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electron user

ISSN 0952-3057
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Published by Database Publications Ltd
Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.

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MicroLink: MAG001
Prestel: 614568383

Subscriptions:
051-357 2961

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News trade distribution:
Diamond Europress Sales & Distribution, Unit 1, Burgess Road, Ivyhouse Lane, Hastings, East Sussex TN35 4NR. Tel: 0424 430422.

Printed by Carlisle Web Offset

Electron User is an independent publication. Acorn Computers Ltd. are not responsible for any of the articles in this issue or for any of the opinions expressed.

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ISSN 0952-3057

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Back to school

10 educational games for the Electron for just £5.95

Order on Page 45

electron user NEWS

The sure-fire way to win conversions – write in

GAMES players should fight for the right to have more big titles released on the Electron. Their best chance of success is to present a united front and lobby the huge software houses.

That's the advice of top BBC/Electron programmer Peter Scott who numbers Last Ninja 1 and 2, Barbarian 1 and 2, Predator and Ballistix among his popular Electron conversions.

He has added his technical weight and knowledge of the market to the growing number of readers who have bombarded the *Electron User* mailbag with demands for more big game conversions.

"I have very strong opinions on this topic", said Peter. "Games such as Robocop, Dragon Ninja, Outrun, Ghostbusters II, Strider and New Zealand Story could easily be converted to the Acorn machines. Believe me, if Last Ninja 2 could be converted, almost anything can".

While accepting that some technical compromises have to be made, Peter says they do not substantially modify the games so there are few obstacles. Much of Peter's work has been done through Superior Software which is one of the few software houses still committed to providing good programs for the Electron.

"The attitude of the big software houses is the problem", added Peter. "They don't seem to realise that by supplying Superior or any other company with a disc, a cheat and very little else, they can make a lot of extra money. In the case of Last Ninja, this was 20,000+ copies worth of extra revenue. All the companies that have agreed to BBC Micro and Electron conversions are happy with the results as are the users who buy these games in their thousands.

"I urge Electron owners to write to companies like US Gold and Ocean and ask them to give someone the rights to produce their games. Only if they receive literally hundreds of letters will they react. One 15p stamp and five minutes of your time is a small price to pay for continued software and hardware support for your machine".

Going down for the second time

AS well as shrinking the price Electron owners have to pay for their games, the two latest offerings from budget label Blue Ribbon (0302 321134) also shrink the size of the games' heroes.

Elixir features Cyril, proprietor of a busy chemists shop. Tired after a hard day, he mistakenly drinks a liquid which shrinks him to the size of an asprin bottle.

In the second title, Palace of Magic, the player is one of the world's very nice people which upsets all-powerful wizard Caldeti. As a punishment, the player is shrunk to the size of a dwarf and banished to the Palace of Magic.

Both games cost £2.99.

Don't forget to oil it

ARE you fond of your Electron? If so, you can now have it committed to canvass. David Phillips of Abstract Art Foundation is offering to do oil paintings of computers for their owners for around £60.

Deal brings top games from France

ELECTRON users will soon be reaping the benefits of a computer version of Entente Cordiale.

Disillusioned with the shoot-'em-ups and car racing games on which many UK games houses currently dwell, Steve Hanson of Superior Software (0625 58585) has looked across the Channel to sign a licensing agreement with French software house Infogrames.

It will bring Electron conversions of top selling Atari ST and Amiga packages Hostages and Sim City from the Lyon-based company, which is making itself a name for producing original games.

In Hostages, the player has to formulate a plan of action then storm an embassy to rescue hostage held by terrorists. Sim City is described as "a pacifist Populous", including the creation of a city but without the warfare.

Steve hopes it will lead to further Infogrames titles like Captain Blood and Tin Tin being available for Electron conversion. "These original titles make a welcome change from the shoot-'em-ups and car racing games ", he said.

How an Electron is serving youth

TWO youth centres in Kent cater for 1,300 youngsters from more than 20 villages on The Weald. The huge tasks of collating membership, providing youngsters with the activites they want and making sure all the catchment area is covered have now been taken over by an Electron.

The Area Youth Worker for Kent County Council, Rick Kirby, has responsibility for the two Youth Wings based at Mascalls School, Paddock Wood and Angley School, Cranbrook.

"We need to ensure that all the villages in our area are adequatley covered and that we are giving our members the activities they want", Rick told *Electron User*. "We also have the situation where we need the details of youngsters who turn up but have forgotten their membership cards".

To solve these problems, Rick teamed up his 64k Electron with Rombox Plus I, Pegasus 400 disc drive and Amstrad DMP2000 printer. He has constructed a special database of members including their interests, date of birth and address. This is immediately available when membership cards are forgotten and is used on a long term basis to structure future activities which cover a wide range of sports and courses.

"At present the Electron is only used in an adiministrative capacity but we hope to extend this into market research and to allow members to use it to improve their computer skills", said Rick.

"I started using the Electron because it is a simple machine with BBC Basic which does the jobs we want".

GALLUP SOFTWARE CHART

THIS MONTH	LAST MONTH	TITLE (Software House)	COMMENTS	PRICE
1	2	PAPERBOY *Encore*	Back at the top again for this one. It's a shame about the ficker and slow speed – get a turbo for faster arcade action.	2.99
2	•	COMMANDO *Encore*	Also returning to the top of the charts is another in a long line of Rambo type kill-'em-alls. Will you survive long enough?	2.99
3	4	SUBWAY VIGILANTE *Players*	Your angelic presence must strike to make the underground safe. A hack and slash martial arts game offering little out of the ordinary.	2.99
4	5	JOE BLADE 2 *Players*	Good graphics added to a very playable game, plus puzzle screens give this staying power. Designed to test the little grey cells.	1.99
5	•	PALACE OF MAGIC *Blue Ribbon*	Next in the generation of Superior/Blue Ribbon releases. Reminiscent of Citadel but still worth the money and very enjoyable.	2.99
6	•	LAST OF THE FREE *Audiogenic*	Audiogenic's oldie has returned to the charts. Copies are few and far between these days so seek it out. A must for a collector.	7.95
7	•	COPS 'N' ROBBERS *Atlantis*	For the more villainous; this game allows you to don the striped shirt and swag bag. Dispatch the cops and escape with the booty.	1.99
8	•	FRAK! *Alternative*	Re-released by Alternative, originally on the Aardvark label in the early 1980s. It says something for its quality that it's still selling.	1.99
9	•	PLAY IT AGAIN SAM 9 *Superior*	If you missed them first time round here are Life of Repton, Steve Davis Snooker, Spycat and the premiere of Camelot.	9.95
10	17	CODENAME: DROID *Blue Ribbon*	Stryker's fresh from his last adventure, and here is the sequel. An ingenious and devilish reworking of the original game.	2.99
11	•	FOOTBALL MANAGER *Addictive*	So you think you could do better than some of the managers in the league at present? Here's your chance to prove it.	2.99
12	•	STRIKE FORCE HARRIER *Alternative*	Nice to see this one again – reasonably realistic flight simulator with the Harrier feel on take-off and landing, plus usual controls and functions.	2.99
13	•	YIE AR KUNG FU *Hit Squad*	A martial arts game to which all others are compared. Buy it and you will see what some of the more recent efforts are lacking.	2.99
14	•	CRICKET *Bugbyte*	After England's opening performance in the West Indies, you may be inclined to try a little fast bowling yourself. A difficult game to simulate.	2.99
15	•	FOOTBALLER OFTHE YEAR *Gremilin Graphics*	Tie up your boots and see if you qualify. Have you the skills and determination to win through? Not a bad effort.	9.95
16	9	STRYKER'S RUN *Blue Ribbon*	One you really must have if you missed it first time around. Buy it as a sequel or for its own sake, you won't be disappointed.	2.99
17	•	GRID IRON *Top Ten*	Fed up with European-style football? Then try the American version. You will find more strategy and thought are called for.	2.99
18	•	JOE BLADE *Players*	The original adventure for the community-conscious Joe. Shows how effective two-colour graphics can be. An excellent arcade action adventure.	1.99
19	11	HOPPER *Acornsoft*	Another oldie from the Acorn stable. Probably better value as a budget game, but a classic to add to any gamester's collection.	9.99
20	•	STORMCYCLE *Atlantis*	Save Earth from imminent invasion and disaster by finding five diodes, killing the enemy and beating the clock. Easy when you know how.	1.99

Eastern block pile-up

Neatly stack the falling blocks to succeed in Anthony Houghton's fast-paced arcade game

BASED on a popular arcade game that has its roots firmly planted behind the Iron Curtain, Tetron is a simple game, but one which is extremely addictive. It requires quick reactions, the ability to plan ahead and nerves of steel. If you think you have these qualities then read on...

When the game starts a wide necked bottle will be drawn on screen. One at a time, different shaped blocks will begin to fall down the screen into the bottle. Your task is to stack up the blocks into as neat a pile as possible without leaving gaps or holes.

Quickly examine each block's shape as soon as it appears at the top of the screen. If a block looks as if it won't fit very well use the Return key to turn it around then Z and X to move it left or right to the best position.

If there is an unbroken row of blocks in the bottom of the bottle that row will disintegrate and the blocks above will drop down to fill the gap. So by carefull stacking and making complete rows the bottle will never become full – that's the theory, anyway.

In fact, panic usually sets in, the controls are often fumbled and you simply can't decide quickly enough how best to fit in a new block. It's frustrating and very addictive.

There are five skill levels, but the difference between the hardest and easiest isn't that great. More points are gained on the most difficult level.

CONTROLS	
Z	Left
X	Right
Return	Rotate block

```
   10 REM TETRON
   20 REM by A. Houghton
   30 REM (c) Electron User
   40 ON ERROR MODE 6:REPORT:PRIN
T" at line ";ERL:END
   50 *FX229,1
   60 ENVELOPE 1,1,50,-20,10,4,10
,10,126,0,0,-126,126,126
   70 VDU 23,224,56,69,65,57,5,69
,56,0
   80 VDU 23,225,227,20,4,4,4,20,
227,0
   90 VDU 23,226,207,40,40,47,42,
41,200,0
  100 VDU 23,227,62,160,160,60,32
,32,190,0
  110 DIM HN$(9),HS%(9):FOR N%=0
TO 9:HN$(N%)="Tony":NEXT
  120 FOR N%=1 TO 9:HS%(N%)=&A00-
&100*N%:NEXT:HS%(0)=&1000
  130 PROCassem
  140 MODE 5:VDU 23,1,0;0;0;0;
  150 REPEAT:PROCtitle:IF INKEY-9
99 UNTIL TRUE ELSE PROCtable:PROCw
ait:UNTIL INKEY-99
  160 PROCskill
  170 !score=0:PROCscreen
  180 ?speed=235:?rate=?diff:CALL
 main
  190 COLOUR 128:COLOUR 2:PRINT T
AB(1,20)"GAME"TAB(15,20)"OVER":TI
ME=0:REPEAT UNTIL TIME>400
  200 IF !score>HS%(9) PROCenter:
GOTO 220
  210 PROCtable
  220 PROCwait:IF INKEY-99 GOTO 1
60 ELSE GOTO 150
  230 DEF PROCenter
  240 S%=0:REPEAT:S%=S%+1:UNTIL H
S%(S%-1)<!score:S%=S%-1
  250 IF S%<9 PROCshift
  260 HN$(S%)="":HS%(S%)=!score
  270 PROCtable:VDU 23,1,1;0;0;0;
31,10,S%*2+7:FOR N%=0 TO 3:VDU 19
,N%,N%;0;:NEXT:COLOUR 2
  290 A%=0:X%=0:Y%=&52:!&5200=&20
095280:?&5204=126:CALL &FFF1
  300 HN$(S%)=$&5280:VDU 23,1,0;0
;0;0;:ENDPROC
  310 DEF PROCshift:FOR M%=8 TO S
%STEP -1
  320 HN$(M%+1)=HN$(M%):HS%(M%+1)
=HS%(M%):NEXT:ENDPROC
  330 DEF PROCscreen:FOR N%=0 TO
3:VDU 19,N%,0;0;:NEXT:CLS
  340 CALL tetron
  350 GCOL 0,3:MOVE 444,828
  360 DRAW 444,60:DRAW 832,60:DRA
W 832,828
  370 DRAW 848,828:DRAW 848,700:D
RAW 860,700
  380 DRAW 860,32:DRAW 416,32:DRA
W 416,700
  390 DRAW 428,700:DRAW 428,828:D
RAW 444,828
  400 S%=!score:!score=HS%(0):PRO
Cwindow(1):COLOUR 129:COLOUR 2:PR
INT TAB(1,10)"HIGH"
  410 !s=&65D0:CALL high:!score=S
%
  420 PROCwindow(15):VDU 31,15,10
,224,225,226,227:CALL prscr
  430 FOR N%=0 TO 3:VDU 19,N%,N%;
0;:NEXT
  440 ENDPROC
  450 DEF PROCwindow(X%):top%=704
:bot%=636:left%=X%*64-8:right%=(X
%+4)*64
  460 VDU 18,0,129,24,left%;bot%;
right%;top%;16,26
  470 MOVE left%-8,top%+8:DRAW ri
ght%+8,top%+8
  480 MOVE right%+16,top%+4:DRAW
right%+16,bot%-4
  490 MOVE right%+8,bot%-8:DRAW l
eft%-8,bot%-8
  500 MOVE left%-16,bot%-4:DRAW l
eft%-16,top%+4
  510 ENDPROC
  520 DEF PROCtable:FOR N%=0 TO 3
:VDU 19,N%,0;0;:NEXT
  530 COLOUR 128:CLS:CALL tetron
  540 FOR N%=0 TO 9:COLOUR 1:IF N
%=9 PRINT TAB(0,25)"10 "; ELSE PR
INT TAB(1,N%*2+7);N%+1" ";
  550 COLOUR 3:PRINT RIGHT$("0000
"+STR$~HS%(N%),5)"0 ";
  560 COLOUR 2:PRINT HN$(N%):NEXT
:ENDPROC
  570 DEF PROCwait:COLOUR 1:PRINT
 TAB(0,31)"Press SPACE to play";
  580 FOR N%=0 TO 3:VDU 19,N%,N%;
0;:NEXT:TIME=0:REPEAT UNTIL TIME>
1200 OR INKEY-99:ENDPROC
  590 DEF PROCtitle:FOR N%=0 TO 3
:VDU 19,N%,0;0;:NEXT:COLOUR 128:C
LS:CALL tetron
  600 COLOUR 2:PRINT TAB(0,5)" Ma
nipulate the"'''"falling shapes to
"'''"form solid rows,"'''"which dis
integrate,"'''"allowing everything
"
  610 PRINT'"above to fall down."
''" Stop the pile from"'''"reachin
g the top."''' Higher skill level
"'"means higher score."
  620 COLOUR 3:PRINT'TAB(5)"KEYS"
TAB(5)"----"'TAB(5)"Z - Left"'TAB
(5)"X - Right"'"RETURN - Rotate"
  630 PROCwait:ENDPROC
  640 DEF PROCskill:FOR N%=0 TO 3
:VDU 19,N%,0;0;:NEXT:COLOUR 128:C
LS
  650 CALL tetron
  660 COLOUR 3:PRINT TAB(2,10)"En
ter Skill Level"'" (1=Easy .. 5=
Hard)"
  670 PRINT''''"Level:";:FOR N%=0
 TO 3:VDU 19,N%,N%;0;:NEXT
  690 REPEAT:A$=GET$:UNTIL A$>"0"
 AND A$<"6":PRINT A$
  700 ?skill=VAL A$:?hold=6-?skil
l:?diff=50*?hold
  710 TIME=0:REPEAT UNTIL TIME>10
0:ENDPROC
  720 DEF PROCassem:?&D00=&40
  730 RESTORE 1930
  740 FOR N%=&900 TO &937 STEP 4:
READ A$:!N%=EVAL("&"+A$):NEXT
  750 FOR N%=&D80 TO &DE7 STEP 4:
READ A$:!N%=EVAL("&"+A$):NEXT
  760 FOR N%=&940 TO &A60 STEP 16
:READ A$
  770 FOR A%=1 TO 16:IF MID$(A$,A
%,1)="1" N%?(A%-1)=&FF ELSE N%?(A
%-1)=0
  780 NEXT:NEXT
  790 DIM addressl 19,addressh 19
,orient 7
  800 FOR N%=0 TO 18:A%=&940+16*N
%:addressl?N%=A% MOD 256:addressh
?N%=A% DIV 256:NEXT
  810 FOR N%=0 TO 6:READ orient?N
%:NEXT
  820 DIM ctabl 25,ctabh 25
  830 FOR N%=0 TO 24:A%=&5FD8+N%*
&140:ctabl?N%=A%MOD256:ctabh?N%=A
%DIV256:NEXT
  840 DIMcolr 7:FORN%=0TO6:READN%
?colr:NEXT
  850 A%=&5000:FORN%=1TO48:READA$
:FORM%=1TO6:?A%=VAL(MID$(A$,M%,1)
):A%=A%+1:NEXT,
  860 s=&70:d=&72:shadr=&74:shadr
2=&76
  870 IFINKEY-256=1 timer=&29F EL
SEtimer=&2A0
  880 DIMQ%2000:FORP=0TO2STEP2:P%
=Q%:[OPTP
  890 .calc:TXA:ASLA:ASLA:ASLA:CL
C:ADCctabl,Y:STAs:LDActabh,Y:ADC#
0:STAs+1:RTS
```

```
  900 .print:LDY#7:.l:LDA(d),Y:EO
R(s),Y:STA(s),Y:DEY:BPLl:RTS
  910 .cx:BRK:.cy:BRK:.ty:BRK:.pt
r:BRK
  920 .prshape:LDXx:LDYy:STYty:LD
Acolour:ASLA:ASLA:ASLA:STAd:LDA#9
:STAd+1
  930 LDA#0:STAptr:LDA#4:STAcy:.l
1:LDA#4:STAcx
  940 .l2:LDYptr:LDA(shadr),Y:BEQ
blank:LDYty:JSRcalc:JSRprint
  950 .blank:INX:INCptr:DECcx:BNE
l2
  960 DEX:DEX:DEX:DEX
  970 INCty:DECcy:BNEl1:RTS
  980 .shape:BRK:.colour:BRK:.rot
:BRK:.x:BRK:.y:BRK:.rotl:BRK
  990 .appear:LDA#7:STA&2A:LDA#0:
STA&2B:STA&2C:STA&2D:JSR&AF12:DEC
&2A:LDA&2A:STAcolour
 1000 TAY:LDAcolr,Y:STAshape:TAY
 1010 LDAaddressl,Y:STAshadr:LDAa
ddressh,Y:STAshadr+1
 1020 LDA#0:STArot:LDA#6:STAx:LDA
#0:STAy
 1030 LDYcolour:LDAorient,Y:STAro
tl:JMPprshape
 1040 .key:LDY#&FF:LDA#&81:JSR&FF
F4:TYA:RTS
 1050 .manipulate:LDX#&B6:JSRkey:
BEQntrot
 1060 LDYrot:INY:CPYrotl:BNEincro
t:LDY#0
 1070 .incrot:STYtrot:LDYcolour:L
DAcolr,Y:CLC:ADCtrot:STAtshp
 1080 TAY:LDAaddressl,Y:STAshadr2
:LDAaddressh,Y:STAshadr2+1:LDAx:S
TAx2:LDAy:STAy2:JSRcomplex:LDAstu
ck:BNEntright
 1090 LDAshadr2:STAshadr:LDAshadr
2+1:STAshadr+1:LDAtshp:STAshape:L
DAtrot:STArot:JMPprshape
 1100 .ntrot:LDX#&9E:JSRkey:BEQnt
left
 1110 LDXx:DEX:STXx2:JMPmove
 1120 .ntleft:LDX#&BD:JSRkey:BEQn
tright
 1130 LDXx:INX:STXx2
 1140 .move:LDAy:STAy2:LDAshadr:S
TAshadr2:LDAshadr+1:STAshadr2+1:J
SRcomplex:LDAstuck:BNEntright
 1150 LDAx2:STAx
 1160 .ntright:JMPprshape
 1170 .trot:BRK:.tshp:BRK:.x2:BRK
:.y2:BRK
 1180 .test:JSRcalc:LDY#0:LDA(s),
Y:RTS
 1190 .delay:STXspecial:JSR&FFE0:
LDXspecial:RTS:.special:BRK
 1200 .flag:BRK:.flag1:BRK:.flag2
:BRK
 1210 .row:LDA#&FF:STAflag1:STAfl
ag2:STYty:LDX#3
 1220 .l:LDYty:JSRtest:BEQempty:L
DA#0:STAflag1:JMPfull
 1230 .empty:LDA#0:STAflag2
 1240 .full:INX:CPX#15:BNEl
 1250 LDAflag1:BEQnrem:LDA#&80:ST
Aflag:RTS
 1260 .nrem:LDAflag2:BEQnrfu:LDA#
&FF:STAflag:RTS
 1270 .nrfu:LDA#0:STAflag:RTS
 1280 .stuck:BRK
 1290 .fall:LDXx:STXx2:LDYy:INY:S
TYy2:LDAshadr:STAshadr2:LDAshadr+
1:STAshadr2+1:JSRcomplex
 1300 LDAstuck:BNEndown:INCy:.ndo
wn:RTS
 1310 .complex:LDA#0:STAflag1:LDA
#&FF:STAstuck
 1320 LDA#4:STAcy:CLC:LDYy2:INY:I
NY:INY:STYty:LDA#15:STAptr
 1330 .l1:LDA#4:STAcx:LDXx2:INX:I
NX:INX
 1340 .l2:LDYptr:LDA(shadr2),Y:BE
Qnext
 1350 LDYty:JSRtest:BEQnext:RTS
 1360 .next:DECptr:DEX:DECcx:BNEl
2
 1370 DECty:DECcy:BNEl1
 1380 LDA#0:STAstuck:RTS
 1390 .pile:LDY#23:STYty
 1400 .l:LDYty:JSRrow:CMP#&FF:BNE
ncolps:JSRcollapse:JMPl
 1410 .ncolps:CMP#&80:BNEnss:LDA#
0:STAdead:RTS
 1420 .nss:DECty:LDAty:CMP#3:BNEl
:LDA#&FF:STAdead:RTS
 1430 .dead:BRK
 1440 .mask:BRK
 1450 .collapse:LDA#&7F:STAmask
 1460 .l1:LDA#0:STAcy:LDA#19:JSR&
FFF4
 1470 .l2:LDX#3:LDYty:JSRcalc
 1480 LDX#12:LDYcy
 1490 .l3:LDA(s),Y:ANDmask:STA(s)
,Y
 1500 LDAs:CLC:ADC#8:STAs:LDAs+1:
ADC#0:STAs+1
 1510 DEX:BNEl3
 1520 INCcy:LDAcy:CMP#8:BNEl2
 1530 LDAmask:LSRmask:BNEl1
 1540 LDAty:CLC:ADC#6:STAbot:LDY#
0
 1550 .l:LDAvdu,Y:JSR&FFEE:INY:CP
Y#14:BNEl:LDA#7:LDX#so2 MOD256:LD
Y#so2 DIV256:JSR&FFF1
 1560 LDA#19:JSR&FFF4:JSR&FFF4:LD
A#10:JSR&FFEE
 1570 JMPadd100
 1580 .vdu:EQUB17:EQUB128:EQUB28:
EQUB7:.bot:BRK:EQUB12:EQUB5:EQUB1
1:EQUB26:EQUB30:EQUB11:EQUB31:EQU
B0:EQUB31
 1590 .so1:EQUW1:EQUW1:EQUW10:EQU
W4
 1600 .so2:EQUW0:EQUW-15:EQUW4:EQ
UW4
 1610 .speed:BRK:.rate:BRK:.waito
p:BRK:.diff:BRK:.hold:BRK
 1620 .delay:BITtimer:BMIdelay:LD
Aspeed:STAtimer:LDA#19:JMP&FFF4
 1630 .main:JSRappear:LDAhold:STA
waitop:.l:JSRdelay:JSRprshape:JSR
manipulate:DECwaitop:BNEl
 1640 .l:JSRdelay:JSRprshape:JSRf
all
 1650 DECrate:BNEnacc:INCspeed:BN
Enacc:LDAdiff:STArate
 1660 .nacc:LDAstuck:BNEhit:JSRma
nipulate:JMPl
 1670 .hit:JSRprshape:LDA#7:LDX#s
o1 MOD256:LDY#so1 DIV256:JSR&FFF1
:JSRadd10:JSRpile
 1680 LDAdead:BEQmain:RTS
 1690 .score:EQUD0:.skill:BRK
 1700 .add10:SED:LDAscore:CLC:ADC
#1:STAscore:LDAscore+1:ADC#0:STAs
core+1:JMPcarry
 1710 .add100:SED:LDAscore+1:CLC:
ADCskill:STAscore+1
 1720 .carry:LDAscore+2:ADC#0:STA
score+2:CLD
 1730 .prscr:LDA#&80:STAs:LDA#&66
:STAs+1
 1740 .high:LDA#0:JSRdigit:LDAsco
re+2:JSRword:LDAscore+1:JSRword:L
DAscore:JSRword:LDA#0:JMPdigit
 1750 .word:TAX:LSRA:LSRA:LSRA:LS
RA:JSRdigit:TXA:AND#&F
 1760 .digit:ASLA:ASLA:ASLA:CLC:A
DC#&80:STAd:LDA#&D:STAd+1
 1770 LDY#7:.l:LDA(d),Y:STA(s),Y:
DEY:BPLl
 1780 LDAs:CLC:ADC#8:STAs:LDAs+1:
ADC#0:STAs+1:RTS
 1790 .line:LDAshadr:STAs:LDAshad
r+1:STAs+1
 1800 LDA#36:STAcx
 1810 .l:LDY#0:LDA(shadr2),Y:ASLA
:ASLA:CLC:ADC#&D0:STAd:LDA#&D:STA
d+1
 1820 LDY#3:.l1:LDA(d),Y:STA(s),Y
:DEY:BPLl1
 1830 LDAs:CLC:ADC#8:STAs:LDAs+1:
ADC#0:STAs+1
 1840 INCshadr2:BNEok:INCshadr2+1
:.ok:DECcx:BNEl:RTS
 1850 .tetron:LDA#&50:STAshadr:LD
A#&59:STAshadr+1
 1860 LDA#0:STAshadr2:LDA#&50:STA
shadr2+1
 1870 LDA#4:STAcy
 1880 .l:JSRline:LDAshadr:CLC:ADC
#4:STAshadr:LDAshadr+1:ADC#0:STAs
hadr+1
 1890 JSRline:LDAshadr:CLC:ADC#&3
C:STAshadr:LDAshadr+1:ADC#1:STAsh
adr+1
 1900 DECcy:BNEl:RTS
 1910 JNEXT
 1920 ENDPROC
 1930 DATA FOFOFOF,FOFOFOF,FOFOFO
FO,FOFOFOFO,FFFFFFFF,FFFFFFFF,A55
AA55A,A55AA55A,AF5FAF5F,AF5FAF5F,
FAF5FAF5,FAF5FAF5,5AA55AA5,5AA55A
A5
 1940 DATAAFAFAF4F,F4FEFAF,4F4FCF
4F,FEFEF4F,4F2FAF4F,FEFEF8F,4F2FA
F4F,F4FEF2F,AFEF6F2F,F2F2FEF,2FCF
8FEF,F4FEF2F,AFCF8F6F,F4FEFAF,2F2
FEFEF,F4F4F4F
 1950 DATA4FAFAF4F,F4FEFAF,AFAFEF
4F,FCF2F6F,0,FOFOFOF,103,80C,3010
000,C080000
 1960 DATA 0000111100000000,00100
01000100010
 1970 DATA 0000011100010000,00000
01000100110,0000100011100000,0000
011001000100
 1980 DATA 0000011100100000,00000
01001100010,0000001001110000,0000
010001100100
 1990 DATA 0000001101100000,00000
10001100010
 2000 DATA 0000011001100000
 2010 DATA 0000011101000000,00000
11000100010,0000000101110000,0000
010001000110
 2020 DATA 0000011000110000,00000
01001100100
 2030 DATA 2,4,4,2,1,4,2
 2040 DATA 0,2,6,10,12,13,17
 2050 DATA 111110,111110,111110,1
11150,411150,100210
 2060 DATA 301020,100020,301020,1
00210,130210,150010
 2070 DATA 001000,100400,001000,1
00410,100010,115010
 2080 DATA 001000,111100,001000,1
11130,100010,121510,
 2090 DATA 001000,100200,001000,1
21500,100010,102110
 2100 DATA 001000,100040,001000,1
02150,150410,100210
 2110 DATA 041500,111110,041500,1
50210,211130,150010
 2120 DATA 000000,000000,000000,0
00000,000000,000000
```

ADVENTURES

By Pendragon

Myorem mastered

THE wind is whisking the rain against the battlements as the pale spring sunshine struggles to break through and cast some light on these sodden walls. With the lack of dry weather and this eternity indoors, my armour not only smells musty, it is positively rusty!

Meanwhile, in the damp sanctuary of my tower I have also been fairly whisking through Electron adventures. To the triumphs which I hailed last month, I can now add success against the entire first division of Level 9 adventures, including Colossal Adventure, Adventure Quest, Dungeon Adventure, Lords of Time, Emerald Isle, Red Moon, The Price of Magik and The Worm in Paradise.

Enthar Seven

Alongside the recent Acornsoft conquests, this gives me a plethora of maps and trails for future help in these columns, so as I have said many times before: Watch this space.

Already I have received response to my call for readers to let me know of the most irksome or problematic points they have come across in Electron text adventures, and some of the letters ring familiar bells.

Duncan Hume of Taplow states that nothing has baffled him more than the initial procedures to Robico's Myorem. Not only did it take him nearly three days to trigger the game by THINKING, but it then took him a further week to make his escape from the drainage ditch.

At the time of its release in 1986, Myorem posed some unique problems, most of which have since been copied by other programmers. It remains one of my all-time favourite games, but I must admit that I experienced something of the same trouble as Duncan at the outset. To escape from the ditch you must avoid a poisonous spider while building yourself a raft from an old oil drum and linking it to various artifacts which you come across. However, the crux to success involves handling a rusty tin can, a plastic bag and the oil drum lid in the correct order. The problem is something akin to the classic chicken, wheat and fox puzzle _ and just as taxing.

However, it is not perhaps as infuriating as the Giant Spider escapade in Robico's other masterpiece, Enthar Seven. As Karen Marbeuf of Leighton Buzzard points out, if you fail to do the obvious quickly you meet a sticky and cruel end.

Such a demise is particularly annoying as the problem comes after you have completed almost 300 puzzle-ridden locations of the game. Having been enmeshed and stung by a giant spider you appear to be drifting in a coma towards death.

Only the most experienced of adventurers will perhaps try WAKE UP as the key to escape, and then after possibly many nights of head scratching and false hopes! Next month I will reveal some other stymies sent in by you, the readers.

Along with a wash of letters concerning difficulties, I have also had my month brightened by a hefty package of goodies from Sheila Beattie of London. Sheila was one of my first correspondents when I started writing this column back in the dimness of time, and has rewarded four years of often mutual help with full solutions to almost 20 Electron adventures.

Each parchment from her parcel has now been placed in my vaults, and each will in turn be used to help lost travellers and pleading questers. As a token of thanks some prized items of software are now winging their way to Mrs Beattie.

I must also thank James Farmer of Redditch who kindly gives a correction to part of his solution to Plane Crash, so recently featured in these pages. The following may help adventurers who are probably cursing the previous inaccuracy.

He suggests that once you have had a snooze in the hut, in part two of the game, you should go North, North, East, East, North, South, South, South, East, East, East, East, North, North, North, North, then look and climb the vine.

Another correction arrived from Kerry Kirwan of Tiger Soft. His communication concerns the release of Tiger Soft's first adventure, The Magic of Merlin, which will be priced at £9.95 and not £7.99 as previously stated. It appears that Tiger Soft games will only be available by mail order, and all queries should be addressed to Kerry at: Tiger Soft, 7 Granville Road, Gillingham, Kent ME7 2PB.

On a different tack, I have received an interesting adventuring secret from Leroy Ofoau of USAF, Dresden, who has discovered a hitherto undocumented bug in Sphinx Adventure. So for benefit of all, I exclusively reveal Leroy's secret.

First finish the game in the usual way by gathering all the treasures at the foot of the Sphinx and kneeling. Now comes the rub, as you must set about returning them all to their original collection points. Watch your points double as you make your way back to the starting location.

Finally, this month's featured map is of the openings to Robico's excellent Blood of the Mutineers. This will supplement Barbara Gibb's ongoing audit trail, and hopefully prove useful to many wayfarers who may be stuck at the outset of this classic game.

● Next month I will begin a new series of maps to some of the most difficult adventure games ever released for the Electron. I will also be beginning a small cheat section to enable you to dissect the innards of some of the most complex text adventures. So hardened questers, stay tuned.

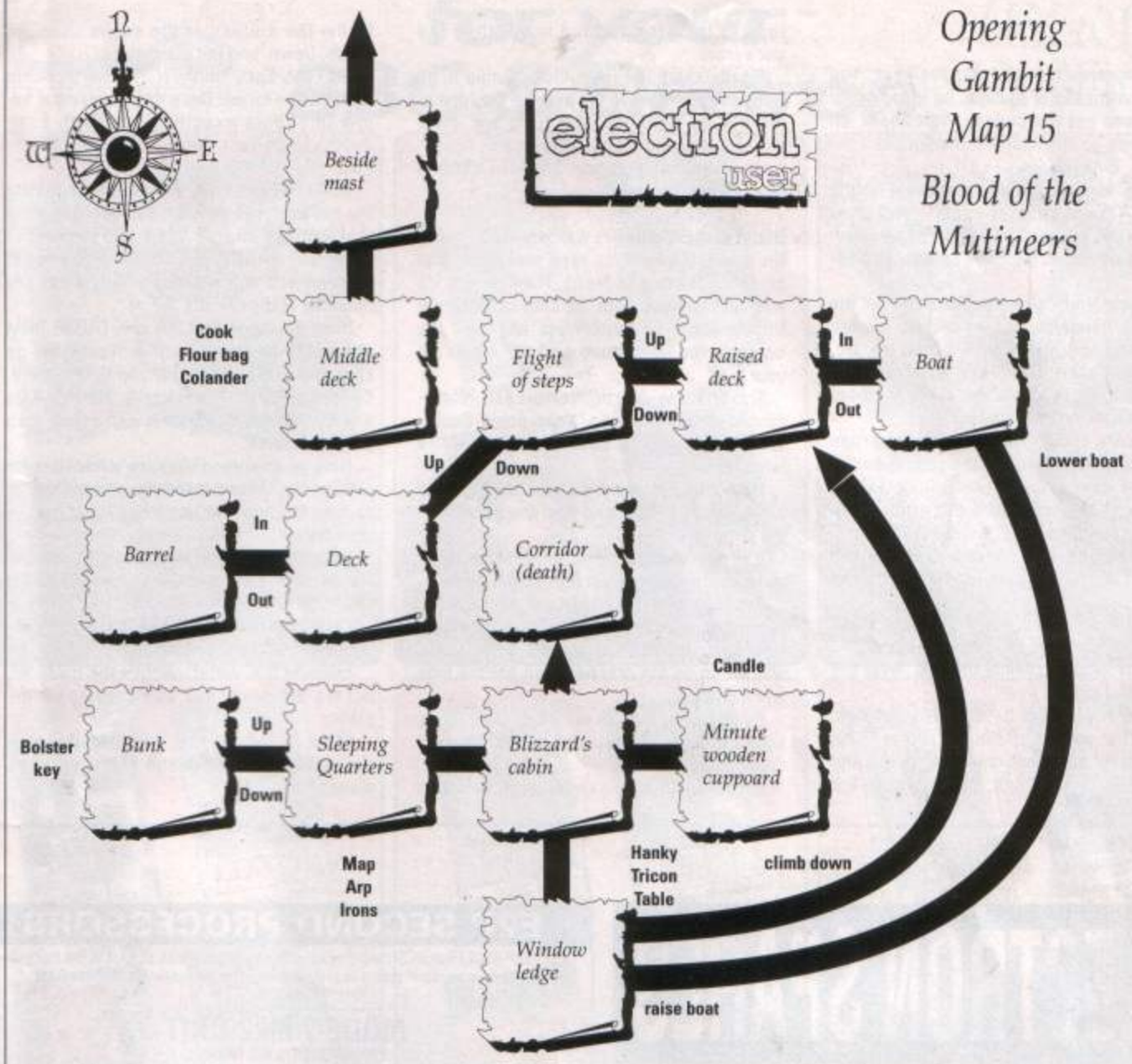
Readers' Hall of Fame

Acheton *Bob Purder*

Go through to the Toll Room and collect the amber, amethyst and chess set. Also get the Stake from DeRoom 3 and the cross from the gallery. Journey to Star-room 5, go through the normal ZOOGE procedure and drop the amethyst, amber, chess set, stake and cross.

Now enter the Timeless Cavern, go down the slope and into the mine. From here collect the opals, amulet, brooch, jade, lead and quartz, and take the sword from DeRoom 7. Immediately go to the LS Room and from there to the Alchemy Room. Transmute and return to the Toll Hall, where you should drop the quartz and take the topaz.

ZOOGE away and drop the opals, brooch, jade, gold, topaz and sword, and take the



keys. Go to the Habergeon and go West, West, West, open the door, wave the amulet, West, Up, North, West.

Along the way you should collect the clock, roc, moonstone and diadem. Then return to Star-room 3, ZOOGE away and drop the four treasures. Take the stamps and the scroll, ZOOGE away again and take the amulet from Star-room 1.

Go to the Slab Room, take the scissors and rod, drop the keys, go above ground and turn off your lamp. Say EXAKCIP and take the diamond, rhodium, silver and axe.

Go back below ground, turn on your lamp and bring out the axe, cane, cross, dagger, keg, mace, spear, sword, stake and vial. Visit the idol and enter the eye.

Go through the now familiar process of dying, but remember to turn off your lamp. Enter the rear safe, get the skull, do the safe and enter the Masters Section.

In this final part you must defeat all manner of foe sent to test your mettle. To succeed, you must use nothing against the knight, the spear against the cyclops and the vial on the scorpion.

Kill the serpent with the sword, the orc with the dagger, the vampire with the stake, the minotaur with the mace, the spectre with the cross, the wolf with the cane and the dragon with the keg.

If you manage all that, then victory and maximum points are now yours, and probably the most complex of all Electron adventures is completed.

The Axe of Kolt *Harry Bastien*

Enter the code for part four, which is TRAP TSAL _ LAST PART spelt backwards _ then wait. Now get the food, eat it and wait a little longer for your jailer to arrive.

Now you have to be brutal, so hit the

➤

jailer, examine him and get the keys. You have your means of escape, so unlock your chains and get the cudgel. Wait again, hit the soldier, go out, examine the floor and get the rope.

Go Up, look East, tiptoe East and hit the soldier. To ensure your escape you must now get the cudgel, rope and dagger. Now go Up, North, East, East and smash the padlock.

Continue North, examine the linen, get the bedsheet, bandage your leg and sit. You are now ready to travel South, West, Up, Up, East and listen. Go West, examine the embrasure, go to the ledge, climb the bastion, Go East and look around.

Take care at this point as you tie the rope to the flagpole and lower the rope over the side. The next stage is also tricky, as you must climb the rope, pull the grille three times, tie the grille and GO EMBRASURE.

Once inside you should examine the stone, listen once again, and examine the room.

Lifting the sacking you find the hammer and chisel, then lift the sacking again and get the crowbar. Examine the axe, lever the staples and get the axe.

Although you now have the Axe of Kolt, you are not yet out of danger, and to finish you must go out, climb the rope, pull it and untie it. Go South, South, look down, tie the rope to the crowbar and lower the rope once more.

Finally, climb the rope, flick it, untie it, go East, shout and wave the axe. Tie the rope to the axe, go West, run east, jump and lower the axe. After so much problem solving, listening and manipulating, success and the Axe of Kolt are now yours.

Blood of the Mutineers *Barbara Gibb*

Go North, North-West, take everything and continue North and North. Now go Up, Up and cut the shrub with the cutlass. Continue Up, Up, North-East and West, and wear the colander on your head and the boots on your feet.

Travel West, North, North-East, North-East and read the map. Keep going South-West, South-West, East, and remove the large lens.

Now drop the wood, go East, wait, get the whetstone, go West and light the wood with the large lens.

It is now essential that you wait for three turns before going West four times. Sharpen the cutlass with the whetstone, and cut the smooth tree with your razor sharp sailor's sword. Now climb the smooth tree, go Up and swing on the creeper, then get the lime and eat it.

By now your cutlass will need sharpening again on the whetstone _ your life will depend upon it.

If you do this quickly enough you can throw the cutlass at the snake. Now go Down, Down, and get the cutlass.

Go East, East, North, North, North, North and into the forest. Once there, you must follow this route exactly: East, East, East, South, South-East, North, North and North-East.

Go East, East, East, and cut the rope with the cutlass _ see what I mean about keeping that cutlass sharp? Wait and jump, GET ARM, GET HANKY, GET COLANDER, and put the hanky in the colander. Now wear the colander and go North.

Hook the ledge with the arm, CLIMB ARM and continue Up for four moves. Now go East, climb the ivy, go in, and down twice. Continue North, East, North, North, West and Up. Wait until Varan is under you, then push the statue.

Now go down and examine Varan, get the star, go Up, Up and insert the star in the slot to open the door. Go North and Up to get the tapestry.

Examine the door, unbolt it and open it. Now travel East and South and SEARCH TREASURE.

Keep searching and take the ring, necklace, gold coin and platter.

Examine the platter, remove the colander, get the hanky and spit on it then polish the platter.

Finish by going North, West, Up, Up, open the window, go West and signal with the platter.

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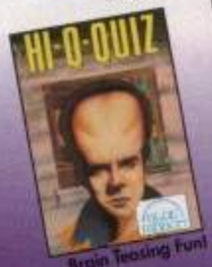

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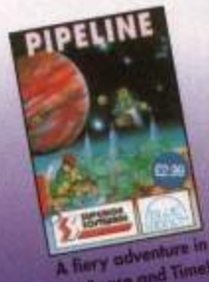

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PERPLEXITY

– stand aside, Repton

Product: Perplexity
Price: £9.95
Supplier: Superior Software,
PO Box 6, Brigg, S. Humberside
DN20 9NH
Tel: 0652 58585

HOW could the ever-popular Repton, with its combined puzzle and arcade action elements, be improved upon? The answer is Perplexity, which could be described as a 3D version of Repton.

When I first saw the cassette inlay I thought of Pacmania on an Archimedes. That's just a 3D version of Snapper, and while that's fast and colourful, Perplexity shows that good games can be produced on the Electron and 32 bits are only an advantage, not a necessity.

In Perplexity you wander around 16 screens collecting diamonds, some of which are visible while others are formed by pushing two boulders together. Collect all the jewels on one screen and you move on to the next.

It sounds easy, but accidentally pushing one rock against a wall could mean going back to the start. On several occasions I wished I'd had a pull option as well as the push one! To add to your problems, a few monsters are lurking around.

Most of the boulders form diamonds when pushed against another but some, identified with a question mark, are mystery ones and form one of four other objects. They are positioned at different places in each game, so even if you know a particular screen well, you could still run into trouble.

While you must collect all the diamonds to complete a level it's up to you whether you collect the mystery objects which are created. Three of the four are useful but the other should, wherever possible, be avoided.

One certainly worth collecting is an hour glass which gives you extra time. With only 500 seconds to complete each screen, this is a welcome bonus.

Extra lives – always useful – can be obtained by collecting four bottles of the magic potion which are sometimes formed when the mystery boulders touch.

Don't collect the key swap object unless it's blocking your way and you have no option. Sometimes they swap the actions of

all four keys, at other times they only swap two.

If you're forced to collect one you can look for another and, if you're lucky, it may reverse the original swap. I found that in the majority of cases all four directions were changed, so this method often, but not always, worked.

However, once one is collected, you may be doomed to pressing the right key for left and the left key for right. In this situation it's very easy to accidentally push a key or boulder against a wall.

The final mystery object is a 500 point bonus – always useful and produces a satisfying ping as it is collected. As well as the boulders, mystery boulders and monsters scattered around the maze you'll find a few other items.

Some of the passages are locked and you'll find keys scattered in the maze. Only ones facing the correct way will open a lock, so find it and push it round.

Once it touches the lock the way will be cleared and you can proceed. There are only enough keys for the number of locks, so careful thinking about how to get the locks to the keys is essential.

If you block a key you may as well give up on a screen or use the remaining time to explore the maze and think of a strategy ready for your next game.

As well as coloured boulders there are also black ones. They are just obstacles and can be pushed out of the way, but be careful not to push any into a position that will block you later.

Only the lower portion of the screen is used for the game, the top being used by the program as a workspace. The graphics are good and flicker free.

On the right hand side of the screen a lot of useful information is displayed, probably the most important being a scanner map which is constantly updating.

This shows your position in the maze together with all the diamonds and green boulders. Unfortunately it doesn't show things like the black boulders, lock, keys or monsters. Nevertheless, it's very useful.

Also displayed are the number of diamonds and boulders, but I didn't find any use for this information because, once the number is low enough to concern you, you can clearly see the number and position of the few remanining on the scanner.

Of more use is the time – 500 seconds seems a fair old ration, but as you near the end of a screen they seem to tick away rather quickly.

The number of bottles of magic potion you've collected is also displayed and, once you have collected four, it shows zero again and your number of lives – also noted on the screen – will be increased by one.

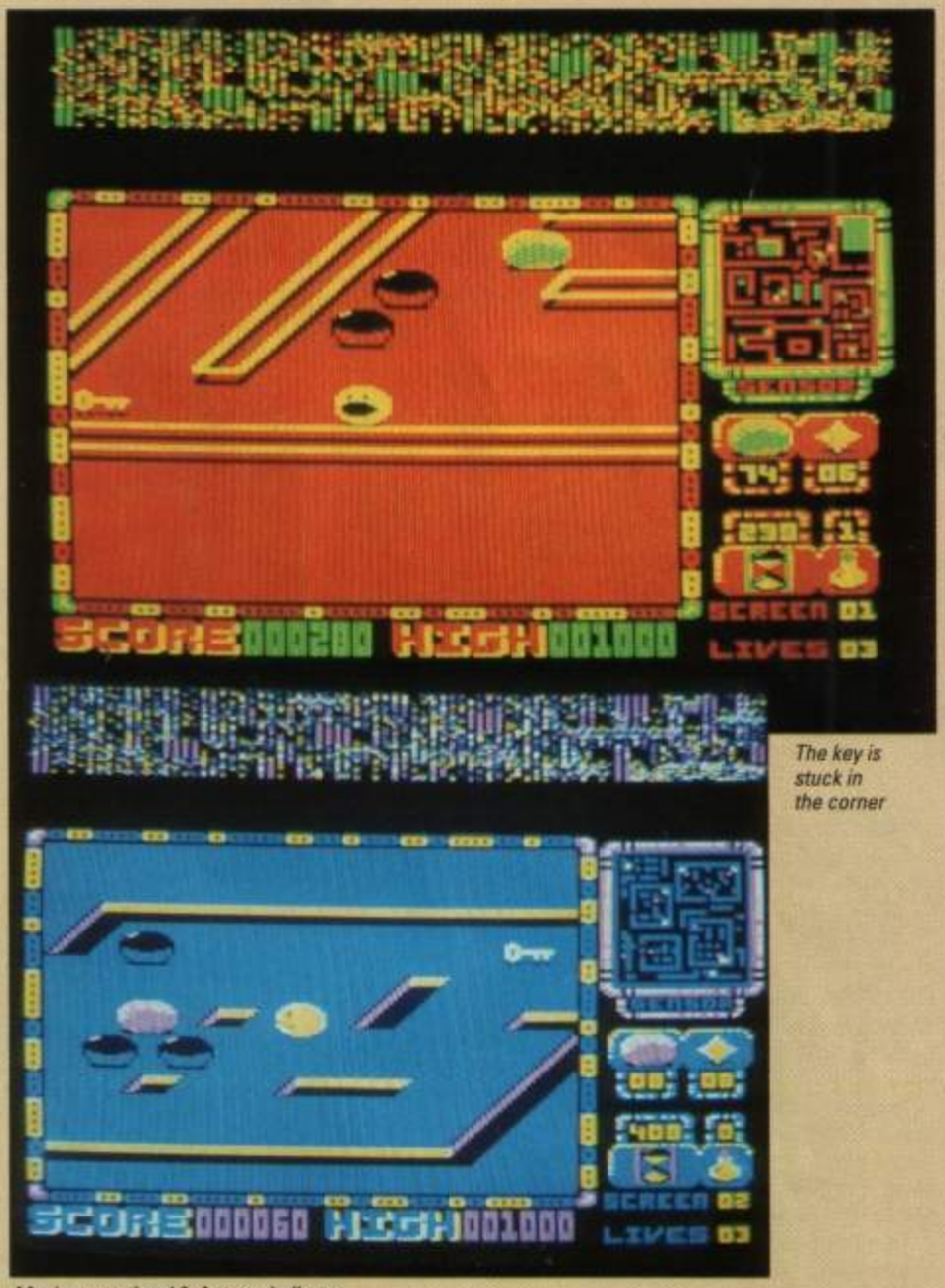
Perplexity is a superb game and will keep you glued to your keyboard for hours.

There's only one real let-down – the sound. While it's adequate, it's nothing like as good as other games have shown the micro to be capable of.

It's good to see Superior still supporting the Electron market, especially with games of this quality.

Louise Colinson

Sound	*6*
Graphics	*10*
Playability	*10*
Value for money	*9*
Overall	*9*



The key is stuck in the corner

Moving on to level 2: A new challenge

Second Opinion

Perplexity is compulsive fun at its best. The first few screens alone are enough to keep you going for hours – the 16 will keep you going for weeks.

The password system lets you practise the levels individually, but the object is to start on the first and work your way right through to the sixteenth. In an adventure where one false move can spell disaster – quite a challenge.

It's not a budget game, but well worth every penny.

Peter Davidson

IT'S MAGIC – abracadabra!

Product: It's Magic
Price: £2.99 (tape) mail order only
Supplier: Central Computing,
61 Beech Road, Gillway, Tamworth,
Staffs ST9 8QQ.

IT'S MAGIC, designed for the BBC Micro but working on an Electron with Slogger 64k ram board, is a two-part text adventure set 200 years in the future.

A career as a showbiz personality or pop singer no longer appeals to school-leavers – they see a more attractive future as magicians. But ones more akin to the legendary Merlin than Paul Daniels.

To accomplish this they must join the International Union of Magicians. However, the Union doesn't want a sudden influx of semi-skilled members, so it decided that all prospective candidates would have to earn their nomination by learning the 14 basic spells.

This put them on the short-list. The handful of successful candidates would be announced at the annual banquet, and only those present would be admitted to the elite band of magicians.

The first part starts at the school gates where you are assaulted by the leader of the Mob. You are told you must return later to participate in the ritual book-burning ceremony or the Mob will ensure that you never get to the Magicians' Ball.

Your first task is to find your schoolbooks and return for the bonfire so that the Mob won't bother you again, leaving you free to search for spell plaques hidden around a town that boasts a shopping centre, library, police station, wax museum, bad housing and a park.

Provided you remembered to examine the books you will be on the first rung of the ladder. Your next task is to enlist the help of your girlfriend Diane, who wears a Just Seventeen T shirt, which is a lie 'cos she's only 16.

Now you're ready to do your bit for nature conservation, with just rewards, as Woody will save you several times if necessary. But make too many silly mistakes and he won't bother.

The spells are in capital letters on plaques and to learn them you must read the plaque. The names of each spell is self-explanatory – for example bounce allows you to jump higher and alien changes you or something into something else.

The emphasis in part one is on learning the spells, the easier ones being used to discover the more elusive ones. At first you may have to use trial and error tactics.

I thoughtlessly cast grav without a roof over my head and soon discovered that aliens can't read plaques – at least in the beginning.

Part two begins with you dreaming about Universal Magic. Poor Woody got the chop, but Diane is still with you. As you are no longer a novice your spells are more effective, allowing you to cast while an alien. Unlike the first section, problems must now be solved in a precise order.

The map can be split into three sections: Up to the wood, the brick building complex and, the countryside and banquet hall. It's easy to find a quick way back to the brick building, but a slightly less obvious method of returning to the asylum.

The loading screen for part one could damage your eyesight, but part two has an animated picture of a wizard. Pressing the spacebar a few times sends him into manic mode. The programming is very user friendly and inputs such as Ask Diane for help are understood, as are multiple commands separated by a full stop or comma.

Perhaps the most useful command to begin each part are words which give a list of verbs used.

Don't despair if this isn't enough as a very comprehensive help sheet is available if you send an sae to Central Computing. In part one Status reminds you which spells you know and can cast safely, as well as any that are active.

Part two replaces this with an indication of whether the location is inside or outside. Most adventurers are familiar with the save and load to tape facility, but not so recognisable are the store and recall commands.

They're rare on the Electron and BBC Micro, but commonplace on other micros and allow you to save your current position, giving instant recall. It's amazing how audacious this makes your adventuring.

It's Magic has taken more than three years to write on a BBC Micro using the machine's built-in assembler – which is identical to the Electron's.

Simon Maren has written an absorbing adventure about enterprising youth. Stubbornly refusing to be conformist, his storyline and quirky puzzles are refreshingly original, often with a sideways swipe at more conventional adventures.

Barbara Gibb

Presentation	*6*
Atmosphere	*9*
Graphics	*n/a*
Value for money	*8*
Overall	*9*

Second Opinion

This one is well worth a try. The two parts give you a chance to practise on an easier level, and well thought out puzzles will tax the old grey matter and give you hours of fun.

Mark Reed

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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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Every aspect of machine-code programming is covered in this book in a friendly, readable style, and there's also a comprehensive index. If you want to get more out of your micro, but thought machine code was indecipherable, this is the book for you. *Save £3 off the recommended retail price.*

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Square up to the battle

Martin Sann presents a two player game that will improve your mental arithmetic and powers of logic

IN this fascinating and addictive program designed to improve your arithmetic and ability to plan ahead, you place numbers in a four by four square. The aim in Addenda is to complete a line of four numbers which add up to a specified target number.

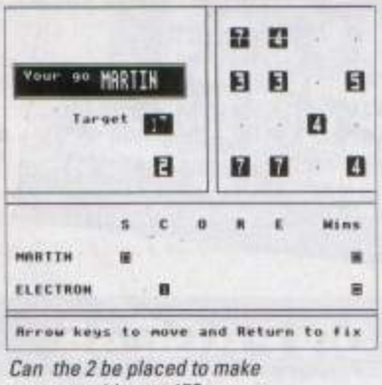
A target number is displayed on the screen and a die is rolled which should be placed in one of the 16 positions by moving the square cursor with the arrow keys. Fix your number using Return.

When a few numbers have been placed in the grid you can start planning ahead by calculating what number is required to make a row or column add up to the target number. You gain a point for each successful line, which can be horizontal, vertical or diagonal. More then one line can be completed simultaneously for extra points. The winner of the game is the first to complete four lines.

If all the grid positions become filled they are cleared and a new target is selected by the Electron.

At the start of the game you can choose the target from three levels of play. The micro will pick a number at random from within the range you select.

The program is in two parts. Enter the first and save it to tape or disc with the filename ADDEND, then enter the second and save it with the filename ADDEND1. To run the program CHAIN"ADDEND".



Can the 2 be placed to make any row add up to 17?

Listing I

```
  10 REM ADDEND
  20 REM by Martin Sann
  30 REM (c) Electron User
  40 MODE 6 :VDU 23;8202;0;0;0;
  50 p$=STRING$(39,"-")
  60 PROCname:PROCinit
  70 $&38D=p1$:$&38A=p2$
  80 CHAIN"addend1"
  90 END
 100 DEFPROCname
 110 PRINTTAB(0,0)p$
 120 FOR R%=0TO1
 130 PRINTTAB(11,R%+1)"A  D  D
E  N  D  A"
 140 NEXT R%
 150 PRINTTAB(13,3)"FOR TWO PLAY
ERS"
 160 PRINTTAB(0,4)p$
 170 PRINTTAB(0,20)p$
 180 PRINTTAB(2,21)"Type in the
name of the "
 190 PRINTTAB(10,22)"and then pr
ess Return"
 200 PRINTTAB(0,23)p$;
 210 p1$=FNin("FIRST player")
 220 p2$=FNin("SECOND player")
 230 ENDPROC
 240 DEF FNin(m$)
 250 LOCAL a$,i$,g%,l%
 260 VDU 23,255,255,255,255,255,
255,255,255,255
 270 PRINTTAB(16,16)STRING$(8,CH
R$255)
 280 PRINTTAB(26,21)m$
 290 REPEAT
 300 REPEAT g%=GET:a$=CHR$g%:l%=
LEN i$
 310 IF l%=0 AND g%=13:VDU7:GOTO
290
 320 UNTIL g%=13 OR g%=127 OR (g
%>64 AND g%<91)
 330 IF g%=13 OR g%=127 ELSE IF
l%=8 ELSE i$=i$+a$
 340 PRINTTAB(16,16)i$
 350 PROCs
 360 IF g%=127 IF i$>"" PRINTTAB
(15+l%,16)CHR$255:i$=LEFT$(i$,l%-
1)
 370 UNTIL g%=13 AND l%>0
 380 =i$
 390 DEFPROCs
 400 SOUND1,-10,180,2
 410 ENDPROC
 420 DEFPROCinit
 430 ?&368=&13
 440 VDU23,48,255,129,189,189,18
9,189,129,255
 450 VDU23,49,255,247,231,247,24
7,247,227,255
 460 VDU23,50,255,129,253,129,19
1,191,129,255
 470 VDU23,51,255,129,253,225,25
3,253,129,255
 480 VDU23,52,255,251,243,235,21
9,129,251,255
 490 VDU23,53,255,129,191,129,25
3,253,129,255
 500 VDU23,54,255,129,191,129,18
9,189,129,255
 510 VDU23,55,255,129,251,247,23
9,239,239,255
 520 VDU23,56,255,129,189,129,18
9,189,129,255
 530 VDU23,57,255,129,189,129,25
3,253,129,255
 540 VDU23,224,0,0,0,0,8,0,0,0
 550 VDU23,225,15,15,15,15,15,15
,15,15
 560 VDU23,226,240,240,240,240,2
40,240,240,240
 570 VDU23,227,0,0,0,31,31,0,0,0
 580 VDU23,228,32,48,56,252,252,
56,48,32
 590 VDU23,229,0,126,126,126,126
,126,126,0
 600 ENDPROC
```

Listing II

```
  10 REM ADDEND1
  20 REM by Martin Sann
  30 REM (c) Electron User
  40 MODE1:VDU23;8202;0;0;0;
  50 ENVELOPE1,20,16,-16,0,8,1,2
0,-128,0,0,-10,128,128
  60 *FX4 1
  70 *FX11 0
  80 *FX12 20
  90 :
 100 DIM sq%(16)
 110 p1$=$&38D:p2$=$&38A
 120 cl$=STRING$(8," "):Y$="Numb
er"
 130 go$="Your go":S$="0"
 140 res$=" "+CHR$224+"   "+CHR$
224+"   "+CHR$224+"   "+CHR$224+"
"
 150 w1=0:w2=0
 160 :
 170 go=1:sc1=0:sc2=0
 180 PROClevel:PROCset:PROCtarg
 190 PROCscreen:VDU19,0,0;0;19,7
,6;0;
 200 REPEAT:IF go MOD2=0 name$=p
1$ ELSE name$=p2$
 210 ?&D3=255:PROCd(name$+STRING
$(8-LENname$," "),11,6):?&D3=0
 220 PROCselect:PROCmove:PROCche
ck
 230 go=go+1:UNTIL sc1=4 OR sc2=
4
 240 IF sc1=4 w1=w1+1 ELSE w2=w2
+1
 250 PRINTTAB(37,23)STR$w1
 260 PRINTTAB(37,26)STR$w2
 270 FOR n%=0TO17:PRINTTAB(0,n%)
STRING$(40," "):NEXT n%
 280 PRINTTAB(2,30)"Do you want
to play again.....(Y/N)?"
 290 REPEAT:G$=GET$:UNTIL INSTR(
"YN",G$)
 300 IF G$="Y" CLG:GOTO170
 310 END
 320 :
 330 DEFPROClevel
 340 GCOL1,3:pl%=5
 350 PROCframe(0,0,1279,1023)
 360 PROCd("Please choose the ta
rget range",5,12):PROCd("press",1
8,15)
 370 PRINTTAB(12,19)"1  for  10
- 15"
 380 PRINTTAB(12,22)"2  for  16
- 22"
 390 PRINTTAB(12,25)"3  for  23
- 30"
 400 REPEAT:level=GET-48:UNTIL l
evel>0 AND level<4:CLS
 410 ENDPROC
 420 :
 430 DEFPROCset
 440 FOR N%=1TO16:sq%(N%)=0:NEXT
 N%
 450 ENDPROC
 460 :
 470 DEFPROCtarg
 480 IF level=1 targ=9+RND(6)
 490 IF level=2 targ=15+RND(7)
 500 IF level=3 targ=22+RND(8)
 510 targ$=STR$(targ)
 520 COLOUR3:PROCd(CHR$225+targ$
+CHR$226,17-LENtarg$,10)
 530 ENDPROC
 540 :
 550 DEFPROCscreen
```

```
  560 GCOL0,3:pl%=5
  570 PROCframe(0,464,704,1023)
  580 PROCframe(736,464,1279,1023
)
  590 PROCframe(0,114,1279,432)
  600 PROCframe(0,0,1279,96)
  610 pl%=85:MOVE64,748
  620 PROCframe(64,748,632,848)
  630 pl%=5:GCOL0,0
  640 PROCframe(68,752,628,844)
  650 PROCdots:PROCscore:PROCinfo
  660 ?&D3=255:PRINTTAB(3,6)go$:?
&D3=0
  670 ENDPROC
  680 :
  690 DEFPROCdots
  700 FOR row=0TO3:FOR col=0TO3
  710 PROCd(" "+CHR$224+" ",24+ro
w*4,2+col*4):NEXT col:NEXT row
  720 ENDPROC
  730 :
  740 DEFPROCscore
  750 PRINTTAB(13,20)"S   C   O
R   E"
  760 PRINTTAB(34,20)"Wins"
  770 PRINTTAB(37,23)STR$w1
  780 PRINTTAB(37,26)STR$w2
  790 COLOUR2
  800 PRINTTAB(2,23)p1$:PRINTTAB(
2,26)p2$
  810 COLOUR3
  820 PRINTTAB(13,23)S$:PRINTTAB(
13,26)S$
  830 ENDPROC
  840 :
  850 DEFPROCinfo
  860 COLOUR2:PRINTTAB(8,10)"Targ
et"
  870 PRINTTAB(2,30)"Arrow keys t
o move and Return to fix":COLOUR3
  880 ENDPROC
  890 :
  900 DEFPROCselect
  910 *FX15,0
  920 PROCfull:PRINTTAB(8,14)cl$
  930 s%=0:N%=0:COLOUR1
  940 REPEAT:N%=N%+1
  950 IF level=1 s%=RND(5)
  960 IF level=2 s%=1+RND(6)
  970 IF level=3 s%=3+RND(6)
  980 SOUND0,-5,1,1:SOUND0,-10,s%
MOD3,1
  990 PROCd(CHR$225+STR$s%+CHR$22
6,16,14)
 1000 UNTIL N%>20
 1010 COLOUR2:PRINTTAB(8,14)Y$
 1020 ENDPROC
 1030 :
 1040 DEFPROCmove
 1050 x=768:y=494:pl%=21:GCOL0,3
 1060 PROCframe(x,y,x+96,y+96)
 1070 p=768:q=494
 1080 REPEAT:G=GET
 1090 IF G=136 x=x-128:IF x<768 x
=768
 1100 IF G=137 x=x+128:IF x>1152
x=1152
 1110 IF G=138 y=y-128:IF y<494 y
=494
 1120 IF G=139 y=y+128:IF y>880 y
=880
 1130 PROCbox:UNTIL G=13:PROCocc
 1140 IF occ=1 GOTO1050
 1150 SOUND1,-10,140+s%*8,4
 1160 COLOUR1:PROCd(CHR$225+N$+CH
R$226,x/32,30-y/32):COLOUR3:sq%(Q
%)=s%
 1170 ENDPROC
 1180 :
 1190 DEFPROCbox
 1200 N$=STR$s%
 1210 GCOL0,0:PROCframe(p,q,p+96,
q+96)
 1220 GCOL0,3:PROCframe(x,y,x+96,
y+96)
 1230 p=x:q=y
 1240 ENDPROC
 1250 :
 1260 DEFPROCocc
 1270 COLOUR2:occ=0
 1280 N%=(x-768)/128:M%=4*(880-y)
/128
 1290 Q%=N%+M%+1
 1300 IF sq%(Q%)<>0 occ=1:VDU7:PR
INTTAB(8,14)"Full up":PROCwait(3)
:PRINTTAB(8,14)cl$:PRINTTAB(8,14)
Y$
 1310 GCOL0,0:PROCframe(x,y,x+96,
y+96)
 1320 ENDPROC
 1330 :
 1340 DEFPROCframe(Xo,Yo,X,Y)
 1350 MOVEXo,Yo:PLOTpl%,X,Yo:PLOT
pl%,X,Y:PLOTpl%,Xo,Y:PLOTpl%,Xo,Y
o
 1360 ENDPROC
 1370 :
 1380 DEFPROCd(A$,x,y)
 1390 X%=0:Y%=13:A%=10:D%=&D00
 1400 C$=CHR$240+CHR$8+CHR$10+CHR
$241
 1410 M%=0:REPEAT:M%=M%+1
 1420 B$=MID$(A$,M%,1):?D%=ASC(B$
):CALL&FFF1
 1430 VDU23,240,D%?1,D%?1,D%?2,D%
?2,D%?3,D%?3,D%?4,D%?4
 1440 VDU23,241,D%?5,D%?5,D%?6,D%
?6,D%?7,D%?7,D%?8,D%?8
 1450 PRINTTAB(x+M%-1,y)C$
 1460 UNTIL M%=LENA$
 1470 ENDPROC
 1480 :
 1490 DEFPROCwait(D)
 1500 FOR time=1TO300*D:NEXT
 1510 ENDPROC
 1520 :
 1530 DEFPROCcheck
 1540 h=0:v=0:d1=0:d2=0
 1550 PROCh(Q%):PROCv(Q%):PROCd1:
PROCd2
 1560 PROCclear
 1570 ENDPROC
 1580 :
 1590 DEFPROCfull
 1600 N%=1:S2%=0:full=1:REPEAT
 1610 S1%=sq%(N%):S2%=S2%+S1%:S3%
=S2%+S1%
 1620 IF S2%=S3% full=0
 1630 N%=N%+1:UNTIL N%=17
 1640 IF full=1 PROCset:PROCdots:
PROCtarg
 1650 ENDPROC
 1660 :
 1670 DEFPROCh(h%)
 1680 H%=4*((h%-1) DIV4)+1
 1690 SH%=sq%(H%)+sq%(H%+1)+sq%(H
%+2)+sq%(H%+3)
 1700 IF SH%=targ AND sq%(H%)<>0
AND sq%(H%+1)<>0 AND sq%(H%+2)<>0
 AND sq%(H%+3)<>0 h=1
 1710 ENDPROC
 1720 :
 1730 DEFPROCv(v%)
 1740 V%=v% MOD4:IF V%=0 V%=4
 1750 SV%=sq%(V%)+sq%(V%+4)+sq%(V
%+8)+sq%(V%+12)
 1760 IF SV%=targ AND sq%(V%)<>0
AND sq%(V%+4)<>0 AND sq%(V%+8)<>0
 AND sq%(V%+12)<>0 v=1
 1770 ENDPROC
 1780 :
 1790 DEFPROCd1
 1800 SD1%=sq%(1)+sq%(6)+sq%(11)+
sq%(16)
 1810 IF SD1%=targ AND sq%(1)<>0
AND sq%(6)<>0 AND sq%(11)<>0 AND
sq%(16)<>0 d1=1
 1820 ENDPROC
 1830 :
 1840 DEFPROCd2
 1850 SD2%=sq%(4)+sq%(7)+sq%(10)+
sq%(13)
 1860 IF SD2%=targ AND sq%(4)<>0
AND sq%(7)<>0 AND sq%(10)<>0 AND
sq%(13)<>0 d2=1
 1870 ENDPROC
 1880 :
 1890 DEFPROCclear
 1900 IF h=1 PROCclearH
 1910 IF v=1 PROCclearV
 1920 IF d1=1 PROCcleard1
 1930 IF d2=1 PROCcleard2
 1940 IF h=1 PROCresetH
 1950 IF v=1 PROCresetV
 1960 IF d1=1 PROCresetd1
 1970 IF d2=1 PROCresetd2
 1980 ENDPROC
 1990 :
 2000 DEFPROCclearH
 2010 PROCd(res$,24,H%+1):PROCinc
score
 2020 ENDPROC
 2030 :
 2040 DEFPROCresetH
 2050 FOR N%=0TO3:sq%(H%+N%)=0:NE
XT
 2060 ENDPROC
 2070 :
 2080 DEFPROCclearV
 2090 FOR N%=0TO3:PROCd(" "+CHR$2
24+" ",20+V%*4,2+N%*4):NEXT N%:PR
OCincscore
 2100 ENDPROC
 2110 :
 2120 DEFPROCresetV
 2130 FOR N%=0TO3:sq%(V%+N%*4)=0:
NEXT
 2140 ENDPROC
 2150 :
 2160 DEFPROCcleard1
 2170 FOR N%=0TO3:PROCd(" "+CHR$2
24+" ",24+N%*4,2+N%*4):NEXT N%:PR
OCincscore
 2180 ENDPROC
 2190 :
 2200 DEFPROCresetd1
 2210 FOR N%=0TO3:sq%(N%*5+1)=0:N
EXT
 2220 ENDPROC
 2230 :
 2240 DEFPROCcleard2
 2250 FOR N%=0TO3:PROCd(" "+CHR$2
24+" ",36-N%*4,2+N%*4):NEXT N%:PR
OCincscore
 2260 ENDPROC
 2270 :
 2280 DEFPROCresetd2
 2290 FOR N%=0TO3:sq%(N%*3+4)=0:N
EXT
 2300 ENDPROC
 2310 :
 2320 DEFPROCincscore
 2330 IF go MOD2=0 PROCinc1 ELSE
PROCinc2
 2340 SOUND1,1,20,4:PROCwait(4)
 2350 ENDPROC
 2360 :
 2370 DEFPROCinc1
 2380 PRINTTAB(13+sc1*4,23)CHR$22
4
 2390 sc1=sc1+1:IF sc1>4 sc1=4
 2400 PRINTTAB(13+sc1*4,23)STR$sc
1
 2410 ENDPROC
 2420 :
 2430 DEFPROCinc2
 2440 PRINTTAB(13+sc2*4,26)CHR$22
4
 2450 sc2=sc2+1:IF sc2>4 sc2=4
 2460 PRINTTAB(13+sc2*4,26)STR$sc
2
 2470 ENDPROC
```

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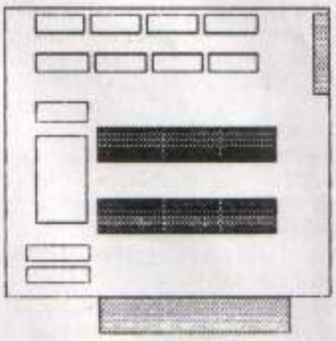
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TIME WARP 1984

Barry Woods takes a trip back to 1984, just after the launch of the Electron

LET us cast our minds back to April 1984, to the early beginnings of the Acorn Electron and, of course, *Electron User*. The front cover of Volume one Number seven proudly displayed the Micro Kid on a bright and cheerful cartoon background. In those early days the magazine was aimed squarely at the younger micro user with features like Pelican Crossing, Bunny Blitz and Dog, Duck and Grain.

The news pages made pretty grim reading with a lead story revealing Acorn's production problems. With sales of its recently launched Baby Beeb rapidly soaring Acorn simply found it impossible to match demand with production.

Long waiting lists formed and I remember religiously fighting my way through the Saturday morning shopping crowds in order to find out whether W.H. Smith had received any of the many Electrons it had on order.

Acorn announced that the Malaysian factory couldn't produce anywhere near the number of Electrons demanded and so a new production line was to be set up in Wales. Around 4,000 Electrons per week were being turned out and if you multiply this by 52 it means a staggering 208,000 computers per year were being produced, and still Acorn couldn't keep up with demand.

The problems caused by the the shortage of micros were compounded by an unusually high failure rate. Dealers reported that between eight and 25 per cent of micros had to be returned because of faults. However, some of *Electron User*'s micros were bought around this period and are still running tody, so perhaps these reports were slightly exagerated.

Starting in the April 1984 issue was Merlin's adventure series, little did he realise just how popular it was to become. In fact, it still runs today, six years later, though it was taken over some time ago by an equally able adventure wizard, Pendragon.

Sounds Exciting was one of the most popular features from those early *Electron User* days and four sound effects based on common telephone tones are reproduced here.

A number of exciting new hardware add-ons were either launched or announced six years ago this month. Among them was First Byte with its clever switched joystick interface enabling the Electron to be used with Atari-style joysticks. Signpoint was also marketing a joystick port and printer port. Likewise, Sir Computers had a joystick and printer interface board on offer.

As we now know these add-ons were later pushed out of the market by Acorn's multi-function Plus 1, but at the time they were revolutionary and amazing products. In addition, Sir Computers also had a 12-rom add-on board providing 192k of rom expansion space and promised an input/output port and RS423 soon. Sadly, although Sir Computers was first to release many exciting add-ons, it was one of the first companies to disappear.

On the software scene a number of educational programs were enjoying unexpectedly high sales with the Electron, following closely in the footsteps of its big brother, the BBC Micro, in its wide use in education. For the gamester, Cybertron Mission headed the bill in Software Surgery, the regular survey of the games market. Other highly rated games were Castle Frankenstein, Croaker, Caterpillar and Kamikasi.

● *That just wraps it up for this month in 1984. I hope my brief excursion has jogged a few pleasant memories of "the good old days". I'll now set my time machine's controls for May 1985. See you next month!*

LIKE GREASED LIGHT

Robert Charlton's hints and tips will help put extra zip into your machine code programs

THERE are probably quite a few programmers who, like me, have spent a long time writing a complicated assembly language routine to zip their aliens around the screen at dizzy speeds, only to find when they run it that the aliens don't have quite as much zip as they might like. This article will help put fizz in their tails.

It is well worth searching your local library for an Electron book on assembly language programming. If you are in luck, it should have a chart in the back labelled something like Instruction Cycle Times. (The Advanced User Guide for the BBC Micro also lists instruction timings).

This information tells you how long each of the machine code instructions takes to execute. Table I lists a few common instructions and each cycle represents one tick of the micro's internal clock, which, in real terms, takes about 0.0000005 seconds.

You might be wondering why anyone would want to speed up machine code at all when the slowest instruction takes just seven cycles, or 0.0000035 seconds to execute.

Suppose I was writing a game. Every time the screen was updated two 17 by 17 windows had to be redrawn. Each of the individual blocks of these consisted of eight bytes which had to be transferred to the screen.

Cutting down the time taken in the main loop by just one cycle would save 0.002 seconds. Not much, but then consider the fact that to stop flicker, the screen has to be refreshed faster than 1/25 of a second or 0.4 seconds. It could then make the difference between a good game and a jerky mess.

You must remember though that, as with speeding up Basic programs, speeding up machine code ones will frequently lead to spaghetti-like listings. It is usually better to write a program and ensure it works before trying to speed it up.

How do you go about shaving the odd surplus cycle from a piece of machine code? Well, there are a number of different areas where improvements can be made. Firstly, always try to use zero page for storing variables

Zero page instructions take one cycle less to execute than ones which use the rest of memory.

Zero page is mapped out in the April 1988 issue of *Electron User*, which reveals the following free areas:

```
&4F - &9F
&A0 - &A7  If you aren't using discs
&A8 - &AF  If you aren't using star com
           mands
&E0 - &E1
&F5 - &F9
```

As long as you know what you are doing, you may be able to use other areas as well. Also, remember that if you use locations temporarily in separate parts of your program, you may be able to use the same zero page locations for other temporary variables.

Close inspection of the cycle times will reveal another way of saving time. The instructions JSR and RTS each take six cycles but JMP takes just three. This means that the following two lines:

```
JSR subroutine
RTS
```

could become:

```
JMP subroutine
```

This saves nine cycles with virtually no effort at all. You are just using the RTS at the end of the subroutine instead of putting another in your program.

If you have a series of subroutines called one after another, then if they are only called from one point, or if this is the only order in which they are called, the following code is normally used:

```
JSR subroutine1
JSR subroutine2
JSR subroutine3
    ...
    ...
.subroutine1
    ...
RTS
.subroutine2
    ...
RTS
.subroutine3
    ...
RTS
```

But this can be replaced with:

```
JMP subroutine1
.back
    ...
    ...
.subroutine1
JMP subroutine2
    ...
.subroutine2
JMP subroutine3
    ...
.subroutine3
JMP back
```

This represents a saving of 24 cycles,

Instruction	Cycles
LDA #number	2
LDA address	3
LDA address,X	4
STA zero-page	3
STA address	4
STA address,X	5
STA (address),Y	6
RTS	6
ROL address,X	7
JSR	6

Table I: Some common 6502 instructions and their timings

WING...

which could make all the difference to the main routine of a program. It is also a great way of creating a spaghetti listing, so it is best left until the end of program development.

And, if the subroutines fall together in your program you can also leave out the JMP to the next. This saves another three cycles for each one left out.

Another area where savings can often be made is in looping. I often find myself automatically writing routines which loop forwards, that is starting from one and counting upwards.

It is quicker however, if you can design your routine to work in the same way when counting backwards.

This may seem a bit odd but look at the following code:

```
        LDY #0
.loop   ..
        ..
        ..
        INY
        CPY #7
        BNE loop
```

This could easily be changed:

```
        LDY #7
.loop   ..
        ..
        ..
        DEY
        BNE loop
```

Both of these examples do exactly the same job but just by counting backwards you can cut out a whole instruction.

Of course, this is no use if your routine only works forwards.

Another area that can often be speeded up is arithmetic. Frequently you will have to add a value to a two byte number, such as altering the address your well-designed Pac Man is drawn at.

The best way of doing this varies according to what value is being added. The standard method for adding a two byte number to another two byte number is:

```
CLC
LAD lobyte
ADC #number MOD 256
STA lobyte
LDA hibyte
ADC #number DIV 256
STA hibyte
```

The same principles apply when subtracting numbers as well.

If you are adding a value of 255 or less this chunk of code can be changed to:

```
CLC
LDA lobyte
ADC #number
BCC skip
INC hibyte
.skip
```

This skips the second byte of the number if no carry occurs. If there is a carry, the quickest way of adding one is with INC, instead of LDA, ADC, STA. And if you are simply adding one, then there is an even quicker alternative:

```
CLC
INC lobyte
BCC skip
INC hibyte
.skip
```

These methods can make a dramatic difference to a program's performance.

If your program doesn't use any sound, the clock, or the keyboard in a particular section, then surrounding that section with SEI ... CLI will make a huge difference. These instructions turn off interrupts which cause the Electron to leave your program at regular intervals to carry out some other housekeeping tasks, like dealing with a keypress.

If your program uses sound elsewhere this may be affected, because they normally continue for much longer than the instructions that make them take to execute.

You can use the keyboard within these instructions if you use the routine by Michael Jacobson in the August 1986 issue of *Electron User*, which read the keyboard directly.

Finally, there are nearly always illegal ways of speeding things up. This does not mean you can get arrested for using them, just that your program may not work on other machines.

This was particularly true of the BBC Micro which had a number of different versions of the operating system.

However, the Electron hasn't undergone any changes since it was introduced.

One such illegal method is as follows – if you use operating system routines such as oswrch (&FFEE) or osword (&FFF1) then you can include these lines at the start of your program:

```
oswrch = !&20E AND &FFFF
osword = !&20C AND &FFFF
```

Then, in your assembly language, you can use JSR *osword* instead of JSR &FFF1 and JSR *oswrch* instead of JSR &FFEE. This saves time because normally when you call one of these routines it reads another address in and then jumps to this new address.

The lines above read this new address, thus cutting out a jump. Remember that as long as you assemble you code on all the computers it is used on, you shouldn't have any problems.

I hope you find these techniques as useful as I have. Some may be frowned upon by structured programmers, but unfortunately structure doesn't always lead to the best possible speed.

Probably the best approach is to write your program in a structured way – well documented so that it can later be speeded up . Remember, finding errors in a spaghetti listing can be a nightmare.

But a few cycles difference can often make or break a computer game where speed is of the essence. So, it's worth breaking a few of the rules.

Pack 'em in with a graphics cruncher

Robert Henderson provides a trio of compaction routines

WHEN the Electron was launched way back in 1983 it was thought that 32k of ram was ample memory for any programming or business requirements. Now, however, it seems miniscule by comparison with megabyte monsters like the Archimedes, the ST and Amiga.

The Electron programmer must therefore make his programs and graphics as compact as possible, as space is at a premium. With the size of games and art programs growing all the time compaction techniques have taken on a critical role.

Here are three alternative methods of squeezing full screens into as little memory space as possible. The method used for Program I is restricted to displays which use only text and user defined characters.

It implements a machine code routine to read the Ascii code of each character on a Mode 4 screen, which are then stored in memory. The bit mapped Mode 4 screen is 10,240 bytes long, but only requires 1,240 bytes when stored as Ascii characters – quite a saving in space. To regenerate the screen all you have to do is print the Ascii characters.

Program II can be used to compress and expand cartoon-style graphic screens and simple pictures. What happens is that every second byte is read from the screen and saved in a 5k block of memory.

When the screen is redrawn each of the bytes in the block is printed twice, resulting in an expanded screen. This technique works well with some pictures, but fails miserably with others – it all depends on the complexity of the image being compressed.

The second part of the demonstration shows how half a screen – 5k long – can be expanded to fill the whole screen. It works rather like a magnify function.

The final compaction routine, used in Program III, uses the traditional byte and counter method. This takes a byte from the screen and then counts how many identical ones follow it. The byte and count and then saved.

The next different byte is taken, and the number of identical ones following is counted and so on. Using this method, even quite complex screens can be squashed do to 60 or 70 per cent of their original size.

That is by no means the complete story as far as compaction goes, but the routines shown here should give you food for thought.

Program I

```
10 REM VDU Compression
20 REM By R.Henderson
30 REM (c) Electron User
40 MODE 4
50 PROCassemble
60 PROCimage
70 ?&74=40
80 ?&75=32
90 CALL compress
100 G=GET
110 CLS
120 CALL decomp
130 ?&D0=0
140 VDU 28,8,23,32,8
150 ?&35F=10
160 REM Normal cursor
170 CLS
180 END
190
200 DEF PROCassemble
210 FORi%=0TO2 STEP2
220 P%=&900
230 [ OPT i%
240 .compress
250 \ Read VDU codes and save in a
260 \ convienient area of memory
270 LDA #0
280 STA &72
290 STA &73
300 STA &70
310 LDA #&30
320 STA &71
330 LDY #0
340 .loop
350 LDA #31
360 JSR &FFEE
370 LDA &72
380 JSR &FFEE
390 LDA &73
400 JSR &FFEE
410 LDA #135
420 JSR &FFF4
430 TXA
440 LDY #0
450 STA (&70),Y
460 INC &72
470 INC &70
480 LDA &70
490 CMP #0
500 BEQ dat
510 .cont
520 LDA &72
530 CMP &74
540 BNE loop
550 LDA #0
560 STA &72
570 INC &73
580 LDA &73
590 CMP &75
600 BNE loop
610 RTS
620 .dat
630 INC &71
640 JMP cont
650 \ Reconstruct
660 \ from VDU codes
670 .decomp
680 LDA #0
690 STA &70
700 LDA #&30
710 STA &71
720 LDA #31
730 JSR &FFEE
740 LDA #0
750 JSR &FFEE
760 JSR &FFEE
770 LDY #0
780 LDA &74
790 STA &72
800 LDA &75
810 STA &73
820 LDY #0
830 .loop2
840 LDA (&70),Y
850 JSR &FFEE
860 DEC &72
870 LDA &72
880 BEQ set2
890 .ret
900 INY
910 BNE loop2
920 INC &71
930 LDA &73
940 BNE loop2
950 .rts RTS
960 .set2
970 LDA #40
980 STA &72
990 DEC &73
1000 BEQ rts
1010 JMP ret
1020 ]
1030 NEXT
1040 ENDPROC
1050
1060 DEFPROCimage
1070 VDU 23,1,2;0;0;0;0;
1080 ?&D0=2
1090 REM Static cursor / no scro
lling
1100 FORX=1TO 32
1110 PRINT "This is an example o
f the VDU compressor";
1120 NEXT
1130 ENDPROC
```

Program II

```
10 REM Scanline Compression
20 REM and double height
30 REM By R.Henderson
40 REM (c) Electron User
50 FOR i%=0 TO 2 STEP 2
60 P%=&900
70 [ OPT i%
80 \ Scrunch the image down
90 \ to around half size...
100 .comp LDA #0
110 STA &70
120 STA &72
130 LDA #&58
140 STA &71
150 LDA #&30
160 STA &73
170 LDY #0
180 .loop
190 LDA (&70),Y
200 STA (&72),Y
210 INC &72
220 LDA &72
230 BEQ out1
240 .middle
250 INC &70
260 INC &70
270 BNE loop
280 INC &71
290 LDA &71
300 CMP #&80
310 BNE loop
320 RTS
330 .out1
```

```
340 INC &73
350 JMP middle
360 \ Redraw image
370 \ on the screen.
380 .decomp
390 LDY #0
400 LDA #&30
410 STA &71
420 LDA #&58
430 STA &73
440 LDA #0
450 STA &70
460 STA &72
470 .loop2
480 LDA (&70),Y
490 STA (&72),Y
500 INC &72
510 STA (&72),Y
520 INC &72
530 INC &70
540 LDA &70
550 BEQ out2
560 .continue
570 LDA &72
580 BNE loop2
590 INC &73
600 LDA &71
610 CMP #&44
620 BNE loop2
630 RTS
640 .out2
650 INC &71
660 JMP continue
670 \ Double the height of a
680 \ 5k chunk of screen...
690 .dblhsc
700 LDA #&28
710 STA &74
720 LDA #0
730 STA &70
740 STA &72
750 LDA #&58
760 STA &73
770 LDA #&30
780 STA &71
790 LDY #0
800 .st
810 LDX #4
820 .dbloop1
830 LDA (&70),Y
840 STA (&72),Y
850 INC &72
860 STA (&72),Y
870 INC &72
880 LDA &72
890 BEQ rt1
900 .bk1
910 INC &70
920 LDA &70
930 BEQ rt2
940 .bk2
950 DEX
960 BNE dbloop1
970 CLC
980 LDA &72
990 ADC #&38
1000 STA &72
1010 LDA &73
1020 ADC #1
1030 STA &73
1040 LDX #4
1050 .dbloop2
1060 LDA (&70),Y
1070 STA (&72),Y
1080 INC &72
1090 STA (&72),Y
1100 INC &72
1110 LDA &72
1120 BEQ rt3
1130 .bk3
1140 INC &70
1150 LDA &70
1160 BEQ rt4
1170 .bk4
1180 DEX
1190 BNE dbloop2
1200 SEC
1210 LDA &72
1220 SBC #&40
1230 STA &72
1240 LDA &73
1250 SBC #1
1260 STA &73
1270 DEC &74
1280 LDA &74
1290 BNE st
1300 CLC
1310 LDA &72
1320 ADC #&40
1330 STA &72
1340 LDA &73
1350 ADC #1
1360 STA &73
1370 LDA #&28
1380 STA &74
1390 LDA &73
1400 BPL st
1410 RTS
1420 .rt1
1430 INC &73:JMP bk1
1440 .rt2
1450 INC &71:JMP bk2
1460 .rt3
1470 INC &73:JMP bk3
1480 .rt4
1490 INC &71:JMP bk4
1500 ]
1510 NEXT
1520 MODE 5
1530 VDU 23,1,0;0;0;0;
1540 PROCdemo1
1550 CALL comp
1560 VDU 7 : G=GET : CLS
1570 CALL decomp
1580 G=GET : CLS
1590 PROCdemo2
1600 VDU 7: G=GET : CLS
1610 CALL dblhsc
1620 END
1630
1640 DEF PROCdemo2
1650 no%=&55AA
1660 VDU 23,&FF,no%;no%;no%;no%;
1670 FOR x%=0 TO 3
1680 FOR y%=3 TO 0 STEP-1
1690 COLOUR x%
1700 COLOUR y%+128
1710 PRINT STRING$(20,CHR$255);
1720 NEXT
1730 NEXT
1740 GCOL 0,3
1750 MOVE 0,508
1760 DRAW 1278,508
1770 REM Relocate graphics data
1780 FOR x%=&3000 TO &4600 STEP4
1790 !x%=!(x%+&2800)
1800 NEXT
1810 ENDPROC
1820
1830 DEF PROCdemo1
1840 GCOL 3,3
1850 FOR d%=0 TO 1278 STEP 24
1860 MOVE d%,0
1870 DRAW d%,1024
1880 NEXT
1890 GCOL 3,2
1900 FOR e%=0 TO 1024 STEP 12
1910 MOVE 0,e%
1920 DRAW 1278,e%
1930 NEXT
1940 ENDPROC
```

Program III

```
10 REM Colour Compactor
20 REM By R.Henderson
30 REM (c) Electron User
40 MODE 0
50 MODE 6
60 A$="Compaction failed"
70 FOR i%=0 TO 2 STEP 2
80 P%=&900
90 [ OPT i%
100 .scrunch
110 LDA #&58
120 STA &73
130 LDA #&30
140 STA &71
150 LDA #0
160 STA &70
170 STA &72
180 LDA #1
190 STA &78
200 LDY #0
210 .main
220 INC &70
230 BEQ inc
240 JMP out
250 .inc
260 INC &71
270 .out
280 LDA (&72),Y
290 STA &77
300 STA (&70),Y
310 INC &70
320 BEQ in2
330 JMP out2
340 .in2
350 INC &71
360 .out2
370 LDA &78
380 STA (&70),Y
390 INC &72
400 BEQ in3
410 JMP check
420 .in3
430 INC &73
440 LDA &73
450 BPL check
460 RTS
470 .check
480 LDA (&72),Y
490 CMP &77
500 BEQ put
510 JMP main
520 .put
530 LDA (&70),Y
540 CLC
550 ADC #1
560 STA (&70),Y
570 STA &79
580 INC &72
590 BEQ in4
600 JMP check2
610 .in4
620 INC &73
630 LDA &73
640 BPL check2
650 RTS
660 .check2
670 LDA &79
680 CMP #&FF
690 BNE chk
700 JMP main
710 .chk
720 LDA (&72),Y
730 CMP &77
740 BNE main
750 BEQ put
760 \ Redraw original screen
770 \ From compacted data...
780 .decomp
790 LDA #&30
800 STA &71
810 LDA #&58
820 STA &73
830 LDA #1
840 STA &70
850 LDA #0
860 STA &72
870 TAY
880 .rest
890 LDA (&70),Y
900 STA &75
910 INY
920 LDA (&70),Y
930 STA &76
940 STY &74
950 LDY #0
960 .redraw
970 LDA &75
980 STA (&72),Y
990 INC &72
1000 BEQ cp
1010 JMP dec
1020 .cp
1030 INC &73
1040 LDA &73
1050 BPL dec
1060 RTS
1070 .dec
1080 DEC &76
1090 BNE redraw
1100 LDY &74
1110 INY
1120 BNE rest
1130 INC &71
1140 JMP rest
1150 ]
1160 NEXT
1170 MODE 5
1180 HIMEM=&3000
1190 VDU 23,1,0;0;0;0;
1200 PROCtri_draw
1210 CALL scrunch
1220 PROCgive_size
1230 CLS
1240 CALL decomp
1250 END
1260
1270 DEF PROCtri_draw
1280 FOR x%=1 TO 20
1290 GCOL 3,RND(3)
1300 MOVE RND(1278),RND(1024)
1310 MOVE RND(1278),RND(1024)
1320 PLOT 85,RND(1278),RND(1024)
1330 NEXT
1340 ENDPROC
1350
1360 DEF PROCgive_size
1370 start%=&3000
1380 end%=(?&71*&100)+?&70
1390 IF end%>&57FF CLS:PRINT''A$
:END
1400 PRINT "Size = ";end%-start%
1410 G=GET
1420 ENDPROC
```

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NOW ON SALE AT YOUR NEWSAGENTS

We're taking control

Robert Henderson shows how to manipulate the Electron's custom designed ULA chip

THE biggest chip on the Electron's circuit board is the uncommitted logic array, or ULA for short. It is this chip which controls most of the Electron functions like reading from and writing to the cassette port, generating interrupts, setting the screen modes and colour palettes.

The power of the ULA is accessable through several special control registers located high in the Electron's memory map at &FExx. Poking these registers will change the colours displayed, the screen mode, the sound output, cassette motor operation and so on.

For instance, the colour palette for the two-colour Modes 0, 3, 4 and 6 are stored in &FE08 and &FE09. Although the Electron is capable of displaying eight colours, you can't simply poke the values zero to seven into the ULA registers and hope to get the right colours.

The palette is produced by mixing the three primary colours – red, green and blue. The Electron can produce the whole range of colours by using these singly or mixed together. For instance, red and green make yellow and red mixed with green and blue makes white.

Not all the bits in registers &FE08 and &FE09 are needed, so Figure I shows the ones used in each – three for colour zero and three for colour one. If a bit is zero then the colour is on, and a one means the colour is off. So to set colour zero to blue and colour one to yellow 64 is placed in &FE08 and 17 in &FE09.

If you look at the bit pattern of these two numbers you'll see that green and red are off for colour zero leaving the blue on so the background is blue.

However, blue is turned off for colour one and red and green turned on. These two colours produce yellow when mixed, so that's the colour of the text.

Let's take a step back now and look at the ULA register at &FE07. This has a variety of functions, such as setting the caps lock, turning the cassette motor on and off, selecting between cassette and sound operation – you can't have both at the same time – and also setting the display mode. Figure II shows the function of this bit-mapped register.

As you can see, bits three, four and five set the display mode and simply poking a new value into these bits – making sure not to alter any of the others – will cause the Electron to change mode.

A problem, however, is that the operating system won't know that a new mode has been selected. It stores a variety of variables relating to character width, height and colours available in page three of memory, so some poking around here must also be done if you want to print text or draw using Basic's graphic functions.

It is relatively easy to split the screen horizontally so that two modes are displayed at once, as was demonstrated in the January 1986 issue of *Electron User*. This displayed Mode 0 in the top third of the screen, Mode 1 in the middle and Mode 2 at the bottom.

It was originally thought impossible to split the screen vertically so that text on the same line appears in different modes. However, this is what Program I achieves. Mode 4 is displayed in the left third of the screen, Mode 5 in the middle and Mode 4 again on the right.

If you find that this program doesn't work then try switching off the Plus 1 as the interrupts it generates can upset the timing of the split mode. Also if you press a key the split will again be altered as time is spent processing the keypress.

Have you ever wanted to write GAC-style adventures with Mode 5 graphics in the top half of the screen and Mode 4 text in the lower half? Program II shows how this can be achieved without tieing up the processor too much.

The only disadvantage is that sound effects become a bit buzzy and you must also remember to switch off interrupts before loading and saving data or programs.

To change the colours, poke &70/&71 for the bottom half of the screen and &72/&73 for the top half with the values for registers &FE08 and &FE09.

Finally, Program III shows how flicker free animation may be implemented on the Electron by employing dual screens. The disadvantage is that it takes up a large amount of memory so it isn't often used. Other micros with large quantities of ram nearly always use this technique for arcade games.

A separate, hidden, screen is held in memory and all graphics command operate on this.

When the drawing command has been completed – in the case of Program III, a large circle – the display is instantly flicked to this screen.

Hopefully, these demonstration programs should have given you an insight into how the ULA works and how it can be manipulated. Try experimenting with the programs and see if you can come up with some more useful effects.

ULA register &FE08	
128	Not used
64	Blue – COLOUR 1
32	Not used
16	Blue – COLOUR 0
8	Not used
4	Green – COLOUR 1
2	Not used
1	Not used
ULA register &FE09	
128	Not used
64	Not used
32	Not used
16	Green – COLOUR 0
8	Not used
4	Red – COLOUR 1
2	Not used
1	Red – COLOUR 0

Figure I: The palete ULA registers for Mode 0, 3, 4, and 6

Bit	Function
7	Caps lock
6	Cassette motor
5	Display mode
4	Display mode
3	Display mode
2	Cassette/sound operation
1	Cassette/sound operation
0	Not used

Figure II: The multi-function ULA register at &FE07

Program I

```
 10 REM Vertical split modes
 12 REM By R.Henderson
 14 REM (c) Electron User
 20 FOR X%=1 TO RND(4)+1+4
 30 *FX19
 40 NEXT
 50 *KEY10 OLD|MRUN|M
 60 ?&FE07=164
 70 MODE 4
 80 VDU 23,1,0;0;0;0;
 90 P%=&900
100 [OPT 0
110 LDA #19
120 JSR &FFF4
130 .kkk
140 LDA &71
150 LDY &70
160 LDX #164
170 STA &FE07
180 .call
190 STA &FE07
200 LDX #4
210 .l DEX
220 BNE l
230 STY &FE07
240 JMP call
250 .dddd SEI
260 RTS
270 ]
280 VDU 19,1,1;0;
290 ?&360=3 : ?&361=3
300 ?&355=5 : ?&34F=16
310 FOR A%=0 TO 30 STEP 2
320 PRINT TAB(3,A%);"Mode 5..."
330 NEXT
340 ?&FE07=164
350 ?&360=0 : ?&361=0
360 ?&355=5 : ?&34F=8
370 B$=" THIS IS MODE NUMBER FO
UR"
380 FOR X%=1 TO LEN(B$)
390 PRINT TAB(31,X%);MID$(B$,X%
,1);" *";TAB(0,X%);"* ";MID$(B$,X
%,1)
400 NEXT
410 ?&70=164 : ?&71=174
420 CALL dddd
430 *FX19
440 CALL &900
```

Program II

```
 10 REM Split modes II
 20 REM By R.Henderson
 30 REM (c) Electron User
 40 ?&74=0
 50 FOR x%=0 TO 2 STEP 2
 60 P%=&900
 70 [ OPT x%
 80 PHP : PHA
 90 TXA : PHA
100 TYA : PHA
110 LDA #&FF
120 STA &29B
130 STA &29C
140 STA &29D
150 STA &29E
160 STA &29F
170 LDA &74
180 EOR #&FF
190 BNE col3
200 ASL A
210 BEQ col4
220 .ret
230 PLA : TAY
240 PLA : TAX
250 PLA : PLP
260 RTS
270 .col4
280 STA &74
290 LDA &72
300 STA&FE08
310 LDA &73
320 STA&FE09
330 LDA #168
340 STA &282
350 STA &FE07
360 JMP ret
370 .col3
380 STA &74
390 LDA &70
400 STA&FE08
410 LDA &71
420 STA&FE09
430 LDA #160
440 STA &282
450 STA &FE07
460 JMP ret
470 .go
480 LDA #19
490 JSR &FFF4
500 LDA #&FF
510 STA &29B
520 STA &29C
530 STA &29D
540 STA &29E
550 STA &29F
560 LDA #0 : STA &74
570 LDA #0 : STA &220
580 LDA #9 : STA &221
590 LDA #14
600 LDX #5
610 LDY #0
620 JSR &FFF4
630 RTS
640 ]
650 NEXT
660 ?&72=112 : ?&73=49
670 ?&70=60  : ?&71=23
680 CALL go
690 MODE 4
700 VDU 23,1,0;0;0;0;
710 ?&355=4
720 ?&361=7
730 ?&360=0
740 ?&34F=8
750 VDU 28,0,31,39,13
760 REPEAT
770 MOVE 0,612
780 MOVE 1000,700
790 FOR F%=0 TO 480
800 ?&360=3
810 GCOL 0,RND(4)-1
820 PLOT 85,RND(1278),RND(400)+
612
830 ?&360=0
840 PRINT "This is Mode 4...";
850 NEXT
860 UNTIL 0
```

Program III

```
 10 REM Circles
 20 REM By R.Henderson
 30 REM (c) Electron User
 40 SOUND 1,0,0,1
 50 P%=&900
 60 [OPT 0
 70 LDA #0
 80 STA &70
 90 STA &72
100 LDA &74
110 STA &71
120 LDA &75
130 STA &73
140 LDY #0
150 .copy
160 LDA (&70),Y
170 STA (&72),Y
180 INY
190 BNE copy
200 INC &71
210 INC &73
220 LDA &71
230 CMP&76
240 BNE copy
250 RTS
260 .intoff
270 SEI
280 RTS
290 ]
300 CALL intoff
310 MODE 0
320 MODE 5
330 HIMEM=&3000
340 VDU 23,1,0;0;0;0;
350 ?&34E=&30
360 ?&351=&30
370 REPEAT
380 ?&FE02=0
390 ?&FE03=&2C
400 x%=RND(1278)
410 y%=RND(1024)
420 r%=RND(200)+60
430 GCOL 3,RND(3)
440 PROCc(x%,y%,r%)
450 ?&FE03=&18
460 ?&74=&30
470 ?&75=&58
480 ?&76=&80
490 CALL &900
500 IF RND(40)=4 CLS:UNTIL 0
510 UNTIL 0
520
530 DEF PROCc(X%,Y%,R%)
540 FOR I%=Y%+R% TO Y%-R% STEP
-8
550 J%=SQR(ABS(R%*R%-(I%-Y%)*(I
%-Y%)))
560 MOVE X%-J%,I%
570 DRAW X%+J%,I%
580 MOVE X%-J%,(I%+4)
590 DRAW X%+J%,(I%+4)
600 NEXT
610 ENDPROC
```

Make a CASE for the Electron

WHEN you add CASE to Basic you'll find it a great improvement, OTHERWISE Stephen Ramplin's utility will be wasted

PERHAPS you know a little about the Basic of the omnipotent Archimedes, Acorn's latest offspring. A key feature is the wealth of programming structures available, one of the more useful being the CASE, WHEN, OTHERWISE, ENDCASE structure.

The humble Electron is perfectly capable of an equivelent command structure too. Case is a utility which adds the CASE structure to the Electron's built in BBC Basic. Let's see what the syntax of this new command is.

Imagine a series of IF ... THEN statements plagued with ORs and GOTOs, a nightmare which can now be replaced with an admirably structured slice of Basic – the CASE structure. This is an efficient method of executing one of a range of options.

Enter the program listing, then save and run it. By doing this the special two line Basic program below, is created and saved to disc or tape under the filename CASE:

```
 0 REM
 1 CALLPAGE+264:REM
```

It is imperative that these two lines are not ammended in any way, otherwise the machine code hidden in them would cease to function and a crash may occur.

Load the two-line program and either type in your own program lines, EXEC them in or use the following instruction:

```
OSCLI"LOAD file "+STR$~(TOP-2)
```

Press Break, load CASE and add the following lines to it:

```
 10 REM Draw
 20 MODE 4
 30 PRINT
 40 PRINT "Use Z, X, * and ? to
draw...";
 50 X%=640:Y%=512
 60 PLOT 69,X%,Y%
 70 REPEAT
 80 key$=GET$
 90 CASE key$
100 WHEN "Z","z":IF X%>10 THEN
X%=X%-10
110 WHEN "X","x":IF X%<1270 THE
N X%=X%+10
120 WHEN ":","*":IF Y%<1014 THE
N Y%=Y%+10
130 WHEN "/","?":IF Y%>10 THEN
Y%=Y%-10
140 OTHERWISE:VDU7
150 ENDCASE
160 DRAW X%,Y%
170 UNTIL FALSE
```

This program paints a thin line on the screen in response to the usual direction keys (Z, X, :, / for left, right, up and down respectively).

When Draw is run the CALL command in line 1 initialises Case's hidden code in lines zero and one.

Notice how clear and easy to follow the Basic CASE structure is. Lines 10 to 80 are good old reliable Basic keywords.

The first new keyword, CASE, crops up in line 90, and must be followed by a variable name. This declares the variable to be the subject of the WHEN statements. The logic of the structure hinges on these WHENs, found in lines 100 to 130.

The Basic equivalent of line 100 is the rather more ugly:

```
100 IF key$="Z" OR key$="z" AND
X%>10 THEN X%=X%-10
```

The CASE structure offers an elegant alternative. In line 100 the WHEN statement is followed by two possible values for *key$* (upper and lower case Z) which must be separated by a comma.

If *key$* – the CASE variable – equals either of these the actions following the WHEN are executed, and the remaining WHENs and the OTHERWISE are ignored. Similiar arguments can be applied to each WHEN statement.

If none of the WHEN statements possess a value matching *key$* the OTHERWISE statement leaps into action and a beep (VDU 7) is output.

The OTHERWISE statement is optional and may be ommitted. Finally, the ENDCASE command neatly exits the structure. It is essential because another CASE statement could cause a *Bad CASE* error report, as Case cannot handle nesting. The neccessity of the ENDCASE encourages a structured approach to programming.

A second example will illustrate the versatility of the Case implementation of CASE. Press Break, reload CASE and then add these lines:

```
 10 REM Sectors
 20 MODE 4
 30 MOVE 640,512
 40 FOR theta=0 TO 360 STEP 15
 50 X%=640+300*SIN(RAD(theta))
 60 Y%=512+300*COS(RAD(theta))
 70 CASE theta/45
 80 WHEN 1,2,INT(22/7),VAL("4")
,LOG(1E5),6,7:DRAW X%,Y%:DRAW 640
,512
 90 ENDCASE
100 DRAW X%,Y%
110 NEXT
```

This program draws a circle divided into eight equal sectors, demonstrating a couple of points on its way.

The first is that a calculation may form part of the CASE condition. Secondly, both Basic keywords and calculations may form part of the WHEN condition – the rather long winded line 80 illustrates this.

Note, however, that Basic keywords cannot follow a CASE command.

The possible errors given by Case are listed in Table I accompanied by their error numbers and the possible cause.

Table II provides the full list of syntax rules.

AN article cannot be without its piece of technical information to satisfy the programming buffs; here it is. Briefly, the program works by revectoring brkv (the BRK vector) to point to the program's own code. Henceforth, when an error occurs, Case is called.

If the error was a mistake Case checks the cause against its four keywords until either a match is found or the table terminator is reached. If a Case command was responsible for the error, the corresponding machine code routine is executed and operation is then returned to Basic.

A number of subroutines are borrowed from the Basic rom, and &90 to &9A of zero page is used to store variables. The code is stored as a Basic program to keep free the areas of memory usually burdened, and therefore allowing user defined graphics and so on, in a program which utilises Case.

This decision caused a few headaches as certain byte values could not be used, and the program had to be relocatable.

Complete technical descriptions can make for heavy going, and the curious can refer to the May to July 1986 issues of *Electron User*, where the techniques used are fully covered. There are endless applications for the CASE structure. Experiment – it's not difficult to pick up.

Error message	Error number	Possible problem
Bad CASE	**46**	*A second CASE statement was encountered before an ENDCASE*
No CASE	**47**	*A WHEN, OTHERWISE or ENDCASE command was found when no CASE had been encountered*
Type mismatch	**6**	*This error will be issued by the Basic subroutine EVAL if a string variable is compared to a numeric value or vica versa*
Syntax error	**16**	*Part of the CASE structure syntax is incorrect – refer to Table II*
No such variable	**26**	*An undefined variable may be lurking about within the CASE structure or a Basic keyword may follow a WHEN, without a separating space*

Table I: Possible CASE command errors

- The name of a variable must follow the CASE statement.
- WHEN, OTHERWISE, and ENDCASE statements must be the first statements on a new line, apart from the one immediately after the CASE.
- A series of possible values for the CASE variable may follow a WHEN, and each must be separated by a comma.
- The combined length of the variable name and its value must not be greater than 254 characters. This would only really happen with strings.
- The BASIC statements WHEN and OTHERWISE must be separated from subsequent statements, which must be on the same line, by a colon.
- Values after a WHEN may be the variable names holding the values, calculations or BASIC keywords. If a BASIC keyword is immediately after a WHEN statement a space must be included to separate them.

Table II: The CASE syntax requirements

```
   10 REM Case
   20 REM By Stephen Ramplin
   30 REM (c) Electron User
   40 MODE6
   50 PROCassembler
   60 PRINT"Press <RETURN> to sav
e code"
   70 REPEATUNTILGET=13
   80 OSCLI"SAVE CASE B00 "+STR$~
P%
   90 END
  100 DEFPROCassembler
  110 brk=!&202 AND&FFFF
  120 offsetA=&0A
  130 ptrA=&0B
  140 page=&18
  150 ptrB=&19
  160 offsetB=&1B
  170 intA=&2A
  180 error=&FD
  190 brkv=&202
  200 string=&700
  210 cont=&8B9B
  220 checkend=&985A
  230 addY=&986D
  240 syntax=&982B
  250 eval=&9B29
  260 pointer=&90
  270 caseflag=&92
  280 trueflag=&93
  290 action=&94
  300 temp=&96
  310 strptr=&97
  320 quote=&98
  330 address=&99
  340 code%=&B00
  350 FORpass%=0TO2STEP2
  360 P%=code%
  370 [OPTpass%
  380 EQUD&FB000000
  390 EQUW&15F4
  400 NOP
  410 .case
  420 LDXcaseflag
  430 BMIbadcase
  440 DEX
  450 STXcaseflag
  460 CLC
  470 TYA
  480 ADCptrA
  490 STAaddress
  500 LDAptrA+1
  510 ADC#0
  520 STAaddress+1
  530 LDY#0
  540 .cloop
  550 LDA(address),Y
  560 BMIbadcase
  570 CMP#ASC":"
  580 BEQdone
  590 CMP&801D
  600 BEQdone
  610 INY
  620 BNEcloop
  630 .done
  640 INY
  650 STYstrptr
  660 INY
  670 INY
  680 INY
  690 BNEquit
  700 .badcase
  710 BRK
  720 EQUB46
  730 EQUS"Bad CASE"
  740 BRK
  750 .when
  760 LDAcaseflag
  770 BPLnocase
  780 LDAtrueflag
  790 BMInewline
  800 LDY#0
  810 .wloop
  820 LDA(address),Y
  830 STAstring,Y
  840 INY
  850 CPYstrptr
  860 BNEwloop
  870 DEY
  880 LDA#ASC"="
  890 STAstring,Y
  900 LDY#4
  910 .wloopB
  920 LDXstrptr
  930 .wloopC
  940 LDA(ptrA),Y
```

```
 950 PHA
 960 CMP#34
 970 BNEnotquote
 980 EORquote
 990 STAquote
1000 .notquote
1010 CMP#ASC","
1020 BNEnotcomma
1030 LDAquote
1040 BEQtest
1050 .notcomma
1060 CMP#ASC":"
1070 BNEstore
1080 LDAquote
1090 BEQtest
1100 .store
1110 PLA
1120 STAstring,X
1130 INY
1140 INX
1150 BNEwloopC
1160 JMPsyntax
1170 .test
1180 LDA&801D
1190 STAstring,X
1200 LDA#7
1210 STAptrB+1
1220 LDA#0
1230 STAptrB
1240 STAoffsetB
1250 STYtemp
1260 JSReval
1270 LDYtemp
1280 LDAintA
1290 BMItrue
1300 .false
1310 PLA
1320 INY
1330 CMP#ASC","
1340 BEQwloopB
1350 DEY
1360 .newline
1370 INY
1380 LDA(ptrA),Y
1390 CMP&801D
1400 BNEnewline
1410 .quit
1420 BEQquitB
1430 BNEquitB
1440 .nocase
1450 BRK
1460 EQUB47
1470 EQUS"No CASE"
1480 BRK
1490 .true
1500 STAtrueflag
1510 PLA
1520 CMP#ASC":"
1530 BEQatcolon
1540 .tloop
1550 INY
1560 .tloopB
1570 LDA(ptrA),Y
1580 CMP#34
1590 BNEnotquoteB
1600 EORquote
1610 STAquote
1620 .notquoteB
1630 CMP#ASC":"
1640 BNEback
1650 LDAquote
1660 BEQatcolon
1670 .back
1680 INY
1690 BNEtloopB
1700 .atcolon
1710 BEQquitB
1720 .otherwise
1730 LDAcaseflag
1740 BPLnocase
1750 LDAtrueflag
1760 BMInewline
1770 BPLquitB
1780 .endcase
1790 LDXcaseflag
1800 BPLnocase
1810 INX
1820 STXcaseflag
1830 STXtrueflag
1840 .quitB
1850 DEY
1860 JSRcheckend
1870 LDY#9
1880 .loop
1890 PLA
1900 DEY
1910 BNEloop
1920 JMPcont
1930 EQUD&01000D06
1940 EQUB&98
1950 EQUW&90D6
1960 EQUS"+264:"
1970 EQUW&15F4
1980 .intercept
1990 LDX#main MOD256
2000 SEI
2010 STXbrkv
2020 LDXpage
2030 INX
2040 STXbrkv+1
2050 CLI
2060 LDY#0
2070 STYcaseflag
2080 STYtrueflag
2090 STYquote
2100 RTS
2110 .main
2120 PHP:PHA
2130 TYA:PHA
2140 TXA:PHA
2150 LDY#0
2160 LDA(error),Y
2170 CMP#4
2180 BEQcheck
2190 .out
2200 PLA:TAX
2210 PLA:TAY
2220 PLA:PLP
2230 JMPbrk
2240 .check
2250 LDYoffsetA
2260 DEY
2270 JSRaddY
2280 LDA#keytable MOD256
2290 STApointer
2300 LDXpage
2310 INX
2320 STXpointer+1
2330 .compare
2340 LDY#0
2350 .cmploop
2360 LDA(pointer),Y
2370 BEQfound
2380 BMIout
2390 CMP(ptrA),Y
2400 BNEnext
2410 INY
2420 BNEcmploop
2430 .next
2440 LDY#0
2450 .nloop
2460 INCpointer
2470 BNEnocarry
2480 INCpointer+1
2490 .nocarry
2500 LDA(pointer),Y
2510 BNEnloop
2520 INCpointer
2530 INCpointer
2540 BNEcompare
2550 .found
2560 INY
2570 LDA(pointer),Y
2580 DEY
2590 STAaction
2600 DEX
2610 STXaction+1
2620 JMP(action)
2630 .keytable
2640 EQUS"CASE":BRK
2650 EQUBcase MOD256
2660 EQUS"WHEN":BRK
2670 EQUBwhen MOD256
2680 EQUS"OTHERWISE":BRK
2690 EQUBotherwise MOD256
2700 EQUS"ENDCASE":BRK
2710 EQUBendcase MOD256
2720 EQUB128
2730 EQUD&FFODD6
2740 ]
2750 NEXTpass%
2760 ENDPROC
```


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* E-Type BBC & Electron versions due for release 7th May, 1990. All the above Archimedes games will work on the Archimedes A3000, 310 and 400 series

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The Micro User, October '89.

"This game is excellent ... I'm not a real soccer buff, but I thoroughly enjoyed this desktop version. The micro-controlled players behave in an amazingly realistic manner. Playability 10." ... ***Archimedes review, The Micro user, Feb' 90***

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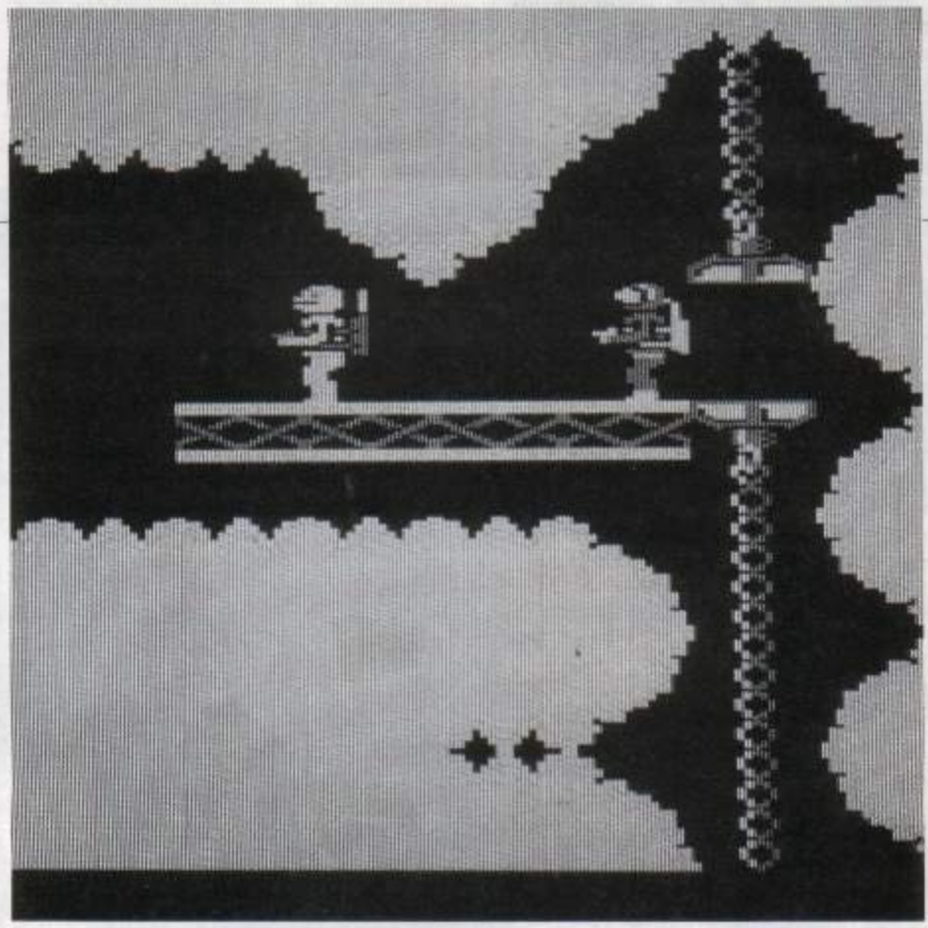
Arcade CORNER

Solutions and passwords

THIS month's bumper helping of hints, tips and solutions to arcade games and arcade adventures includes a complete solution to level two of Ravenskull, passwords for Orbital and Qwak, and help with a common stumbling block in Codename: Droid.

If you have any tips or cheat modes then why not share them with fellow Electron arcade addicts? Send them to:
Arcade Corner, Electron User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.



Codename: Droid
–Superior Software

In Micro Messages in the February issue of *Electron User* John Buchanan requested help with several games that he was having difficulties with. M. Hagan can sympathise with John as he also had problems with Herbert Droid.

He reveals that to solve the problem you need the spanner which is on the Ancient Shrine in sector three. To get it when you first enter sector three, drop from the lift and kill guard one. Go left, up the rope, left and drop down. The spanner is in the middle level.

Make your way past the three pillars and climb the rope. Go left and then drop when no guards are in sight. Try to run left and jump on to the rope in the room with the three chandeliers. When it is safe, drop down and kill the two guards using mines.

Climb back up the rope and collect the passcard, drop down and go left through the five pillars, killing the two guards on the way.

Climb up the rope, kill the guard, go right and take the passcard.

Step back and jump up to the higher floor. Jump right on to the rope, drop right and kill the guard. Protect your energy supply by jumping while you fire. Now walk into the switch which was blocked by the guard and notice that a rope has extended.

Walk left so that you drop to the ground and kill the guard, then walk as far to the right as you can. Climb the rope on the left, jump right and kill the guard – you can use the microfilm map to see when it is safe to jump. Then jump right so that you land in the middle of the floor, walk across and take the spanner.

Now when you walk into Herbert he will lift the pipe which blocks the chest.

➤

Ravenskull – *Superior Software*

In the December 1989 issue of *Electron User* we published a complete solution to level one of Ravenskull. Now, John Knight presents a solutution to level two of this superb mind bending arcade adeventure.

Level two has to be tackled systematically and the best way to go about this is to keep a record of where you go and what you do. If you want to try this yourself you should first examine the south-west corner and the area to which that leads, then tackle the remainder of the eastern side. From there look at the passage beyond the ravenbees to the north.

After that, retrace your steps and see what problems await you in the east. Solve these and you should be able to find the second part of the crucifix. However, if you are still stuck, read on...

First of all, turn west at the crossroads immediately above the starting point and collect the treasure in the first room you come to. From here, follow the path from the bottom left until a gate closes behind you at the point where you turn south. Then travel east as far as you can before turning south again to a boulder. Don't turn south too soon or you will activate a gate to your cost.

Walk left from the boulder, take the second turning north, then west again to the room with the scrolls. You must enter and leave this room the long way round or you will become trapped. Take the treasure and the scrolls – left-hand one for strength, the other to teleport.

Now find your way south to the bottom corridor where another gate will close behind you, but don't worry about this. First take the treasure and then use the strength scroll so that you can move the boulder blocking the exit. Take the passage you see to the north, then first west into the room with the key. Take it, and the treasure, before using the other scroll to teleport out of there.

You will find yourself in the southeast corner. The main task here is to collect all the treasure and the scythe before leaving as you can't return. The scythe is in a room to the south of the exit passage, beyond the killer plants.

You exit to the crossroads where you started. From here make your way north and take the left, northerly, fork at the next junction, then west picking up the treasure and bottle at the end of the passage. Look for treasure in the passages to the south of where you find the bottle before going north to the ravenbees, which must be passed to retrieve a treasure they are guarding.

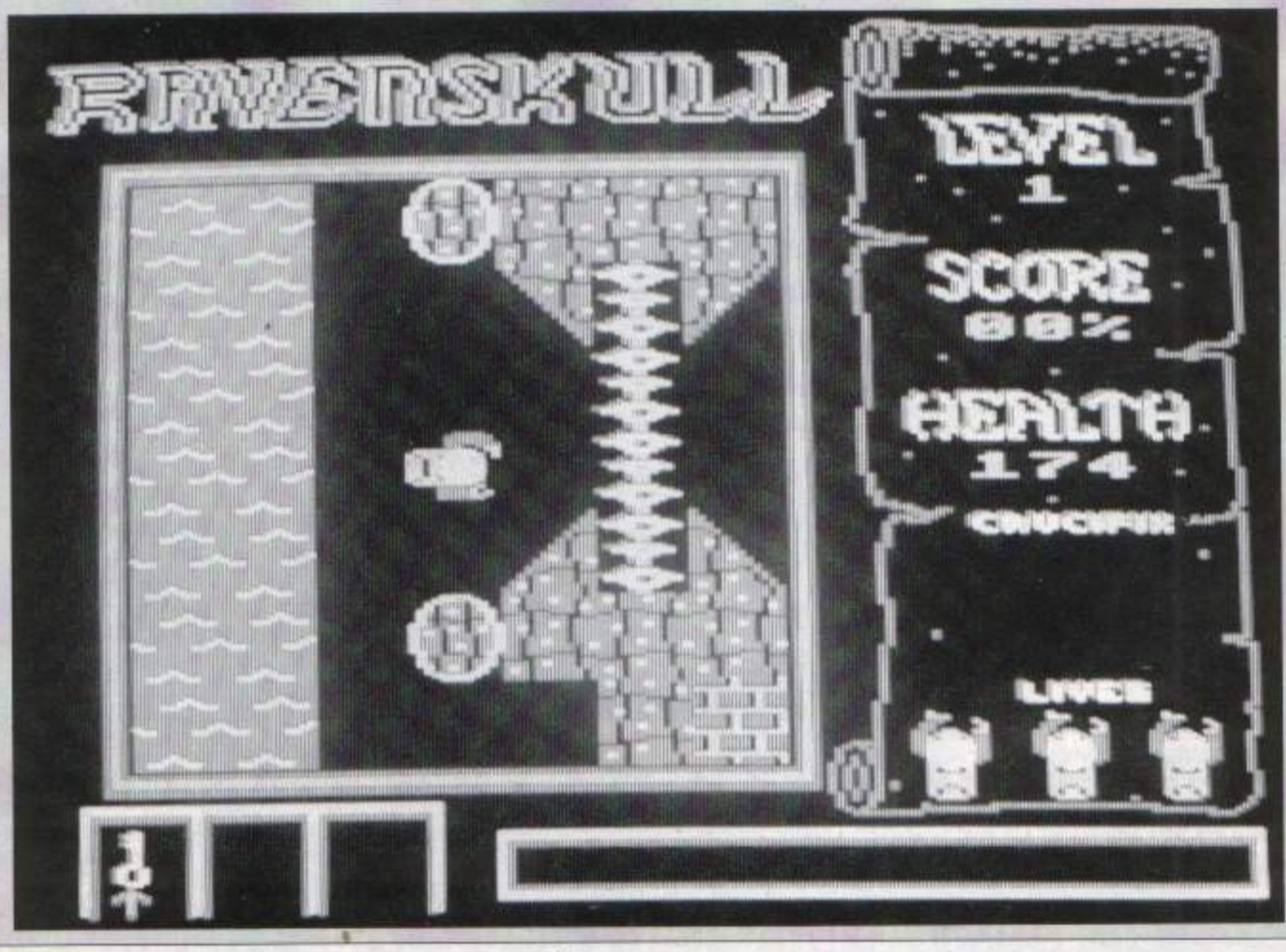
To do this, use the potion in the bottle, which speeds up your movement, effectively slowing down the movement of the ravenbees. Wait at the right-hand side of the entrance and when the bees are in a staggered line moving left with the lowest bee to the fore, make your move.

Use similar tactics to get out again. It is quite difficult and can be frustrating as you will be returned to the starting point if you get it wrong. However, you can practise if you want by going directly to the bees from the start until you are confident of getting it right.

From the bees, work your way in an easterly direction until you can travel south, collecting four treasures in side passages. Then make your way up and west until you can go south again where more treasure will be found.

Journey north, picking up a fish which gives increased health from a side passage, then work your way around to the west and south to a plantation of killer plants. Take the treasure and use the scythe to reach the spade at the bottom left of this area. South of here is more treasure and a bottle of potion which returns your speed to normal. Now retrace your steps to the junction north of the start.

This time, take the right-hand easterly fork and go as far north as you can to a passage where there are two treasures.



Collect these and the treasure in the room to your south, then travel west and south down a wide passage with a scroll at the end. However, only go as far as the first westerly branch passage, leave the scroll alone for the moment.

Follow this westerly passage round in a semi-circle until you are traveling eastwards past a boulder, collecting treasures from side passages along the way. Continue east collecting more treasure (use the key to enter the treasure room to the south) until you reach the end of the passage where you should head north and take the first passage to the west. A gate will close behind you.

You are now back where you started and you should set off down the corridor to the south again, but this time, continue to its end where you can now pick up the strength scroll and more treasure.

Yet another gate will have closed behind you and you will need the extra strength to move the boulder you passed earlier in order to get out. From here, return to the northerly passage to the east and this time travel all the way along, collecting more treasure before pushing another boulder out of the way to escape from yet another gate.

You are now ready to enter the final sector of the level. The aim here is to move the boulders in such a way as to allow you to collect all the remaining treasure and a key – something you may like to try to work out for yourself.

The entrance is to the right. Move the first boulder along one place, go west and push the next boulder along one place, then go north and push the third boulder west until you can enter the room. There is a treasure to your north and south, and you must move the boulders in front of you so that you can squeeze through the passage they are blocking.

Once through, you will be in a north-south passage and you will want to explore the passages leading off from it, but be careful how you move the boulders or you may not reach all of your prizes.

At the top is an east-west passage and moving a boulder will give access to the passages leading to the key and the last of the treasure, but again, be careful. Retrace your steps until you come again to the entrance passage which brought you down to these last two sectors.

A little way down to the side is a boulder blocking the way west, where you must now go.

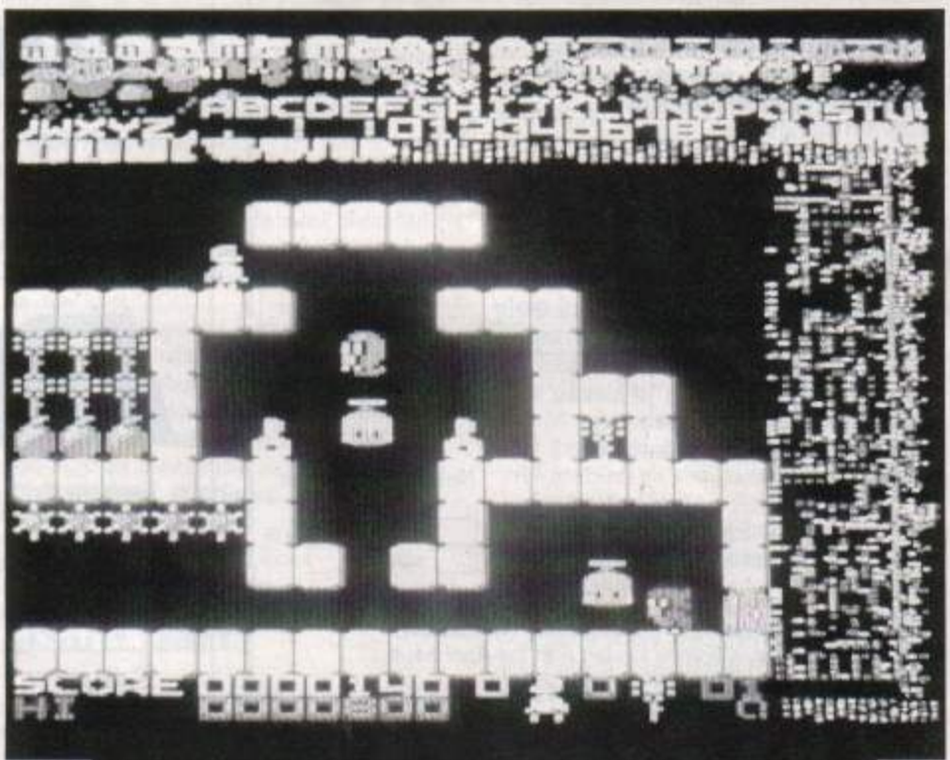
Move the boulder out of the way, use the key you have just found to unlock the door and the spade to dig your way through the mud to the centre where you will find and claim the second part of the crucifix, provided you have not missed out any of the treasure on your travels.

Orbital – *Impact*

Are you still stuck on the first level of Orbital? Would you like to have a crack at completing the other levels? Steven Yeo has discovered the passwords to allow you to choose your starting point. They are:

Zone A: Orbital
Zone B: Midgame
Zone C: Endzone
Zone A: Wipeout

There are two Zone A passwords because after completing the four zones you start again, but this time the maze is invisible.



Qwak – *Superior Software*

Qwak can be found on the Play it Again Sam 10 compilation and was cracked by James Clark. He has provided the passwords for 20 levels – there isn't one for the first, nor for 22, 23 and 24. The only way of playing level 24 is to jump to 21 and work your way through to level 24 by completing each screen.

1 –	13 Sister
2 Purple	14 Inside
3 Please	15 Before
4 Office	16 Dinner
5 Sootie	17 Player
6 Danger	18 Orange
7 Arrows	19 Horses
8 Forgot	20 Pruned
9 Lonely	21 Enamel
10 People	22 –
11 Candle	23 –
12 Shadow	24 –

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MICRO MESSAGES

Falling on deaf ears

I WROTE to you a few months ago regarding the lack of disc software for the Electron. I like other writers to your magazine feel that we are knocking our heads against a brick wall. It would appear that the only companies who are listening to us are Tynesoft and Pres.

Tynesoft is releasing its products on 3.5in ADFS discs and Pres is releasing some of the Superior Software old catalogue on 3.5in ADFS and 5.25in DFS discs.

This is to be applauded, but Pres is only able to release old games, through no fault of its own.

I wonder how much enthusiasm this will generate? I would guess that it will not generate much, as most of the Electron disc fraternity will have already transferred the games on disc, either by cracking the protection or via the Slogger tape to disc roms (alas, no longer available).

I, and I guess, a few others do not buy the newer games simply because they are not available on disc.

I just cannot face the wait while the tape loads and the apprehension that it may stop loading at any time with a Data? error. *I would rather put in a disc and play one of the older games that I have managed to transfer to disc.*

I wonder how many more copies of their programs the software houses would sell if they released them on disc? With the increase in the number of drives owned, discs are very cheap now. Surely it is the only route the software houses can take to increase the sales of their programs for the Electron?

Superior could release the Play it Again Sam series on disc, and the budget labels like Players could release compilations of their games.

The disc seems to be the ideal medium for compilations, but it appears to be ignored, so all power to Alex Buckland (February Micro Messages). But I somehow think that the pleas for disc software will fall on deaf ears.

I see that Superior Software is trying to bring Robocop to the Electron and I hope it succeeds, but please Superior, release it on disc in either 3.5in ADFS or 5.25in DFS and just see how many more copies you sell. You may be pleasantly surprised. – **John Nunn, Hampton, Middlesex.**

No joy with spare parts

I HAVE an Acorn Electron and would like to know if it is possible to get a joystick interface as we are having a problem trying to find spare parts for this model. – **K. Robinson, Atherstone, Warwickshire.**

● There isn't a straightforward joystick interface for the Electron, but the Acorn Plus 1 contains a joystick interface, along with a printer port and two multi-function cartridge ports. Unfortunately, this peripheral or add-on – which we assume is what you mean by "spare parts" – is no longer available. However, Pres will be able to supply you with a an Advanced Plus 1 and Plus 6. This is almost identical to the Plus 1, except that it has an extra facility to add sideways roms.

Merlin's magic most missed

SOME years ago you produced a magazine called Electron User.

I have some copies from 1985 and in them is a games analyst called Merlin who helped solve readers' problems with adventure games. In July 1985 Merlin did a special feature on the game Twin Kingdom Valley for the Electron.

I realise that this is nearly five years ago, but wonder if any back issues of the magazine are in existence and whether it's still published?

If there aren't any copies available, could you publish a request for help in any existing computer magazines that you publish, as perhaps one of your readers may be able to help? – **R. Murphy. Crawley, Sussex.**

● We have news for you, Mr Murphy, *Electron User* has been very much alive for the past five years and you'd have to have been living at the North Pole not to have

➤

Trampoline to the title page

I HAVE discovered an unusual feature in Superior Software's classic arcade adventure game Citadel. Take a trampoline to the end of the island where you are stopped by a ball and drop it on the coloured block. Jump as high as you can using the jump and up keys.

Keep going until you are in the screen above. You may have to dodge to the screen to the left and back again if the ball gets too close. When you finally bounce up to the screen above you'll find that you are on the title page!

Can you tell me what happened when I was playing Elite? I was shooting at a ship when the message Right on commander *appeared at the bottom of the screen.* – **Chris Said, Bournemouth, Dorset.**

● This feature of Citadel is fairly well known by old hands, Chris, but newcomers buying the games for the first time on budget labels may not have come across it.

The *Right on commander* message appears after a certain number of spaceships – 256 on the lower rating levels – have been shot, and marks your progression up the ratings from Poor, through Dangerous and finally, the coveted Elite status. You'll need several of these messages to improve your rating, so keep on blasting.

MICRO MESSAGES

➤ noticed the magazine on newsagents' shelves.

Merlin has moved on to greener pastures, but his column was taken over a long time ago by an equally able adventure wizard called Pendragon.

Unfortunately, back issues from 1985 are no longer available, so we have passed on your request for help to Pendragon. Watch his regular column for tips and clues.

Driving me round the bend

IN the February issue of Electron User *I read your reply to a letter from M.A. Budd with reference to the View Printer Driver. You first say that you don't load the driver into View, and then in the next paragraph you say you can load it, or rather, you say go into View and then load it.*

As View must be in the cartridge slot before the Electron is switched on, how can you run the driver program and then go into View?

Also, I typed in the driver program you listed in the December 1989 issue. I subsequently ran it to check for any bugs and it appeared to be OK until halfway through the program I got an error message No such variable at line 790. *On listing that line and checking it with the magazine I could find no fault with my typing. Yet it continued to tell me the same error on running it. Any suggestions?* – **R. Chisholm, Southampton, Hampshire.**

● There is still a lot of confusion surrounding this utility so we'll elaborate further. The program we listed was a simple Basic one whose function is to create a machine code program called a printer driver for use with View. The Basic program is not a printer driver – that is the machine code file saved when you run the Basic program. The Basic program can't be loaded into View, however the machine code file that it creates can – that's the printer driver.

Put another way, the Basic program is a tool for creating special machine code programs – it enables you to tailor it to the make and model of your particular printer. These machine code programs can then be loaded into View.

When you switch on your micro it will automatically enter View. Type *BASIC to get back into Basic. Now you can load the Basic program and design you printer driver. When you have finished, type *VIEW to return to View and type PRINTER DRIVER (or whatever filename you called your printer driver) to load your custom designed machine code program.

There was an error in the listing, which we pointer out in a later issue. Line 790 should have read:

```
IF C%<>27 THEN =C%+&100*EVAL(a$)
```

No room at the top

I TYPED in the program Fade into the Big Time, which is on Page 11 of the December 1989 issue of Electron User.

I have checked it again and again, but it still gives a No room at line 50 *error report. Could you please tell me what I did wrong?* – **Ph.B.A Kroon, Sneek, The Netherlands.**

● When it is run this program requires a large amount of ram for workspace, which it takes from the top of memory.If you have an ADFS disc filing system you may find yourself running out of memory.

Although you don't say whether or not you have an ADFS, it sounds like this could be causing your problem.

Some utility roms also take a small amount of memory for their own workspace, and may need disabling.

Remove any comments from the listing and relocate the program to &E00 by typing in this function key definition, loading the program and hitting f0:

```
*KEY0 *TAPE|MD%=PAGE-&E00:FOR I%=PA
GE TO TOP STEP 4:!(I%-D%)=!I%:NEXT|
MPAGE=&E00|MOLD|MRUN|M
```

Look after the pennies...

ONCE again I seek the assistance of some of your experts concerning the Home Finance Manager program by Julie Boswell (April 1989 Electron User*), and further improvements suggested by A.R. Dunks.*

After typing in the program and running it, I find that the total in the last column should appear as £24.68. However, it does not. It appears as £24 in the right hand column and the 68 pence overflowing into the left hand column on the line below.

It would appear that I have made some mistake in the program concerning the positioning of the amounts in the columns. Otherwise, the program works perfectly. – **F.J. Campbell, Gateshead, Tyne & Wear.**

● All that is wrong is that you have either entered a wrong TAB position to print the total, or you have missed out a semicolon. Check lines 790 and 810 carefully – mistaking a semicolon for a comma or missing it out completely will all cause the problem you are experiencing.

Pen pals please apply here

I HAVE been a dedicated Electron buff for about six years now and have enjoyed receiving Electron User *every month. I recently received the December 1989 issue and it was while I was reading a letter from Simon Tarry in Micro Messages that I jumped with astonishment. There in the second to last paragraph were the words New Zealand.*

I also live in New Zealand (a country South East of Australia if you're not sure). Our successes are many: We are makers of world class racing yachts, breeders of world champion rugby players and home of the XIV Commonwealth Games.

But sadly, we seem to be deficient in one most important area – the Electron market.

My brother and I have eight programs published in Electron User *to our credit, all in the form of educational software. These were all produced on our Electron here in New Zealand.*

We have recently expanded the system with a Plus 1 with AP6, AP4 with DFS and E00 ADFS in sideways ram, with one 5.25in and one 3.5in disc drive, and a Panasonic 24 pin printer.

We write all the software ourselves, including an intelligent ADFS disc menu system, a front end system which integrates View, Viewspell, Viewstore and Viewsheet, and we are currently working on a sheet music publisher for the Electron.

We consider our micro to be one of the best equipped in New Zealand. Unfortunately though, we are beginning to think that we have the only one in the country.

I'm sure there is someone in the UK who might be interested in the more serious software we write, or even someone who is willing to share the latest gossip or news.

If so, please write to us– Andrew Wier, 64a Selwyn Street, Christchurch 2, New Zealand.

MICRO MESSAGES

Electron that can't add up

I WONDER if anyone else has noticed that if you type in the following program the computer prints -10, -9.9, -9.8 and so on as expected, but instead of -9.6 it displays -9.59999999:

```
10 FOR A = -10 TO 10 STEP 0.1
20 PRINT A
30 NEXT
```

Is my micro faulty or will this happen on any Electron? The problem is easily corrected by setting @% as in the User Guide on Page 61:

```
@% = &2010A
```

The 1 is the number of decimal places to show.

Another slightly annoying fault is that if you enter:

```
x = 0.6
PRINT STR$(x)
```

the micro prints 0.5, but changing the value to 0.6 yields 0.60000001. Does this happen with all Electrons? – **Johnathan Bell, Edinburgh, Scotland.**

● What you have discovered is perfectly normal behaviour for the Electron and the anomaly arises because of the restricted accuracy of floating point numbers.

The Electron holds these numbers in just five bytes of memory and it rounds up any number it can't exactly fit in those five bytes.

Take the number PI for instance, that's 3.14159... it goes on forever.

The micro has only five bytes of memory available to store it and so it rounds up the number to fit in. Hence, PI stored in the Electron is only a very close approximation.

The same goes for other floating point numbers, too. Some just won't fit in five bytes, so an approximation is made – 0.60000001 is as near enough to 0.6 as makes no difference – unless you're an accountant working with millions of pounds, that is. So there's nothing wrong with your Electron. All computers – even large mainframes – suffer from rounding errors at some point.

Printer with a mind of its own

*I HAVE a very irritating problem. I am relatively new to the world of computers and initially my sole aim was to build up an inexpensive word processing package. Seeing the Electron on offer, and adding to it a View cartridge and a Panasonic KX-P1080 printer, I set to work. With the help of your letters page I discovered the much needed *FX6,0. However, my biggest problem now is trying to discover where the print is going to start on the page. It never seems to be at the top of the paper and always appears to skip down about a quarter of a page when I am using single sheets.*

Even if I use continuous paper I cannot discover how to make the print start at the top of the page. – **S. Noble, Carlisle, Cumbria.**

● The problem is that View expects a page to be laid out in a particular way – with a header and footer. Space will be left on the page for them. You won't want them in a letter, so View must be told to miss them out.

Enter TM 0 (zero lines for the top margin) and HM 0 (zero lines for the header margin).

The top margin is the distance in lines between the top of the page and the header, and the header margin is the distance between the header and the start of text.

Do the same for the footer, setting the distance between the bottom of text and the footer, and the footer and the bottom of the page to zero with FM 0 and BM 0.

You don't need to type in *FX6,0 every time you want to print something out as a DIP switch inside the printer will automatically produce the same effect as this command. Just check with your manual which one to move and alter your printer so line spacing is off.

Battle of the disc filing systems

I HAVE had my Electron for about two years now and I am just thinking of upgrading to discs, but I have a problem. Could you please tell me what a DFS can do that an ADFS can't and vice versa?

Also, is it possible to remove the Basic rom and replace it with another such as Forth or C? – **David, Glyn Down, Eastbourne, Sussex.**

● A DFS uses less memory than an ADFS, only moving PAGE up to &1900 compared to &1D00 for ADFS. Also, it will work quite happily most of the time with PAGE set to &1100, so freeing some memory.

On the other hand, you can place an unlimited number of files on an ADFS disc, but only 31 on a DFS disc. ADFS discs also have a much greater storage capacity – around one and a half times – than DFS discs.

Most BBC Micros use the DFS filing system so you can build up a high degree of BBC comatibility, but on the other hand the ADFS is used by the Archimedes, which, by the way, can read Electron ADFS discs and even run some of its programs using BBC Basic and the 6502 emulator.

The Basic rom can't be removed, but you can still add others by adding a rom cartridge to your Plus 1 or Plus 6. Forth was once produced by Skywave, but is no longer available, and C has never been converted for the Electron. However, Acronsoft produced a good implementation of Pascal on rom and a good Forth on tape. Both are no longer produced and may be difficult to find.

Remsave developes a bug

I REGRET that I have found a logic error in the Remsave utility published in the February issue of Electron User.

At first all appeared to be well. The utility was typed in, found to be working, and no more was thought about it – until last night.

A friend of mine also typed in this program into his BBC Master. He was delighted with it, and again there were no problems. However, last night I went round to his house to transfer a program from DFS to ADFS for a third party using the copyfiles utility program supplied with the Master. He was in the middle of typing in another program and saved it using Remsave before letting me do the transfer.

It was with great consternation that we discovered that a Bad program *error message was generated every time we tried to load his program back into the micro. On dumping the memory we discovered that the beginning of the program had been corrupted.*

I investigated this matter this morning, assuming that he had made a typing error. This was not the case, as I discovered by the use of a machine code monitor that osfile poked &E6 into byte 10 of the parameter block before returning control to Basic on both the Electron with Plus 4 DFS and a BBC Micro with Acorn 0.90 DFS.

*All was now clear. The parameter block consists of zeros apart from the execution address of &8023 at bytes six and seven when the utility is first executed. However, if the command *RS is used more than once the parameter block is corrupted by osfile, causing subsequent load addresses to be too high.*

There is a simple way to correct this fault. Add the following line to the assembler listing and all will be well:

```
805 STA block+&0A
```

I have not experienced this before when using osfile, but have only used it for loading files from within a machine code program, and Stephen Ramplin can be forgiven for not thinking this would occur. – **Michael Cargill, Retford, Nottinghamshire.**

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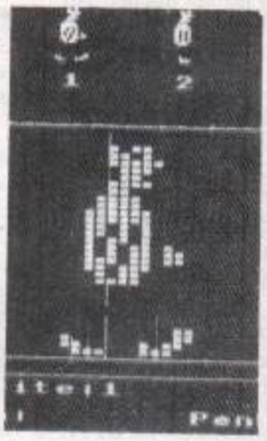

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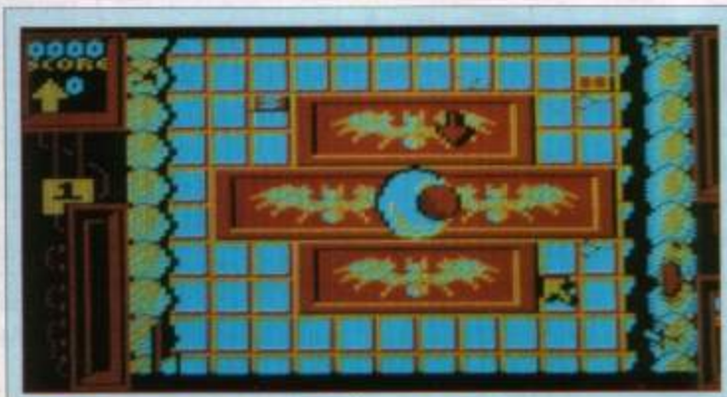

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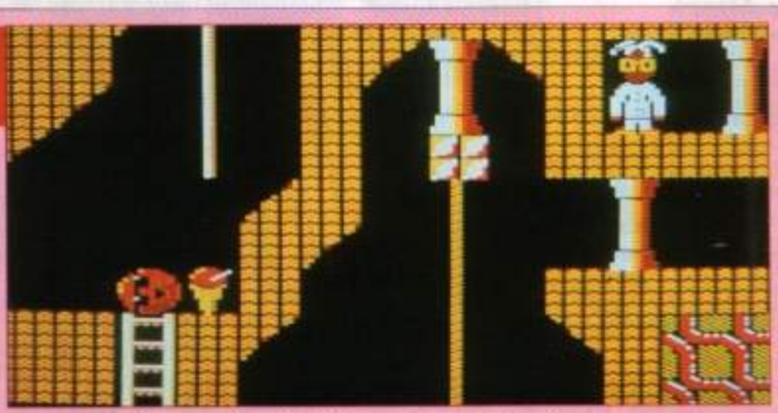

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