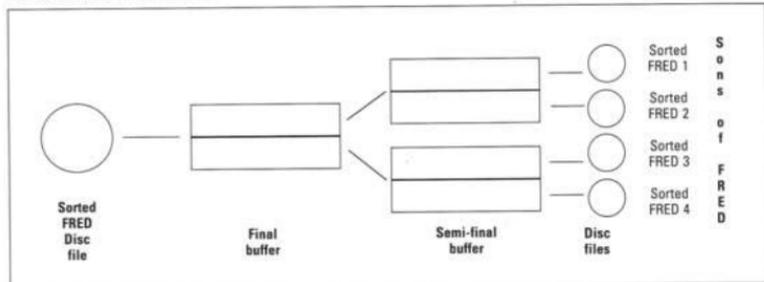
If you delete the original FRED file before writing the sorted FRED you will avoid the dreaded *can't extend* error message, as the two files will be exactly the same length.

However, when adding records to FRED make sure that it is the last file on the disc – the last thing you saved – so the DFS can extend it.

There you have it . . . you can now sort files as large as you like.



First split up FRED into smaller files



Then let the tournament begin

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EACH year many hundreds, or even thousands, of pounds are spent by software companies in a constant war against the pirate and hacker. It is a never-ending battle of wits, with the program protector – some programmers specialise in protection methods – on one side and the pirate and hacker on the other.

At one time the protection methods used were quite simple, the technical knowledge of the average user being quite limited. But over the last few years the level of expertise has risen and even those still struggling with the basics can find tools to do the hacking for them.

Many *Electron User* readers have asked how they can protect their own programs from being accessed by other users.

Unfortunately this is such a complex subject that I can only just scratch the surface and present the most basic of techniques.

What we'll look at is how we can prevent a simple Basic program from being listed on the screen, edited and modified. Our first task must be to disable the Break and Escape keys to prevent anyone stopping the program then listing it.

The Escape key is disabled with *FX229,1 and Break can be programmed like a function key:

```
*KEY10 OLD|RUN|N
```

If these commands are placed at the start of a program once it is running the Escape key will be ignored and the program will be automatically run when the Break key is pressed. What this doesn't stop is a Control+Break. After hitting these keys and typing OLD the program can be listed.

To prevent this happening the following command can replace the two previous ones: *FX200,3. It disables the Escape key and when Break or Control+Break are pressed the whole of memory from 8400 upwards is cleared, wiping out whatever was in memory, making it impossible to list the program.

In addition you can make the Electron crash by poking the value 84C – a machine code JMP instruction – into the first byte of the Break vector.

This is entered twice when the Break key is pressed and our poke will cause the micro to hang up. The only solution is to switch the power off.

This isn't the end of the story, as there is a very simple way for the pirate or hacker to gain access to your program or data. The methods discussed so far prevent you interrupting the program once it is running, but if you load it you can simply list it.

As long as the program isn't run it can be hacked into easily without specialist knowledge. Clearly additional, more sophisticated, protection techniques must be employed.

The next step is to insert special VDU codes into the program to prevent it from being listed. A couple of good ones are 12, which clears screen, and 21, which switches off all output.

Once these codes are hidden in REM state-

ments, if anyone tries to list the program the screen will be cleared and the micro will appear to play dead. The only problem left is how to put the codes into the listing.

The first stage is to add several REM statements to the the Basic program you want to

protect, using a REM statement as follows:

```
*00REM**
```

Now you can use a simple procedure to scan the program and replace the two asterisks with the codes 12 and 21. Add the fol-



For your eyes only

**Julie Boswell reveals
how to prevent your
programs from being
accessed with simple
protection techniques**

lowing lines to the end of your program:

```
10000 DEF PROCprotect
10010 PX=PAGE+1
10020 REPEAT
10030 IF PX*3=8F4 PX*4=12:PX*5=21
10040 PX=PX+PX*2
10050 UNTIL ?PX=8FF
10060 ENDPROC
```

To protect it enter PROCprotect. Delete lines 10,000 to 10,060 and save the protected program. It should now be unlistable. Try it and see. I hope you saved a copy of the original program somewhere safe as you can't alter this one any longer!

One other trick we can perform is to wipe out the first line of a program once it has started. Adding the following procedure to the end will do the job:

```
11000 DEF PROCwipe
11010 PX=PAGE
11020 REPEAT
11030 ?PX=8FF
11040 PX=PX+1
11050 UNTIL ?PX=80D
11060 ENDPROC
```

You must include a REM statement at the start of your program and a call to PROCwipe. The first line is destroyed and once your program has finished you'll get a *Bad program* error message and it can't be listed.

You can combine all the techniques outlined so far. Add *FX200,3 to clear memory then include the VDU codes in REMs and finally wipe out the program's first line.

You may be thinking that if anyone gets through that lot they deserve a medal, but it is easier than you might think. Armed with a simple memory editor the program can be loaded and the VDU codes overwritten with harmless spaces. It can then be listed.

What we have done so far will prevent the average user from accessing your programs, but it won't deter the hardened hacker or smart Alec. More sophisticated techniques are called for.

What we can do is to scramble the Basic listing so that it can't be recognised by the Electron as a Basic program. It then can't be listed or examined with a memory editor.

The following utility will load a Basic listing called PROGRAM, scramble it, then save the resulting code:

```
10 REM Scrambler
20 HIEM=(TOP+600)AND 8FF00
30 PX=HIEM
40 FILE=OPENIN "PROGRAM"
50 REPEAT
60 byteX=BGET#file
70 byteX=byteX EOR $AA
80 ?PX=byteX
90 PX=PX+1
100 UNTIL EOF#file
110 CLOSE#file
120 OSCLI"SAVE PROGRAM "+STR$ "HIEM+" "+STR$ PX
```

It works by exclusively ORing each byte of the file with &AA (any value could have been chosen). Now if you try to load or chain it you'll simply get a *Bad program* error message.

What is required is a loader utility that will load the program, unscramble it and then run it. The following will perform this task quite nicely:

```
10 REM M/C Unscrambler
20 REM by R.A.Waddilove
30 REM (c) Electron User
40 osfind=8FFCE
50 osbget=8FF87
60 oscli=8FFF7
70 osbyte=8FFF4
80 store=870
90 channel=872
100 FOR pass=0 TO 2 STEP 2
110 PX=8C00
120 I OPT pass
130
140 \Unscramble machine code
150 LDY #end-start
160 .loop
170 TYA
180 EOR start,Y
190 STA start,Y
200 DEY
210 BNE loop
220
230 .start
240 \disable Break key
250 LDA #84C
260 STA 8287
270
280 \disable Escape key
290 LDA #200
300 LDX #3
310 JSR osbyte
320
330 \open file
340 LDA #840
350 LDX #name MOD 256
360 LDY #name DIV 256
370 JSR osfind
380
390 \load file
400 TAY
410 LDA #18 : STA store+1
420 LDA #00 : STA store
430 .loop
440 JSR osbget \get byte
450 PHP
460 EOR #8AA
470 STY channel \save Y
480 LDY #0
490 STA (store),Y
500 INC store
510 BNE ok
520 INC store+1
530 .ok
540 LDY channel \get Y
550 LDP
560 BCC loop
570
580 \close file
590 LDA #0
600 JSR osfind
610
620 \run program
630 LDX #key MOD 256
640 LDY #key DIV 256
650 JSR oscli
660 LDA #15B
670 LDX #0
680 LDY #12B
690 JMP osbyte
700
710 .name
720 EQU$ "PROGRAM"+CHR$13
730 .key
740 EQU$ "KEYO OLD|RUN|M"+CHR$
13
750 .end
760 J
770 NEXT
780
790 REM Scramble machine code
800 YX=end-start
810 REPEAT
820 start?YX=start?YX EOR YX
830 YX=YX-1
840 UNTIL YX=0
850
860 REM Save Loader
870 OSCLI"SAVE LOADER C00 "+STR$
$end
```

A machine code loader program

```
10 REM Unscrambler
20 PX=PAGE+256
30 FILE=OPENIN "PROGRAM"
40 REPEAT
50 byteX=BGET#file
60 byteX=byteX EOR $AA
70 ?PX=byteX
80 PX=PX+1
90 UNTIL EOF#file
100 CLOSE#file
110 PAGE=PAGE+256
120 "KEYO OLD|RUN|M
130 *FX138,0,128
```

This is a vast improvement over our previous methods, and combined with the other techniques will prevent access by all but the most determined hacker.

One flaw with this unscrambler is the fact that it is written in Basic. This reduces its effectiveness quite dramatically as you can simply load it, delete the last two lines and run it to unscramble the Basic program.

Then with a memory editor you can whip out the disabling VDU codes and you've now got access to the listing. The battle against pirate and hacker continues...

So far we have made our program unlistable and unrecognisable to Basic by scrambling it. What we need to do now is to make the loader unlistable too. We could scramble it, but we'd need a loader to load the loader. And this would still be listable.

A little machine code is called for. By rewriting the loader in assembly language

we can create a machine code loader program that can only be *RUN. It can't be listed and Basic programmers won't be able to decipher it.

However, armed with a disassembler it could still be cracked by a machine code programmer. To raise an additional barrier the code itself can be scrambled so that it can't be disassembled.

The following program is a rewrite of the last using assembly language. When the code has been assembled it is totally scrambled apart from the first six instructions and then saved.

If you examine this loader using a disassembler all you will see are the first six instructions followed by garbage. To run your scrambled Basic program all you do is enter:

```
*RUN LOADER
```

The machine code loads, unscrambles itself, disables the Break and Escape keys, alters the Break vector, loads the program, unscrambles it and then runs it. Although it may sound quite a long-winded process it all happens so quickly you won't notice it.

Don't leave the source code lying around as this will help a hacker to discover what your machine code loader is doing. Also vary the byte that the Basic program is exclusively ORed with.

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 1988-April 1989 bundle:

November 1988 issue:

Games: Rally Driver, Bomber. *Utilities:* Elite Cheat, Disc and rom routines. *Features:* Using the Hybrid Music System, Adventure tips, Heyley interview. *Reviews:* Triple Deckers, Cheat it again Joe, Pipeline, Rebel Planet, In Search of Atahaulpa. DIY service manual.

December 1988 issue:

Games: Santa's Warehouse, Blow football, Senet board game. *Utilities:* Cut phone bills, Predict the pools. *Features:* Tape problems cured, Osfite routines explained. Floating point maths made easy. *Reviews:* Sam 4, Joe Blade, Frankenstein.

January 1989 issue:

Games: Sheep dog trials. *Utilities:* *WIPE command for ADFS users, Retirement fund planner. *Features:* Game cheats, pokes and tips, Screen scroller, Elkview noticeboard. *Reviews:* Play it again Sam 3, By Fair Means or Foul, Golden Figurine, Pegasus disc interface.

February 1989 issue:

Games: Slippery Sam. *Utilities:* Supercharge your programs, Verify tape programs. *Features:* Random access filing, Adventure hints, Reverse Polish tutor. *Reviews:* Pixel Perfect DTP, Preparing for breakdowns.

March 1989 issue:

Games: Taktiks, Trivia Test, Bomb Disposal, Sprog. *Utilities:* Search and Replace, Poetry. *Features:* Map of The Nine Dancers, Disc directories explored. *Reviews:* Repton Infinity, Question of Sport, Zenon, Last Ninja, Advanced File Manager.

April 1989 issue:

Games: Diamonds - a mind bending puzzle. *Utilities:* Pattern fill routine, automatic program saver, Home Finance Manager. *Features:* Input routines explained, disc drives revealed, palindromic numbers explored. *Reviews:* Sam 6, Exile, Orbital.

electron user

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MICRO MESSAGES

Adventures with The Quill

I AM a nine-year-old Electron user with a 3.5in ADFS disc system. I am rather ambitious and would like to create a good high quality text adventure. I have heard of adventure game creators and I hope you can recommend one to me, preferably on disc.

I've heard of Alpines's ALPS, Phoenix Software's Adventurescape, Incentive's Adventure Creator and Gilsoft's The Quill. I am looking for one which has lots of advanced facilities yet is reasonably easy to use. If you know of any such product could you please tell me where I could obtain a copy and what format it's in.

I would also like to know why Superior Software hasn't published many disc games, and as far as I am concerned all those which it has done are poor. Could you please tell me where I can obtain a

Logo rom (not in a cartridge) at a reasonable price? — **Matthew Hammond, Chelmsford, Essex.**

● The Quill is the most widely used utility for creating Electron adventures, but we can't find anyone who can supply a copy. Can any readers or suppliers help?

The problem of disc software is all down to demand. Software will be released on disc if sufficient sales can be guaranteed to cover costs. However, it is not always possible to produce ADFS versions due to memory limitations.

Logo is only available for the Electron in a rom cartridge. We haven't used the BBC Micro version which comes on plain roms. You could try this, but it is risky as it may not be totally compatible.

Trouble with teletext

WHILE reading March's Micro Messages I noticed the program to give teletext graphics on the Electron. I typed this in and entered RUN. I then typed:

```
PRINT TS(n)
```

where n is a number between zero and 63 and got a Subscript error message. I didn't know what this meant so I entered:

```
PRINT CHR$(n)
```

where n is a number between 160 and 190 and it worked. Why was this OK and the other not?

I played around with the program for a while and something strange happened. I typed PRINT and then copied the character produced by the code 177 and it produced a number which was different every time. This number was the same as that of the TIME variable. Could you tell me why this happened?

Also what is the best system for word processing, as I own an unexpanded Electron and wish to get the best from it.

Do you know what the command *B. means? It prints BASIC on the screen. — **Matthew Green, Halifax, West Yorkshire.**

● We aren't sure why the teletext program

didn't work for you, but suspect that it was due to a typing error. Please check your listing carefully.

The PRINT CHR\$ command is quite different and totally unrelated. It is a simple Basic command that prints a character on the screen. We can't reproduce the effect you describe when copying the character with an Ascii code of 177 and are stumped by your results.

You'll need a Plus 1 and printer for word processing, and of course, software. The vast majority of Electron users use View on rom cartridge as it is reasonably cheap and very powerful. A disc drive is extremely useful, but is more of a luxury than a necessity.

The *B. command is used to enter the Basic language. You would normally do this when you have finished with View or Viewsheat.

Reprise on Replace

I HAVE been the proud owner of an Electron with a Plus 1 and Plus 3 for about three years and I am a regular reader of your excellent magazine.

However, I do have one complaint. Many of your contributors assume a level of expertise among your readers which is not always the case. For instance, in the March issue the article and program, Try ringing the changes, does not tell us how to use the

Replace program.

I have entered it, RUN it, but cannot use it. Perhaps you could ask Mr Geraghty to bear with those of us who are not well up in these matters and give us a hint at least on how to go about using it. — **Daniel Brosyran, County Kerry, Eire.**

● The accompanying article includes full instructions explaining how to use it. Here is a brief summary:

Run the program and enable the machine code with:

```
CALL @COD
```

Suppose you wanted to replace the old variable name length with the new name width. To do this you would enter:

```
DEFLength=width
```

Throughout the listing every occurrence of the variable length will be replaced by width.

Infinity is impossible

I RECEIVED Superior Software's Repton Infinity last Christmas and I now think one of the screens is impossible. It's the third in Repton 3 Take Two part one. I can't get to the middle of the screen.

If there was a key I'm sure it would be possible, but there isn't. I looked for it on the map and editor, but couldn't find it. In the manual there is a picture of this screen and the key is not on that either. Can anyone help? — **D. Bibby, Wrexham, Clwyd.**

● Has anyone completed this screen, and if so, can you help with a few hints and tips?

Prompting Trivia Test

I FOUND the program Trivia Test in your March issue excellent. I entered the listing in less than an hour without making any mistakes. However, I have been unable to alter line 600 so that it prompts for a filename before loading different data files. What is the most straightforward method of doing this?

In reply to Steven Elkins' request for a screen dump for his Citizen 1200 printer — also in the March issue — can I suggest that he contacts C.J.E. Micros on 0903 213361 who supplied a tape and booklet with my Citizen printer. These contained hints, tips and utilities, including setting up procedures, VDU codes, DIP switch settings, a text dump,

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◀ From Page 47

graphics screen dump and a View printer driver.

I can recommend the 120D, which is a dot matrix printer capable of 120cps. It offers a wide variety of print styles and is reasonably priced at £159.

If any Electron owner would like to share ideas concerning their hobby, I can be contacted through PO Box 122, Taunton, Somerset. Alternatively my mailbox number on MicroLink is MAG40165. My set-up consists of a 64k Electron, Plus 1, Plus 3, Citizen 120D printer and a Nightingale modem. — **Bob Standing, Taunton, Somerset.**

● You can make Trivia Test prompt for a data filename by adding these lines:

```
590 INPUT "Filename";dfn$
600 OSCLI "LOAD "+dfn$+" "+STR
$"HIMER
```

Dumping in colour

IN June 1986 I entered the screen dump from Electron User and I have been using it very successfully ever since. Recently I bought a Star colour printer and would very much like to dump my graphics in colour. However, I cannot locate any screen dump software that will do this.

Can the June 1986 UCode program be modified to identify and reproduce coloured graphics? If so, could you possibly publish an update? I for one, and I'm sure many others, would be most grateful.

Alternatively, can you please suggest a source of colour dumping software? — **D. Randle, Brooksby, Leics.**

● Sorry, we haven't heard of any colour dump software specifically for this printer and the Electron and the UCode program can't be altered to produce colour.

Search for compatibility

I WOULD appreciate your advice on upgrading my Electron to enable it to be used, among other things, for technical computations, word processing, spreadsheets and educational programs. At the same time it must be compatible with the BBC Micro using the ADFS to which I have access at work, and the Archimedes used by my daughter's school.

Although I have read various articles in your magazine (and numerous advertisements!) I am still somewhat confused by all the products apparently available.

As someone who has used computers at home and work, but have only a limited understanding of their internal operation, what I feel I need is a simple guide to recommended options and approximate costs which would hopefully meet my requirements. — **D. J. Mould, Alton, Hampshire.**

● What you need is a Pres AP3 disc inter-

face and 3.5in drive. This will give you compatibility with both the BBC Micro (with ADFS) and Archimedes. The Archimedes can read and write to Electron discs, but can format discs that the Electron can't read so make sure they are formatted on the Electron.

Running the Gauntlets

CONSIDERING the quality of recent Electron games I am sure that Gauntlet I and II could be converted to the Electron with graphics almost as good as those of the Commodore 64.

I don't mean the Gauntlet by MicroPower in which you are a spaceship shooting aliens, but the one by US Gold which has four good guys — Merlyn, Questor, Thor and Thyra — running around mazes shooting ghosts, trolls, Death and so on.

It's a brilliant game and I would love to see it released for my micro. — **Andy Duncan, Camberley, Surrey.**

● Gauntlet is quite a complex game, but we can't see why a slightly simpler version couldn't be written for the Electron.

All programs printed in this issue are exact reproductions of listings taken from running programs which have been thoroughly tested.

However, on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the mail pages.

Put me in the picture!

I WONDER if any of your readers could help me? I recently bought a copy of Acornsoft's Picture Maker. However, the instructions booklet was missing from the box and the retailer where I bought it from was unable to find one for me.

Could any reader please be kind enough to let me have a copy of the instruction book? I am so frustrated that I'm unable to use my program and can't wait to draw with it. — **Rupert Plumridge, Marshfield, Wiltshire.**

BBC Basic hits the pools

IN response to Mrs Blakeway's query in February's issue concerning the Pools Predictor listing from your December 1988 issue, the problem is not with the listing, but with BBC Basic.

It does not allow variable names which are also Basic keywords, hence the problem with the variable DRAW%. Because of this quirk, it is always best to use lower case variable names. — **Darren Douch, Rye, East Sussex.**

● Apart from the resident integer variables A% to Z% all the variables used are lower case. Unless listings are entered exactly as printed they are unlikely to work.

Protecting listings

I HAVE noticed that most commercial software has protection to stop users from listing the program. How could I protect my Basic programs?

I would also like some good sound effects, for example, lift-off of a spaceship. — **Oliver Wright, St Ives, Cambridgeshire.**

● Program protection is a very complex subject and involves many advanced programming techniques. You'll find an article outlining some of the simpler methods on Page 20.

The easiest way for you to protect your program is to use the command *FX200,2 in the first line of the listing. Enter and run this short listing to hear the sound of a spaceship blasting off into space:

```
10 REM Spaceship blast-off
20 ENVELOPE 1,1,1,1,1,5,5,5,126,0
   ,0,-126,126,126
30 FOR I=0 TO 250 STEP 5
40 SOUND 1,1,1,5
50 NEXT
```

Have any readers discovered any interesting sound effects?

Bins full of energy

IN the February issue of Electron User Roland Waddilove reviewed the game Joe Blade 2. He asked what the dustbins were for.

At the bottom of the screen there is a bar with a line on it denoting your energy. Every time you touch a punk this line goes further left and if it ever gets to the end of the bar you lose a life.

However, if you collect five bins the line goes back to its original position, giving you extra energy.

I have managed to complete this game with a score in excess of 30,000 points. — **James Reed, Heald Green, Stockport.**

Piling on the speed

SUPERCHARGER from your February issue is a great little utility. I have been using it in conjunction with the Turbo Save utility from December 1987's Electron User and together they speed up playing and tape loading, using much less tape into the bargain.

You can print a hard copy using Control+B when prompted for the filename, but it uses a lot of paper, especially with fairly long programs, so I have added the following lines:

```
91 PRINT "Printout required (Y/N
)?"
92 IF INSTR("y",GETS) THEN 93 E
LSE 100
93 VDU2:FX6
175 VDU3
```

VDU2 switches on the printer and *FX6 enables alternate line feed, VDU3 switches off the printer.

Thanks for a great magazine. — Tony Bullock, Menorca, Spain.

Running short of power

I HAVE contacted many Electron users regarding the replacement of my broken power adaptor, but regrettably they have not been able to assist. Can you help? — R.J. Eames, 97 Lon Hedydd, Llanfairpwll, Gwynedd, North Wales.

● If it's the computer end that's broken a power switch from Pres may be the solution. Otherwise a new one can be obtained from Software Bargains, 8A Regent Street, Chapel Allerton, Leeds LS7 4PE. Tel: 0532 687735.

Can any readers help Mr Eames? All Plus 3 owners should have two power supplies. The original one is redundant as a replacement was supplied with the Plus 3.

Free tapes welcomed

I THINK your magazine is really good and would not buy any other Electron magazine. I have recently taken out a subscription with which I get a free tape. This is very useful because I find that I don't have enough time to type in the listings myself. — C. Sansbury, Aberdeen.

● What other Electron magazines are there?

Vanishing 10 Liners

I AM a great fan of the 10 Liners page and when I read the contents page of your March 1988 issue I noticed that they were in, so I bought the magazine out of my weekly £1.50 pocket money.

When I got home I was very distressed to

Multi-column output

I HAVE been looking for a word processor which will allow me to produce a newsletter providing two columns on a single page without the need to cut and paste.

As many of your readers will be aware, View does not do this. However, I have worked out a method that will allow me to have two columns a page.

Set the ruler to the width of one column. As soon as the words spill over to the next

line delete the characters on the new line and enter the line number. For instance, if you have just overflowed from line 10, enter 10 in place of the overspilled characters, followed by Return.

When you have typed in the correct number of lines to make up one column, go back to the first line and continue your document by overwriting your line number.

When this line overfills, delete the new line with Function+8. Move the cursor to the end of the previous line and using Function +/, concatenate the two lines.

Use Function+9 to add the number of spaces required between the two columns. Continue in this manner until a complete page is finished. I know it is a little tedious, but becomes less cumbersome with practice. It is important not to reformat the new page. — David Martin, North Walsham, Norfolk.

● The line numbers are unnecessary. Basically, the technique used is to type in the text on every other line until the bottom of the column is reached. Then go back and type on the blank lines. Finally join line two to line one, four to three, six to five and so on, also adding spaces in between the columns. The two screen dumps demonstrate how this is done.

```
FJJ.....*.....*.....{
.. .....*.....*.....{
Multi column print
```

output from View is quite easy if you follow this simple guide:

First decide how many lines you want in the column. Then enter the text on every other screen line until you've got enough lines to fill the column.

Enter the first column of text on alternate lines

```
FJJ.....*.....*.....{
.. .....*.....*.....{
Multi column print
output from View is
quite easy if you follow
this simple guide:
First decide how
many lines you want in
the column. Then enter
the text on every other
screen line until you've
got enough lines to
fill the column.
When this is done,
go back and fill in the
blank lines with the
text for column two.
```

When you have typed in the text for both columns, go back to the start and join line two to the end of line one, line four to the end of line three, line six to the end of line five and so on. Space them out as required.

After filling in the blank lines with text for the second column, join pairs of lines together

find that the 10 Liners page was missing. Why was it not there? — Richardo Lobo-Morell, Farnborough.

● We are sorry to hear of your disappointment. The reason for the error was quite simple. Although the contents page is normally the final one to be written it is sometimes necessary to make last minute changes to the magazine — perhaps due to late adverts — after this has been completed.

This appears to be the case, but unfortunately, the contents were not changed to take the changes into account. To compensate for the omission we have included a double-page 10 Liners feature in both this and last month's issue.

Pen pal plea from Holland

AS a reader of your magazine for three years I would like to congratulate you on producing such an excellent publication. I own an Electron with a Plus 1, Plus 3, Rombox Plus with View, Sheet, ADT and Pascal. The Electron is fitted with self-made 32k rom-ram cartridges. An input-output port and a speed-up board (up to 300 per cent speed increase).

Now I would like to contact Electron users in the UK to swap ideas, for example hardware projects, experiences and programs. — Wilfred De Wolf, Marijkestraat 8, 4744-AV Bosschenhoofd, The Netherlands.



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The pan-galactic cocktail bar

Mike Cook shows how the Electron can help make some interesting and refreshing drinks

COCKTAILS are always popular at any time of year, so here is a program to help you create new and exciting drinks. Well, to be perfectly honest, some of the creations sound awful, but then, you never know until you try.

In the world of the cocktail bar, the rule is that almost anything goes, so this program is not terribly reticent about what it mixes.

Every cocktail must have its own unique name, so PROC_Name designs one on a modified random basis. The process is open-ended so it can generate extremely long names on occasions. However, they should all be pronounceable – at least before trying the drink. And endless party fun can be had attempting to say the name after having imbibed.

The program classifies drinks according to type, for example spirits, liqueurs, fortified wines and soft drinks. The recipe for the cocktail is generated by choosing a random number of items – maybe zero – from each category.

Some drinks should never be mixed and these are separated into groups in the spirit and liqueur sections. The program will only

match group A and B spirits and liqueurs, never drinks from the same group. Basically group A spirits are grain-based and group B spirits grape-based. Similarly group A liqueurs are generally fruit-based with group B being herb-based.

The data statements defining the available ingredients can be modified to remove anything you disapprove of, or to add your own particular favourites. All sections end with a null string which tells the program that the end has been reached. Therefore all you need to do is add or remove items from the data statements in the appropriate section.

That's enough theory, happy mixing.



WARNING: It ish an offensh, under the 1876 Home Computhic/ter Act, to operate a computhic/ter while under the influensh of the prog...

```

10 REM The Pan Galactik
20 REM Cocktail Bar
30 REM By Mike Cook
40 REM (c) Electron User
50 NODET:you$="aeiou"
60 con$="bcdfghjklmnpqrstvwxyzn
..
70 DIM drink$(7,50),maxX(7)
80 FOR AX=0 TO 7:MX=0:REPEAT
90 MX=MX+1:READ drink$(AX,MX)
100 UNTIL drink$(AX,MX)=" "
110 maxX(AX)=MX-1:NEXT
120 drunk=FALSE:REPEAT AX=RND(-
TIME)

```

How to make a Tirebehu

2 Measures of Kirsh
2 Measures of Madeira
2 Measures of Pineapple Juice
1 Measure of Lemon Juice

and some raisins
and some ice cubes
and some fresh pineapple cubes

```

130 CLS:PRINT"The Pan Galactik
Cocktail Bar"
140 PRINT"By Mike Cook"
150 PRINT""How to make a ";
160 PROC_Name:PRINT
170 IF RND(2)>1 PROC_ING(1):PRO
C_ING(2) ELSE PROC_ING(0):PROC_IN
G(3)
180 FOR AX=4 TO 6:PROC_ING(AX)
190 NEXT:PRINT:PROC_ING(7)
200 PRINTTAB(0,22)"Press P to p
rint"
210 PRINTTAB(0,23)"Press space
for another drink"
220 REPEAT AS=GETS:UNTIL INSTR(
"Pp",AS)>0
230 IF AS=" " ELSE PROC_Print
240 UNTIL drunk
250 DEF PROC_ING(CX):LDX=0
260 TX=RND(4)-1:IF TX=0 ENDPROC
270 IF CX=7 PRINT"and some
";G
070 300
280 PRINT TAB(4);TX;" Measure";
290 IF TX>1 PRINT"s of "; ELSE
PRINT" of ";
300 REPEAT DX=RND(maxX(CX))
310 UNTIL DX<>LDX:PRINT drinks(
CX,DX)

```

How to make a Quagozadoke

1 Measure of Kirsh
1 Measure of Sloe Gin
1 Measure of Sweet Sherry
1 Measure of Apricot Juice
2 Measures of Pepsi

and some apple slices

```

320 IF RND(100)<10 LDX=DX:GOTO
260
330 IF CX=7 AND RND(100)<10
LDX
=DX:GOTO 260
340 ENDPROC
350 DEF PROC_Print:FOR YX=0 TO
19
360 LS=""":FOR XX=0 TO 39:VDU31X
YX
370 AX=135:1870=USR(BFFF4)
380 LS=LS+CHR$(871:NEXT:FX3,10
390 PRINT LS:FX3,4

```

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◀ From Page 53

```
400 NEXT:ENDPROC
410 DEF PROC_Name:R:=RND(21)
420 VDU ASCMIDS(conS,RZ)-820
430 IF RZ=12 vS="u":VDU ASCvS
440 IF RZ=15 IF RND(5)=1 VDU
AS
C"n"
450 REPEAT REPEAT vS=FNV(vS)
460 VDU ASCvS:UNTIL RND(15)>1
470 RZ=RND(21):VDU ASCMIDS(conS
,RZ)
```

How to make a Poquaguaqua

- 1 Measure of Schnapps
- 2 Measures of Sloe Gin
- 3 Measures of White Wine
- 3 Measures of Pear Juice

and some apple slices

```
480 IF RND(15)=1 VDU ASCMIDS(co
nS,RZ)
490 IF RZ=12 vS="u":VDU ASCvS
500 IF RZ=1 IF RND(20)=1 VDU
AS
C"b"
510 IF RZ=2 IF RND(2)=1 VDU
ASC
"k"
520 IF RZ=15 IF RND(9)=1 VDU
AS
C"n"
530 IF RZ<=12 IF RND(15)=1 VDU
ASC"r"
540 UNTIL RND(5)>3
```

```
550 IF RND(9)<5 VDU ASCFNV(vS):
IF RND(15)=1 VDU ASC"r"
560 PRINT:ENDPROC
570 DEF FNV(xS):LOCAL V%,vS:REP
EAT
)
580 V%=RND(5):vS=MIDS(vovS,V%,1
)
590 UNTIL vS<=xS:vS=vS
600 REM Spirits group A
610 DATA Gin,Whisky,Vodka,Kirsh
,Saki
620 DATA White Rum,Tequila,Schn
apps,""
630 REM Spirits group B
640 DATA Brandy,Dark rum,White
rum
650 DATA Armagnac,""
660 REM Liqueurs group A
670 DATA Apricot brandy,Peach b
randy
680 DATA Advocaat,Abricotine
690 DATA Blackberry Liqueur,Cas
sis
700 DATA Moka,Cherry Brandy,Col
ntreau
710 DATA Creme d'Ananas,Creme d
e Cassis,Creme de Fraise
720 DATA Creme de Mandarin,Crem
e de Noyau,Curacao,Drambuie
730 DATA Framboise,Glaway,Grand
Manner,Maraschino
740 DATA Van der Hum,""
750 REM Liqueurs group B
760 DATA Sweet vermouth,Dry ver
mouth,Strega,Sloe gin
770 DATA Millefiori,Creme de Me
nthe,Yellow Chartreuse
780 DATA Green Chartreuse,Campa
ri
790 DATA Dubonnet,""
800 REM Wines & Fortified
Wines
```

```
810 DATA White wine,Red wine,Ro
se wine,Cider,Port,Sweet sherry
820 DATA Dry sherry,Medium sher
ry,Madeira ""
830 DATA ""
840 REM Soft drinks
850 DATA Lemon juice,Apple juic
e,Pineapple juice, Tomato juice,Ap
ricot juice
```

How to make a Kemeju

- 3 Measures of Whisky
- 1 Measure of Sweet Vermouth
- 3 Measures of Red Wine
- 1 Measure of Apricot Juice
- 1 Measure of Pepsi

and some fresh pineapple cubes
and some lime peel
and some dried apricots

```
860 DATA Orange juice,Mixed fru
it juice,Lime juice,Pear juice
870 DATA ""
880 REM Fizzy drinks
890 DATA Coke,Pepsi,7 Up,Lemona
de,Bitter Lemon,Tonic water
900 DATA Ginger ale,Soda water,
""
910 REM Floaters
920 DATA orange peel,lice cubes,
cloves,lemon peel,lime peel
930 DATA cherries,crushed ice,a
pple slices,raisins,dried apricot
s
940 DATA dried peaches,fresh pi
neapple cubes,orange slices
950 DATA ""
```

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