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electron

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Vol. 5 No. 3 December 1987 £1.25

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- Santa's Dilemma*
- Santa's Tour*



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News

All the latest products and news from the ever expanding world of the Electron.

5

Logo

The final part of the series shows how to write a hex/ASCII memory dump utility.

19

Adventures

Hints, clues, spells and adventure competition results from our resident wizard.

8

Santa on the Tiles

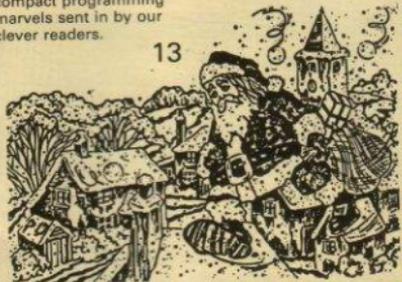
Take Santa for a jaunt over the rooftops in this superb machine code game.

22

10-Liners

Another selection of compact programming marvels sent in by our clever readers.

13



Software

Our panel of reviewers cast a critical eye over *Play It Again Sam*, *Village of Lost Souls*, *The Hunt and Oxbridge*.

29

Santa's Dilemma

Can you solve this intriguing puzzle and get Santa back to his grotto?

34

Santa's Tour

Help Father Christmas deliver his presents to all of the houses in Squartown.

40

Arcade Corner

More hints, pokes and cheat modes for popular arcade games.

43

Education

Nic Outterside concludes his look at the Electron as an educational tool in the classroom.

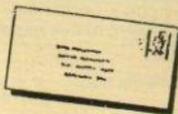
47



Ziggy

The inner secrets of one of the latest arcade favourites revealed by the author.

50



Adventure Writer

In Part 6 of this popular series we present a puzzling mini adventure.

53

Micro Messages

Another selection of letters from our bulging mailbag.

55

Turbo Loader

Speed up your cassette filing system with this powerful routine.

63

Hardware Projects

Graphically illustrate your Plus 1's ADC port with this handy utility.

65

Bargains galore!

Don't miss our special offers on Pages 60-61

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Alan McLachlan
Features Editor
Roland Weddell
Editorial Assistant
Mark Smiddy

Production Editor
Peter Glover
Reviews Coordinator
Pam Turnbull
Promotions Editor
Chris Payne

Advertising Sales
John Snowden
Peter Babbage

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Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.

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electron user NEWS

Silence is golden

A CLEVER new device allows Electron users to play their favourite games without disturbing the rest of the household.

Chasing those high scores without fear of complaint has been made possible through SoundMaster, which costs just £14.99 from Database Electronics (061-480 0171).

The package includes a special interface encased in tough plastic with a graded volume control. It connects easily inside the computer and is supplied with all the necessary leads.

The handsome Ross stereo headphones are fully guaranteed. They come with a special adapter which allows them to deliver crystal clear reproduction with personal stereo or hi-fi systems too.

Every SoundMaster is supplied in a colourful presentation pack with detailed instructions.

Utility rom enhanced

A utility rom being developed for the Electron by Project Expansions (see the October issue of *Electron User*) has been enhanced to feature more than 40 commands instead of the 11 originally planned.

Called Pluscom 1.0, it will cost £14.95 and make it possible to move Basic programs to anywhere in the machine's memory and to slow down printing on screen by variable amounts, according to Project Expansions boss Chris Rudge (0329 221109).

Drive to produce more peripherals for the Electron

A determined campaign to make the Electron one of the most versatile home computers on the market has been launched by John Huddleston, managing director of research and development company Pres.

He and his team have embarked on a long-term programme to develop exciting new peripherals for the machine.

Huddleston, who is also boss of Advanced Computer Products, told *Electron User*: "We are working on a wide range of new items which we feel will exploit the full potential of the machine".

Recently Pres (0276 72046) launched a 3.5in disc upgrade – the £99 Advanced Plus 3 and interface – which can be used in conjunction with the Plus 1.

"Until now the price for a disc upgrade had been in the region of £200 which was prohibitive to many users", said Huddleston.

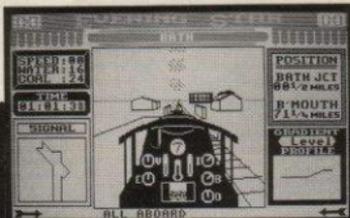
As a result of this development Pres can now supply a second disc drive for existing disc users for £59.

Advance orders for the new disc system have been so great that the manufacturing process has been stepped up in order to cope with the demand.

Other products in the pipeline include the Advanced Plus 6 which is an internal ram/rom upgrade for the Advanced Plus 1 which allows six roms or four roms and two rams to be fitted.

Also available will be ADFS (Advanced Disc Filing System) for existing Plus 3 and AP4 users. The new ADFS has had all of the known problems of the earlier version removed and also incorporates patches in the rom for future expansion to E00 use and for configuring a ram disc.

Budding musicians have not been forgotten. Pres is shortly to release Hybrid's music 5000 system which will have the same extensive music capabilities as the BBC Micro version.



THE second steam locomotive simulation from Hewson, called Evening Star, has been released on the Electron.

It features detailed moving graphics with full hidden line removal and reproduces the many famous landmarks of the Somerset and Dorset line from Bath to Bournemouth, says Hewson (0235 832939).

A multitude of combinations of journey type, control level and schedule, plus a variety of tricky situations for those tackling the Problem Run are included.

Evening Star costs £14.95 on disc, £9.95 on cassette.

Slogging around the country

A 2,000 mile tour of dealers is underway which will bring Slogger's range of Electron products to users' doorsteps.

Described as "a first in Electron computing", the tour set out from the Electron and BBC Micro User Show at London's New Horticultural Hall before moving to the Computer Depot in Buchanan Street, Glasgow on November 21 and Allen James in Stratford Road Birmingham on November 28.

In December, the dates are ACL in Bartholomew Street, Newbury, on the 5th, Computer Exchange, City Road, Cardiff, on the 12th, and Home and Business, Yorkshire Street, Oldham, on the 19th.

Sales manager Barry Johnson explained: "In order to assist our growing network

of dealers we are visiting our more extensive outlets to make our goods more accessible to our loyal end users.

"I feel that by doing this we can supply the kind of support only given at the excellent Micro User shows which occur in only two locations but only three times a year".

Towerhill, now one of the top suppliers of Electron tape software.

As another indication of its commitment to Electron users, Slogger has just released the Pegasus 400 disc drive system at £130.

At the centre of the system is the Slogger 40/80 track double sided 5.25in drive which has 400k storage per disc, a one-year guarantee, internal power supply and reliability at a rate four times faster than some drives, claims Slogger (0634 52303).

The Pegasus disc interface which boasts excellent CAD production, Acorn approved design, 90 page documentation and compatibility with APC's ADFS Version 1.1 is included.

The system, which has all utilities built in, is completed by the Slogger SEDFS rom.

THE GALLUP CHART

TOP 10

ELECTRON SOFTWARE

THIS MONTH	LAST MONTH	TITLE (Software House)	PRICE
1	1	AROUND THE WORLD IN 40 SCREENS <i>Superior</i>	6.95
2	2	FOUR GREAT GAMES <i>Micro Value</i>	3.99
3	3	SOCCER BOSS <i>Alternative</i>	1.99
4	4	SUPERIOR COLLECTION VOL. 2 <i>Superior</i>	9.95
5	5	CODENAME DROID <i>Superior</i>	9.95
6	6	PAPERBOY <i>Elite</i>	9.95
7	7	TRIPLE DECKER <i>Alternative</i>	1.99
8	8	STRYKER'S RUN <i>Superior</i>	9.95
9	9	PALACE OF MAGIC <i>Superior</i>	9.95
10	10	EDDIE KIDD JUMP CHALLENGE <i>Ricochet</i>	1.99

Compiled by Gallup/Microscope

Superior Software dominates the chart this month with Around the World in 40 Screens in pole position and a new entry. Two budget titles enter the charts from Alternative and Ricochet, with the highest new entry being Triple Decker - watch out for a review in this month's *Electron User*.

Take a degree on your Electron

ELECTRON owners will soon be able to use their machines to study for degrees.

Pioneering education software house LCL has introduced Home College which it claims marks a new era in learning.

A spokesman for LCL (0491 579345) explained that Home College brought the best in lecturers and teachers into the student's home. Techniques used were similar to those in colleges, with lectures by video and tutorials by software, books and tapes.

"This revolutionary and exciting way of learning enables adults, both beginners and exam candidates to pass the exams essential for most interesting careers", said the spokesman.

"With Home College they can choose the subject they

require and progress to degree level, passing GCSE and A-level on the way".

The project is the most ambitious ever undertaken by LCL.

The first releases are Foundation Level courses in Maths, English Language and French. Advanced Maths will follow soon.

The company is aiming the course at adults working at home, students needing extra help before exams, teachers and industry.

Home College users need their Electron, a video and a cassette player.

Each course consists of a video of around 24 complete sections, two discs or tapes of 24 programs, books and tape.

An introductory offer of £49.99 per course is available.

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NEW GAMES

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*Available on 3.5" disc

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THIS is it, the moment you have all been waiting for – the announcement of the winners of the home-written adventure competition.

With dozens of entries to review and consider, it has taken me months to decide upon the winners. The standard of entry has generally been very high and the breadth of imagination breathtaking.

Some entrants do, however, need a crash course in spelling if they are to become serious adventure authors.

The entries were given marks out of 20 in five categories – originality, presentation, spelling and grammar, puzzle construction and atmosphere.

Joint third place with 78 per cent each, was shared by **Robert Henderson** for *Landed* and **Andrew Piercy** for *Traitor*.

Landed is a two-part

You dreamed up superb adventures

spoof on the Superior classic, *Stranded*. It incorporates clever puzzles, an excellent loading screen and should not prove too daunting for the beginner to text adventuring.

Traitor is a Le Carré-type spy adventure, and though influenced by Rick Hanson, it is a devious journey into this genre of puzzle solving, and is perhaps closer to the real world of spies than *Robico* has dared to go.

Robert and Andrew each receive two pieces of top class software for their efforts.

In second place with 80 per cent is a hilarious spoof on *Gremlins*, *Dracula* and *Airplane*, entitled *Vampire Hamsters*. Its author, **Neil Sedgwick** has a deliciously wicked sense of humour as well as the ability to construct atmospherically superb puzzles. Three classic adventures are now winning their way to Neil.

Second to none with 84 per cent is an outstanding entry from **Martyn Amos** of *Heddon on the Wall*. *Rune-staff* is of the Donaldson/Tolkien ilk, but deserves to be called a masterpiece of fantasy in its own right.

It is very complex and extremely cunning in construction and Martyn has obviously benefited from having a disc system to devise his adventure.

As you will see, I have altered the prizes slightly to account for the outstanding merit of the winners, and four of the very best adventures have been awarded to Martyn.

If all four authors develop their writing style, they

deserve a successful future in this field of computer software.

Mention should also go to several other entrants who missed the mark by only a few per cent. **Henry O'Donnell** and **Troy Helm** would surely have been up there with their entries *Bright Eyes* and *Hagar the Horrible* respectively, but went too close to the original sources.

Geoff Barber's *Haunted House* was a highly original jaunt, but lacked the real atmosphere of a winner.

Andrew Stewart's *Skull Island* included some marvellous puzzles, but the program crashed as I tried to cross the sea.

Andrew Harkness displayed a unique writing talent with his entry, *The Land of Fangorn*, and I have forwarded his work to a number of software companies for appraisal. His is certainly a name to watch out for.

Congratulations and thanks to all of you, perhaps we'll do it again sometime.

With the increasing 64k user base as announced last month, 1988 will surely be the year of upward mobility for all Electron owners.

Slogger has just announced that anyone buying their Master Ram Board will be given the opportunity to buy *Robico's Island of Xaan* at £4.50, and *Enthar Seven* at a give-away £9.95.

Merry Christmas to all readers, and thanks to so many of you who have made my first year in the cave so exciting and enjoyable. Until the hamsters get you, happy adventuring.

Adventurer's Glossary

Bag: Often used for carrying items or perhaps for waving.

Bar of silver: A treasure.

Barrel: Sometimes contains Rum, but could be used for hiding in or even as a means of transportation.

Basket: Could be used for carrying items, but often the home of a snake.

Beans: Try planting them, as Jack once did.

Bear: Usually friendly, but often a cumbersome accomplice. Sometimes needs to be baited.

Bed: To sleep in, but watch out for booby traps.

Bell: Ring it and see.

Belt: Often has magical properties if worn or might be used for transportation.

Bible: A potent force of good.

Bird: May need to be charmed or killed.

Book: Always worth reading.

Boots: Not the chemist – they should be worn.

Bottle: No adventure is without one. Fill it with water, oil or whatever.

Bones: Worth examining, though could be a demonic adversary.

Boulder: Useful for pushing and destroying or for climbing upon.

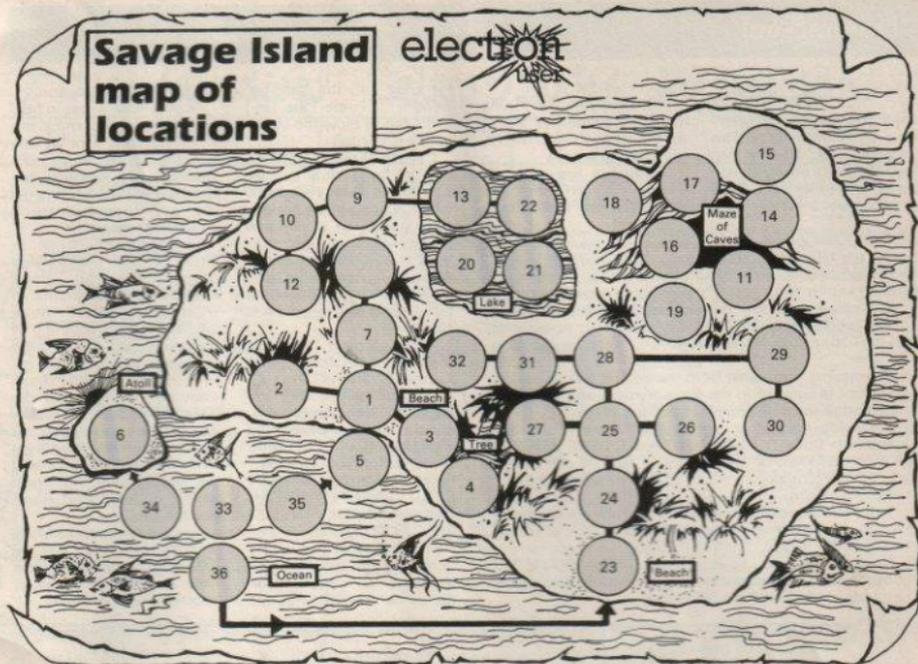
Box: Open it, but remember Pandora.

Bucket: For carrying a liquid.

Building: Always worth entering, but you may need a light source.

Savage Island map of locations

electron
USER



Here is the complete map showing the Savage Island locations listed in the September, October and November issues of the Electron User

Readers' Hall of Fame

Kayleth – Robert Henderson

When the game starts you find you are bound with metal bands. You must **BREAK BANDS**, go **UP**, **UP** and **PULL LEVER** to escape. The droid will vanish leaving you to explore the ship. Examine everything and take what you find.

Turn the knob on the chair. If you look at the reflective sheet you will notice an unfamiliar face gazing back. Your mind is now in the body of an android.

After examining everything you should be equipped with some tape, a canister, a fuse and a pair of gloves. Wear the gloves and **UNSEAL TAPE**, then **STICK TAPE ROUND CANISTER**.

This will soon dissolve and leave **Dextra**, **Masta** and **Serta**. These are cartridges which will give you different personalities.

To make use of these sci-fi wonders **INSERT** cartridge in **SLOT**. You will become in turn, a plasma-firing droid, a repair droid and an overseer droid.

Insert the repair droid cartridge and you can open the aperture. Once outside **EXAMINE APERTURE**, **UP**, **EXAMINE APERTURE** and **OPEN APERTURE**. The code letters **ROO** and **DHT** are **AZAP** code which allow you to visit different parts of the game.

Examine the controls, this will give you the code **ELY**. Go to the **AZAP** chamber and type **AZAP CODE ELY** which will transport you to the first part of the game.

The Puppet Man – Geoff Livesey

WAKE UP, **EAST**, **TALK** to **MUSE** then **SOUTH**, **SOUTH**, **SOUTH**, **EAST**, **ENTER** the **MANOR**. Go **UP** then **WEST** and **TALK** to **BALLERINA**. **EAST**, **NORTH**, **GET LADDER**, **SOUTH**, **DOWN** and **LEAVE** the **MANOR**. **WEST**, **NORTH**, **NORTH**, **WEST**, **DROP LADDER** and **CLIMB TREE**. **EXAMINE HOLLOW** and **JACKET** and **GET SILVER** key. **DOWN** and **GET LADDER**.

EAST, **SOUTH**, **SOUTH**, **EAST** and enter the **Manor**. Go **NORTH** into the lounge and unlock the closet. Examine the skeleton and get the skeleton key. Then return **SOUTH**, leave the **Manor** **WEST**, **SOUTH**, **WEST**, and **UNLOCK** the **DOOR**.

Enter the village hall and examine the goods on the table to find the ballet shoes. Get the shoes and leave. Return **NORTH**, **EAST**, enter the **Manor**, go **UP**, **WEST**, and give the shoes to the ballerina.

At this point **Harlequin** will appear and you will be transported to section two.

Enthar Seven (continued from last month) – The Boss

Having successfully completed nearly two thirds of this mega-adventure, you are now prepared for the computer registration centre in sector seven.

Equip yourself with the copper coin and once more

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"I can recommend it to anyone who wants easy access to the Electron's functions." - Electron User, August 1987.

- ACP's main features are:-
- Pull down windows operate throughout
- Users can create their own windows
- Simple to change MOS's configure options
- Easy entry to other languages
- Floating point calculator
- File manager
- Sideways ROM's utilities

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(05) /E/

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For Master and Electron users. A battery backed 32k RAM cartridge A.B.R. is a self contained cartridge containing two 16k pages of sideways RAM with a rechargeable battery back up. Each 16k page can be individually locked by software. Supplied with full software support, to include loading software, ROM save, advanced print buffer and a disc utility MAKEROM. "It's a superb Addon and a must for all serious Electron Users." - EU June

ADVANCED PLUS 4

(08) /E/+1

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DISC DRIVE COMPATIBILITY AT LONG LAST (Electron User June 86) this sums up AP4 & ACP's approach to producing products. AP4 is a fully ACORN compatible disc interface & will accept any standard drive inc. PSU, runs 1770 DFS (as fitted in the B+ & Master), saves page & disc info in ROM & provides a spare rom socket. ACP's PLUS 4 comes out on top. I can recommend it to anyone. (E.U. June 86)

• AP4 should be considered the standard interface for the Electron (AU July 86)

AP4 100 £199.00 (inc VAT & Secunor delivery)

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(09) /E/+1

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3 versions ADM-C111) - ADB(12)

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(14) /E+ASR/

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ADVANCED QTR MEG RAM

(19) (M/ADM)/E+1(ADE)

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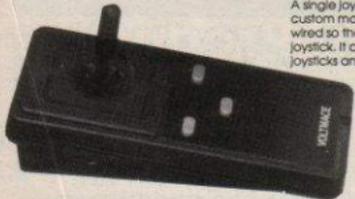
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SPIRAL

10 LINERS this month starts with a very unusual picture creator from Mathew O'Donnell. Instead of drawing with a brush, you draw by moving a spinning circle around the screen using keys Z and X for left and right and * and ? for up and down.

When the program is run a circle is drawn made up from 23 triangular segments of alternating colours. Pressing any of the direction keys moves the centre of the circle and seg-

ment origin around the screen.

By changing the movement and pressing combinations of direction keys it is possible to create some quite stunning patterns.

To create a slightly different effect try changing line 40 to:

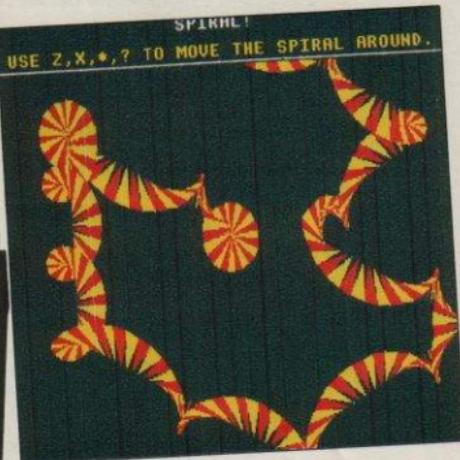
```
40 CX=CX+1:IF CX=4 CX=0
```

Owners of Plus 1s and Plus 3s should note that these units have been switched off by the program to gain extra speed.

```
10 MODE:78212:806:78213:
&F1:782AC:0:CX=1:XX=640:YY=5
12:DIMSX(360),CX(360):FORPP=
0 TO 360 STEP 16:SS(PX)=SINC
RAD(PX)):SB:CC(PX)=COS(RAD(P
X)):80:NEXT:ZZ=0:MODE1:VDU23
:8202:0:0:0:ONERROR MODE6:R
EPORT:PRINT at line ;ERL:EN
D
```

```
20 PRINTTAB(16)"SPIRAL!":
COLOUR2:PRINT" USE Z,X,*,?
TO MOVE THE SPIRAL AROUND.":
GCOLB,3:MOVED,916:DRAW1276,9
16:DRAW1276,4:DRAW,4:DRAW,
```

```
916:VDU24,8,12:1268:908:
30 MOVEXX,YY:ZZ=0:REPEAT*
FX178,0,0
40 CX=CX+1:IF CX=3 CX=1
50 GCOLB,CX:ZZ=ZZ+16:IF Z
X=368 ZZ=0
60 MOVEYY,YY:PL0T85,XX+SX
(ZX),YY+CX(ZZ):OSCL1:(FX178,
255,0):IF INKEY(-98):XX=XX-
16
70 IF INKEY(-67):XX=XX+16
80 IF INKEY(-105):YY=YY-8
90 IF INKEY(-73):YY=YY+8
100 UNTIL0
```



HIGHLIGHTED TEXT

This is highlighted text

But this isn't!

Highlighted text shows up clearly...

But ordinary text does not.

(That says 'But ordinary text does not')

It even looks good when you use the same colour as the background.

OUR second 10 liner, also from Mathew O'Donnell, is a demonstration of a super-sub procedure to highlight text anywhere on the screen in any colour, even background.

The routine fits easily on to one line, the rest of the program providing examples.

The procedure takes four

arguments: AS is the text to be printed, X%, Y% is the position and C% is the foreground colour.

The coordinates are graphic and not text coordinates. To calculate the graphics position from a text position in Mode 1 use:

```
XX=XX+32:YY=1024-YY+32
```

```
10 REM Highlighted text
20 REM BY M. O'Donnell
30 REM (c) Electron User
40 *FX16
50 MODE1:VDU23:8202:0:0:0
:19,1,2:0:19,2,6:0:19,3,5:0:
:GCOLB,1:MOVED,0:MOVE1280,0:
:PL0T85,1280,1024:MOVED,0:MOV
E0,1024:PL0T85,1280,1024:PRO
Chighlight('This is highligh
ted text',260,900,2)
60 VDU5:MOVE400,800:PRINT
'But this isn't':PROChighli
ght('Highlighted text shows
up clearly...',80,600,3):VDU
5:MOVE200,400:PRINT'But ordi
```

```
nary text does not':VDU4
70 PROChighlight('That s
ays 'But ordinary text does
not')',0,320,2)
80 PROChighlight('It even
looks good when you use the
',100,200,1):PROChighlight('
same colour as the background
0.',200,140,1):END
90
100 DEFPROCChighlight(AS,XX
,YY,CX):VDU5:GCOLB,0:MOVEXX,
YY-4:PRINTAS:MOVEXX-8,YY:PRI
NTAS:MOVEXX+8,YY:PRINTAS:MOV
EXX,YY+4:PRINTAS:GCOLB,CX:MOV
EXX,YY:PRINTAS:VDU4:ENDPROC
```



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The SLOGGER PEGASUS Disk Interface which boasts

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- * Acorn approved design and standard WD1770 floppy disk controller
- * NEW Type-Ahead facility when used with Master RAM Board
- * 90 page documentation usually provided as a separate purchase
- * Compatibility with the ACP ADFS Version 1.1, which offers a total 640k when used with SLOGGERS 5.25" Disk Drive

The SLOGGER SEDFS ROM, about which the Electron User magazine enthused

"I can recommend SEDFS unreservedly"
"Anyone considering upgrading to disk"
"SEDFS is the logical choice"

The quality of SEDFS speaks for itself, unlike other filing systems it offers

- * No loss of Electron memory, PAGE=&E00 (not &1D00)
- * Full Acorn DFS (BBC Model B and MASTER SERIES) compatibility
- * All utilities built in, requires no additional menacing utility disk

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¹ can thoroughly recommend it"

Electron User 1987

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Electron User July 1986

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A&B July 87

Electron User May 87

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Electron User, July 87

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Electron User July 87

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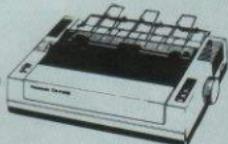
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I HAVE stressed throughout this series that there is far more to Logo than the simple turtle graphics commands most of us are familiar with.

In fact there are more than 200 built-in commands in Acornsoft's Logo - available on rom cartridge for the Electron - of which only around 20 are concerned with turtle graphics.

It is impossible to cover the whole of Logo in three short articles so I have illustrated the language by choosing three vastly different topics.

The first article - in the October 1987 issue of *Electron User* - examined turtle graphics.

Last month in Part II we looked at a recursive function which was used in a short program to test for palindromes. Now we'll look at a more complex programming example - a hex/Ascii memory dump utility.

This can be used to explore the Electron's memory map, and as you have probably seen similar utilities written in Basic it should be familiar territory.

However, a large proportion of the Electron's memory is organised by the currently selected language so the map will be entirely different when running Logo.

Looking at this month's listing you'll see two procedures and one function - the function is the one which OUTPUTS a value.

The first procedure HEXPRINT prints the decimal number *n* in hexadecimal. The number passed to it is in the range 0-255 (eight bits) and is printed as two hexadecimal digits - the left and right nybbles.

These are calculated by dividing *n* by 16. The quotient is the left digit and the remainder is the right one:

```
QUOTIENT :n 16
REMAINDER :n 16
```

These calculations, give us a decimal result between

What the hex, it's a dump . . .

ROLAND WADDILOVE explores the memory map in Part III of his introduction to Logo

zero and 15, but we want hexadecimal. The correct digits are printed by using ITEM to pick out the hex numbers from the string of characters stored in *digit*.

ITEM is a primitive (built-in keyword) that picks out a particular item from a list. For instance:

```
ITEM 3 'LOGO
```

would return the letter G, as it is the third letter in the word LOGO.

In HEXPRINT our hexadecimal digit is picked from the list of 16 characters held in *digit*. This technique

could easily be adapted to output any number in any number base.

The next function, HEXINPUT, as its name suggests inputs a hexadecimal number from the keyboard.

Local variables have been used, though strictly speaking they're not essential in this program.

Logo's LOCAL operates in the same manner as Basic's and the original value of the variables are restored on exit from the procedure or function.

RC is used to read a character from the keyboard into the variable *i* and is

equivalent to Basic's GETS. If Return is pressed, the character will have Ascii code 13 and the value *n* (initially zero) will be OUTPUT. This terminates the function.

MEMBER is used to test whether each character entered is a hexadecimal digit. It does this by testing whether *i* is a member of *digit* and returning its position if it is.

It functions rather like Basic's INSTR(*a*,*b*,*s*) which tests whether *b* is in *a* and returns its position if it is, otherwise the result is zero.

Turn to Page 20 ►

```
*LOGO
TS
SETMODE6

TO HEXPRINT :n
TYPE ITEM (1 + QUOTIENT :n 16) :digit
TYPE ITEM (1 + REMAINDER :n 16) :digit
END

TO HEXINPUT
LOCAL 'n 0
LOCAL 'i 0
LOCAL 'j 0
input:
MAKE 'i RC
IF :i = CHAR 'S [OUTPUT :n]
MAKE 'j (MEMBER :i :digit) - 1
IF :j < 0 [GO 'input]
TYPE :i
MAKE 'n (:n * 16 + :j)
GO 'input
END

TO DUMP
MAKE 'digit '@123456789ABCDEF
TS
PRINT
PRINT [Hex / Ascii Memory Dump]

PRINT
TYPE [Address to dump:]
MAKE 'addr HEXINPUT
MAKE 'i 0
PRINT
PRINT
TIDY
MAKE 'a ""
HEXPRINT QUOTIENT :addr 256
HEXPRINT REMAINDER :addr 256
TYPE :a
MAKE 'i 0
loop2:
MAKE 'byte EXAMINE :addr + :i
HEXPRINT :byte
TYPE ""
TEST ALLOF (:byte > 31) (:byte < 127)
IFTRUE [MAKE 'a WORD :a (CHAR :byte)]
IFFALSE [MAKE 'a WORD :a "."]
MAKE 'i :i + 1
IF :i < 8 [GO 'loop2]
PRINT :a
MAKE 'addr :addr + :i
MAKE 'j :j + 1
IF :j < 16 [GO 'loop1]
END
```

Programming

◀ From Page 19

For instance, Logo's:

```
MEMBER 'G 'LOGO
```

and Basic's

```
INSTR("LOGO","G")
```

both return 3 as G is the third member of the word LOGO.

The second to last statement in HEXINPUT is Logo's equivalent of Basic's GOTO. You can GO to any label placed within the current word definition, but you can't jump out of one. In this case it's a backward jump to *input* to read the next character.

The third and final procedure is DUMP and this is where most of the work is done.

The first line stores the hexadecimal digits in *digit* and the next four switch to

the text screen and print the title. HEXINPUT is then called to MAKE *addr* equal to the address to start dumping from.

There are two loops in Dump labelled *loop1* and *loop2*, one nested within the other.

Logo hasn't got a FOR...NEXT structure so this has to be emulated using MAKE to increment the loop counters *i* and *j*, then using IF and GO to jump back to the loop start if the limit hasn't been exceeded.

The contents of memory locations are fetched using the primitive function EXAMINE and stored in *byte*. This is printed in hexadecimal by passing the value to HEXPRINT.

Unfortunately, EXAMINE won't handle addresses larger than &7FFF so you can't browse through the roms which start at &8000.

The Ascii characters

Hex / Ascii Memory Dump

Address to dump: \$1200

```
1200: 16 48 75 67 6F 81 8D 6A .Hugo..j
1208: 0D 0D 66 32 46 56 0D 00 ..f2FV..
1210: 00 00 00 FF FF FF FF C6 .....
1218: 82 00 00 5D 81 00 16 C4 ...J....
1220: 05 4D 50 31 0D 0D 0D 0D .MP1....
1228: 0D 00 00 00 00 FF FF FF .....X...
1230: FF 84 04 00 00 5B 01 00 .....
1238: 15 C6 D2 45 44 0D 47 51 ...ED.GD
1240: 71 47 0D 00 00 00 00 FF qG.....
1248: FF FF FF 2A 01 00 00 29 ...*...
1250: 01 00 03 CC EF 67 6F 52 .....goR
1258: 4F 4D 31 8D 31 00 00 FF OM1.1...
1260: FF 00 00 FF FF 00 40 00 .....0
1268: 00 A9 00 00 01 CC EF 67 .....g
1270: 6F 52 4F 4D 32 0D 31 00 oROM2.1.
1278: 00 FF FF 00 00 FF FF 00 .....

```

corresponding to the contents of memory are stored in the string *a* and is printed every eight bytes EXAMINE.

If the value of *byte* is greater than 31 and less than 127 it is converted to an Ascii character with CHAR and added to *a*, otherwise a dot is added instead.

TEST ALLOF tests all of the following conditions to see if they are true. The result of this is used by

IFTRUE and IFFALSE to decide whether the byte is a printable Ascii character or not.

That just about sums up this memory dump utility. Type it in and enter DUMP to run it. Figure 1 shows the sort of output you can expect.

● Next month we'll return to View, but instead of word processing we'll see how it can be used for developing programs.

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Santa on the tiles

IT'S Christmas Eve once more, and time for Santa Claus to do the rounds.

The presents are wrapped the candles are lit and Rudolf and the rest of the reindeer are ready to go. Then disaster strikes, someone has pinched the sleigh!

There's no time to lose. The culprits must have been the evil pixies. Santa will have to do the job on foot. As he climbs nimbly on to the first rooftop he discovers the pixies have been up to even more mischief.

The place is littered with holes, moving platforms and pine trees that will make your eyes water. To cap it all, they're trying to knock him off the roof by throwing snowballs.

Can you get Santa across each of the 11 different rooftops? What will happen if you do? Only you will know as you play this excellent Christmas special.

When entering the program and checking for typing errors it is recommended that you save the game before running it and

Don your beard and costume and play ANTHONY HOUGHTON's brilliant Christmas game

omit line 40 (which disables the Escape key) until the listing is correct. These comments apply especially to owners of the Plus 3, since the program downloads itself before running and corrupts the ADFS workspace.

The data for each screen in line 420 consists of a string of eight characters, split into six parts as follows:

- Hole type - 0 means no holes, 1 means three empty holes and 2 is three holes containing trees.
- High snowball direction -

0 means no high snowball, L means a high snowball travelling left, R is a high snowball travelling right.

● High snowball delay - a two digit number expressed in hexadecimal, from 00 to FF where 00 is the shortest delay, FF is the longest.

● Low snowball direction - one character in the same format as the high snowball.

● Low snowball delay - two characters in the same format as the high snowball.

● Platform flag - 0 indicates no moving platform while 1 is a moving platform while 1 is a moving platform crossing a large gap.

The length of data for each screen must always be eight characters long. The data for your own screens should be inserted into line 420. Remember there must always be enough data for 11 screens.

A further point to bear in mind when designing screens is that certain items are not compatible. For example, the holes are not compatible with the moving platform.

An error of this type in the data will not crash the program, but will not give the expected result. ■



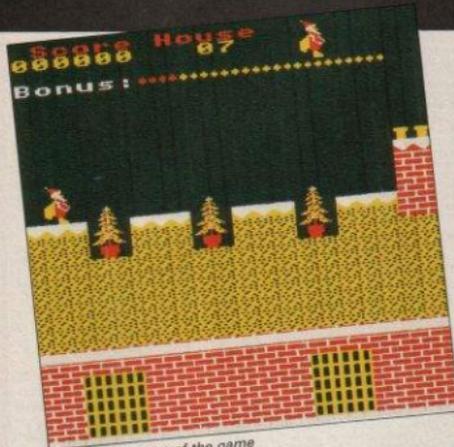


Figure I: The start of the game

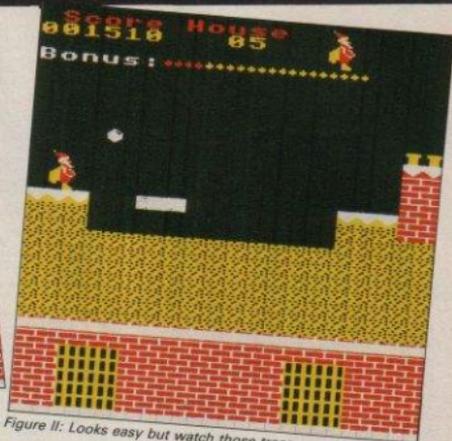


Figure II: Looks easy but watch those trees

```

10 REM Santa on the tiles
20 REM by Tony Houghton
30 REM (c) Electron User
40 *FX229,1
50 IF PAGE=6E00 THEN 1450
60 MODES:VDU23;8202;0;0;0
;;PROCInstruct:PROCassen:PRO
Csetup
70 REPEAT:PROCwait:PROCga
ne:IF?dead=27PROCInstruct
80 UNTILO
90 DEFPROCgame:VDU20:CLS:
Lives=3:SZ=0:level=1:7speed=
245:REPEAT:PROCsreen:PROCma
n:CALLman:IF?dead=27PROCbonu
s ELSEIF?dead=11Lives=Lives-1
100 IF?dead=27UNTIL:ENDPR
OC ELSEUNTILLives=1
110 IF?S:CH(7)PROChsc:ENDP
ROC
120 HX(7)=SZ:HS(7)=?:FORN
X=7701STEP:1:=1:HX(NX)>HX(NX
-1):SS=HS(NX):HS(NX)=HS(NX-1)
:HS(NX-1)=SS:SZ=HX(NX):HX(NX
)=HX(NX-1):HX(NX-1)=SS
130 NEXT:PROChsc:VDU23,1,1
:0;0;0;17,3:AZ=0:XL=870:YL
=0:*FX21
140 REPEAT:VDU7,31,9,tyX:1
870=8500:1672=10:1673=32:76
74=126:CALL&FFFF:UNTIL96500
<>
150 VDU23,1,0;0;0;0;0:HS(t
nX)=85060:ENDPROC
160 DEFPROCbonus:COLOUR1:P
RINTTAB(5,63)bonus x';10+lev
el:7jump=0
170 REPEAT:7bont=1:CALLbo
nus:SOUND0,-15,4,1:SZ=SZ+10:
level:COLOUR2:PRINTTAB(0,2)R
IGHTS(00000*STRSS,6)UNTIL
7jump=400
180 level=level+1:IFlevel<
12ENDPROC
190 level=1:CLS:COLOUR2:PR
INTTAB(4,5)Well done!:COLO
UR1:PRINTTAB(2)You reached
the TAB(2)end of the roa
d.:COLOUR3:PRINTNow try a

```

```

nother...
200 IF?speed<252 ?speed=?s
peed+2:PRINTTAB(4)A bit fas
ter TAB(5)this time.
210 FORNX=1TOS000:NEXT:END
PROC
220 DEFPROCsnoBall:FORNX=
0T07:NL?hisb=0:NEXT:BS=MIDS(
AS,2,1):IFBS<>?PROCbAl(BS
,EVAL('B'+MIDS(AS,3,2)),0)
230 BS=MIDS(AS,3,2):IFBS<>
?PROCbAl(BS,EVAL('B'+MIDS
(AS,6,2)),4)
240 ENDPROC
250 DEFPROCbAl(dir$,$delZ,
ofs$):IFdir$='Lofs?hisb=&F
ELSEofs?hisb=1
260 ofs=?hisb+2):del%ofL
%?(hisb+3)=del%:ENDPROC
270 DEFPROCsreen:CLS:COLO
UR3:COLOUR120:PRINTTAB(0,15)
STRINGS(20,CHR$120):COLOUR0:
PRINTTAB(0,16)STRINGS(100,CH
R$129)
280 COLOUR3:COLOUR29:PR
INTTAB(0,25)STRINGS(20,CHR$132
):PRINTTAB(10,10)chInneyTAB
(0,26)STRINGS(120,CHR$130):
290 window$=STRINGS(5,STR
INGS(3,CHR$133)+STRINGS(3,CHR
$0)+CHR$10):COLOUR120:COLOU
R2:PRINTTAB(2,26)window$TAB(1
3,26)window$:VDU50,11
300 RESTORE420:FORNX=1T0le
vel:READAS:NEXT:PROCsnoBall:
?RIGHTS(AS,1)="+?PROClft
ELSEPROCholes
310 COLOUR1:PRINTTAB(1,1)
ScoreTAB(7,1)7house:COLOUR
2:PRINTTAB(0,2)RIGHTS(00000
*STRSS,6)TAB(9,2)RIGHTS(0
*STR$level,2)
320 IFLives=0:1870=8905A20
:XL=24:YX=3:FORNX=1T0Lives:C
ALLrnt:1870=1870-83A8:1872
=8990:ENDPROC
330 COLOUR3:PRINTTAB(0,4)
Bonus:':X$=8:YX=1:FORNX=8506
BT085E18STEP:1870=NX:1872=6

```

PROCEDURES

assem	Assemble machine code
game	Play the game
instruct	Display title page
bonus	Calculate bonus
setup	Initialise game.

VARIABLES

level	Current screen number
S%	Current score
H%	Array of high scores
lives	Number of lives remaining

```

AAB-B*(NX-85000):CALLprint:N
EXT:7bont=35:7bont=5
340 ENDPROC
350 DEFPROCholes:7lft=0:
?trfl=0
360 IFEFTS(AS,1)<>?PRIN
TTAB(3,15)hole$TAB(0,15)hole
$TAB(13,15)hole$
370 IFEFTS(AS,1)=2:CALLL
Ocrs:7rnt=1:8678T0=66E18ST
EP850:1870=NL:1872=8A90:CALL
print:NEXT
380 ENDPROC
390 DEFPROClift:7trfl=0:PR
INTlgap$?7lft=22:7lft=2:7
lft=1:8668T0=STRINGS(40,CH
R$255):786098=0:ENDPROC
400 ENDPROC
410 DEFPROCman:7max=2:7ma
ny=12:1870=8996710:1manadr=
1870:7fac=ing=890:7step=0:XX=
24:YX=3:CALLprint:7dead=0?7
jump=0:ENDPROC
420 DATA 1000000,0000L050
,00000001,002L0C0,0R100001,
186L0E0,20000000,0000L0C1,2

```

```

000L050,200L040,0R10L051
430 DEFPROCsetup
440 VDU23,128,255,255,255,
255,126,60,24,0
450 VDU23,129,66,0,162,0,6
6,16,33,4
460 VDU23,130,0,254,254,25
4,0,239,239,239
470 VDU23,131,0,126,126,60
,60,60,60,60
480 VDU23,132,16,255,255,2
55,255,255,255,0
490 VDU23,133,255,153,153,
153,153,153,153,255
500 chInney$=CHR$17+CHR$12
8+CHR$17+CHR$2+CHR$13+CHR$1
3+CHR$17+CHR$3+CHR$17+CHR$1
29+CHR$0+CHR$0+CHR$10+CHR$12
8+CHR$128+CHR$17+CHR$13+CHR
$17+CHR$1+STRINGS(5,CHR$8+CH
R$8+CHR$10+CHR$130+CHR$130)
510 hole$=STRINGS(3,')+'C
HR$8+CHR$8+CHR$10)
520 lgap$=CHR$17+CHR$128+C
HR$3+CHR$83+CHR$15+STRINGS(5

```

Turn to Page 25 ▶

The Tenth Annual Kansas SALE

OF ELECTRON PROGRAMS

BATTLE ZONE SIX

Play the most hectic battle of your life in the ultimate Zap game!

The screen of aliens you virtually every movement imaginable, all with one purpose - to get you!

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WORD PROCESSOR

This is the one designed for the two finger typing and has received rave notices over the past two years. It allows continuous typing, with no need to look at the screen, with line ends, margins and everything else automatically sorted out at the printing stage by the Embedded Control Characters - as used by professional word processors.

You can automatically move left margin, decrease characters per line, centre text, right flush, new line, new paragraphs, new page, underline, and enlarged, emphasised and condensed characters.

All main controls toggle on the function keys, which are: Add, Edit, Search, Replace, Save text, Load text, Inform, Exit processor, Enter processor, Delete text, Insert buffer, Clear buffer, Format.

It will do many other things, printing either continuous or single sheets, emphasised or draft copy, double or single spacing, adjustable page length and optional page numbering. Editing and insertion is simplicity itself and a buffer allows 255 characters to be moved anywhere.

Complete with extensive User Guide giving actual examples.

Catalogue price £22.50. Sale price £7.95

MICROTYPE

Now firmly established as the 'standard' typing tutor for the BBC and is now used in over 200 colleges and schools and in training by ICI, NCB, Shell, Boots, Post Office, British Telecom, etc.

The program gives both exercises and sentences with a complete analysis of your average typing speed, accuracy and the keys mis-typed. If you wish to master the computer keyboard, then this is the program for you. You will benefit even after the first lesson!

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We operate a first class return post service, whether payment is made by cheque or credit card. Telephone orders by Access, Barclaycard or Diners before 4pm will be in our private collection at 4.30 If a program fails, no matter how caused, it will be replaced absolutely free of charge, this year, next year or in ten years...

So though the cowboys are deserting the Electron fest, Kansas will most certainly be here!

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Nothing extra to pay!

Kansas

Kansas City Systems, Unit 3, Sutton Springs Wood, Chesterfield, S44 5XF. Tel. 0246 850357

Top games at £3.95 each!

"Ten out of ten for value" - Electron User

LOONY LOCO

The new Arcade from Kansas—a four in one game with four entirely different and active, colourful screens. Drive the Loco, switching lines, firing harpoons and snorks to evade the rockets and planes. Then get to the buffet car by jumping the gaps and avoiding the cannon balls and arrows. The fun never ends as you will be all out catching the spinning cups from the three tables. Then as you come to a standstill, in the last screen you have to find out how to release the brakes.

MOON BUGGY

An ultra active arcade game which outdid everything when on display at the last Micro User exhibition. Needs no small amount of skill to get past the first level and there are seven of them! Manipulate the Buggy three different ways as the ground speeds by and at the same time use the different firing directions to split or jump the many obstacles. There are craters, boulders, debris, mines, tanks and bridge traps. Spacecraft and rockets all add to the excitement. This is a very challenging one, with single hazards, multiple hazards and even combination hazards. Multiple scenes with fast fluid action.

Catalogue price £8.50

PINBALL ARCADE

The only game ever to achieve FIVE five star reviews in the Press! Now faithfully converted to the Electron, with all the original BBC features, and running at the correct speed. Build your own pinball tables from the many bumpers, targets, slings, etc., from the six pages of colourful art-work. Move or re-moving anywhere on the board. Adjust tilt, bounce and even alter the scores. A most realistic spring action and even the strength of the flippers are adjustable. After a board is been created, it can be saved to tape, played and even altered again.

Catalogue price £10.35

THE FERRYMAN AWAITS

There's never been anything like it before! An entirely new computer language—Devised by the programmer and a virtual 50K Adventure into the normal Electron world has resulted in the most involved and challenging of all. The Adventure never to appear on the Electron, with literally around half a screen of objects and things take the adventurer onto a totally different plane. It is the only Adventure to accept more than a two word command. Such as TAKE SKULL FROM SHELVE OPEN DOOR is quite acceptable! It will even accept multiple commands. Set in the future, it is a magical quest in a wasteland populated only by fanatical devil worshippers and savage pirate hords, to which you are sold at sacrifice. Do not attempt to complete this Adventure in a few evenings, it will take a long, long time. And you will need our Help service...

Catalogue price £9.50

Any THREE below for £6.50

SINGLE COPIES £3.95

FIGHTER PILOT

A true cockpit view of both the runway during take-offs and landings, and the enemy fighters which have to be blasted out of the sky. Graphics include an accurate radar system and a combined artificial horizon and bank and level indicator. Information shown on fuel, speed, rate of climb, altitude and score. As the fuel gets low, you can switch to approach, land, re-fuel and take off again.

Catalogue price £8.50

CAVEMAN

Take the barrow down the lift into the many galleries of the cave, first to dig for diamonds and then for gold. Astute use of the lift and ladders and you might escape the monsters—or lead them to their destruction. Then go down for coal to re-fuel the furnace, which depletes as you use energy for the lift.

Catalogue price £9.50

MANIAC MOWER

Try to mow the grass in the park whilst avoiding the maniac mower, whose only aim is to cut you up! To make it harder there are lots of nasties lurking in the grass—all out to get you. To make it harder still there is a karate expert training in the park, who is very unfriendly indeed!

Catalogue price £8.50

HARLEQUIN

Played by one, two or four players. Harlequin is a very different sort of game—treasure hunting on the computer! Try to find which of the 14 treasures places the treasure is hidden, using the given clues. In addition to the information, there are lots of different tunes, very well done, with plenty of colour.

Catalogue price £9.95

MUNCHMAN

This is the one that started it all—a real live "Pacman" for the Electron. It is just like the original Arcade game with ghosts chasing you around as you devour, with all the facilities of the energisers which give limited time to zap the ghosts.

Catalogue price £8.50

SNAKE

Seven hectic levels with split screen and even double split screen make this very active indeed. The snake gets longer as you wind your way around, but avoid the roadstools at all costs. Ideal for young children, whilst by increasing the speed, active for adults and experts too.

Catalogue price £7.50

REVERSI

The Electron as your partner at Reversi—also known as Othello. Plays to all the rules with accepted black and white counters on a green board. Moves easily entered with very quick responses. All information and scores on the screen.

Catalogue price £7.50

DRACULA ISLAND

This Adventure has started countless people on adventures and provided a great deal of pleasure. The aim is to find and kill Count Dracula before he gets you. It is an ideal starter, needing plenty of effort to solve but not being too difficult to finish. Like all Kansas adventures, it is totally logical, which means things are always in the same order. Also like every Kansas adventure it has a game saving facility. And if you really get stuck, don't throw it away in disgust—give us a ring, for we operate a telephone Help service!

Catalogue price £9.50

RING OF TIME

The sequel to Dracula, this is a little harder to solve, though still retaining all the features, including the split screen, which means the important information remains on the screen all the time. The object is to retrieve the elusive Ring of Time, going through many trials and tribulations.

Catalogue price £9.50

REVENGE OF ZOR

The long awaited sequel to Dracula and Ring of Time. Somewhat more difficult This is a natural progression, and the adventure programmer has become much more devious, thus requiring greater effort to solve.

Catalogue price £9.50

◀ From Page 23

```
STRINGS(12,"") + STRINGS(12,
CHR$B) + CHR$10)
```

```
530 ENVELOPE1,1,5,5,5,10,
10,126,0,0,-126,126,126:ENV
ELOPE2,1,10,-1,-8,10,10,10,1
26,0,0,-126,126,126:ENVELOPE
3,2,3,0,0,7,7,0,126,0,0,-126
,126,126
```

```
540 DIM$S(7),H$(7):FORMX=0
T07:HS(NX)=TONY:HX(NX)=200
0-NX=100:NEXT:ENDPROC
```

```
550 DEFPROCINSTRUCT:PROCI
tle
```

```
560 COLOUR1:PRINT TAB(6)
Controls:COLOUR3:PRINT "SP
C62 - Left"SPC6'X - Right
"SPC2:Shift - Jump"
```

```
570 COLOUR2:PRINT SPC3:CO
Y - Freeze"SPC1:Delete - U
nfreeze""SPC6'S - Sound on
"SPC6'Q - Sound off""SPC1'
Escape - Restart"
```

```
580 ENDPROC
```

```
590 DEFPROCWAIT:COLOUR3:PR
INTTAB(0,30):Press Space to
play:OSCL:FX21:REPEATUNT
LGET=3:ENDPROC
```

```
600 DEFPROCITL:VDU12,19,
3,6,0,:COLOUR3:PRINTTAB(1,1)
Santa on the tides:COLOUR1
:PRINTTAB(3,3),by A. Houghto
n:GCOL0,31:MOVE27,95:PL0T21
,1216,95:ENDPROC
```



```
610 DEFPROCCHOC:PROCI:tle:F
ORNS=0T07:COLOUR1:PRINTTAB(0
,NX+27):NX+1:COLOUR2:PRINTT
AB(2,NX+27):RIGHTS(00000'S
TRSH(NX),6) :HS(NX)
```

```
620 IFS(NX)=TY:Y=NX+247:
tn=NX
```

```
630 NEXT:ENDPROC
```

```
640 DEFPROCASSEM:RESTORE3
680:FORMX=0T07:STAB74:STAB70:LD
A875:STAB71:STAB76:STAB72:LD
A877:STAB73:PLA:TA:PLA:TA
```

```
680 PRINT STX800:TYA:TA
```

```
:prnlp1 LDY#0:prnlp2 LDA(87
2),Y:EDR(870),Y:STA(870),Y:I
NY:CPY#80:BNENRnlp2
```

```
690 LDA#72:CLC:ADC#80:STAB
72:LDA#73:ADC#0:STA#73:LDA#7
0:CLC:ADC#40:STA#70:LDA#71:
ADC#1:STA#71:DEX:BNENRnlp1:R
TS
```

```
700 .calad LDA#0:STA#69:TX
A:LDX#3:.rolp ASLA:ROL#69:DE
X:BNERolp:STA#68:TYA:ASLA:TA
Y:LDA#1tbl,Y:CLC:ADC#68:STAB
68:LDA#1tbl+1,Y:ADC#69:STA#6
9:RTS
```

```
710 .tblti EOUS STRINGS(64
,CHR$0)
```

```
720 .manx EQU00:many EQU0
0:.manadr EQU00:.mandat EQU0
8900:.facing EQU00:.step EQU
80:.mandir EQU00
```

```
730 .nvan LDA#jump:BEQnvt
:CMPE#40:BEQjfall:MPVnt:.j
fall JMPfall.nvt LDA#nvan:L
D#many:JSRcalad
```

```
740 LDA#60:CLC:ADC#0#0:STA
A#60:LDA#69:ADC#3:STAR#69:LDY#
8:LDA(680),Y:CMPE#FF:BEQnann
V
```

```
750 LDA#640:STAJump:LDA#0:
STAMandir:JMPfall
```

```
760 .manw LDA#0:STAMandir
:LDA#81:LDX#9E:LDY#FF:JSR
&FFF4:TYA:BEQleft:LDA#8FF:#S
TAMandir
```

```
770 .nleft LDA#81:LDA#80
:LDY#8F:JSR&FFF4:TYA:BEQnri
ght:INCmandir
```

```
780 .nrigh LDA#81:LDA#8F
F:LDY#8F:JSR&FFF4:TYA:BEQn
ump:LDX#1 MOD256:LDY#1 DIV
256:LDA#7:JSR&FFF4:LDA#80:#S
TAJump:JMPvert
```

```
790 .njump LDAManx:CLC:ADC
nandir:CMPE#FF:BNENall:LDA#0
:.nall.STAManx:TA:LDY#any:JS
Rcalad:LDA#60:STA#74:LDA#69
:STA#75
```

```
800 LDX#3:.sutlp LDA#manadr
r,X:STA#70,X:DEX:BNLSutlp:L
DA#74:STAMandir:LDA#75:STAM
andr1
```

```
810 LDA#jump:BEQchstp:LDA#8
48:STANtep:JMPchstp.chstp
LDA#mandir:BEQchstp:LDASTep:
EOR#840:STASTep
```

```
820 .nchstp LDAMandir:CMPE
#FF:BNENf:LDA#0:STAFacing:
&FF:PRINT.nfle CMPE#1:BNENf:ri
LDA#890:STAFacing
```

```
830 .nfbri LD#facing:CLC:AD
Cstep:STAMandir
```

```
840 LDA#19Y:JSR&FFF4:LDA#24
:LDY#3:JSRprnt:LDA#74:STA#7
0:LDA#75:STA#71:LDA#35:chkp
L1:LDY#23
```

```
850 .chkp2 LDA(670),Y:BN
Ehit:BEY#0:PLCHK(p2:LDA#70:CLC
:ADC#40:STA#70:LDA#71:ADC#1
:STA#71:DEX:BNCHK(p2:JMPnhi
tt:ht LDA#840:STAJump
```

```
860 .nhit LDA#74:STA#70:LD
A#75:STA#71:LDAMandir:STA#72
:LDA#mandir+1:STA#73:LDX#24:L
DY#3:JMPprint
```

```
870 .jump EQU00
```

```
880 .vert LDA#jump:CMPE#FF:
BEQdown:LDY#any:DEY:CPY#8:BE
QtoJ:ST#any:JMP#jump:toj L
```



```
DA#8FF:STAJump
```

```
890 .down LDY#any:INY:STY#
any:CPY#12:BNESC:LDA#0:STAJ
ump:scd JMP#jump
```

```
900 .fall LDY#any:CPY#27:B
CCstfl:LDA#1:STAdead:RTS:.st
fl INY:INY:STY#any:LDA#0
#0:SEC:SB#any:STAditch:LDX#3
MOD256:LDA#3 DIV256:LDA#7
:JSR&FFF1:LDA#anx:JMPnall
```

```
910 .esc LDA#27:STAdead:RT
S:.pause LDA#81:LDX#8A:LDA#
#8FF:JSR&FFF4:TYA:BEQ#pause
920 .main LDA#speed:STAtime
```

```
r
```

```
930 .mainloop LDA#81:LDX#
88F:LDY#8FF:JSR&FFF4:TYA:BN
ESC:LDA#80:LDX#896:LDY#8FF:
JSR&FFF4:TYA:BN#pause
```

```
940 JSR#nball:ST#rtrees:JS
Rliff:LDA#jump:CMPE#40:BEQ#n
on:JSR#bonus
```

```
950 .nbon JSR#vann:JSRwait
:LDA#anx:CMPE#3:BEQ#on:LDA#e
ad:BEQ#mainloop:RTS:.won LDA#
2:STAdead:RTS
```

```
960 .wait BIT#timer:BMwait
```

```
:STA#72:LDA#8A:STA#73:LDX#16
```

```
:LDY#1:JMPprint
```

```
1050 .mvball LDY#1:LDA(680)
,Y:TA:LDY#y:JSRcalad:LDA#6
8:STA#70:LDA#69:STA#71:LDY#0
:LDA(680),Y:CLC:LDY#Y:ADC(6
0),Y:STA(680),Y:CMPE#FF:BEQ#
loff:CMPE#FF:BEQ#loff:CMPE#3
:BN#womp
```

```
1060 .bloff LDY#3:LDA(680),
Y:DEY:STA(680),Y
```

```
1070 .womp LDA#820:STA#72:S
TA#76:LDA#8A:STA#73:STA#77
```

```
1080 LDY#1:LDA(680),Y:TA:XL
DY#y:JSRcalad:LDA#68:STA#74
```

```
:LDA#69:STA#75:LDX#10:LDY#2
:LDA(680),Y:LDY#1:CMPE#BEQ#sp
rt:JMPprint:sprt JMP#sprite
```

```
1090 .trfl EQU00:.trnc EQU
00
```

```
1100 .trees LDA#trfl:BEQ#ntrs
:DECRtrnc:LDA#trnc:BEQ#chnge
:ntrs RTS:.chnge RTS:LDA#trfl:CM
P#80:BN#trsp:JMP#trsdn
```

```
1110 .trspd LDY#4 MOD256:L
DY#4 DIV256:LDA#7:JSR&FFF1:
LDA#880:STA#trfl:LDA#2:ST#trc
nt
```

```
1120 JSR#lotrs
```

```
1130 .hits RDX#6:LDA#12:JS
Rtree:LDX#16:LDY#12:JSRtree:
LDX#26:LDY#12:JSRtree:LDX#7:
JSR#stak:LDX#17:JSR#stak:LDX
#27
```

```
1140 .stak TXA:PHA:LDY#15:
JSR#tlk:PLA:TA:LDY#16:.stlk
JSRcalad:LDA#69:STA#70:LDA#6
9:STA#71:LDA#8A:STA#72:LDA
#8A:STA#73:LDX#1:LDY#1:JMP#P
rint
```

```
1150 .trsv JSRcalad:LDA#68:
STA#70:LDA#69:STA#71:LDA#80
:STA#72:LDA#8A:STA#73:LDX#32
:LDY#3:JMPprint
```

```
1160 .trsdn LDA#8FF:STA#71:
LDA#20:ST#atrc:JSR#trts
```

```
1170 .lotrs LDW#6:LDY#14:JS
Rtree:LDX#16:LDY#14:JSRtree:
LDX#26:LDY#14:JMP#re
```

```
1180 .lftfl EQU00:.lftx EQU
00:.lftdr EQU00:.lftchr EQU0
0
```

```
1190 .lftfs LDAL#ffl:BNENfl
:RTS:.wfltr LDAL#ffl:CMPE#1
:BEQ#lft:.lft LDAL#ffl:CMPE#2
:BEQ#lft:LDAL#ffl:CMPE#2:BEQ
lftx
```

```
1200 LDA#2:STA#lftfl:LDA#8CC
```

This is one of hundreds of programs now available FREE for downloading on **MicroLink**. In addition to these many BBC Micro programs will also run on the Electron.

```
:LDASpeed:STAtimer:RTS
```

```
970 .speed EQU00:.dead EQU
00
```

```
980 .hisp EQU00:.losh EQU0
0:EBU00
```

```
1000 .snby EQU00
1000 .snball LDA#hisp:BEQ#sh
:SR#tbl+1:nhsh LD#losh:B
NE#oball:RTS
```

```
1010 .loball LDA#f4:ST#asy:
LDA#losh MOD256:STA#86:LDA#l
osh DIV256:STA#61:JMP#tbl
```

```
1020 .tblval LDA#10:ST#asy:
LDA#hish MOD256:STA#86:LDA#h
ish DIV256:STA#61
```

```
1030 .tsobl LDY#2:LDA(680),
Y:BEQ#tbl:SEC:SB#1:STA(680),
Y:BN#kdp:RTS:.nkdp LDX#1
#2 MOD256:LDY#2 DIV256:LDA
#7:JSR&FFF1:LDY#0:LDA(680),Y
:CMPE#FF:BEQ#lft
```

```
1040 LDA#0:JMP#tbl:.blftfl
DA#35:.prbl LDY#1:STA(680),Y
:TA:LDY#y:JSRcalad:LDA#68:
STA#70:LDA#69:STA#71:LDA#68
```

Game

```
:JMPPrift:ilfx LDA#1:STAlft
fl:LDA#833:JSRPrift:INCLfx:
RTS
1210 .ctll LDA#5:STAlftdr:L
DA#2:STAlftfl:lftl LDAflfx:
CMP#8:BNENctlr:LDAflftl:CMP#
2:BEQctlr:ncctlr LDAflftl:CM
P#2:BEQdlfx
1220 LDA#2:STAlftfl:LDA#8CC
:JMPPrift:dlfx LDA#1:STAlft
fl:DECLfx:LDA#833:JMPPrift
1230 .ctlr LDA#2:STAlftdr:L
DA#1:STAlftfl:JMPlftlr
1240 .prlft JSRlftchr:LDXl
```



```
tx:LDY#15:JSRcalad:LDY#7:.lft
tlp1 LDAflftchr:EOR(868),Y:ST
A(868),Y:DEY:BNlftlftl:LDY#4
0:.lftlp2 LDAflftchr:EOR(868)
,Y:STA(868),Y:INY:CP#48:BN
E lftlp2:RTS
1250 .int LDA#8R1:LDX#8AE:L
DY#FF:JSR#FF#4:TYA:BEQ#NON:
LDA#0:STAB262:RTS
1260 .nson LDA#8R1:LDX#8EF:
LDY#FF:JSR#FF#4:TYA:BEQ#nosf
fl:LDA#1:STAR262:.nsoff RTS
1270 .bontw EQU0D1:bonx EQU
00
1280 .bonus DECBontw:BNENso
ff:LDA#5:STAbontw:LDXbonx:LD
Y#4:JSRcalad:LDA#68:STAB7B:L
DA#69:STA#71:LDAbonx:CMP#16:
BCRED:LDA#68:STA#72:JMPbon
pr:red LDA#80B:STA#72
1290 .bonp LDA#8A:STA#873:LD
X#0:LDY#1:JSRPrint:DECBonx:L
DAbonx:CMP#11:BEQrunout:CMP#
16:BCBEeb#RTS
1300 .runout LDA#84B:STAJw
pr:beep LDX#blip Mod256:LDY#
blip DIV256:LDA#7:JMP#FF#11:
blip EQU#11:EQU#15:EQU#150
:EQU#1
1310 .s1 EQU#2:EQU#1:EQU#0:
EQU#5
```

```
1320 .s2 EQU#0:EQU#15:EQU#
6:EQU#1
1330 .s3 EQU#11:EQU#2:.pit
ch EQU#0:EQU#5
1340 .s4 EQU#3:EQU#3:EQU#64
:EQU#3
1350 .NEXT:FORM#0#031:AX#N
X#614#85#00:?(nltbl+N#2)+N
XMod256:?(nltbl+N#2+1)+AXD1
V256:NEXT
1360 .#22#int Mod256:#221
#int DIV256:#FX14 4
1370 ENMPROC
1380 DATA#0,80,847030000,87
6F23577,80BC0C22,8880808,810
01100,811212111,8AF3E9ECF,88
FAF2F2F,8C0808000,8F0F0F0E0,
81,810100000,860F0F0F,8E0E0
E06,86070F0F0,80
1390 DATA#0,80,847030000,87
6F23577,80BC0C22,8880808,810
01100,811212111,8AF3E9ECF,84
FAF2F2F,8C0808000,8F0F0F0E0,
811,870301010,860F0F0F,87030
1010,86070F0F0,80
1400 DATA#1030344,8111101,8
2E0C0000,86F4CAEE,80,80,830
100000,8F0F0F070,85FC7973F,8
7F2F4F4F,80080800,868488800,
868E0F0F0,80,8670F01F,8E0C08
008,888,8E0C08000
1420 DATA#7773311,81133777
7,8EEAA4A8,80CC0EEEE
1430 DATA#0,80,821103211,80
8523054,800800000,862080844,
80,80,80,810000000,821087013,
8E1587053,880624800,8F68084
C0,80,80,832,8653010,8F28470
80,8181C149,8E068C8A9,830705
2,888,84C0800
1440 DATA#F0F0F0F,8707070F,
8E0E0E0,8C0C0C0E,81010101,8
1010101,870200000,82070,8702
0000,8207
1460 #FX 136,0,128
1450 #K.0#T.#MFOR 1#0 TO (
TOP-PAGE)STEP#1:1:#E00=13:PA
GE-NEXT:MPAGE#E00:WOLD:NRUN
IN
```

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

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6

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Candle Light. A classic game updated in this "light the Christmas tree" challenge.

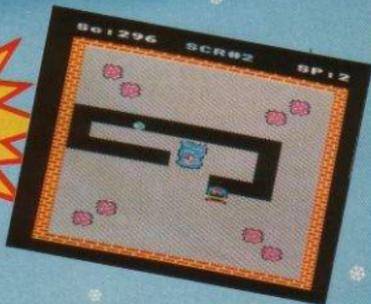


A Christmas Carol

Happy the Herald Angels sing
To bring you news of
The birth of a King
In Bethlehem
Silent Night



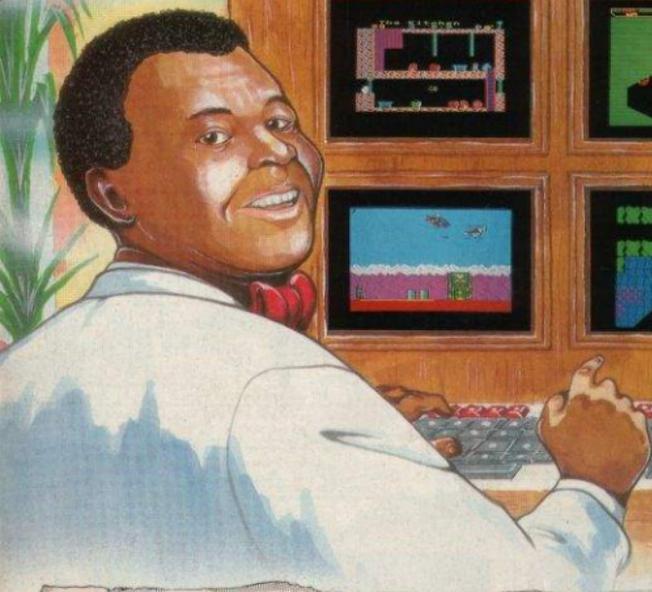
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Sam, an ardent fan of Superior Software's games, is always ready for a challenge... and the tougher the better! Here's four games that, as time goes by, he returns to again and again.

Citadel, a fascinating arcade-adventure, features over 100 beautifully detailed screens of action. Computer Gamer reported: "The game is extremely good. Well worth the cash!"

Thrust is simple and fun-to-play, yet incredibly realistic and highly addictive. "This game has class... try it!" urged Computer & Video Games.

Stryker's Run is a challenging action-packed combat game. "This game will impress you... the graphics are stunning... this should be in every collection," A & B Computing remarked.

Ravenskull is a massive arcade-adventure game, full of puzzles and problems to be solved. Acorn User commented: "Ravenskull is a very good game and is destined to become another Superior classic."

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Program: Triple Decker 1, 2 and 3
 Price: £1.99 each
 Supplier: Alternative Software, Unit 3-6,
 Baileygate Industrial Estate, Pon-
 tefract, West Yorkshire.
 Tel: 0977 797777

TRIPLE Deckers 1, 2 and 3 consist of three games on each budget priced cassette which sounds as though it must be a bargain not to be missed.

The three on the first tape are Grand Prix, Manic Mole and Day at the Races. It will come as no surprise to hear that **Grand Prix** is a motor racing game.

You see a plan view of a track with four midget-sized cars. One of these lethal machines is yours and it is locked in gear. Not only that, the accelerator is full on as well. All you can do is steer round the track, avoiding the other cars, getting knocked sideways by collisions with the three computer-controlled racers seem hardly affected.

After five frenetic laps, the race is over and a result sheet gives your position. This is a simple game and not of outstanding quality, but fun all the same.

Manic Mole is a platform game which has been written in pure Basic. The aim is to collect a jewel from each room so your girlfriend can be released. The only moving object on the screen is the mole - driven by you - which means the speed is quite good.

The first couple of rooms are easy, but then slides and dissolving platforms rear their ugly heads. Manic Mole is hardly eye-catching, but it is quite a neat bit of programming.

Day at the Races is a game for addicted gamblers. Chose your computer horse, bet your pretend money, watch a random race and collect your imaginary winnings.

I don't understand why anyone would want to do this, but for those who do, at least there is the satisfaction of a near guaranteed win. The

bookies in this simulation offer incredibly generous odds.

Collection two in this series gives you **Invasion Force**, **Haunted** and **Parachute**. **Invasion Force** is a simple, if fairly fast, space invaders. The Mode 4 graphics (just two colours) are rather dull and the whole process seems a little too easy.

I'm not usually very good at shoot-'em-up games, but I soon got bored with my own success here.

Haunted by Peter Scott is in a vastly better league. This machine code game has you rushing around a room collecting keys and other goodies while avoiding or shooting the meanies.

Success in a room leads you to a new and more challenging one with more problems to overcome. To keep you on your toes, there is a time limit as well. The graphics and sound make this game a pleasure to play.

In **Parachute** a helicopter is releasing its huge cargo of lunatic parachute jumpers. These idiots are jumping into a river which is well stocked with man-eating sharks. You can save these unfortunate half-wits if you manoeuvre your raft to catch them and then transfer them to the jetty.

You can only carry one parachutist at a time and they arrive thick and fast, so speed and care are required. This isn't a brilliant game.

Triple Decker 3 brings us **Lunar Invasion**, **Jam Butty** and **Lunar Lander**.

Lunar Invasion is set on the surface of the moon. Armed with a buggy and an anti-aircraft gun, you have volunteered to fight off the invaders.

Wave after wave of aliens stream on to the screen - some are harmless, mere target practice, but others produce showers of missiles. A hit reduces your shield and the game is over when you have none left. Good sound and smooth, fast graphics make this game a winner.

Jam Butty is a platform game. Your aim is to pinch all the sandwiches from a building site while the workers are holding a meeting.

The sprites are smooth, but control of your rather plump man is difficult and I have not yet completed the first room. The game is well laid out, with good title pages and pleasing sound which can be turned off.

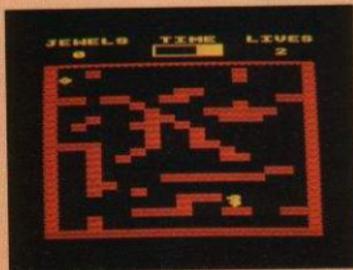
The final program is **Lunar Lander**, which is very much a make-weight. The landing craft has the usual left, right and up controls and must be landed at a very low speed. You must also use the minimum quantity of fuel.

Unfortunately, the graphics are far too jerky and the sound is poor. There are plenty of better lander programs around.

Overall, these three packages do represent reasonably good value for money. **Haunted** and **Lunar Invasion** could easily stand as budget games in their own right. The extra ones can then be regarded as something of a bonus.

The games are actually *Electron User's* own 10 of the Best repackaged. There are now three games on each tape (Three of the Best?). If you buy the lot it works out more expensive than 10 of the Best, but if you only want three particular favourites then go for Triple Deckers.

Rog Frost



Graphics.....	7
Sound.....	5
Playability.....	7
Value for money.....	8
Overall.....	6

Superb quartet

Program: *Play it Again, Sam*
 Price: £9.95 (cassette) £11.95 (5.25in disc) £14.95 (3.5in disc)
 Supplier: Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.
 Tel: (0532) 459453

DESPITE what many people think, Bogey never uttered the immortal words "Play it again, Sam". However, I suspect that if he'd been around to see Superior Software's latest compilation he'd have been sorely tempted to say "Let me play them again, Sam!"

The problem with compilations is that all too often they seem to be a vehicle to make money from useless games that didn't sell well the first time round, embellishing them with pretty packaging and offering them at bargain basement prices.

Superior Software's latest release escapes all of these criticisms because it really does contain what amounts to four of the best arcade games available for the Electron. And what's more, they are now available on disc too.

Citadel starts this excellent collection of classics with a bang. The scenario casts you as an intrepid adventurer charged with destroying the teleport system created by Marduk the Dictator. He has established a base

in a deserted castle and will soon be using his teleport system to bring his invasion force to Earth.

Your task is to prevent the impending invasion and you will have to do battle with the guardians of the castle.

Some you can avoid, but the stange wandering monks can only be destroyed by a well-aimed magic spell between the eyes. They soon reappear, however, so you mustn't



hang around too long in any one room.

The castle itself consists of over 100 individually illustrated locations and the Mode 2 graphics are detailed and very colourful. Each room is complete with its own set of bad guys and useful objects to be collected.

Much of the game involves plodding around, collecting things and



carefully planning your next move. For those of us whose fingers are not quite what they used to be, I have to admit this is a welcome respite. Fear not though, lightning reflexes do not go unnoticed.

The sound employed is a little basic and the graphics are starting to show their age slightly compared to others on this release.

This is most evident in the garbage that appears at the top and bottom of the screen – the game is so big it won't fit in the memory. This is something you'll just have to live with and you soon get used to it.

Despite that criticism though, the game still stands up remarkably well and is guaranteed to provide hours of fun and entertainment.

Second in the collection is **Thrust**. Not one for the faint of heart or slow of pinkies, it's a game of subtle control and careful manoeuvring.

Your job is to plunge into the depths of a high gravity asteroid and recover an energy pod vital to the resistance movement.

Pitted against you are the nuclear-powered automatic Limpet guns forming the asteroid's defence. By careful shooting you can either disable the reactor for a while or destroy the guns.

Too much energy punched into the reactor will cause it to explode and destroy the entire asteroid. This results in a loss of bonus – but it's a nice way of skipping screens.

There are 24 different asteroids and over 70 levels, some with increased gravity, reversed gravity and even invisible landscapes.

On the face of things, the graphics appear to be quite simple: This in fact disguises their real elegance. The scrolling is faultless as you manoeuvre your little spaceship around the tightest of corners.

This is one of those games which always seems to have just one more challenge lying in wait around the next corner and no matter how many times you get killed you always want that one last go.

Next in the line-up is **Stryker's Run**, the game that took the charts by

storm. You are Commander John Stryker. Your mission is to return top secret information to the allied forces' HQ.

While Stryker comes equipped with just a laser pistol and grenades, the Volgon enemy have mortars, mines, rocket launchers and SAM missiles, so your task is going to be tough.

Stryker can run, jump and duck and you'll need these abilities to avoid the barrage of enemy fire, though along the way you may utilise the enemy's helicopters to complete your mission.

The scenery is breathtaking and what it lacks in playability is made up for by sheer fun. If you missed this one on its first release, don't miss it now.

Bringing up the rear is my old favourite **Ravenskull** – an arcade adventure of the highest calibre. You haven't lived until you've been killed in Castle Ravenskull.

At the start of the game you can choose to be either a Wizard, Adventurer, Elf or Warrior. Your choice doesn't affect the way the game plays, it merely selects the graphics for



treasure.

The object of the game is to collect and assemble the pieces of a silver crucifix. You start outside the castle, faced with the first puzzle of how to get in. This can take some time, not least because of the sheer size of the map.

Each level is no less than 64 times the size of the screen. Needless to say, with a map this large, getting from one place to another can take quite some time.

The inside of the castle is filled with a variety of objects and obstacles. Some – the pickaxes for instance – are helpful, but others are either a nuisance

or just downright lethal.

The puzzles in Ravenskull are nothing less than complex: Make one mistake and you'll have to start again. There is only one solution to each level.

The overhead view graphics used are beyond belief and the four colours of the Mode 5 display used to excellent effect.

In conclusion I have to say that since every one of these games achieved number one in the software charts at the time of their release, this package represents unequalled value for money.

Although most people probably have at least one of the four, this is a stocking filler that everybody should have.

Julia Forester

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

Revitalised soul

Program: *Realm of Chaos – Village of Lost Souls*
Price: £9.95
Supplier: LAP/Robico, 3 Fairland Close, Llantrisant, Mid Glamorgan CF7 8QH.
Tel: (0443) 227354

WAY back in 1985 I came upon a game which heightened my whole perception of text adventuring. That adventure was released by the small, and now defunct, Magus Software – its title, *Village of Lost Souls*.

It was, indeed, the most sophisticated and atmospheric text adventure which I had ever seen. My only regret was that it was a BBC Micro-only offering, and though an Electron version was promised, it never materialised.

That is, until now. The master of silicon suspense, Robert O'Leary, thankfully bought the rights to *Village of Lost Souls* and it is now available under Robico's own label for the Electron.

This version is complete, not only with scintillating new packaging, but in a much improved and revamped form including Robico's superb advanced parser, and written using Martin Moore's Amulet machine

coding.

What's more, the text has been lengthened to add even greater atmosphere to the game.

The adventure includes the command OG which means if you are killed, or you did something you later regret, you can return to the position you were in before the mistake was made.

The Help facility within the game is a marvellous aid if you really do become stuck with some of the extremely devious puzzles.

Lost Souls is set in a medieval world in which magic exists, but may only be used by those with a touch of the Talent. All use of magic is controlled by the Church, represented by the Order of Saint Leofric, Patron of Magic and discoverer of the 13 Realms of the Arcane.

As Nathan, Inquisitor to the Order of Saint Leofric, you have been summoned to the study of Father-Magister Alain to commence an investigation for the Council of 12, who hold the keys to the 12 realms of order.

Father-Magister Alain closes his eyes, his face cloaked by the gentle mist which rises from the slab at his feet. He raises his hands and the blue

cloud of the Transmission Spell billows around you.

You are transported to the Village of Dinham where the Rector of the Church has requested the assistance of an Inquisitor, since he believes the Lord-Talent of the Village to be attempting to open a portal into the forbidden 13th realm, the Realm of Chaos.

The atmosphere has to be smelt to be believed – just try this offering: "There is an unkempt pack of curs here snapping and fighting among themselves ... woof ... bark ... snarl!"

The puzzles are ingenious, often complex and at times excruciating, but are all logical in retrospect, and enjoyable in every aspect.

This is an essential purchase for any serious adventurer. Indeed, in my humble opinion this is the best cassette-based text adventure available for either the Electron or BBC Micro.

Pendragon

Presentation.....	10
Atmosphere.....	10
Frustration factor.....	10
Value for money.....	10
Overall.....	10

Lost in space

Program: *The Hunt (Search for Shauna)*
Price: £9.95
Supplier: Robico Software, 3 Fairland Close, Llantrisant, Mid Glamorgan CF7 8QH.
Tel: 0443 227354

A 59TH century space cruiser soaring into the unknown, boldly going where no adventure has gone before. The cover shot and introduction may seem familiar, but *The Hunt* ranks as something of a deviation and gamble by Robico.

Not only is it the company's first adventure which has not sprung from the hands of Rob O'Leary, but it is also Robico's first escapade in the field of graphic adventures.

It is, I believe, a gamble which has paid off. The puzzles are devious but logical, as you would expect from Robico, and the graphics are superb. I would go so far as to say that they are even superior to those in *The Lost Crystal*.

As pilot of an intergalactic space craft, you have searched the galaxy for a missing crew member, Shauna. Your mission has led you to an enormous space station where you have finally docked, your space craft

battered and on the verge of collapse.

You begin your quest at the console of your ship with only 60 seconds to space exposure. As with all Robico adventures the start is gripping and can be deadly if you don't equip yourself quickly.

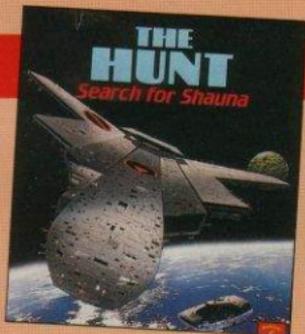
No sooner do you escape from the confines of your ship than you have to face the rigours of intergalactic customs – I would suggest you check your itinerary before doing so. If you succeed, the adventure begins in earnest.

The superb advanced parser enables your Electron to seemingly understand almost any prompt you type in, as long as it has something to do with the game.

My one and only criticism of *The Hunt* is that I feel the location descriptions lack a little of the atmosphere of the Robico text-only adventures.

However, the descriptions created in each location are layered to give just enough clues to help with the problem solving. Your search will be difficult, but not impossible: And the conclusion is rewarding.

If for some strange reason you don't like graphic games, the simple command GROFF will let you play the game in text-only format.



I understand this is just the first of many alliances that Robico has made with out-of-house authors. If this is evidence of the calibre of adventures to follow, then you had better start saving your pennies fast.

This is without doubt the best graphic adventure I have seen for the Electron and is an essential purchase for any discerning adventurer.

Pendragon

Presentation	10
Atmosphere	9
Frustration factor	10
Value for money	10
Overall	10

Adventure student

Program: *Oxbridge*
Price: £7.95
Supplier: Tynesoft, Unit 3, Addison Industrial Estate, Blaydon, Tyne and Wear NE21 4TE.
Tel: 091-414 4611

THIS adventure landed on my desk for review way back in July. It's not that I'm slow, but it has taken me a long time to complete the game and even longer to make decisions as to its merit.

The adventure is an oddity as it is presented with simplistic, if sometimes crude, graphics. However, the adventure is ingenious and more about puzzle solving than true adventuring.

The cover instructions do give some warning concerning the contents: "Oxbridge takes a light-hearted look at the world of higher education. If you like puzzle books, you'll love this game!"

Those of you who have played Colin Jack's previous adventure, *Programmer's Revenge*, will have gained some insight into the sardonic wit and

ingenuity which is present in this game.

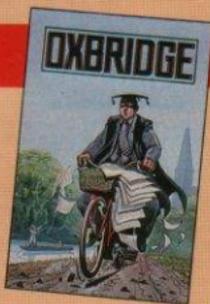
Your object, as the hero is to escape from the college, get served in a pub, learn how to punt, get cash from your bank, solve numerous puzzles and generally cope with student life.

My favourite part of the adventure involved the deviation on the old Chinese sliding-block puzzle. In this case, however, you need to sort out furniture into appropriate rooms. This is difficult to say the least, but you are rewarded with a Rubik's cube.

I also loved the garden maze, which is solved using the Knight's Tour chess problem. Needless to say, chess players will find this easier than others.

Obtaining the manuscript from the library also involves a clever maze and requires very careful mapping. Look at the colours and lettering. I found the higher letters very difficult to locate.

Having played the 300 location BBC Micro version of this game, I found the watered-down Electron version which has 200 locations a little disappointing. I also found it more difficult, as a result of the paring of the game's



structure.

The cassette inlay offers some help in solving the puzzles and if you really do feel like tearing your hair out, Tynesoft provides an excellent four page Puzzle and Solution leaflet.

As someone who loves mathematics and puzzle solving, I like this game, though it does not follow that you will. Try before you buy is perhaps the best advice I can give.

Pendragon

Presentation	9
Atmosphere	6
Frustration Factor	10
Value for Money	9
Overall	8

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Santa's dilemma

Guide Santa back to his grotto in Joanne Stevens' intriguing game



IT is early Christmas morning, Santa has delivered all his presents and is now making his way home. He's put his sleigh away till next year and tucked Rudolf up with a pile of sweet hay to munch in the barn.

His work is done for this year and he can now relax with his feet up in front of the blazing log fire in the living room.

Outside his grotto at the North Pole nine magic snowmen are guarding the entrance - only his gnomes are allowed in to help at his toy factory.

The snowmen use their powers to create an invisible and intricate maze of one-way paths to the entrance. Only Santa knows the true direction to take to get to the front door and unauthorised visitors who don't know the devious route find their path blocked by invisible walls.

Santa is tired after a busy night visiting all the children and delivering their presents and heads from the barn to his grotto. Unfortunately, he is rather absent minded and has forgotten the correct route to take. Can you help him on his way?

You guide Santa round the snowmen using the A, Z < and > keys. Remember, the route is devious and you'll soon feel the influence of the magic snowmen as they block your progress and direct you up blind alleys and one-way paths in the invisible maze.

If you find yourself stuck you may have entered a section of the maze that doesn't have any exits. If you think this has happened, press Q to quit and

try again, starting from the entrance.

There are three mazes. The first is fairly straightforward, and if you stray from the route you are directed back on to the right path by the snowmen.

The second and third mazes are much more difficult and could take many hours to solve, so get cracking.

```
10 REM Santa's Dilemma
20 REM By Joanne Stevens
30 REM (c) Electron User
40 ON ERROR MODE6:PRINT:R
EPORT:PRINT at line ;ERL:O
SCL:FX178,255:END
50 MODE 1:VDU 23,1,0;0;0;
0;
60 PROC:initialise
70 maze=1
80 PROCbig(3,1,** Santa'
s Dilemma **)
90 COLOUR 1:PRINT TAB(3,3
0):Press: A Z < > to move:TA
B(1,31)"Or Q to quit and try
again";
100 REPEAT
110 PROCmaze
120 PROCscreen
130 REPEAT
140 PROCgame
150 UNTIL x=12 OR quit
160 IF NOTquit maze=maze+1
170 UNTIL maze=4
180 MODE 5
190 PROCbig(4,10,"Well Don
e!")
200 PRINT
210 END
220
230 DEF PROCgame:FXZ1
240 KX=INSTR("Z,A,Q",GETS
)-2:IF KX<0 GOTO 240
250 IF KX=4 VDU7:quit=TRUE
:ENDPROC
260 IF (x MOD 3)+(y MOD 3)
=0 ELSE IF KX=dirX PROCmove:
ENDPROC ELSE ENDPROC
270 X1=x DIV 3:Y1=y DIV 3
280 exitsZ=(mI(KX,Y1)DIV 1
6'dirX)AND 8F
290 IF exitsX AND 2^KX dir
X=KX:PROCmove ELSE OSCL:FXZ
```

TYNESOFT

COMPUTER SOFTWARE

New Autumn Release

WINTER OLYMPIAD 88



Winter Olympiad'88 is undoubtedly the best winter sports simulation to date written by the same programmers who brought you such sports classics as Winter Olympics and Commonwealth Games. It surpasses these titles with its incredible game play, addictiveness and graphics. It features the classic winter Olympic events: Ski-Jump, Bob-sled, Biathlon, Down-Hill, Giant Slalom and Speed Skating. These events are depicted in a way not seen on any home computer before. The result is a phenomenally realistic and well-binding game.

The game also includes entry to our fantastic competition with a prize of a 7 day holiday in Calgary, Canada (includes tickets for major Olympic Events and spending money). The prize has a total value of

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BBC Master Compact	N/A	14.95	14.95	14.95

Electron

BBC B

BBC Master Plus

BBC Master Compact

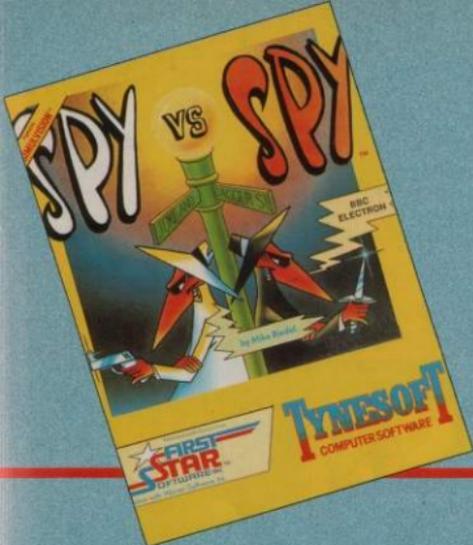
SPY Vs. SPY

This game marks a new era in BBC/Electron programming, a product of unequalled quality that will become a legend of its time. A brilliant and unique split-screen layout which allows both players to play independently. The action starts from screen one, no need to wait your turn as you guide the white and black spies through the inter-connecting rooms of the Foreign Embassy.

You'll need to keep one eye on your opponent, though, as you set (and defuse) a variety of booby traps, engage in club to club combat and frantically search for the Top Secret Briefcase, but don't forget to collect your passport, secret plans, money and a key which must be obtained in order to escape before your plane takes off.

Cassette	S1/N1 Disk	S1/N1 Disk	S1/N1 Disk
Electron	9.95	N/A	N/A
BBC B	9.95	14.95	14.95
BBC Master Plus	9.95	14.95	14.95
BBC Master Compact	N/A	14.95	14.95

Electron
BBC B
BBC Master Plus
BBC Master Compact



BOULDERDASH

This classic game from First Star Software in America which has been brilliantly converted for the BBC/Electron.

An addictive mixture of challenge, strategy, reflex and charm. Collect the required number of jewels and the mysterious escape tunnel is awarded. Can you and Rockford™ master the enchanted walls, transform butterflies into jewels and escape the growing amoeba?

Cassette	S1/N1 Disk	S1/N1 Disk	S1/N1 Disk
Electron	3.95	N/A	N/A
BBC B	9.95	14.95	14.95
BBC Master Plus	9.95	14.95	14.95
BBC Master Compact	N/A	14.95	14.95

Electron
BBC B
BBC Master Plus
BBC Master Compact



INDOOR SPORTS

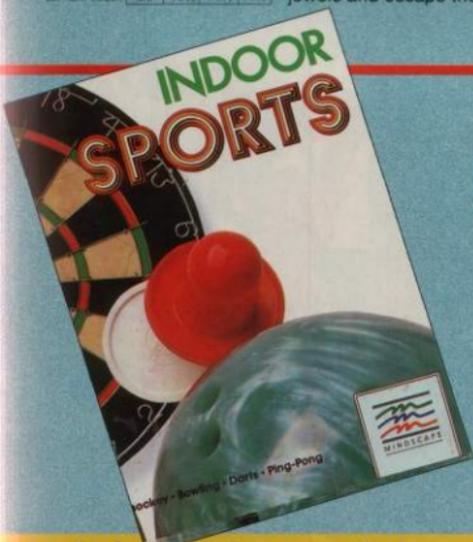
This conversion of the American hit gives stunning reality to the following games:

Ten Pin Bowling - Air Ball
Darts - Table Tennis

This superb conversion will give you hours of enjoyment on your Acorn machine.

Cassette	S1/N1 Disk	S1/N1 Disk	S1/N1 Disk
Electron	3.95	N/A	N/A
BBC B	9.95	14.95	14.95
BBC Master Plus	9.95	14.95	14.95
BBC Master Compact	N/A	14.95	14.95

Electron
BBC B
BBC Master Plus
BBC Master Compact



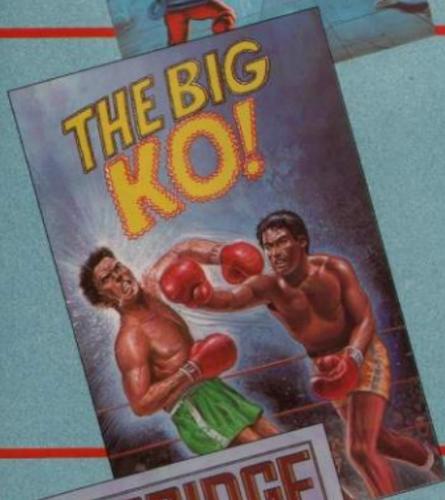
PHANTOM

Something strange has been happening, something unnatural. At first no one took much notice, those who'd experienced it were considered crackpots by those who hadn't. But now people are noticing, the so called 'crackpots' now outnumber the disbelievers. And so the scene is set.

This game, original in design and concept, is one of the new breed of role playing games, that have rocked the Charts and the Arcades in recent months. Now available for your Computer.

Cassette	5 1/4" Disk 40 Tracks	5 1/4" Disk 80 Tracks	8 1/2" Disk
Electron	7.95	N/A	N/A
BBC B	7.95	12.95	12.95
BBC Master Plus	7.95	12.95	12.95
BBC Master Compact	N/A	N/A	N/A

Electron
BBC B
BBC Master Plus
BBC Master Compact



BIG K.O.

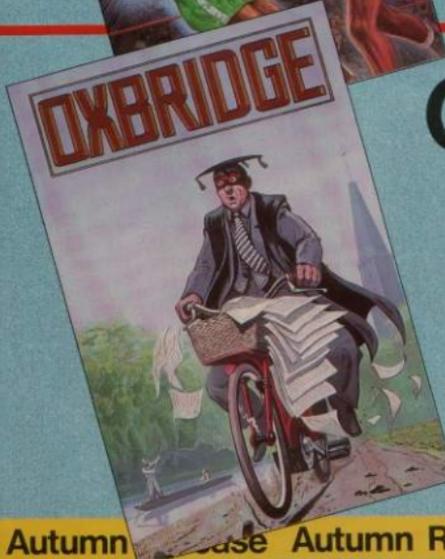
Compete against eight increasingly more agile opponents in this unique boxing simulation which stretches your computer to the limits. Super size sprites, superb animation and a touch of humour make this a game not to be missed. One or two players. Keyboard / Joystick. You compete against eight opponents each of which are attributed with various strengths and weaknesses: VOTED GAME OF THE MONTH - (A. & B. Computing)

"THIS LOOKS LIKE ANOTHER WINNER FROM TYNESOFT, EVEN BETTER THAN THEIR USUAL HIGH QUALITY" (A. & B. April, 1987)

"THE BEST BOXING GAME I HAVE PLAYED ON ANY COMPUTER" (Electron User) 9 OUT OF 10.

Cassette	5 1/4" Disk 40 Tracks	5 1/4" Disk 80 Tracks	8 1/2" Disk
Electron	7.95	N/A	N/A
BBC B	7.95	12.95	12.95
BBC Master Plus	7.95	12.95	12.95
BBC Master Compact	N/A	N/A	N/A

Electron
BBC B
BBC Master Plus
BBC Master Compact



OXBRIDGE

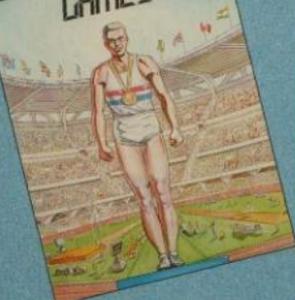
Another First for Tynesoft. A Fully Illustrated Adventure for the BBC/Electron. 300 Locations with Graphics on BBC 200 Locations with Graphics on Electron. Yes it's here now! A Graphic Adventure for the Electron. Oxbridge is an Adventure which takes a light-hearted look at the world of higher education. The cursor keys move you about a beautifully illustrated landscape to meet various brain-teaser type problems. If you like puzzle books, you'll love this game. It is no marathon science-fiction epic taking hours to get into. You make progress within minutes and as you play you absorb the atmosphere and folklore of the world's most famous university.

The author is an Oxford-based mathematician and puzzle composer who has used his skills to pack an incredible 300+ pictures into the BBC's memory. Features include HELP facility, mobile talking characters (some famous personalities), single operation load, fully integrated graphics. Nothing like it has ever been produced for a 32k machine. *Electron version has 200.

Cassette	5 1/4" Disk 40 Tracks	5 1/4" Disk 80 Tracks	8 1/2" Disk
Electron	7.95	N/A	N/A
BBC B	7.95	N/A	N/A
BBC Master Plus	7.95	N/A	N/A
BBC Master Compact	N/A	N/A	N/A

Electron
BBC B
BBC Master Plus
BBC Master Compact

COMMONWEALTH GAMES



COMMONWEALTH GAMES

This superb sports simulation explores new territory in programming with a new sprite compression technique used for the first time to give you the very best in graphics display.

Compete against the computer and the clock in 8 challenging sports events in search of the coveted world record

- * WeightLifting * Long Jump * Rowing
- * Swimming * Cycling * Hammer
- * Running * Steeple Chase

Cassette	5 1/4" Disk 40 Track	5 1/4" Disk 80 Track	3 1/2" Disk
7.95	N/A	N/A	N/A
9.95	12.95	12.95	N/A
9.95	12.95	12.95	N/A
N/A	N/A	N/A	12.95

Electron
BBC B
BBC Master Plus
BBC Master Compact

Electron
BBC B
BBC Master Plus
BBC Master Compact

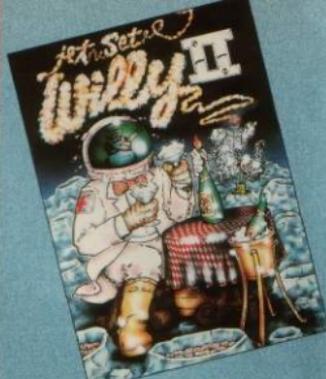


FUTURE SHOCK

Game Features:
Pull Down Menus
Control System
Interactive Sub-Plots
Large Style Graphics

These unique features combined with over 60 screens extends the machine and the player to unparalleled limits making this a game not to be missed.

Cassette	5 1/4" Disk 40 Track	5 1/4" Disk 80 Track	3 1/2" Disk
9.95	N/A	N/A	N/A
9.95	14.95	14.95	N/A
9.95	14.95	14.95	N/A
N/A	14.95	14.95	14.95



JET SET WILLY II

Whilst recovering in hospital from a severe fall down some stairs, Willy called in the builders. He thought it odd that they had green skin, but needing the work done in a hurry he asked them to remove the offending edges from the stairs. Trouble was, they did far more work than asked, adding several rooms to his mansion. Can you help Willy find and tidy up all his new rooms?

Cassette	5 1/4" Disk 40 Track	5 1/4" Disk 80 Track	3 1/2" Disk
7.95	N/A	N/A	N/A
7.95	12.95	12.95	N/A
7.95	12.95	12.95	N/A
N/A	N/A	N/A	12.95

Electron
BBC B
BBC Master Plus
BBC Master Compact

Autumn Release Autumn Release Autumn Release Autumn Release

All the titles listed in this Catalogue available from leading Computer Software retailers. If you have any difficulty in obtaining them they are available free of postage and packing charges direct from Tynesoft or you can order by phone using Visa or Access - (091) 414 4611.

Name	Description	Price
_____	_____	_____
Address _____	_____	_____
_____	_____	_____
_____	_____	_____
Post Code _____	_____	_____
Machine _____	_____	Total _____

CONTROLS

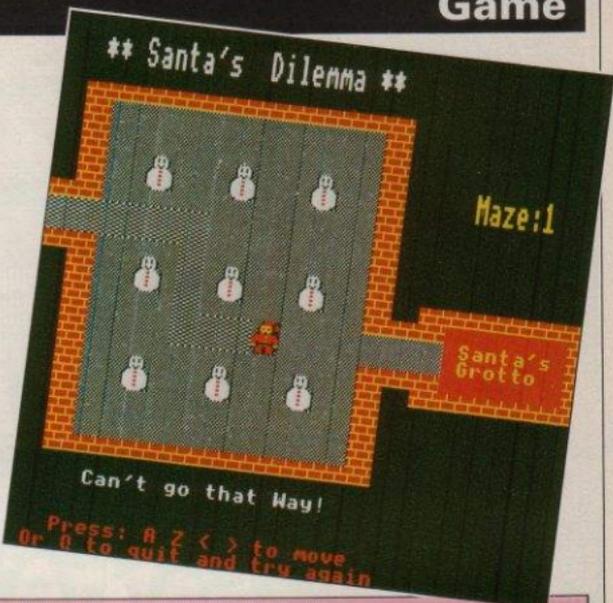
A Up
Z Down
< Left
> Right
Q Quit

PROCEDURES

big maze Double-height print routine
screen Read the current maze
game Set up the screen display
move Play the game
move Move Santa

VARIABLES

x,y Santa's coordinates
m%() The maze
dir% Santa's direction
maze Number of current maze
quit TRUE if you have quit
exits% Exits from the current junction



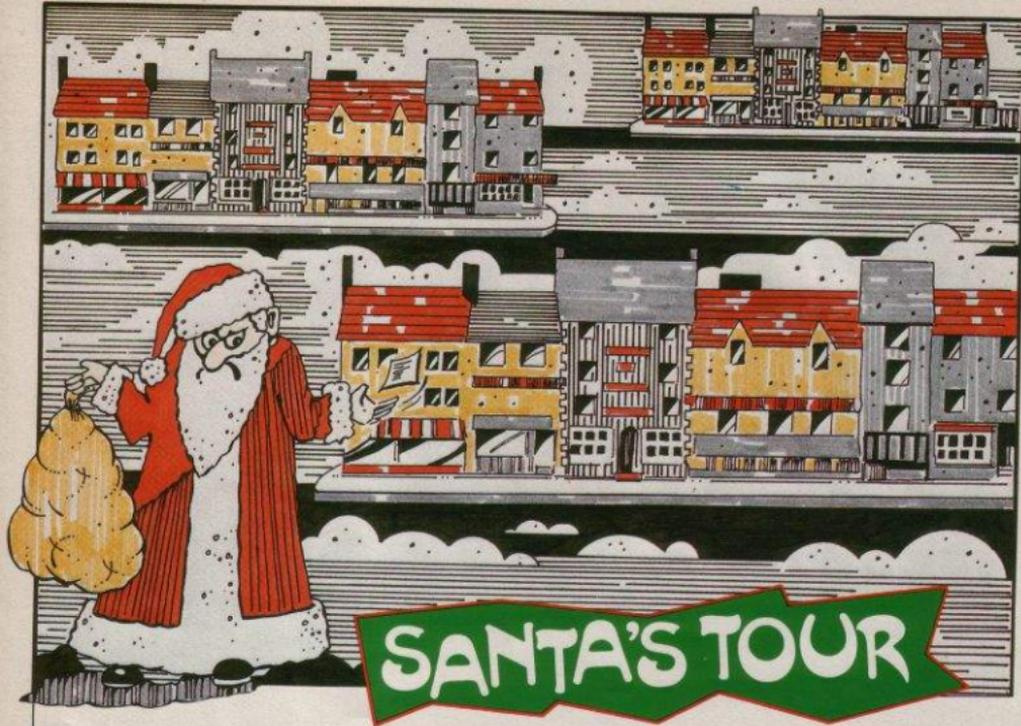
```
1:PRINT TAB(5,27)Can't go
that Way:CHR7:TIME=0:REPEA
T UNTIL TIME=100:PRINT TAB(5
,27)SPC30
300 ENDPROC
310
320 DEF PROCmove
330 COLOUR 128:COLOUR 3
340 PRINTTAB(4+x*2,5+y*2);
350 VDU 225,225,8,8,10,225
,225
360 x=x+(dir%1)-(dir%3)
370 y=y+(dir%2)-(dir%0)
380 PROCPrint(4*x*2,5+y*2,
#900)
390 SOUND 0,-10,4,1
400 ENDPROC
410
420 DEFPROCprint(X!,Y!,D%);
430 :&70=&3000+16*X!+&200+
Y!:&72=&D%:CALL &800
440 ENDPROC
450
460 DEF PROCscreens:=FX178
470 COLOUR 129:COLOUR 2
480 FOR IX=15 TO 20:PRINT
TAB(20,IX)STRING$(12,CHR$226
):NEXT
490 PRINT TAB(30,16)SPC9;T
AB(30,17) Santa's TAB(30,1
8) Grotto TAB(30,19)SPC9;
TAB(2,4)STRING$(24,CHR$226)T
AB(2,25)STRING$(24,CHR$226)
500 FOR IX=5 TO 24
510 PRINT TAB(2,IX)CHR$226
:CHR$226;
520 COLOUR 128:COLOUR 3:PR
INT STRING$(20,CHR$224);
530 COLOUR 129:COLOUR 2:VD
U 226,226
540 NEXT
550 FOR IX=7 TO 19 STEP 6:
FOR JX=8 TO 20 STEP 6:PROCpr
```

```
int(IX,JX,&940):NEXT
560 PRINT TAB(0,10)CHR$226
:CHR$226;TAB(0,13)CHR$226;CH
R$226;TAB(20,16)STRING$(4,CH
R$226)TAB(20,19)STRING$(4,CH
R$226)
570 COLOUR128:COLOUR3:PRIN
T TAB(24,17)STRING$(6,CHR$22
4)TAB(24,18)STRING$(6,CHR$22
4)TAB(0,11)CHR$225;CHR$225;T
AB(0,12)CHR$225;CHR$225
580 x=-1;y=3:quit=#
590 dir%3:PROCmove
600 COLOUR 2:PROCbig(31,8)
Maze:*STR maze)
610 *FX178,255
620 ENDPROC
630
640 DEF PROCinitialise
650 AX=&70:D%=&72
660 FOR IX=0 TO 2 STEP 2
670 PX=&800
680 COPT IX
690 LDX #2
700 :loop1
710 LDX #51
720 :loop2
730 LDA (D%),Y:STA (AX),Y
740 DEY:BPL loop2
770 DEY:BNE loop1
780 RTS
790 J
800 NEXT
810 *FX16
820 VDU 225,224,170,85,170,
85,170,85,170,85
830 VDU 225,225,204,51,204,
51,204,51,204,51
840 VDU 225,226,4,4,4,255,3
```

```
2,32,32,255
850 RESTORE 1020
860 DIM m(5,5)
870 RESTORE 1190
880 FOR IX=0 TO 127 STEP 4
:READ as:IX/&900=&EVAL('S'+as
):NEXT
890 ENDPROC
900
910 DEF PROCmaze
920 IF maze=1 RESTORE 1020
930 IF maze=2 RESTORE 1070
940 IF maze=3 RESTORE 1130
950 FOR y=0 TO 3
960 FOR x=0 TO 3
970 READ m(x,y)
980 NEXT
990 NEXT
1000 ENDPROC
1010
1020 REM Maze 1
1030 DATA &010,&020,&0010
,&1200
1040 DATA &000,&010,&0200
,&4001
1050 DATA &000,&01019,&0200
,&1000
1060 DATA &004,&0004,&040
,&0002
1070 REM Maze 2
1080 DATA &010,&0210,&0220
,&1200
1090 DATA &0409,&0300,&0500
,&5404
1100 DATA &040,&0504,&0604
,&0500
1110 DATA &000,&0200,&040
,&4002
1120 REM Maze 3
1130 DATA &010,&0210,&0230
,&0200
1140 DATA &0001,&0510,&0420
,&1400
```

```
1150 DATA &0100,&1000,&5240
,&0602
1160 DATA &004,&0208,&0C00
,&4000
1170
1180 REM Santa
1190 DATA 444455AA,70044A,
50700789,F0F2708,1A1E0E0F,87
0F42E1,7070000,00C1100,00E0E
00F,45094501,F000F0F,20E0E0
,8700070F,4070070,7007070F,1
92A1900
1200 REM Snowman
1210 DATA 44AA44AA,339944AA
,FFDDDD77,EEEE66DD,FFBB0BEE,
7FFF66BB,552255AA,CCAA5522,7
7777777,44007777,EEEEFFFF,FF
EEEEFF,7FFF7FFF,FFFF7FFF,EE
EEEE,22CCEEEE
1220
1230 DEF PROCbig(x,y,as)
1240 PRINT TAB(x,y);
1250 FOR IX=1 TO LEN as
1260 :&70=&ASC(MID$(as,IX))
1270 AX=10:IX=&70:YX=0:CALL
&8FF1
1280 VDU 225,255,7071,7071,?
&72,7072,7073,7073,7074,7074
,255,10,8
1290 VDU 225,255,7075,7075,?
&76,7076,7077,7077,7078,7078
,255,11
1300 NEXT
1310 ENDPROC
```

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



ARTHUR LINDON presents a perplexing Christmas puzzle

SANTA'S Tour is a superb variation of the game Knight's Tour, with the part of the knight replaced by Santa Claus.

The job of Santa Claus has never been easy at the best of times, having to cope with reindeer that don't like the cold, the elves going on strike, ridiculous deadlines and the appalling weather at

the North Pole. Things aren't getting any easier either. With high-rise blocks that all look the same and central heating that doesn't need a chimney, the poor fellow just can't win.

The tiny village of

Squareberry is a typical example, one of the worst in fact. In total it has 64 houses that all look alike and a one-way system that makes spaghetti junction look straight.

It's so bad that to get from any one place in the village to another Santa has to move in an L shape. That is — two houses up and one left, one up and two right and so on. Figure 1 shows all of the possible moves he can make.

While delivering the presents, Santa can only visit each house in the village once, because he only has 64 presents and some people would get more than one and some would get nothing.

Once a house, shown here as a coloured square, has been visited its number vanishes and it may not be visited again.

Can you solve the puzzle and get Santa to deliver to

all of the houses? It can be done, and just to prove it the program includes a demonstration, starting at square H1 and finishing at G3.

When the program is run you will be asked whether or not you would like a demonstration. Press the Y key to enter demo mode or the N key to play the game.

At the start of the game you can choose your starting position anywhere in the town. The four corners are most usual, but it is possible to solve the game from any of the 64 start positions.

To move Santa to a new house simply type the letter and number of the house you want to go to and he will move automatically, provided of course the move is allowed.

Illegal moves are flagged by a short beep.

If you find yourself stuck in such a way that movement is impossible press the X key for another try.

Press "X" to exit	01	01	E1	F1	Number of houses
	02	F2	02	H2	38
	03	F3	E3	F3	
	04	F4	E4	04	
	05	F5	E5	05	
	06	F6	E6	06	
	07	F7	E7	07	
	08	F8	E8	08	

This is just one of several solutions

The game in progress

Santa's Tour listing

```

10 REM Santa's Tour
20 REM by Arthur London
30 REM (c) Electron User
40 MODE:VDU19,0,4,0,0,0
50 PROCgraphics
60 DIM SX(8,8)
70 MODEI:FX11,0
80 VDU19,0,1,0;19,1,2;0;1
9,2,4;0;
90 VDU23,1,0;0;0;0;
100 PROCprintboard
110 MOVE 432,1000:VDU:PRI
NT'Santa's Tour:VDU4
120 PRINTTAB(13,27);"Do yo
want a";TAB(11,29);"demons
tration? Y/N"
130 IF FNyesno PROCdemo
140 PRINTTAB(8,27);SPC(24)
;TAB(8,29);SPC(24)
150 CNTX=0
160 :
170 REPEAT
180 IF CNTX PRINTTAB(8,28)
;Movement to: ELSE PRINTT
A(8,28);Start:
190 REPEAT
200 fault=FALSE
210 PRINTTAB(21,28);"Lette
r?":SPC5
220 *FX21,0
230 LX=(GET AND 223)-64
240 IF LX=24 THEN 390
250 IF LX<1 OR LX>0 fault=
TRUE:GOTO390
260 PRINTTAB(21,28);SPC4"N
umber?"
270 NX=GET-48
280 IF NX<1 OR NX>0 fault=
TRUE:GOTO390
290 IF SX(LX,NX) fault=TRU
E:GOTO390
300 IF CNTX=0 THEN 350
310 IF NOT ABS(LLX-LX)=1 O
R ABS(LLX-LX)=2 fault=TRUE:
GOTO390
320 IF ABS(LLX-LX)=1 IF AB
S(NNX-NX)>2 fault=TRUE:GOTO
390
330 IF ABS(LLX-LX)=2 IF AB
S(NNX-NX)>1 fault=TRUE:GOTO
390
340 PROCblank(LLX,NNX)

```

```

350 PROCsanta(LX,NX)
360 SX(LX,NN)=TRUE
370 COLOUR128:COLOUR3
380 CNTX=CNTX+1:PRINTTAB(3
7-(CNTX<10),9);CNTX
390 IF fault:VDU7
400 UNTIL fault=FALSE
410 LLX=LX:NNX=NX
420 UNTIL LX=24 OR CNTX=64
430 :
440 IF CNTX=64 PRINTTAB(8,
28);SPC5"Congratulations!":SP
C6;TAB(8,30);SPC5"Another g
?":Y/NSPC5 ELSE PRINTTAB(8,2
8);SPC4"Another try?":Y/NSPC
5

```

This is one of hundreds of programs available FREE for downloading on

MicroLink

In addition to these many BBC Micro programs in the MicroLink library will also run on the Electron.

```

450 IF FNyesno PROCprintbo
ard:GOTO140
460 VDU23,1,0;0;0;:*FX12
,0
470 END
480 :
490 DEF FNyesno
500 *FX21,0
510 REPEAT
520 ANSS=CHR$(GET AND 223)
530 UNTIL ANSS="Y" OR ANSS
="N"
540 *N=(ANSS="Y")
550 :
560 DEFPROCsanta(X,Y)
570 COLOURS:IF (X+Y)MOD2
=0 COLOUR129 ELSE COLOUR130
580 VDU31,3*X+5,3*Y-1,22
4
590 VDU31,3*X+5,3*Y,227
600 COLOUR0
610 VDU31,3*X+6,3*Y-1,22
5,226
620 VDU31,3*X+6,3*Y,228,
229
630 VDU31,3*X+5,3*Y+1,23
0,228,231
640 ENDPROC

```

```

650 :
660 DEFPROCblank(X,Y)
670 IF (X+Y)MOD2=0 COLOU
R129 ELSE COLOUR130
680 VDU31,3*X+5,3*Y-1,32
,32,32
690 VDU31,3*X+5,3*Y,32,3
2,32
700 VDU31,3*X+5,3*Y+1,32
,32,32
710 ENDPROC
720 :
730 DEFPROCprintboard
740 COLOUR128:CLS
750 FOR JX=1 TO 8:FOR IX=1
TO 8
760 COLOUR0:IF (JX+IX)MOD2
=0 COLOUR129 ELSE COLOUR130
770 PRINTTAB(3*JX+5,3*IX-1
);
780 PRINTTAB(3*JX+5,3*JX);
CHR$(IX+64);JX;"
790 PRINTTAB(3*JX+5,3*JX+1
);
800 SX(IX,IX)=FALSE
810 NEXT:EXT
820 COLOUR128:COLOUR3
830 PRINTTAB(33,31);"Number
";TAB(37,5);"of":TAB(33,7);"
houses";TAB(38,9);"0"
840 PRINTTAB(1,3);"Press:
TAB(1,5);CHR$(34)*CHR$(34);TAB
(1,7);"to":TAB(1,9);"exit"
850 MOVE0:DRAW0:DRAW0:DR
A1276,1020:DRAW1276,0:DRAW0
,0
860 MOVE252,960:DRAW1024,9
60:DRAW1024,1080:DRAW522,1080:
DRAW252,960
870 ENDPROC
880 :
890 DEFPROCdemo
900 AS=123124312465787865
42135786875656878687568753421
2134578642131243437531245687
8756421357867865342131246875
43121243578642132134657868
910 PRINTTAB(8,27);"This
is just one of":TAB(8,29)
;" several solutions
920 AAZ=0:CNTX=0

```

```

930 FOR IX=1 TO 64
940 IF ISMOD=0 COLOUR129
ELSE COLOUR130
950 IF AAZ=0 PROCblank(AAZ
,88X)
960 AAZ=VAL(MIDS(A$,"129-IX
",1))
970 BX=VAL(MIDS(A$,"12",1))
980 IF ISMOD=0 COLOUR130
ELSE COLOUR129
990 PROCsanta(AZ,BX)
1000 AAZ=AAZ+88X=88X
1010 CNTX=CNTX+1
1020 COLOUR128:COLOUR3
1030 PRINTTAB(37-(CNTX<10),
9);CNTX
1040 TX=TIME:REPEAT UNTIL T
IME-TX=20
1050 NEXT
1060 PRINTTAB(8,27);SPC6"Pr
ess any key":SPC5;TAB(8,29);S
PC(24)
1070 *FX21,0
1080 KS=GETS
1090 PROCprintboard
1100 ENDPROC
1110 :
1120 DEFPROCgraphics
1130 VDU23,224,0,7,7,7,3,3,
1,3
1140 VDU23,225,0,3,255,255,
255,255,255,255
1150 VDU23,226,56,240,224,1
92,192,192,192,192
1160 VDU23,227,7,1,3,7,15,1
4,30,28
1170 VDU23,228,255,255,255,
255,255,255,255,255
1180 VDU23,229,192,192,128,
128,0,0,0,0
1190 VDU23,230,0,1,1,3,3,3,
3,3
1200 VDU23,231,128,192,224,
224,240,240,240,240
1210 ENDPROC

```

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

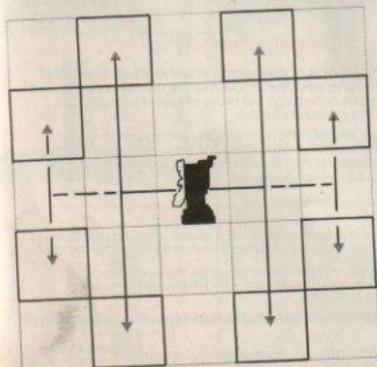


Figure 1:
The eight possible moves from a central position

PROCEDURES

graphics
santa
blank
demo

Define the characters
Display Santa at X, Y
Blank square at X, Y
Create the demonstration

VARIABLES

S% Array containing the visited status of each house
L% Ascii value of the letter entered, minus 64
N% Ascii value of the number entered, minus 48
CNT% Number of houses visited
X% Santa's X coordinate
Y% Santa's Y coordinate

PALACE of MAGIC



Leaping over deadly
swords and spikes



Climbing up the
East Tower



Wandering through
a patch of woodland



Approaching the
meandering river



At the top of
the West Tower



Exploring the passages



Greeting the Guardian
of the Guards



Down in the dungeons



Over 100 Screens full of Challenging Puzzles and Awesome Foes

By practising acts of benevolence and goodwill, you have offended the evil wizard Caldeit. Summoning forth his satanic powers in order to extract retribution, he has cast two powerful spells upon you: (1) you have been reduced to the size of a dwarf; (2) Caldeit has banished you to one of his old homes, the "Palace of Magic".

The palace and its surrounding land is littered with magical objects and mysterious creatures. It is rumoured that there is also a hidden transporter — your only means of escape from this enchanted place.

After exploring the rooms of the palace, you should venture forth through the enclosing woodland: towards the ancient church and the eerie dungeons, or through the maze of secret passages, or over the river to the princess's house.

On your journeys, you will encounter many strange animals and people including rock monsters, gremlins, imps and guards. Some are good and some are evil. You will need to decide who you can trust to help you in this arduous quest.

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PRIZE COMPETITION

The first prize in our competition is a treasure chest containing over £200 worth of mystical and magical artefacts. 10 runners-up will each receive £5 and a signed certificate.

To enter the competition, you must complete the "Palace of Magic" adventure, and note down the congratulatory message you receive. Closing Date: 30th April, 1988.

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Electron user

ARCADE CORNER

Compiled by MARTIN REED

LAST month's request for help with level two of Ravenskull has drawn a similar plea from J. Pennington of Bolton, Lancs. He can't do level three!

This month you'll find a complete map of level two of Ravenskull along with a key showing the objects you'll come across on your travels.

Many thanks to Timothy Jameson of Lancaster, Paul Dryden of Lemington, Newcastle, Peter Clarke of Wootton Bassett, Wiltshire and Douglas MacKenzie of Colinton, Edinburgh for their cheat modes and passwords.

Share your hints, tips, peeks and pokes with fellow *Electron User* arcade addicts, but please ensure they are all your own work. Send them to:

Arcade Corner
Electron User
68, Chester Road
Hazel Grove
Stockport
SK7 5NY

Vindaloo - Tynesoft

Load the game normally and press Control+f9 when playing it. You will hear a short tune. When you restart the game you will find you now have nine lives. Repeat this whenever necessary.

Paperboy - Elite

Here are some tips that will be invaluable to anyone struggling with Paperboy:

If you find it hard to gain bonus points (by smashing windows or delivering extra papers) then simply don't bother - you'll lose too many lives.

Avoid stationary obstacles by riding over the lawns. To bypass moving objects, approach them

slowly, then dodge and accelerate out of their way, as they have a nasty habit of homing in on you.

Use this technique for the C5 and the jaywalking pedestrian who seems to be out to get you at the beginning of every day.

When you come to the road junction, move to the right of the screen to avoid the bouncing tyre - although in general you should try not to go on the road.

Deathstar - Superior Software

For the second month in succession, I find that a game I spent ages hacking into for the October column actually has a cheat mode built in.

When playing the game press the Caps Lk, Q and 1 keys together. This restarts you on the current level with a full quota of starbombs.

Syncron - Superior Software

We seem to have been inundated with lists of passwords this month. Here are Syncron's:

- A ALPHA
- B MEGATRON
- C COMMODORIA
- D CYCLIA
- E LAMBIA
- F ATOMICA
- G QUARKIA
- H CHROMA
- I BETERON
- J DELTA
- K SYNCLAIRIA
- L QUADRAVOX
- M PLATINUM
- N ORICA
- O SHOTOKIA
- P PARTISIA

This must rate as the fastest game ever seen on the Electron (correct me if I'm wrong), so much so that I've only ever completed level A once.

The BBC Micro version is so fast as to be almost unplayable. I complained to Gary a while ago that this was the third Partis game in succession that was too fast for the average games player from the outset.

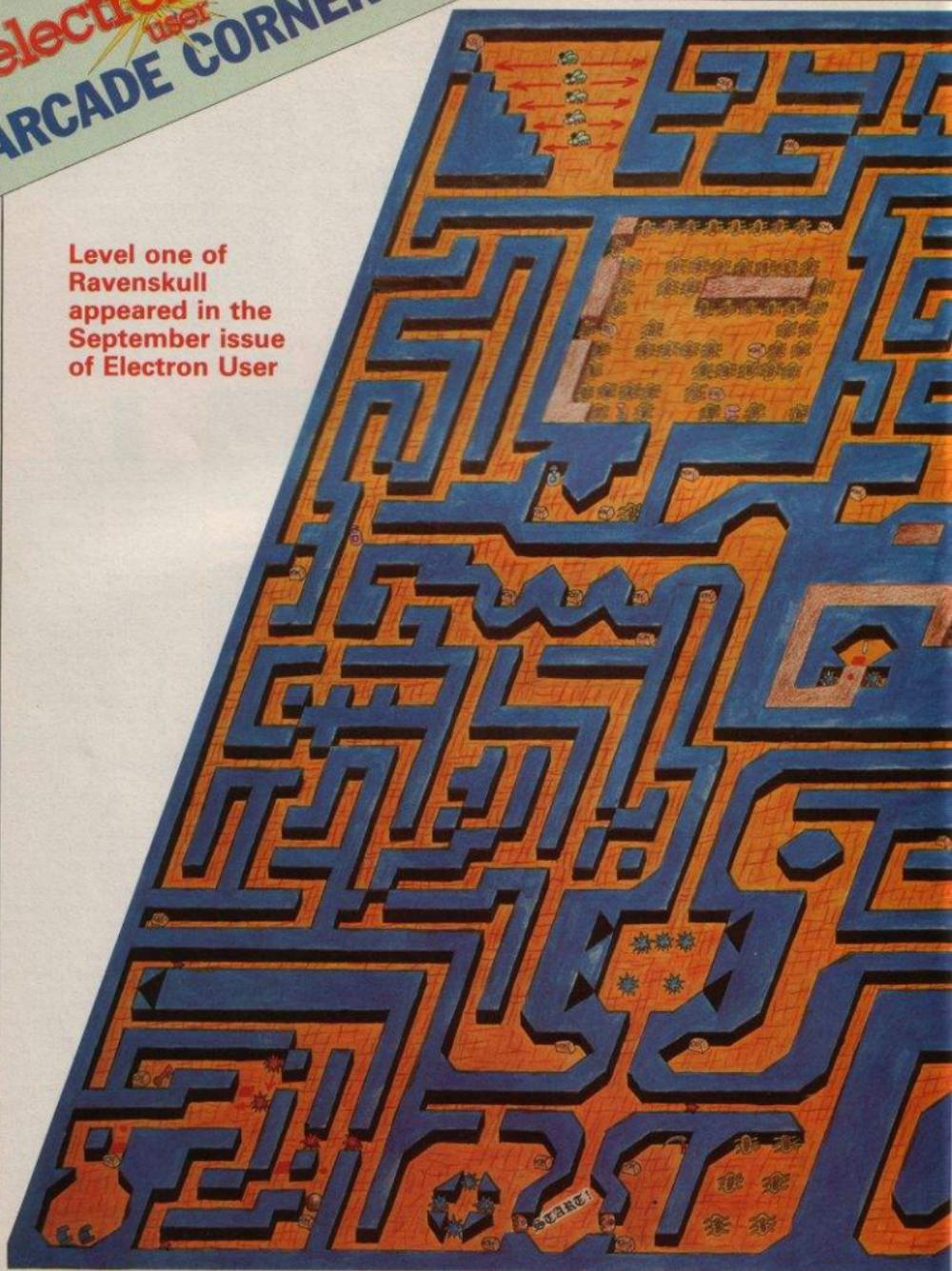
Gary replied proudly "But Impact (his latest game, out soon) starts off easy".

The Big KO - Tynesoft

The passwords for Tynesoft's excellent boxing game are as follows:

- | | | |
|---|--------------------|---------|
| 1 | Heap Big Nose | START |
| 2 | Strongman Joe | SWITCH |
| 3 | Stippo the Steamer | POSTER |
| 4 | Handsome "DEVIL" | GUNSTAR |
| 5 | Hairy Harry | LOGICAL |
| 6 | Roger Rattash | SPIKE |
| 7 | Groovy Man | JOHNBOY |
| 8 | Cheap N'Nasty | WINDOW |

Level one of
Ravenskull
appeared in the
September issue
of Electron User





3D Ravenskull

MAP

THE HARBOR OF DEATH

by Morgan for SUPERIOR SOFTWARE LTD ©1987

KEY TO LEVEL 2

-  Key: opens similar coloured doors
-  Pressure Pad: when stepped on, triggers all Spined nearby to block your path, or trap you. * Detects where you are. If any, will appear.
-  Treasure
-  Spine Door/TRAP.
-  Wooden Cask.
-  Sledge.
-  Man/E/Esser II
-  Scroll: STRENGTH
-  Scroll: TELEPORT TO
-  When walked over, a door will appear and block your path directly behind you
-  Only collect this treasure from an easterly direction.
-  Slow Poison
-  Deadly Poison.
-  MUD
-  Gives/reserves 100 health.
-  Shovel.
-  Scroll: SPEED
-  2nd part of the Crucifix.

More great Electron games

This month we introduce a new volume in our Ten of the Best series – 10 more games to give you many hours of fun and entertainment.

These four packages are crammed with the best games from the last two years of Electron User. As an added bonus a previously unpublished game has been added to each one – stunning machine code masterpieces from our technical wizard, Roland Waddilove.

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Haunted House: Fight against all the odds to get out alive.

Space Hike: Another classic. Help the spaceman avoid marauding monsters.

Parky's Peril: Help Parky through an invisible maze, racing against time.

Rally Driver: All the thrills of high-speed driving with none of the risks.

Alphaswap: Your letters are in a twist. Can you put them in order.

Knockout: Fast and furious action as you batter down a brick wall.

Money Maze: Avoid ghosts and collect coins in an all-action arcade classic.

Lunar Lander: The traditional computer game specially written for the Electron.

Volume 2

Atom Smash: Machine code thrills as you help to save the world from destruction.

Bunny Blitz: Go egg collecting, but keep away from proliferating rabbits.

Castles of Sand: Build castles – but beware the rising tide and hungry sandworms.

Reaction Time: Test your reactions with this traffic lights simulation.

Solitaire: The Electron version of the age-old game

of logic and patience.

Jumper: Jump for your life in this exciting arcade action game.

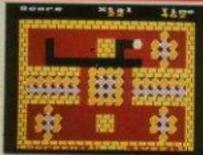
Break free: Test your wits and reflexes in this popular classic ball game.

Code breaker: Crack the code in a colourful if frustrating brainteaser.

Parachute: Save the plunging sky divers from a watery end.

Star fighter: Attack the bandit ships in this fast-moving 3D punch up.

Volume 3



Rockfall: Come diamond mining in this fun packed game with its own screen designer.

Karate Warrior: Win your black belt in this gruelling test of karate skill.

Grand Prix: Battle your way into the lead in this tricky racing simulation.

Invasion Force: Can you survive wave after wave of relentlessly advancing aliens.

Grebit: Guide the frog across the busy road then across the fast-flowing river!

Fruit Worm: Steer the worm towards the fruit while avoiding rocks and its ever-growing tail.

Manic Mole: Watch out for melting platforms and conveyor belts in your quest for jewels.

Skramble: Fly your fighter fast and low over the landscape to penetrate enemy territory.

Mr. Freeze: You'll need speed and strategy to reach the ice blocks before they melt away.

Paint Roller: Steer a speeding roller, run over paint pots but keep clear of the rocks.

Volume 4



Lunar Invasion: Defend the moon from wave after wave of marauding aliens in this superb multi-screen arcade game.

Howzat: Try not to get caught out in this vivid recreation of a day's test cricket.

Snapdragon: Enjoy this two-player micro version of the familiar card game.

Day at the Races: Fancy a flutter? You can bet your shirt in safety in this two-player horse racing game.

Revers: Combine cunning and chance as you try to out-think your Electron at this classic

board game.

Fishing: Relax and enjoy a quiet afternoon by a shady brook. You'll regret it if you let this one get away.

Cavern Capers: Escape from the depths of the planet by blasting oil drums and dodging deadly fireballs.

Craal: Escape from the maze and win the beautiful princess in this superb text adventure.

Oxo: High strategy meets low cunning in a logic game to strain your brain.

Missile Attack: Defend your city from a missile invasion and save it from certain doom.

TO ORDER PLEASE USE THE FORM ON PAGE 61

ONE of the first lessons I learned as a child was that there are good and bad teachers. The bad ones would come into our classroom ill-prepared and usually leave us to our own devices. Hence, little was learned and disruption usually followed.

The good teachers were well prepared, firm but kind, and monitored each stage of our learning with understanding and guidance.

Now as an adult I see the divide between good and bad even more clearly. The advent of the micro into schools has laid wide the possibility for all kinds of creative, innovative and structured learning.

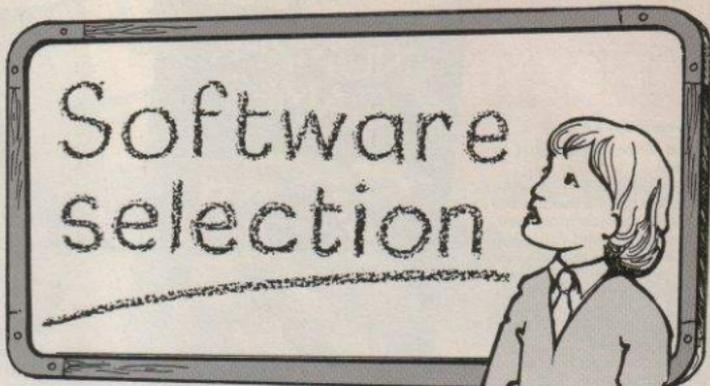
It has also, however, given the lazy teacher the tool to keep individuals or even whole classes quiet for long periods on end.

I have seen a class, in one particular school I taught in, use computers almost every day with one particular teacher. Yet at the end of two years very few members of that class would say they had enjoyed the experience and most could do little more with a micro than play space invaders.

I do not presume to use this article to make good teachers out of you, but merely to indicate the best ways to get the most out of the educational software piling up beside your Acorn Electron.

Most pre-school infants will sit in awe looking at the flashing lights produced by your Electron for about 10 seconds before they are screaming to be allowed to touch a button for themselves. A home micro is perhaps one of the most wonderful toys now available for any four or five year-old.

Let your toddler use the computer for games, providing of course you sit nearby for safety purposes. My own three year old loves playing a simplistic arcade



In Part IV of his series **NIC OUTTERSIDE** continues his survey of educational software for the Electron

game called Bill Bounces Back.

Such games will improve hand-eye coordination and familiarise junior with the keyboard and even lead him to load his own software from tape.

Educational programs such as Podd and Let's Count (both ASK) can at this stage be used purely in a game context. Alternatively, they can be used for structured teaching of reading and counting.

Providing you don't attempt long periods of instruction ad nauseam, your child will soon learn words such as cry, pop, eat, grow, fly and run very quickly with Podd.

If inclined you can then encourage your child to try to form the letters on paper or even transpose his own name in place of Podd. Once again, my own son loves trying to write, "Ben can pop" over and again with crayon on paper.

Let's Count is most popular in our house, partly for the Popeye tune which is played in part one of the

program, but also for the sheer fun factor of this piece of software.

Counting the ships and barrels in the game is then continued in counting the stairs in our house, the eggs from the supermarket, or even the pieces of Lego in the toy box. Very soon your child should be counting up to 10 and beyond with ease.

Once at primary school, the real learning can begin. A package such as Table Adventures can be used purely to consolidate the multiplication tables taught at school or home.

Tables achievement should be tested regularly, either in the form of jumbled written tests or by using Database Software's brilliant Tables Mountain.

Needless to say rewards for learning a table correctly can provide superb motivation. I can still remember the policy of my junior school teacher of giving us a sweet for each new table learned.

Other software such as Golem's Fun with Words, can be used to support writ-

ten exercises or as teaching devices in their own right. Suffix can be used in conjunction with a book such as Joy Pollock's Signposts to Spelling, to teach and consolidate the Suffix rule.

All-in packages like BBC Soft's Maths with a Story one and two link TV programmes to computing software and finally to written exercises. Although the television programme is not essential to benefit from these packages, a video recorder can prove useful if the core programme is tele-

◀ From Page 47

vised while the child is at school.

Each Maths with a Story program can be used as the basis of one or more half-hour lessons with your child which can then develop into games or replaying the program just for fun. BBC Soft's Number Games can also be used to support work done in this category.

In all cases the child should not forget that a pen and paper are never far away. We are not yet at a technologically advanced stage where writing is not a necessary prerequisite for the next generation.

Support reading or writing are essential exercises if the value of educational software is to be maximised. All work should be monitored and the child encouraged upon his successes and never berated for his failures.

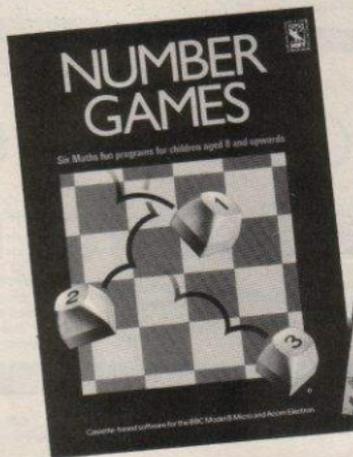
Usborne's series of English Grammar, English Spelling and English Punctuation books will provide superb backing to many of the primary literacy programs mentioned in these articles.

Equally, Four Rules of Number, Money and Time books by Hesse (Published by Longman) will support the numeracy suites.

At secondary school most youngsters will have become quite familiar with their micro and can be left to explore the wonders of silicon technology for themselves.

However, unless your child is particularly self-disciplined, the learning routine should still be supervised. I can remember even as a fairly academic 14 year old I would still turn on my headphones to Bob Dylan rather than pursue my Maths homework.

That is not to say you should stand at the shoulder of your teenager, but merely check the work is being attempted rather than another high-score being



achieved at Snapper.

Most secondary software packages such as the Akadimias series and the Ivan Berg programs are of a revision nature and as such are supporting work completed at school.

However, most good software also contains exhaustive bibliographies and many of the books can be bought for only a couple of pounds each at good second-hand book shops.

Read, study, compute and write is a good adage which can be applied to most



academic GCSE and A Level subjects.

Once again I must recommend All-in packages and in Modern Languages, A Vous La France (BBC Soft) is an outstanding example. Though priced at £19.95 the course contains over 600K of material with excellent supportive exercises and continuation work.

As long as the course of study is judiciously organised to cover a few months, this type of package can provide an end in itself.

Don't try to become a

teacher but simply a mentor to guide your child's educational progress. More can be achieved academically in one hour of one to one work with your child and your Electron, than any teacher could hope to achieve with a class of 30 children at school in a week.

Encourage, monitor, help and assess should be the steps any parent should take if they want their child to gain the most from the educational software I have surveyed in these four articles. ■

Educational Software publishers:

Kosmos Software, 1 Pilgrims Close, Harlington, Dunstable, Bedfordshire LU6 6LX
Tel: 05255 3942

Mupados, Llambod Industrial Estate, Tregaron Road, Lampeter, Dyfed.
Tel: 0570 422877

Golem Software, 77 Qualitas, Bracknell, Berkshire RG12 4QG.
Tel: 0334 50720

Micropower, Software Bargains, 8/8A, Regent Street, Leeds LS7 4PE
Tel: 0532-687735

Highlight Software, 36 Sherbourne Close, Barry, South Glamorgan.

LCL, Melody House, 13 Deanfield Road, Henley-on-Thames, Oxon. RG9 1UG.
Tel: 0491 579345

ABC, 19 Crumstone Court, Killingworth, Tyne and Wear.

Applied Systems Knowledge (ASK), London House, 68 Upper Richmond Road, London SW15 2RP.
Tel: 01-874 6046

Mirrorsoft, Maxwell House, 74 Worship Street, London EC2A 2EW.
Tel: 01-377 4600

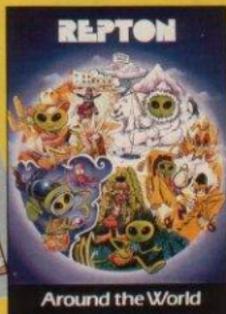
Duckworth, The Old Piano Factory, 43 Gloucester Crescent, London NW1 7DY.
Tel: 01-485 3484

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Thing on a spring

Dean Lester reveals how he wrote the arcade game Ziggy



The title screen

ZIGGY is a three dimensional arcade-adventure I wrote for Audiogenic. It involves guiding Ziggy – a Zebedee-like character – around his strange world, collecting pyramids to enable him to travel upwards to eventually free his ladyfriend.

The many hazards he meets along the way include skulls, glue, sliding cubes and bouncing balls. Also included with the game is a screen designer to enable you to redesign his world to your own specifications.

I have always enjoyed the arcade-adventure style of game – which involves more thinking than just a shoot-'em-up – but with attractive graphics, unlike a text-only adventure.

In particular I was attracted to the style of game which is seemingly found exclusively on other machines.

These involve high resolution graphics with intricate detail, observed at an oblique angle, with sprites moving in true three dimensions behind and in front of other game objects.

Moving around the game usually involves connecting rooms of some description, with the room display switching rapidly as doors are passed through. This then was to be the style of my game. The characters them-

selves developed as the programming progressed.

I have an Electron with a Cumana disc system and did all the main programming on this. I borrowed a BBC Micro and a Master to write versions for these machines.

The entire program was to be in machine code, so that pages 4, 5, 6 and 7 of memory (normally owned exclusively by Basic) could be used by the game.

The reference books I used were the standard Electron User Guide, the Advanced User Guide, a book on assembly language and the equivalent BBC Micro and Master manuals.

The Mode

The first decision to make was which mode to use. I was determined the resolution was to be very good and this left me with the choice of Modes 0, 1 or 4.

Mode 0 is almost never used by games programmers since although the resolution and detail is superb, it gives only two colours and gobbles up 20k in the process.

This left either Mode 1 or 4. Mode 1 would allow four colours, but again it is a 20k mode and somewhat slow for an Electron game. So Mode 4 it was to be.

The first programming job

was to write the main game routine. This is the part of the program which calls all the subroutines, although it does very little in itself. That done, the subroutines were next.

The first routine I wanted to write was the screen layout. The screens consist of 6 x 7 blocks, as this fitted nicely on the Mode 4 screen.

Each block can be one of 16 – blank, a movement arrow (four of these), glue, energy bulb, magic wands, down escalator, up escalator, skull and crossbones, a pyramid, cube start square (two of these) or a ball start square (two of these also).

A byte can hold any number between zero and 255, and this can also be expressed as two numbers between zero and 15, one in the top half of the byte (or nibble) and one in the bottom.

By masking off the nibble I didn't want, it was possible to store two blocks in one byte – that is one screen in 21 bytes and the entire 200 screens in only 4200 bytes.

The screen routine reads the correct nibble from the screen data table, selects the corresponding block from the sprite area of memory and draws it on the screen.

This process is repeated for all 42 blocks, starting from the furthest from the

observer, so that the perspective is correct. At the same time the data is expanded into another area of memory so it is easy to read which square Ziggy is on at any one time.

Sprites

The next subroutine was the sprite routine. A common way of drawing sprites is to Exclusively OR (EOR) the sprite with the background.

This has the advantages of speed and ease, since when the sprite comes to be deleted again all that has to be done is for the sprite to be redrawn. It cancels itself out (1 EOR 1 is 0) and any background which was overwritten is restored.

However, its main disadvantage is that the sprite itself becomes corrupted by any background and can then become difficult to see. So I had to develop a method whereby the sprite was unaffected, but the background was not destroyed.

I also wanted to make the sprites as real as possible, with the ability to see through holes in the body of the sprite. This tall order was eventually solved by one routine.

The procedure first stores the background about to be overwritten in non-screen ram. It then logically ANDs

the screen with a sprite mask (a sort of cut-out of the margins of the sprite). This effectively punches a hole in the screen in the shape of the sprite. The result is then ORED with the sprite itself, fitting it into the hole.

To delete the sprite, you just replace the background (stored earlier) back where it belongs.

The routine works rather well – in the game, Ziggy is not affected by the background, has a nice clear margin around him and you can see through the coils of his spring to the background behind.

3D movement

The next job – theoretically the hardest since I didn't know how to do it – was to allow the game characters to move in 3D relative to each other. That is, the nearer sprites in front of the further ones and so on.

I decided that the way to do it was to sort the sprite positions into distance priority. Each sprite has a small data table associated with it, containing information on position, direction of motion, which character it is and so on.

The position data has x,y and also z values, since the character may be a certain distance off the ground.

By sorting the sprites into distance order – also taking into account the height –

then drawing the furthest first, then the next furthest and so on, the nearer characters will overlay the further ones giving the effect of perspective.

The characters are deleted in reverse order as their stored backgrounds may contain some data from other sprites which have already been erased. The pleasure from seeing the routine work first time was indescribable!

Next was to design the characters themselves. I wrote a small sprite designer program and then spent many evenings trying to get them pixel-perfect.

By stippling the sprite masks, I managed to give the characters shadows, which moved with them and gave a nice lighting effect to game area.

Having done most of the hard work, I then set about writing the smaller routines, such as reading Ziggy's position, reading the keys, setting out the meters and so on.

I was particularly pleased with the death routine – Ziggy vapourises in convincing Star Trek style.

The menu and high score were next, and I also wrote an interrupt routine to give extra colour to the display, and to prevent the whole screen from disappearing when the palette is blanked as rooms are changed.

I am completely tone-deaf

and I'm the first to admit it, but I wanted to include background music to jolly along the game. I therefore enlisted the help of several of my musically-enlightened friends, who between them came up with an assortment of weird and wonderful tunes.

I think the final piece included was a nice balance between being interesting without being too intrusive into the game. The music is interrupt driven, so it plays entirely independently of the game, and therefore does not alter its tempo when the processor has a lot to do.

An output-buffer empty event is enabled, so an interrupt is generated every time the last note being played has finished. The interrupt handling routine then gets the next note, plays it, and returns from the interrupt.

However, for all this, a music-off option was considered essential for those late night Ziggy sessions.

Screen designer

Next I wrote the screen designer, originally just for my own use for the game itself, but later smartened up and included with Ziggy to allow other people to design their own.

I spent many weeks dreaming-up seemingly impossible screens. My

philosophy was that if I could complete the screen – even if it was only once – then it was possible and could be included.

Many of them require a bit of lateral-thinking before attempting, so put your brain in gear before engaging the fingers.

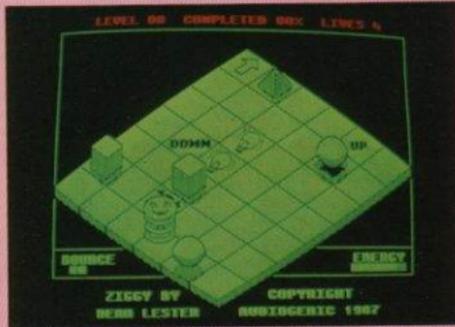
I have completed the game from start to finish three times (without using the cheat mode). It takes about one and a half hours, but I think it is well worth it to see what lies in store for Ziggy in room 200.

The game took about three months from conception to completion, working mainly evenings and weekends, since I am also a full-time (medical) student. Much of the equipment I have is borrowed from friends and my software company (ASL).

The Electron is my first computer, which I have had for about 18 months and Ziggy is my second game.

So it shows you do not need to be enormously experienced, rich or have loads of spare time to write marketable games. So you've no excuses – go on and have a try yourself, you could be pleasantly surprised.

Incidentally, if you do have lots of free time, can program a Cray II with your eyes shut, and are related to John Paul Getty I'm sure it helps. ■



Two screens from the game

BONE CRUNCHER

Bono takes the skeletons to a cauldron

Bono's partner Fozzy restrains a monster

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With the aid of your business partner, named Fozzy, you produce the soap by collecting skeletons amongst the castle caverns and then boiling the bones in a cauldron.

However, the castle caverns are fraught with danger: there are monsters who will kill you, spiders who will eat you alive, and glooks who will block your path. It will pay you dividends to also avoid the perilous trapdoors and hidden volcanoes.

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DEMONIC DATABASES

Theory into programming practice . . .

CLIVE GIFFORD presents a mini fantasy in Part 6 of our adventure writing series



OVER the past few months Bill Trevelyan has been showing how to write Basic text adventure programs on your Electron.

Well, enough of the theory. Let's get down to some serious programming. This month Clive Gifford presents a mini text adventure.

This shows that a

complex and intricate game is not necessarily long and complex to write and it is surprising how much can be squeezed in to just a few lines.

The adventure is set in the Kingdom of Norl which holds two great secrets, one centred round the lost riches of Alazar, the other concerning the plight of the wizard

Drava and his stock of mystic chants. Both are undoubtedly connected with the dreaded grey mass of Dracula's Castle.

Much of Norl's history has fallen into myth and half-truths, but what remains certain is the kingdom's need for a warrior of great courage to enter the castle, find Drava's Scroll of Runes and recover the lost wealth. Well volunteered!

This is no ordinary quest. Were it simple, one of the great soldiers of the past would have accomplished it with ease. Reports of various horrible misfits inhabiting the castle are likely to hold truth, so be careful.

You have a number of single word commands with which you can travel through the adventure and manipulate objects appearing within it: NORTH, SOUTH, EAST, WEST, TAKE, FIGHT, EXAMINE, QUIT and so on.

There are many locations and a quite a few objects, as well as half a dozen basic puzzles — not bad for a program that could be con-

densed a little further to fit on the 10-liners page.

The adventure is miniscule in comparison to commercial programs, but it still provides some good entertainment. Naturally it lacks some of the refinements you would expect from professional text adventures, but that isn't the point.

It is designed to offer an insight into writing adventure games without having to plough through reams of program listing. Not only that, it's fun too.

Most adventures are based on a map of interconnecting rooms and this is no exception. The arrays *LLS*, *LS* and *L* are concerned with decoding and storing the location names and details of which room connects to which and in what direction.

The arrays, *CCS*, *CS* and *C* deal with the objects in a similar way to the adventure's locations. The last array holds the starting positions and the relevant cell is changed to -1 if the adven-

Turn to Page 54 ►

Welcome to...
Count Dracula's Castle...

You are in the Forest.
A Coin is here.
Moves=1
What next? TAKE COIN
It's yours now.

You are in the Forest.
A Coin is yours.
Moves=2
What next? NORTH
* Can't go that way *

You are in the Forest.
A Coin is yours.
Moves=3
What next? SOUTH

Micro Messages

Lick that label printing problem

HOWEVER carefully I copy your listings, there always seems to be something that stops them from running. Is this in fact some kind of protection racketeering to sell more of the monthly tapes?

I have just entered the View label printing utility from the October 1987 issue of Electron User and even though I have checked it meticulously five times I still cannot get it to work.

The tape of addresses recorded from View simply will not load into Basic and on demanding options to examine or print labels all I get is a return to the menu.

When I try to leave the program I get the error No such FN/PROC at line 100. After studying the listing I can find no mention of PROCend anywhere, except in line 100.

All of this makes me think the complete program was not printed in the magazine and if so I would be pleased if you could print the omission. — P. Eisler, Hogarth Hill, London.

● The listing of the label printer was, as you suspected, incomplete. This sort of error is very rare as all listings printed in *Electron User* are reproduced exactly from working programs.

The missing PROCend had unfortunately slipped over our notice, and the person responsible has received 40 lashes.

In fact PROCend serves only to neatly exit the program. The rest of the listing is correct and will run perfectly — you'll only come across the problem when you've finished and quit the program. PROCend is defined as follows:

```
1588 DEF PROCend
1598 CLS
1608 PRINT "Bye"
1618 END
```

The View file itself cannot be loaded directly into Basic. Option one from the menu loads the prepared

View file into the program.

To see the loading taking place insert *OPT 1,2 at line 1375. This enables the extended messages from the cassette filing system. The file is loaded using the BGET command, which defaults to giving no messages at all.

The default filename for the View file to be loaded is ADDLIST. So if you press Return when prompted for a filename, the program will search the tape for this.

Otherwise you should enter the filename of the file you saved. It is important to keep the letters in the correct case or the Electron will skip the files.

Until a file has been loaded, the menu options to list and print labels have no meaning so they are ignored.

Sounding off

I THINK software houses are sexist; most of the adventurers involved in these tricky quests have a tendency to be male. I read your magazine every month and the new Arcade Corner feature is a great help, but why can't software surgery be bigger?

Finally, could you tell me where I can obtain further information on modems and the MicroLink service? — A. Sitadelfan, Newcastle.

● We agree that software houses tend to be sexist — all you can do is write to the companies and tell them. One notable exception to this rule is Citadel from Superior Software, now released on the Play It Again Sam compilation.

We'd really love to make

software surgery bigger than it is, but the problem is there just isn't enough room in the magazine to fit in everything we would like. We have to be selective and each month our reviewers pick the cream of the latest releases.

To access MicroLink you will need a general purpose modem, an RS232 serial port and some suitable software. Further information on the service is available by telephoning MicroLink on 061-456 8383.

Small problem

I AM one of the many people who type in the listings from your magazine. Of course, I could buy the monthly cassette, but then I would lose the vital experience gained from entering the listing.

Recently, your listings have become even more compact with four columns across the page. This has meant that many lines are spliced in unusual places making the meaning of the line unclear, especially when the break appears during some spaces or in the middle of a statement.

Worse still, I am having problems with the new listing style where ' ' ' ' (two apostrophes and one quote) could appear to be "" (two quotes). What, if anything can be done? — Sheila Bridges, Norwich, Norfolk.

● The new listings are produced by a new phototypesetting machine rather than being listed to a dot matrix printer and then photographed. The upshot

of this is the listings are less prone to reproduction errors in the magazine and generally easier to read.

Because of the slightly smaller typeface this also means we can fit, longer and better listings into the available space.

Generally speaking, we try to avoid use of characters like the apostrophe, but it has special meaning in Electron Basic and is often unavoidable. Remember, quotes always come in pairs — one at the start and one at the end of a string. If you find an odd number then you may have mistaken two apostrophes for a quote.

Spaces between Basic keywords are rarely needed and there is never a space between, say, the end of a Basic keyword and its opening bracket. Inserting extra spaces normally has no effect apart from causing some programs to run out of memory.

More jargon

I READ with amusement *Computerspeak Explained* in the October 1987 issue of *Electron User* to which you might like to add the following:

● Digital computer — the literal meanings of which are; Digital — pertaining to the fingers. Compute — to count. Therefore a digital computer is a person who counts on his fingers.

On a more serious note, there is a case to suggest a technical magazine like yours should give a glossary of terms at regular intervals.

For example, while I was

tied up for a few months with home improvements some bright spark invented sideways roms. Although I can guess what this means, I have never seen a written description.

There seems to be a tendency for buzz words such as this to creep into the vocabularies of the computerate and stay there, assuming everyone knows what they mean.

While on the subject of the unknown, I noticed one of your correspondents was having trouble with lines flashing across his display, which also occurs on his Spectrum.

I wonder if he could have a low mains voltage which would cause the 50Hz signal to break through onto the video. — J.E. Kennaugh, Callington, Cornwall.

● Whenever possible, when a new item arrives on the market we try to explain it in plain language everyone can understand.

For folks not in the know, a sideways rom is a piece of software supplied on a read only memory (rom) chip. The rom chip itself is mapped into the micro's memory alongside the Basic language, that is, they occupy the same address space.

When the machine is first switched on, the operating system looks at all the sideways roms for a language, normally Basic, and installs it as the current language.

When a command is sent to a sideways rom Basic is switched off, unplugged in effect, and the new rom switched on while the command is being executed.

Believe it or not, sideways roms are not a new idea. They were present in the design of the BBC Micro several years ago although they've only recently become properly available for the Electron. The cartridge ports on the Plus 1 are themselves non-dedicated sideways rom sockets.

A full description of sideways rams and roms can be found on Page 50 of the February 1987 issue of *Electron User*.

We have since discovered

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

However on the very rare occasions that mistakes may occur corrections will be published as a matter of urgency. Should you encounter error messages when you type in a program

they will almost certainly be the result of your own typing mistakes.

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

that flashing lines present on some television displays can be due to radar signals causing interference. Low pass, UHF filters to stop this are available from Maplin Electronic Supplies Ltd, PO Box 3, Rayleigh, Essex.

Not so random

I BOUGHT my Electron and Plus 1 about one and a half years ago. I am learning the ins and outs of Basic from various books and your excellent magazine. I seem to get stuck though, in what seem to be very simple areas.

I want to write a program which involves using random numbers in the range from zero to 51. However, I don't want to print the same number twice as often happens with the RND function.

If that isn't bad enough the computer always produces the same numbers every time it is switched on. What can I do to rectify this?

— David F. Royle, Warrington, Cheshire.

● This is an interesting point about random number generators. No computer, no matter how big or powerful it is, can reasonably claim to produce completely random numbers. That includes ERNIE, the computer used to select premium bond winners.

Computers can only produce very long sequences of numbers that appear

to be random. They will, however, repeat in the end — true random numbers only occur in nature.

The random number generator in the Electron can be seeded with an initial value which helps matters. This is done by using a negative argument. Like:

```
dummy=RND(-TIME)
```

This will make the random sequence much less predictable because the generator is seeded with a number that is constantly changing.

Here's a random number generator to produce a non-repeating series of random numbers from zero to 51. This sort of routine can be found in most card games.

```
10 REM 52 Random Numbers
20 REM initialise
25 dummy=RND(-TIME)
30 DIM nums(51)
40 FOR NX=0 TO 51
50 nums(NX)=NX
60 NEXT
70 :
80 REM shuffle
90 FOR IX=0 TO 51
100 RX=RND(51)
110 TX=nums(RX)
120 nums(RX)=nums(IX)
130 nums(IX)=TX
140 NEXT
150 :
160 REM display
170 FOR IX=0 TO 51
180 PRINT nums(IX)
190 NEXT
```

There's more than one way to skin an algorithm though, and this is just one possible method. It's fine provided you don't need a massive series of numbers because it uses a large

amount of memory to store the array.

Snail Trail error

I WOULD like to draw your attention to an error I have discovered in Snail Trail in the October 1987 issue of Electron User. The data statement in line 410 contains the characters 194 a ca28, which is clearly wrong. I cannot be sure of what they should be but I have found 194,1,128 works perfectly.

I feel I must also point out that the excellent ADFS restore program, printed in the same issue, does not work with Snail Trail as it also uses memory at &900. — S.M. Cobb. Romsey, Hants.

● Surprisingly, Snail Trail works fine as published, even though the line, as you state appears to be incorrect. Basic very cleverly reads the number 194 and ignores the garbage following.

The problem with memory clashes like this one in Snail Trail and ADFS restore are thankfully rare. In fact neither program should have been using the memory at all — this area is reserved for the cassette output buffer and extended envelope storage.

Machine code programmers often use these system areas to store their code, simply because they don't occupy any user memory.

Power to the buggy

I AM thinking of buying a BBC buggy to interface to my Electron — can you tell me if it would work? I have the user and analogue ports but the buggy also needs a 12v supply derived from the computer. Would a 12v power pack do the job just as well?

On a different note, I have discovered that the Computer Concepts graphics rom for the BBC Micro works in the Electron with everything except for the

The 6522 connection

I AM interested in connecting the 6522 versatile interface adapter to my Electron so I can build add-ons such as the Electron User buggy. I believe there is a location reserved for such a device at &FCB0 is this correct?

When I attempt to read from this location, the operating system sends a character from its credits via the ULA. I assume the 6522 would also send a piece of information causing a conflict on the data bus. Is there any way to turn these credits off?

In the *Advanced User Guide*, it is stated that the credits are made inaccessible by the switch to memory mapped I/O. Have osbytes &92 and &93 anything to do with this?

Finally, are there any books you know of which could be of use? — R. Crook, Wotton, Bedford.

● By far the easiest way to connect a 6522 to the Electron is to buy one of the ready built units available from several manufacturers who advertise regularly in *Electron User*. At least this way you will avoid the chance of damaging your computer.

You'll find reviews of the Project Expansions user port and ACP's Plus 5 in the March 1987 and December

Bottom			Top
18V AC	2	1	18V AC
AC RETURN	4	3	AC RETURN
-5V	6	5	-5V
0V	8	7	0V
+5V	10	9	+5V
16MHz	12	11	SOUND O/P
PHI OUT	14	13	+13 IN
NMI	16	15	RST
R/W	18	17	IRQ
D6	20	19	D7
D4	22	21	D5
D2	24	23	D3
D0	26	25	D1
NC	28	27	RDY
SLOT	30	29	SLOT
A14	32	31	A15
A12	34	33	A13
A10	36	35	A11
A0	38	37	A9
A2	40	39	A1
A4	42	41	A3
A6	44	43	A5
A8	46	45	A7
0V	48	47	0V
+5V	50	49	+5V

Figure 1: Expansion connector layout

1986 issues of *Electron User*.

If you wish to connect a 6522 directly to Electron, the simplest method is to connect your circuit directly to the expansion bus on the rear of the computer. Figure 1 shows the layout of this

connector.

The locations &FC00-&FCFF are an area of memory mapped I/O, named Fred by Acorn. The locations around &FCB0 are reserved for Acorn expansion. Locations &FCC0-&FCFE are reserved for user

applications and should be safe enough to use.

The osbyte calls &92 and &93 are used to read and write Fred legally, although there's no reason why you shouldn't access this memory directly using the indirection operators.

You can read the credits on an unexpanded Electron, but expansion modules are mapped into the same address space.

When plugged in, you'll read and write to these add-ons and the chunk of memory containing the credits disappears from the memory map.

In the BBC Micro, a signal can be derived from the 1MHz bus to inform hardware of any accesses to page &FC. As far as we're aware no such signals exist on the Electron.

The best book available for advanced users of the Electron like yourself is *The Advanced User Guide* by Bray, Dickens and Holmes. When it comes to hardware the guide is more or less BBC Micro specific. A fully updated guide which includes the Electron, written by the same authors, should be in the shops shortly.

extra Mode 8. — G. Cranch, Hoddesdon, Herts.

● The user port of the Electron is mapped into a slightly different place in memory to that on the BBC Micro, so the software to drive the buggy will have to be modified.

There's no reason why you shouldn't use a separate 12v power supply to drive the buggy, provided it can supply enough current.

A better and cheaper option, however, would be to build the *Electron User* buggy as detailed in Joe Pritchard's hardware series from September to November 1987.

Mode 8 in the Graphics rom is provided by directly

configuring part of the BBC Micro's video hardware, which the Electron does not have.

We're always interested in hearing of any BBC roms that work in whole or part when installed in the Electron

Plus 1 plus what?

I OWN and use an Electron and am intending to buy the Plus 1. Could you advise me on suitable software to run with this particular add-on?

I am particularly interested in using the Electron

as a word processor and would like to increase the available memory for such purposes.

Finally, could you provide me with some advice on which educational software to buy for my seven-year-old. — Charles A. McWhan, Dyce, Aberdeen.

● The Plus 1 contains two slots suitable for running software on rom cartridges. Several types of empty cartridge, called rom carriers, are available with blank slots so you can use BBC Micro roms and others supplied without cartridges in the Electron.

Acornsoft's View cartridge is a typical example of rom software and a very

popular word processor for the machine.

By far the most popular memory upgrade for the Electron is Slogger's Master Ram Board, which gives the micro an extra 32k of memory and a speed increase to boot. The actual increase in user memory is, for technical reasons, only 20k at most, but this will be more than adequate for most purposes.

Probably the best guide to educational software around is Nic Outterside's series which started in the September 1987 issue of *Electron User*. Nic is the headmaster of a large school and very experienced in this field.

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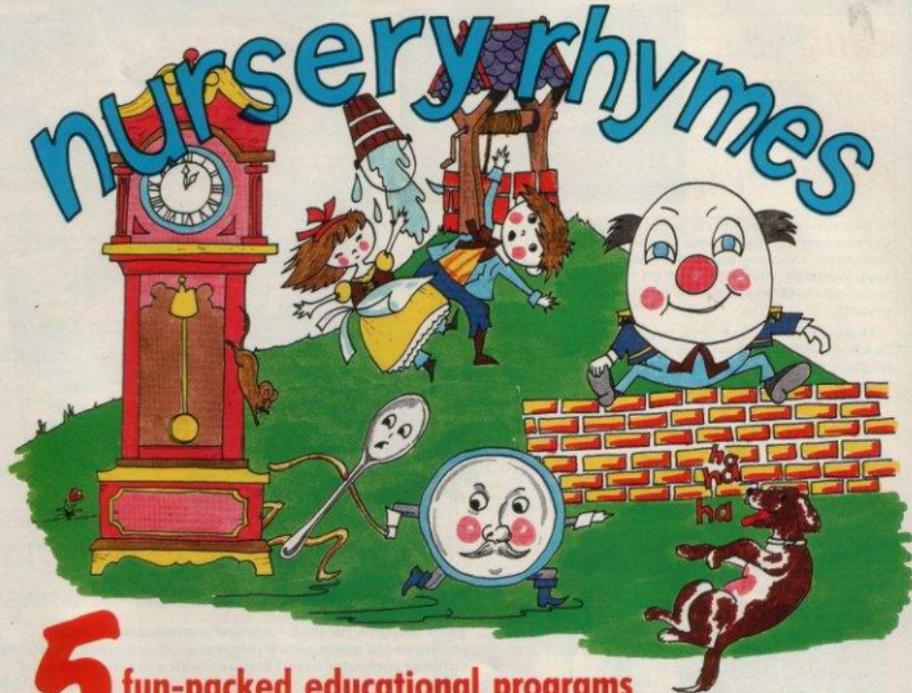


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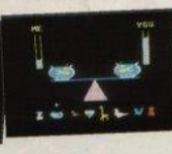
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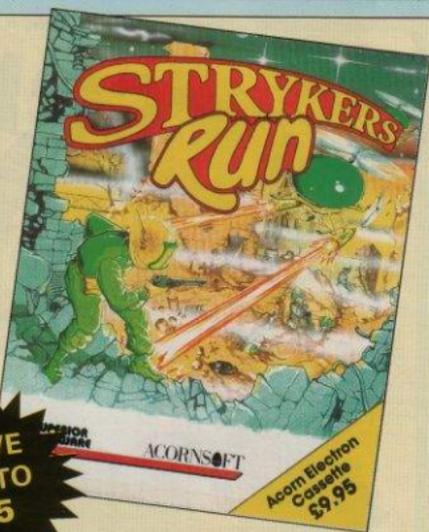
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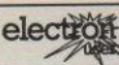
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Turbo tape save



PAUL CLARKE speeds up the cassette filing system with this clever utility

ONE of the major bugbears with the basic Electron is the slow speed of the cassette system.

In the standard machine, the hardware fixes the tape transfer speed at 1200 baud. However, there is still something that can be done.

When the Electron's operating system saves a program it records it as a series of 256 byte chunks, known as blocks. (Further information can be found on page 23 of the August 1987 issue of *Electron User*.)

Between each of the blocks is a small gap of about one second long. This is provided to make each successive block on the tape distinct from the last.

In fact, for all intents and purposes these gaps serve very little useful function and if we could get rid of them we could save and load a program much more quickly.

This program offers some solution to this problem. It's a machine code patch into the operating system's SAVE routine. It enables a program to be saved with very short block gaps saving time. It can be reloaded with Basic's normal LOAD command.

The code works in a rather novel way. Rather than revectoring the osfile routine and rewriting the entire code to save a program, which would be a mammoth task, it copies the routine into ram and then appends the patch into that. Meanwhile, the osfile vector is revectoring to the ram routine.

To install the patch, simply enter and run the program (not forgetting to save it first). Initially, you will be prompted for a

number between zero and 254. This will set the delay between each block. Zero gives the shortest.

If a delay of zero is requested then the program will also check the assembled machine code for any errors. As with any checksum, this routine is not infallible, although it is quite sensitive.

It works by multiplying each byte of the machine code by a number from one to eight and adding the result to the cumulative checksum. The reason for the multiplication is to elimi-

nate transposition errors, for instance BA instead of AB. A purely cumulative sum would not catch this.

If all is well the program responds after a short time with the message, Fast tape installed.

With short delays, programs can be saved and loaded at about one second per block faster than normal, which is noticeable even on a short program.

It should be noted that the operating system copy occupies memory from &5000-&57FF, so obviously programs that use high

resolution screen modes zero to three cannot be used.

However, because the routine is only required when saving, this means you can load long programs in Mode 6 as normal and then save them to a library cassette with the turbo utility installed. They can then be loaded at high speed at a later date using LOAD as usual.

Slogger Turbo Driver owners should switch their machines into normal mode before attempting to run the program. ■

```

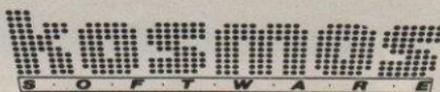
10 REM Turbo tape save
20 REM By Paul A. Clarke
30 REM (c) Electron User
40 *TAPE
50 IF I=<<<&DAE700D2 THEN
MODE6:PRINT"Electron OS 1.
80 only":END
60 MODE6
70 oswrch=&FFEE
80 INPUT"Length of bloc
k 0-254":AX
90 AX=AX+1
100 IF AX>254 THEN 80
110 vec=&202 AND &FFFF
120 FOR I=0 TO 2 STEP 2
130 PV=&5700
140 startX=PX
150 [OPTI
160 LDA &FD
170 CMP #0
180 BNE nextcheck
190 LDA &FE
200 CMP #80
210 BEQ set
220 .nextcheck
230 LDA &FD
240 CMP #111
250 BNE ok
260 LDA &FE
270 CMP #232
280 BNE ok
290 JMP set
300 ok
310 JMP vec
320 .set
330 LDA #000
340 STA &FD
350 LDA #&57
360 STA &FE
370 LDA #11
380 JSR oswrch
390 JSR oswrch
400 JMP vec
410 .delay
420 PHP
430 PHA
440 TXA
450 PHA
460 TYA
470 PHA
480 LDY #0
490 LDY #8
500 .loop
510 DEX
520 BPL loop
530 JNY
540 CPY #AX
550 BNE loop
560 PLA
570 TAY
580 PLA
590 TAY
600 PLA
610 PLP
620 RTS
630 J
640 NEXT
650 endX=PX:M=1
660 FOR NX=startX to endX
670 chksu=chksu+?NX*M
680 M=(M MOD B)+1
690 NEXT
700 IF AX=1 AND chksu<>EB
710 PRINT"Checksum error.":E
ND
720 FOR TX=&5000 TO &57FF
STEP 4
720 ITL=(ITL+&A106)
730 NEXT
740 ?&558F=delay MOD256
750 ?&5590=delay DIV256
760 ?&5074=&87305576
770 ?&212=0
780 ?&213=&50
790 ?&202=&800
800 ?&203=&857
810 ?&5700=0
820 MODE6
830 HIMEM=&5000
840 PRINT"Fast tape inst
alled."
850 END

```

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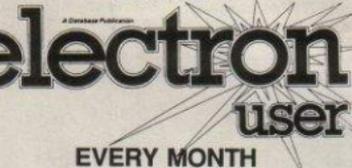
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Plus 1 graphs

JOE PRITCHARD provides some useful software for home and school use

IT'S time this month to put the soldering irons away and write some software for the Plus 1. This will use the information read in from the analogue to digital converter - ADC or joystick port.

Two FX calls influence the way the ADC works. These are *FX16, which allows us to turn off any of the four channels we aren't using, and *FX190, which allows us to set the conversion accuracy of a single channel.

The default value of *FX190 is 12, which gives a slow, 12 bit conversion taking about 10 milliseconds.

Faster results can be obtained by using *FX190,8 which sets the ADC into its faster eight bit mode, each conversion taking five or six milliseconds. For most purposes, the more accurate 12 bit conversion will be better suited.

These calls are useful when we want to make the ADC go as fast as possible. This is very useful to those interested in using the Plus 1 to monitor scientific experiments. Indeed, this is what many people use the analogue port for.

Schools have used the Electron's big brother, the BBC Micro, for several years now to monitor experiments in their science labs.

The Electron equipped with a Plus 1 can do the job just as well, so the rest of the article is devoted to a simple program that draws graphs of analogue inputs against time.

Some examples of the output from this program are shown in Figure 1.

The analogue input could be from a light or temperature sensor, or from more complicated ones that we'll look at in future parts of the series.

As we've already seen, the four channels of the analogue to digital converter in the Plus 1 are constantly running, giving new readings.

The values are placed in a table in memory, and when we request a certain channel

to be read the latest value produced by that channel is returned by the function ADVAL.

This means when we use ADVAL to read a value from an ADC channel the actual value read back can easily be up to 40 milliseconds out of date if we're running all four channels.

Even though a few milliseconds may seem a short time, if we're doing any type of scientific monitoring we want to get the time interval between readings constant. There are two software

tricks we can use to get around this. Firstly, yet another FX call comes into play:

*FX17,n forces channel n of the ADC to be converted.

*FX17,1 will cause a conversion to be started on channel one.

*FX17,2 causes a conversion to be done on channel two immediately followed by channel one and so on.

*FX17,4 causes a conversion to be done on all four channels

To simplify things, we'll stick to channel one of the

ADC, read by ADVAL(1). One possible way to get an up to date reading is as follows: Perform a *FX17,1, wait 10 milliseconds then read the value back with ADVAL(1).

This would work, assuming we could get an accurate 10 millisecond delay. We don't have to bother getting an accurate time delay however, because a further use of ADVAL is to allow us to know exactly when a con-

Turn to Page 66 ▶

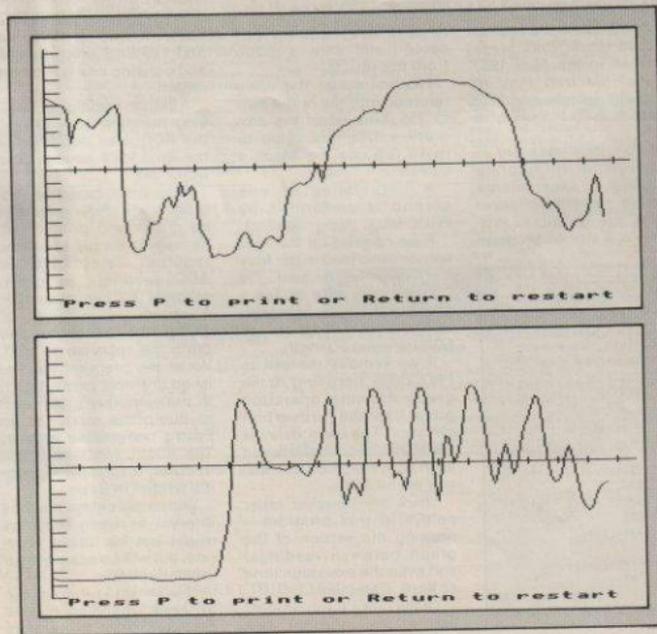


Figure 1: Some examples of Program 1's output

Hardware Projects

version has been completed on a given channel.

ADVAL(0) DIV 256 will return the channel number of the ADVAL channel that last completed a conversion.

If zero is returned, it indicates a conversion hasn't yet been completed since the last *FX16 or *FX17 call.

To get a fresh reading from channel zero of the ADC, we could use the following few lines of Basic:

```
1000 DEFNADVAL
1010 *FX17,1
1020 REPEAT UNTIL ADVAL(0)
DIV 256=1
1030 =ADVAL(1)
```

Here line 1020 simply waits until the Plus 1 informs Basic that channel one has finished converting.

Now we can write a program that takes inputs from an ADC channel and displays them on the screen in the form of a graph.

This will allow the heat or light sensors that were described in the May 1987 issue of *Electron User* to record the information and display it in the form of a graph.

The obvious uses are in education for monitoring scientific experiments although many other applications are possible. Program I is a simple program

```
10 REM Program I
20 MODE 4: *FX16,1
30 XPOS2=0:YPOS2=500
40 MOVE XPOS2,,YPOS2
50 REPEAT
60 YPOS2=FNADVAL*4
70 PROCdelay
80 DRAW XPOS2,,YPOS2
90 XPOS2=XPOS2+8
100 UNTIL XPOS2>=1200
110 END
120 :
130 DEFNADVAL
140 *FX17,1
150 REPEAT UNTIL ADVAL(0)
DIV 256=1
160 =ADVAL(1)/256
170 :
180 DEFPROCdelay
190 TIME=0
200 REPEAT UNTIL TIME>=100
210 ENDPROC
```

Program I

```
10 REM Program II
20 REM Draw graph from AD
channel 0
30 :
40 MODE 4
50 VDU 23,0,820;0;0;0;
60 INPUTTAB(2,10) "Time d
elay in centi-seconds:",TX
70 CLS
80 PROCinitialise
90 REPEAT
100 PROCgraph
110 PROCInstructions
120 PROCdotit
130 CLS
140 UNTIL FALSE
150 END
160 :
170 DEFPROCinitialise
180 DIM AX(8)
190 ENDPROC
200 DEFPROCInstructions
210 PRINTTAB(10,31)"Press
Space to start";
220 *FX15,1
230 REPEAT UNTIL GET=32
240 PRINTTAB(0,31)STRINGS(
39," ");
250 ENDPROC
260 :
270 DEFPROCdotit
280 PROCsample
290 PRINTTAB(1,31)"Press P
to print or Return to resta
rt";
300 *FX15,1
310 REPEAT G=GET:UNTIL G=1
3 OR (G AND 8DF)=ASC("P")
320 IF G=13 THEN CLS:ENDPR
OC ELSE PROCCode4dump:ENDPR
OC
330 :
340 DEFPROCgraph
350 MOVE 0,544:DRAW 1200,5
44
360 MOVE 0,0:DRAW 0,1024
370 FOR Y=32 TO 1024 STEP
51.2
380 MOVE 0,Y:DRAW 32,Y
390 NEXT
400 FOR X=0 TO 1200 STEP 6
4
410 MOVE X,532:DRAW X,556
420 NEXT
430 ENDPROC
440 :
450 DEFPROCsample
460 *FX16,1
470 X2=0:Y2=544
480 MOVE X2,Y2
490 REPEAT
500 Y2=FNADVAL*4+32
510 PROCdelay
520 DRAW X2,Y2
530 X2=X2+8
540 UNTIL X2>=1200
550 ENDPROC
560 :
570 DEFNADVAL
580 *FX17,1
```

Program II

to take one reading per second and draw a graph from the results.

FNADVAL scales the value returned into the range zero to 255. Line 60 of the program scales this value to make full use of the Mode 4 screen.

A time delay of one second is performed by PROCdelay, using the clock.

If we connect up the light sensor described in the May 1987 issue to the analogue port we'll be able to see a graph of changing light level as the light falling on the LDR varies in strength.

If we remove the call to PROCdelay from line 70 the graph drawing operation goes like the proverbial clappers. The main delay is the 10 milliseconds between each conversion on channel one of the ADC.

There are however other delays in this program - drawing the section of the graph between readings, and even the execution time of Basic statements.

These aren't too important at the moment, but might cause problems if the

program is doing more than just reading one channel and drawing one line on the screen.

A better technique, involving machine code to read the ADC, was described in the June 1987 issue of *Electron User*.

Program II, based on Program I, will allow graphs to be drawn and printed out. To use it, simply enter the required delay between ADC readings in centi-seconds (100 centiseconds=1 second).

Run the program and press the spacebar to start. When the program has finished drawing, press Return to draw another graph or P to dump the screen to an Epson compatible printer. The dump will take a few minutes to complete since it's written in Basic.

With small delays the time interval between readings might not be totally accurate, but will be adequate for most purposes.

This skeletal program can be easily modified to take readings from more than one channel, or save and

```
590 REPEAT UNTIL ADVAL(0)
DIV 256=1
600 =ADVAL(1)/256
610 :
620 DEFPROCdelay
630 TIME=0
640 REPEAT UNTIL TIME>=TX
650 ENDPROC
660 :
670 DEFPROCCode4dump
680 VDU2,1,27,1,65,1,8
690 *FX6,0
700 RESTOREBBB:FORIX=0TO7:
READAX(IX):NEXT
710 SX=8500
720 FORYX=0TO31:VDU1,27,1,
42,1,4,1,128,1,2
730 FORXX=0TO39
740 FORAX=0TO7
750 ZX=0
760 FORIX=0 TO 7
770 ZX=ZX+2
780 ZY=ZX*(SX/IBANDAX(AX)
)<0>
790 NEXTIX
800 VDU1,TX,1,ZX
810 NEXTAX
820 SX=SX+8
830 NEXTX
840 VDU1,13,1,10
850 NEXTYX
860 VDU3
870 ENDPROC
880 DATA128,64,32,16,8,4,2
,1
```

load readings to files on disc or cassette. Some of the problems that can occur when producing such graphs are:

- Speed of the Electron: This varies between Modes 0, 1, 2 and Modes 4, 5 and 6. The higher modes are faster because of the way in which the Electron memory is arranged and accessed by the ULA. To keep things going as quickly as possible, the graph is drawn in Mode 4.

- Speed of the program: If we're running all four channels flat out with 10 milliseconds for each reading and at the same time wanting high accuracy of the time delay between readings we may need to take care.

Drawing lines on the screen, or plotting points, is time consuming, and one way around this is to store the information from the ADC channels in an integer array when read, rather than plotting them directly on the screen. After all the readings

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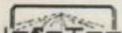
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