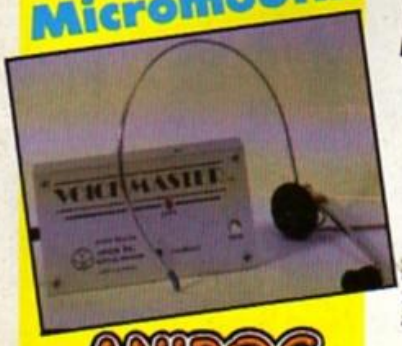
HOME COMPUTING WEEKLY
AN ARGUS SPECIALIST PUBLICATION
May 28-June 3 1985 No. 114 45p

ATARI
400/800/XL/130XE
48K
HIJACK
ENGLISH SOFTWARE

Micromouth!



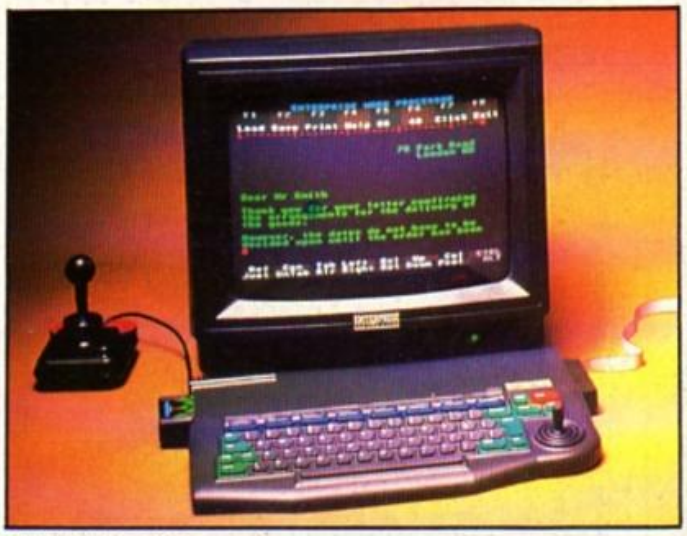
ANIROG
Voicemaster review

MSXtra memory and UK 128K

Spring is the time of birth in the microcomputing industry, judging from recent new releases and announcements.

The Enterprise 128 has arrived and will be boosted with a TV advertising campaign over the next few weeks. Originally scheduled for a June or July launch, production was brought forward by six to eight weeks because "our customers are telling us that a quality 128 machine, at the right price, right now will be a winner", according to Mike Shirley, Enterprise commercial director.

The new machine will cost £249.95; the Enterprise 64 will now sell for £179.95. A major selling feature is software compatibility with the earlier model and Enterprise hopes to have 100 top-selling titles for the two machines by Christmas. US Gold, Ocean, Hewson and Level Nine are among the software houses marketing conversions for the Enterprise range, and there are rumours that Firebird may convert Elite for the machine.



All British 128K Enterprise

The other new machine, announced this week, but not likely to be available before September, is Toshiba's HX-22 MSX computer.

This boasts a total memory of 144K: 80K of RAM and 64K ROM. This ROM space is used to add the Bank Street Writer, a word processor originally developed for Apple and IBM machines. The unit also features an integral RS-232C interface and two cartridge slots. The keyboard is a great improvement over earlier models, which makes it more suitable for word processing.

Toshiba's HX-22 – 144K of memory

Compatibility of software is also being claimed by Toshiba – not simply upward compatibility. There will be an enhanced version of the MSX standard announced soon, but software written for the better graphics of the new version will also run on the earlier models, according to Toshiba's Chris Greet.

On show to the trade was a new machine with enhanced graphics with the model number HX-23. "There are no plans to launch this product in the UK at the moment," said Mr Greet. "It might be here in the New Year though."

Why HCW is the weekly to buy

- We're on the ball with all the latest software, hardware and peripheral reviews. Our easy-to-follow rating system means you can immediately pick out the products our reviewers flipped over – and the ones that made them comatose!
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Holiday spirit in Betty's household
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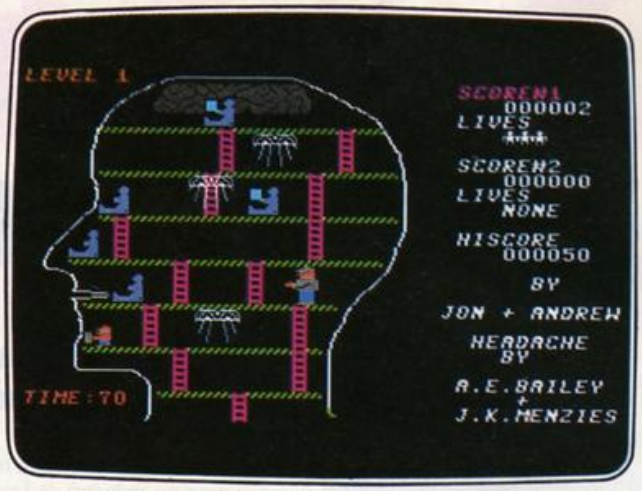
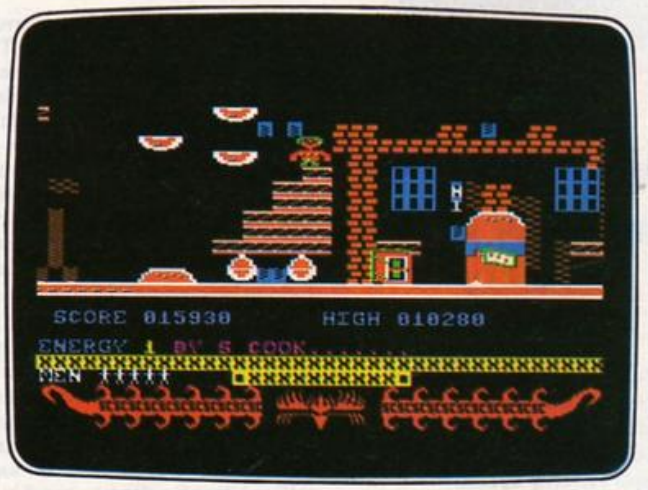
150 different haunted castle chambers



HEADACHE Arcade
Nervous Ned's quest to serve the Brain

CHICKIN CHASE Arcade
Ruling the roost can be a hard life



CIRCUS CIRCUS Arcade
Twenty circus rings to escape

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Soapbox

At the launch of the Enterprise 128, Mike Shirley, Enterprise commercial director suggested: "It'll be a 128K Christmas" and all current indications are that he will be right.

It set me thinking about what the user is going to do with all this extra memory power which will soon be available.

It needs to be said that an eight-bit processor, the most common type at the moment, can only address a total of 64K. This means that those machines which have more memory can only use it by switching banks at high speed.

This type of switching is not always simple and although we will see games written by experts using the added facilities I have my doubts that this extra memory will be of much use to the home programmer.

The message is quite simple. Although vast amounts of memory may look attractive will the machine fulfil your needs? Make sure when you buy a new machine that you examine how that memory is used and don't be swayed by large numbers. Check that the memory is usable by BASIC and only buy if you are certain that the machine will suit your needs. **Dave**

If you disagree or agree with anything said in this column please write to us and we will publish the best responses. We will give a prize for all letters we published too!

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BASIC LIVING

by Jon Wedge and Jim Barker

Ink-jet quality printer

Epson unveiled its new SQ-2000 printer recently. It's the first in a new range of ink-jet printers, which, according to Epson, offer the speed of impact dot matrix machines and a print quality comparable to that of daisy wheels, without the noisiness of either.

Epson has developed new techniques to cope with ink management. The new SQ-2000 supplies a consistent ink flow to the micro-jets, thanks to the use of a special ink in a hermetically sealed contained.

If you want letter quality printing, the SQ-2000 will churn out your documents at 105 characters per second, while if you just want a draft copy, the printer will supply you with one at 176 cps.

The printer can print in pica, elite and roman fonts: expanded, condensed, italic, underlined, emphasised and proportional variants are also available.

The new Epson printer can be used with an RS232C interface, as well as IEEE-488 and industry standard centronics parallel interfaces.

The printer measures 595 x 383 mm and weighs in at 18kg. Price: £1,925.

Epson, Dorland Hse, 388 High Rd, Wembley, Middx HA9 6UH

Epson's new ink-jet printer

FAST bill one step nearer

The bill which should provide copyright protection to software has continued its unopposed passage through the British legislative system.

The Copyright (Computer Software) Amendment Bill received an unopposed second reading in the Lords on Friday May 10.

And there were words of praise for the way the bill is set out. Lord McIntosh of Haringay commended it, saying it was "drafted as concisely and as efficiently as anyone can conceive such a bill to be drafted."

Next stage is for the bill to be amended in minor areas in the Committee Stage. Donald MacLean, FAST chairman commented: "We are now hopeful that the legislative process will be fully completed within weeks."

Smart kids

The Cub National Schools Computer Challenge has proved extremely popular according to sponsors, Microvitec.

Geoffrey Pattie, Minister of State for Industry and Information Technology has shown great interest in the competition. He said: "I am very pleased to see the standard of response to the Microvitec challenge. It illustrates very well the enthusiasm shown by many children towards computers and the imaginative ways in which they expect them to be used."

First prize for the winning team and their teacher is a five day holiday in Florida and the chance to see the US Space Shuttle, Challenger, being launched. Schools which reach the final will receive Microvitec CUB colour monitors.

Microvitec, Futures Way, Bolling Rd, Bradford BD4 7TU

Colin skips away

Mastertronic and KP Skips are linking up for a major marketing promotion in June.

Clumsy Colin, who features on Skips packets, will make his computer debut on a special game, written for the C64 and Spectrum. Mastertronic games all cost £1.99.

Clumsy Colin Action Biker game will be on sale wherever you would normally buy a packet of KP Skips, which means that a whole new area of sales will open up for Mastertronic. Walk in to your local grocer, newsagent or sweet shop and you'll be able to buy the pocket-money priced game.

And the promotion is massive: 12 million packs of Skips will publicise the Clumsy Colin game. At the same time, KP Skips is offering a free model action bike.

Mastertronic, Park Lorne, 111 Park Rd, London NW8 7JL

The Bulge — on C64 and Spectrum

Sorry!

In HCW 112 we printed a review for The Bulge, in which we stated that it was available for the MSX. In fact, it runs on both the C64 and Spectrum. We apologise for any confusion.

Software update

There's a whole batch of new software out this week and the software house with the most new products is Interceptor Micros which has launched five at once.

English Software's Kissin' Kousins has been converted for Atari users, and Icon has a new game for the BBC called Flip! which, claims the company, is a new concept in computer games, "cartoon strategy".

Creative Sparks has a new range of budget software, Sparklers. The games cost £2.50 and there are already four available in the shops for Spectrum, C64 and VIC-20 machines.

Title	Machine	Price	Publisher
zimuth Kit	Amstrad	£8.99	Interceptor Micros
Warlord	Spec/ Amstrad	£5.50 £6	Interceptor Micros
Crystals of Carus	C64	£7	Interceptor Micros
Jewels of Babylon	C64	£7	Interceptor Micros
Arabian Nights	Spectrum	£5.50	Interceptor Micros
Transformer	Spectrum	£9.95	ACS Software
Casino Royal	Spectrum	£5.95	Oxford Cptr Pub
Video Pool	Spectrum	£5.95	Oxford Cptr Pub
Elidon	C64	£8.95	Orpheus
Flip!	BBC	£7.95	Icon
Kissin' Kousins	Atari	£6.95	English Software
Caveman Capers	Electron	£7.95	Icon
Frankenstein 2000	Spectrum	£6.95	Icon
Contraption	BBC	£8.95	Icon
Quackshot	Spectrum	£2.50	Sparklers
Fourth Encounter	VIC-20	£2.50	Sparklers
Chopper	C64	£2.50	Sparklers
Taskmaster	C64	£2.50	Sparklers
Code Machine	Amstrad	£19.95	Picturesque
Timeslip	C16/Plus 4	£6.95	English Software

"Hey, it's a message from Prince Philip!"

Royal link-up

A royal link-up was established between Buck House and a small primary school recently.

Prince Philip sent a congratulatory message down the phone to school children in Woodley, Berks. The message was then transmitted to other Berkshire secondary schools, using the Times Network for Schools.

The occasion for celebration was the opening of the £42,000 Centre for Computers in Education, which is housed in the Berkshire primary school. He expressed some of his ideas on computing in education:

"The opening today of the Centre for Computers in Education is a very important milestone in the development of education in computers. Whether we like it or not, we are well into the electronic age and a knowledge of the operation of electronic systems has become just as important as literacy and numeracy.

"With the opening of the Centre, schools in Berkshire will have access to the Times Network for Schools, through which this message is being distributed. (Incidentally, the message itself was written on a word processor.) I am sure that these new teaching aids will prove to be most valuable for teachers and pupils alike and I hope they will be well used."

And Berkshire County Council is cutting costs with the help of the TTNS. Educational software is bought in bulk and the programs distributed down the phone. This reduces the cost of each program by at least £2.

See the light-pen

Congratulations to the winners of our Trojan Light Pen competition. There were 14 words in the grid and there are 25 winners who will receive their pens direct from Trojan.

Amstrad winners: R E Gladwin, Keynsham; Tom Lynch, London; D Messenger, Kettering; A G Rouse, Ramsgate; R A White, South Okenden; P D G Soundy, Forres; R Butler, Old Hall.

C64 prizes go to: Peter Sharkey, Brandon; Joseph Toomey, London; A G Kluge, Rugby.

Spectrum pens for: S Merrett, Richmond; David O'Leary, Castlebridge; Stephen Martin, London; James Davey, Battersea; Stephen Marsh, Huddersfield; Martin Simmons, Totham; L Hornsby, Horsforth; Charles Pallister, Blyth; E McWilliams, Glasgow; T Jackson Pontefract.

Other winners are: S Langlais, London; Irfan Butt, Maidenhead; Adrian Dobbs, Bromley; Dave Davis, Surbiton; Neil Thornton, Preston.

See the light-pen

BBC bonus

Watford Electronics has just launched five new products for its BBC range.

Romspell is an advanced spelling checker for the serious BBC user, and includes a dictionary disc containing 30,000 words.

Romas is an assembler development system for the generation of assembly programs and Transferom is a sophisticated transfer utility.

If there is a fault in your BBC then the Diagnostics Disc can help out. This novel and advanced software checks RAMs, ROMs, keyboard, sound and many other features, claim the makers.

Colour art is a package to complement the AMX Mouse to add colours and patterns and can use up to 255 different shades.

Watford Electronics, 250 High St, Watford, Herts WD1 2AN

PERIPHERAL

Eric Doyle is stunned, amazed and flipped by Anirog's Voice Master! Read on

Voice Master

Anirog's latest product is a mind-boggling box of tricks. If you've ever wanted a voice synthesiser that sounds like a civilised human being, then this is the peripheral for you. It digitises your own voice and then resynthesises it using nothing more than the SID sound chip inside the computer.

Unbelievable as all this may seem, the system works so effectively that even my dogs recognised my voice issuing from the TV set!

The kit consists of a headset with a fully adjustable boom microphone which leaves your hands free to operate the computer. This plugs into the digitiser box which connects to the joystick port and takes a sound feed from the monitor output socket on the 64. After using the cassette or disc-based software to calibrate the system, the unit is ready for action.

Included in the package are several programs which demonstrate the capabilities of the machine, including two which show how a speaking clock or calculator can be produced.

Apart from a program demonstrating voice recording, there is also a voice recognition program which works perfectly as long as you use a flat tone of voice. There is also a composer program whereby you hum or whistle a tune into the microphone and the corresponding musical notation appears on the screen. The music can then be edited, played by the computer or printed out on a dot matrix printer.

In practice I found that all the software worked satisfactorily but the composer program required a very steady note to be sounded because it is so sensitive that even a slight warble will cause the note on the screen to oscillate up and down.

The most incredible thing about this unit is that once the voice has been captured it can be saved and reused without the hardware being attached to the computer. It is fully transportable from machine to machine in the same way as the voices on Activision's Ghostbusters or CBS Software's Impossible Mission.

I am totally knocked out with this product and no words can describe my admiration for the SID chip or for Covox, the American firm who devised this stunning add-on. If you own a 64 then buy this — you won't regret it.

Price: £59.95

Publisher: Anirog

Address: 29 West Hill, Dartford, Kent DAI 2EL

C64

ATARI 600XL ENTERTAINMENT PACK

Great news for games addicts who appreciate high quality graphics and sensational arcade action gameplay. For Only £69, you can buy a 16K Atari 600XL Computer with two top arcade ROM cartridge titles and a joystick. These two ROM titles are the famous arcade hit Donkey Kong and another favourite Qix (We only have a limited number of packs with Qix. When these run out, Qix may be substituted for an arcade entertainment cartridge of the same value). The 600XL Entertainment Pack offers real value for money and enables you to save £63.96, nearly half of the normal RRP's of the pack items when purchased individually. Silica Shop have a wide range of ROM cartridges available including arcade favourites such as Asteroids, Centipede, Missile Command, Popeye, Q*Bert, Star Raiders, Super Cobra for only £9.95 each! The 600XL is a programmable home computer with the Basic Programming Language built in and if you later add a 1010 Program Recorder (XLP 1010 - £34), a range of hundreds of cassette programs will become available to you. The Atari 600XL is recommended as a first class games machine.

ATARI PACKS - POWER WITHOUT THE PRICE!

ATARI 600XL ENTERTAINMENT PACK

16K Atari 600XL	£99.99
Donkey Kong (R)	£14.99
Qix (R)	£9.99
Single CX40 Joystick	£7.99
Total (if purchased separately)	£132.96
Less Discount (approx 48.1%)	£63.96
PACKAGE PRICE (XLC 1600)	**£69.00**

£69

ATARI 800XL AND RECORDER PACK

The 64K 800XL is packaged here with the 1010 recorder, an economical storage and retrieval unit, a smash hit arcade game and programming aid, all for a package price of only £129 (ref: XLC 1010), a saving of £65.96 off the RRP's of the individual items which total £194.96. The game included in this pack is Pole Position. Now on cassette from Atari, Pole Position is an accurate reproduction of Atari's own highly successful arcade driving game which has all the thrills and spills of the grand-prix racetrack. On the reverse of this cassette is a demonstration program of Atari's amazing sound and graphics capabilities giving an example of the high quality performance of the Atari 800XL. Also included is an Invitation to Programming 1 cassette which takes you step by step through the first stages of programming in Atari Basic using Atari's unique soundthrough facility which allows pre-recorded human speech to be played through your T.V speaker. All you need is a joystick (ATJ 0400 - £7.90 for Pole Position), to be up and running with this package. The Atari 800XL in this pack comes with a Silica two year guarantee.

ATARI PACKS - POWER WITHOUT THE PRICE!

ATARI 800XL + PROG. RECORDER PACK

64K Atari 800XL	£129.99
1010 Program Recorder	£34.99
Pole Position + Demo Prog (C)	£9.99
Invitation to Programming 1	£19.99
Total (if purchased separately)	£194.96
Less Discount (approx 33.8%)	£65.96
PACKAGE PRICE (XLC 1010)	**£129.00**

£129

ATARI 800XL AND DISK DRIVE PACK

This pack includes the 64K 800XL with a 1050 Disk Drive for mass storage and speedy information retrieval as well as a brand new adventure game and a powerful home help program, all for only £249 (ref: XLC 1050), a saving of £115.96 off the RRP's of the individual items which total £364.96. The first of these programs is The Payoff on disk, a new adventure game which is a fantasy simulation in which you play the leading role. An exciting introduction to adventure programs which are always popular (with a demonstration program of Atari's amazing sound and graphics on the reverse). Also included in this pack is Home Filing Manager to help you organise your files. It allows you to catalogue and file details of birthdays, books, your stamp collection or anything else which would normally require you to use filing cards. The instructions for Home Filing Manager are on the reverse of the disk and all the disks which come in this package are in protective paper wallets. You get an extended two year guarantee on the 800XL and 100 free programs with the disk drive when you buy this package from Silica.

ATARI PACKS - POWER WITHOUT THE PRICE!

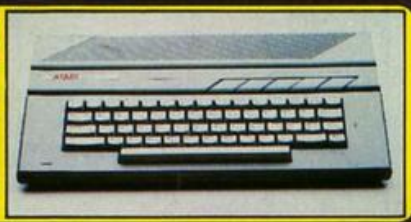
ATARI 800XL + DISK DRIVE PACK

64K Atari 800XL	£129.99
1050 Disk Drive	£199.99
Home Filing Manager (D)	£24.99
The Payoff + Demo Prog (D)	£9.99
Total (if purchased separately)	£364.96
Less Discount (approx 31.8%)	£115.96
PACKAGE PRICE (XLC 1050)	**£249.00**

£249

NEW ATARI 130XE NOW IN STOCK £169

Atari's new 128K computer, the Atari 130XE offers an enormous 131,072 bytes of RAM for only £169. The 130XE comes with built in Basic and full operating instructions and is now in a newly designed case with a modern full stroke keyboard. The XE is fully compatible with both the 400/800 and the XL ranges of machines, this means that it can run approximately 90% of all Atari Computer software on the market. This provides a range of over 1,000 software titles as well as a large selection of accessory and peripheral items. Initial stock of the 130XE will be limited, so it's first come first served.



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ATARI PROGRAM

CHANGING COLOURS

Richard Parkes shows you how to use the many colours available on the Atari to produce colourful title screens

The Atari is equipped with a palette of 256 colours. However, on the face of it, it appears that it is only possible to use a maximum of five, or if GTIA modes are being used (Graphics 9, 10 and 11) 16 colours. By using display list interrupts, it becomes possible to use more colours, but here I am going to use these to change the colours. I will use a locations associated with them — location D40A hex or 54282 decimal — which is usually used for timing display list interrupts so they are synchronised to the drawing of the screen, to make sure that colours do not change in the middle of a line producing an unsightly effect.

Using the timing properties of this location it is possible to change a colour every time a scan line is drawn, then by changing the value of the colour register in a VBI (Vertical Blank Interrupt) scroll the resulting stripy effect.

The machine code routine I have written allows this to be done with up to two colour registers, to produce more colourful title screens to programs. The routine continues until the "START" key is pressed. Once the routine has been POKEd into memory, lines 10 to 50 of the example program, taking care over the data as one wrong number could cause the computer to crash, the routine should be called by using the following:

A = USR(1536,C1,W1,S1,C2, W2,S2)

where C2, W2 and S2 are optional parameters used depending on whether a second colour is to be manipulated or not.

C1 and C2 are the colour register numbers. They must be in the range 0 to 4 as other values may cause the computer to crash.

W1 and W2 allow the bands to be altered. A value in the range 1 to 127 will give, in general, bands with the shading

Machine code listing

```
0000          0100          .OPT NOEJECT
              0110 ;DISASSEMBLY OF
              0120 ;ROUTINE TO SCROLL
              0130 ;COLOURS
              0140 ;
0000          0150          *=   $600
              0160 ;FIND IF 1 OR 2 COLOURS
0600 68       0170          PLA
0601 4A       0180          LSR  A
0602 4A       0190          LSR  A
0603 AA       0200          TAX
              0210 ;SAVE NUM OF COLS -1 IN
              0220 ;LOCATION $CF
0604 86CF     0230          STX  $CF
              0240 ;LOOP TO SAVE COL REG.
              0250 ;NUMS AND SCROLL VALS.
0606 68       0260 LOOP1    PLA
0607 68       0270          PLA
0608 95CD     0280          STA  $CD,X
060A 68       0290          PLA
060B 68       0300          PLA
060C 95CB     0310          STA  $CB,X
060E 68       0320          PLA
060F 68       0330          PLA
0610 95D0     0340          STA  $D0,X
0612 CA       0350          DEX
0613 10F1     0360          BPL  LOOP1
              0370 ;
              0380 ;SET UP VBI - LOAD
              0390 ;X AND Y REGISTERS WITH
              0400 ;HIGH AND LOW BYTES OF
              0410 ;VBI START RESPECTIVELY
0615 A206     0420          LDX  #VBI/256
0617 A051     0430          LDY  #VBI&$00FF
              0440 ;SAVE OLD VECTORS OF
              0450 ;VBI ON STACK
0619 AD2402   0460          LDA  $224
061C 48       0470          PHA
061D AD2502   0480          LDA  $225
0620 48       0490          PHA
0621 A907     0500          LDA  #7
              0510 ;JUMP TO ROUTINE TO
              0520 ;SET VBI
0623 205CE4   0530          JSR  $E45C
              0540 ;
              0550 ;MAIN PROGRAM LOOP
              0560 ;CHANGE COLOUR(S)
              0570 ;AFTER EACH SCAN LINE
0626 A6CF     0580 CHCOL    LDX  $CF
0628 B5CB     0590 NEXCOL   LDA  $CB,X
062A 18       0600          CLC
062B 75D4     0610          ADC  $D4,X
062D 95D4     0620          STA  $D4,X
062F CA       0630          DEX
0630 10F6     0640          BPL  NEXCOL
0632 8D0AD4   0650          STA  $D40A
0635 A6CF     0660          LDX  $CF
```

```
0637 B4CD    0670 LOOP2  LDY  $CD,X
0639 B5D4    0680        LDA  $D4,X
063B 9916D0  0690        STA  $D016,Y
063E CA      0700        DEX
063F 10F6    0710        BPL  LOOP2
             0720 ;TEST IF START PRESSED
0641 AD1FD0  0730        LDA  $D01F
0644 4A      0740        LSR  A
             0750 ;GO TO CHCOL IF START
             0760 ;NOT PRESSED
0645 B0DF    0770        BCS  CHCOL
             0780 ;
             0790 ;SET VBI TO WHAT IT WAS
             0800 ;BEFORE THE ROUTINE
0647 68      0810        PLA
0648 AA      0820        TAX
0649 68      0830        PLA
064A A8      0840        TAY
064B A907    0850        LDA  #7
064D 205CE4  0860        JSR  $E45C
0650 60      0870        RTS
             0880 ;
             0890 ;VBI ROUTINE THAT
             0900 ;ENABLES COLOURS TO
             0910 ;SCROLL
0651 A6CF    0920 VBI    LDX  $CF
0653 B4CD    0930 NEXCSC LDY  $CD,X
0655 B5D0    0940        LDA  $D0,X
0657 18      0950        CLC
0658 79C402  0960        ADC  $2C4,Y
065B 99C402  0970        STA  $2C4,Y
065E 95D4    0980        STA  $D4,X
0660 CA      0990        DEX
0661 10F0    1000        BPL  NEXCSC
             1010 ;RETURN FROM VBI
0663 4C62E4  1020        JMP  $E462
```

If the "S" parameter is zero the colours will not scroll, which can create an interesting effect.

Experimentation with the parameters is probably the best idea to see what sort of effects can be produced, although the USR statement must be checked to make sure there are either three or six parameters after the 1536 and the colour parameter is in the range zero to four as anything different from these two requirements may cause the computer to crash. Also, it is worth noting that the band width will vary depending upon whether one or two colours are being used as two colours will slow the routine down producing wider band widths relative to the band widths for one colour. Another thing to remember is that after using the routine, the colour registers used could contain any value so it is best to do a graphics call or reset the colours using SETCOLOUR.

The example program shows a few of the effects that can be produced using the routine. The machine code for the routine is entered in lines 10 to 50 as already mentioned. Lines 100 to 180 set up a screen which can be in any graphics mode in your own programs. Lines 190 to 410 contain some example calls to the routine, usually one of these would be followed by the main program. Lines 1000 to 1030 just contain a subroutine to reset the colours after one of the USR routines.

Example program

```
1 REM EXAMPLE PROGRAM USING
2 REM SCROLLING COLOURS
10 FOR J=1536 TO 1637:READ A:POKE J,A:NE
XT J
20 DATA 104,74,74,170,134,207,104,104,14
9,205,104,104,149,203,104,104,149,208,20
2,16,241,162,6,160,81
30 DATA 173,36,2,72,173,37,2,72,169,7,32
,92,228,166,207,181,203,24,117,212,149,2
12,202,16,246
40 DATA 141,10,212,166,207,180,205,181,2
12,153,22,208,202,16,246,173,31,208,74,1
76,223,104,170,104,168
```

darkest at the top. Low numbers in this range give wider bands and are generally used. A value 128 to 255 will in general produce a band with the shading darkest at the bottom, with the higher the number the wider the band — high numbers are usually used in this range.

S1 and S2 control the speed of the scroll. Numbers in the range 1 to 127 will give faster speeds the higher the numbers, whereas numbers in the range 128 to 255 will give slower speeds the higher the numbers.

The direction of scroll is determined by W1 and S1 (and W2 and S2), usually in the following ways:

"S" parameter	"W" parameter	scroll direction
1 to 127	1 to 127	up
128 to 255	128 to 255	up
1 to 127	128 to 255	down
128 to 255	1 to 127	down

```
50 DATA 169,7,32,92,228,96,166,207,180,2
05,181,208,24,121,196,2,153,196,2,149,21
2,202,16,240,76,98,228
100 REM TYPE UNDERLINED CHARACTERS
```

```
110 REM IN INVERSE GRAPHICS
120 GRAPHICS 2
130 POSITION 3,1:? #6;"* example of *"
135 POSITION 3,2:? #6;"*            *"
140 POSITION 3,3:? #6;"* scrolling  *"
145 POSITION 3,4:? #6;"*            *"
150 POSITION 3,5:? #6;"*  ColOUrs   *"
155 POSITION 0,7:? #6;"    ***********"
160 POSITION 0,8:? #6;"***************
***"
165 POSITION 0,9:? #6;"    ***********"
170 ? :POKE 752,1
180 ? "      PRESS START TO CONTINUE"
190 A=USR(1536,4,1,255)
200 GOSUB 1000
210 A=USR(1536,4,2,1,2,2,254)
220 GOSUB 1000
230 A=USR(1536,0,1,1,1,255,1)
240 GOSUB 1000
250 A=USR(1536,2,2,2,3,254,255)
260 GOSUB 1000
270 A=USR(1536,4,2,254)
280 GOSUB 1000
290 A=USR(1536,4,254,2,1,2,254)
300 GOSUB 1000
310 A=USR(1536,0,6,0)
```

```
320 GOSUB 1000
330 A=USR(1536,2,253,2,1,5,0)
340 GOSUB 1000
350 A=USR(1536,4,6,0,2,2,2)
360 GOSUB 1000
370 A=USR(1536,4,255,0)
380 GOSUB 1000
390 A=USR(1536,1,137,47)
400 GOSUB 1000
410 A=USR(1536,4,120,136)
420 GOSUB 1000
430 GOTO 190
999 REM SUBROUTINE TO RESET COLOURS
1000 SETCOLOR 0,2,8:SETCOLOR 1,12,10
1010 SETCOLOR 2,9,4:SETCOLOR 3,4,6
1020 SETCOLOR 4,0,0:FOR J=1 TO 200:NEXT
J
1030 RETURN
```


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SOFTWARE

Dark Tower

This game originally appeared on the C64 and has now been converted to C16. In order to fit it in, screens are loaded from tape as required.

The scenario is rather unoriginal. You control Prince Harry who has been mutated by the guardian of the Dark Tower into a creature resembling a potato with legs. The only way of restoring his form is to collect all the jewels scattered about the 27 rooms of the tower. Not unsurprisingly, the rooms are patrolled by nasties and the jewels are placed in rather awkward positions. In order to get about the rooms, there are ladders to climb and ropes to swing on.

As with most games of this type, the secret is finding the correct tactics to avoid the nasties and get the jewels. Timing and perseverance are vital. Some of the rooms are particularly tough and are guaranteed to get you ripping out your hair.

The graphics are simple but reasonably effective. Most of the nasties are well animated although their size is limited to one or two characters. The lack of sprites means that the usual bleeding of colour attributes occurs as you move over ladders and other background objects. The use of sound was very limited and not particularly amazing.

I find this sort of game a little unsatisfying in that the return for a lot of effort can be low. Whilst some rooms were easy to solve some were downright impossible. At the price, however, worth a look. **M.W.**

Price: £5.95

Publisher: Melbourne House

Address: Castle Yard House, Castle Yard, Richmond TW10 6TF

Dambusters

On loading Dambusters you are greeted by a beautiful picture of a Lancaster bomber on a runway. This standard of graphics prevails throughout the game. When it starts up you get a menu of options in order of difficulty — dam approach, English Channel onwards, or taking off from Scampton and flying the whole distance to Germany.

Taking off from Scamption is just like any other flight simulator, except that on a multi-engined bomber a lot of people have to work in co-operation with each other. Instead of plumbing for the easy option Sydney Developments has achieved perfectly the feel of all the people together in a bomber. This is done by switching between eight different screens. The pilot's screen is the one that looks most like a normal flight simulator, with a horizon and instruments, you can also see the night fighters, searchlights, flack, and barrage balloons. Engines are controlled from the engineer's station, there are rev counters, throttles, and fire extinguishers. The two gunners positions are like a normal arcade game, you control cross hairs and blast away with your machine guns at the searchlights, fighters, and barrage balloons.

The navigator's area is composed of a multi-screen map of Europe, you move around a cross with the joystick, this results in a line appearing on the compass in the cockpit. Fly towards that and you fly towards the cross.

When you have finally got to the dam you can go onto the bomb aimer's screen. On this, you can turn on the famous spotlights and fine tune your height. You can then spin up the bomb and prepare to drop.

When the bomb is up to speed the front gunner's sights are replaced with the bomb sights. Line it up then drop the bomb.

When you make your attack run you have to be at just the right height (helped by the spotlights) and speed, then you have to fly at the right speed (more difficult). Then if you drop it at the right time you will be rewarded with some very nice graphics as the dam blows up.

Overall, this is a very good game, though when you are under attack swopping between the screens can be a bit confusing. There are a number of shortfalls, including barrage balloons which occur at any height, Me109s when the text refers to Me110s, and the engine noise still on with all engines out. But these aside I really liked the game. **M.R.**

Price: £9.95, £14.95 disc.

Publisher: US Gold

Address: Unit 10, The Parkway Industrial Centre, Heneage St, Birmingham B7 4LY

C16

C64

Charlie and the Chocolate Factory

The cover blurb for this piece of software boasts "4 arcade games plus a multi-screen arcade adventure", which sounds like good value for £8.50, or £9.95 if you want a copy of the book by Roald Dahl too.

The only problem is that it doesn't work out like that. The four arcade games on side one of the tape actually load as a single 48K block of code, so what you really get is a single game with four screens and none of them are particularly interesting, despite being (loosely) based upon characters and incidents in the book.

The arcade adventure on side two is somewhat better, though that's not really saying much. It is a straightforward JSW clone set in a chocolate factory with forty three rooms, through which you must guide Charlie in order to locate six golden keys.

Although the rooms in the factory are quite well designed and present some interesting problems as you attempt to find your way through them, the graphics are pretty primitive, and look like a bunch of UDGs rather than animated sprites. They are all very flickery and seem to move one character space at a time rather than in pixels.

Even with the four screens on side one taken into account this "multi-screen adventure" simply does not justify its high cost. I can recommend the book to kids of all ages, but frankly I'd forget about the software if I were you. **C.J.**

Price: £8.50, £9.95 with paperback

Publisher: Hill MacGibbon

Address: 8 Grafton St, London W1

Parky and the Yellow Submarine

In addition to involvement with hardware for the 64, Cheetah also now produces software. This game is essentially a maze game with a large number of screens. The plot is simple. You control Parky, a South Atlantic Penguin, in his search for his twin brother Perry. The unfortunate Perry is trapped somewhere in the maze of subterranean caverns, each inhabited by a variety of nasties which move about in varying pattern. There are also moving barriers. Contact with any of these, or the walls means instant loss of life.

The solution of the game involves timing and sorting out the correct method of avoiding each nasty. The space available in some areas is extremely limited making careful control essential. I found this feature of the game a little unsatisfying. Instead of using a special display sequence to show Parky's demise, the screen simply goes blank with a simple written phrase.

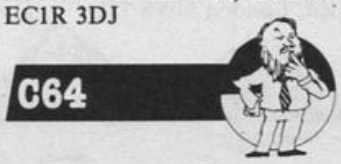
The graphics are competent but unexceptional with simple unanimated hi-resolution sprites for the nasties. The background music comprised of the Magic Roundabout theme. This was sufficiently irritating to have me reaching for the volume control.

As a bonus, a partial map of the caverns is supplied with the game. The first 50 people supplying a complete map will receive a free copy of the follow-up. Overall a tough and tolerably challenging game which is fair value at the price. **M.W.**

Price: £6.95

Publisher: Cheetahsoft

Address: 24 Raw St, London EC1R 3DJ



Ghostbusters

After the enormous success of this game on other computers it has at last arrived for MSX machines. Its popularity was helped by the timing of the release to coincide with the film but also by the inspired combination of music, graphics and game content.

There are three stages: in the first you are given money with which to buy a car and some ghost-catching equipment; next you plan a route from HQ to part of the town with troublesome ghosts; and finally you drive through town to arrive and capture the creature. It's a fascinating game that depends on your ability to perform well at arcade games but includes the added dimension of the business element. The main object is to make money.

The inevitable question is: how does it compare with the other versions? The graphics are as good as the original with excellent use of sprites. It's colourful and responsive giving good control with joystick or keyboard. The music, which was so vibrant in the 64 version, is reasonable but lacks the same harsh quality that gave it a menacing air.

It's a brilliant game and it's a shame it arrived after Ghostbusters fever had died down. If you haven't seen the film then maybe there will be a revival with the video. However, if you haven't played it... buy it **M.P.**

Price: £11.99

Publisher: Activision

Address: 15 Harley Hse, Marylebone Rd, Regent Pk, London NW1 5HE

★★★★★

Flipped

★★★★

Hooked

★★★

Keen

★★

Yawning

★

Comatose

REVIEWS

Ice Palace

Up to date I have seen quite a few text/graphics adventures. A lot of these come in the form of an adventure game with pictures added as a sideline. Ice Palace is rather a game which uses text to help the graphics along.

The main playing screen contains a palace made up of many hexagonal rooms built on ice. You may rotate the rooms to place the exits where you need them and then move around to explore the palace. The controls are quite complex and require a good joystick.

The second screen will let you select one of a series of functions available. These might be: examining where you are, getting/dropping objects, asking for help, etc. There is quite a long list of them, all of which may be selected using the joystick.

Ice Palace is a real-time game; when you are using the text screen there will still be things happing on the graphics screen. If you are in danger when you can't see the playing area then thankfully a warning indicates this to you.

The graphics are very good — the text layout is very neat and pleasant to read. The instructions are quite clear; they are all supplied on the cassette inlay card and are useful for reference purposes. My overall opinion of the game is quite high. It does take quite a long time to learn how to play but the end results make it worthwhile. **K.I.**

Price: £6.95

Publisher: Creative Sparks

Address: Thomson Hse, 296 Farnborough Roadd, Farnborough, Hants

C64

Super Gran

Recently there have been many games based on either films or television programmes. This game is based on the children's television series by Tyne-Tees.

The game contains eight different screens which you must complete. There are no instructions supplied telling you what to do, and I haven't managed to get past the first screen yet.

The instructions tell you the controls to use — keyboard or joystick. Other than this it is covered in pictures and copyright messages. The back of the inlay card contains a "free" poster offer — even though it's free you still have to send off 50 pence for it.

The running demo displays the first four screens. In the first two you must fight off supergrans on flying bikes, hot air balloons and aircraft. In the third you must guide a square blob through a jerky scrolling tunnel. The last one consists of various platforms which you must climb.

The quality of the graphics is appalling. The pictures are made out of big chunky blocks and contain more than an average amount of flicker. It is dreadful that the inlay card states the game has "superb graphics". There is also a rather repetitive boring tune playing constantly in the background. It certainly succeeded in giving me a headache.

My personal opinion is that Tynesoft shouldn't even have made the effort of producing the game — it's rubbish! **K.I.**

Price: £9.95

Publisher: Tynesoft

Address: Addison Ind Estate, Blaydon, Tyne and Wear NE21 4ZE

C64

More adventures of Big Mac the Mad Maintenance Man

Mastertronic has once again come up with an incredibly addictive game at a very competitive price. It is well written and does not contain any obvious bugs.

The objective is to get Big Mac through 18 different vaults of a power station. In each vault he must turn off all the power switches before continuing on to the next screen. There are various traps set by the security system which may kill him if given the chance. Of course even if you avoid the traps he may still suffocate when the oxygen supply runs out.

The screens contain items such as force fields, conveyor belts, ropes, platforms, etc. There are quite a lot of animated displays and colourful graphics which make the game exciting and fun to play.

When you are not playing, the computer will display some introduction screens, hi-score table and go through the various levels. It also comes complete with its own annoying repetitive tune.

The idea behind Big Mac may not sound very original, which it isn't, but for the asking price it represents excellent value for money. The quality of the game is up to the same standards as other programs based on the same idea.

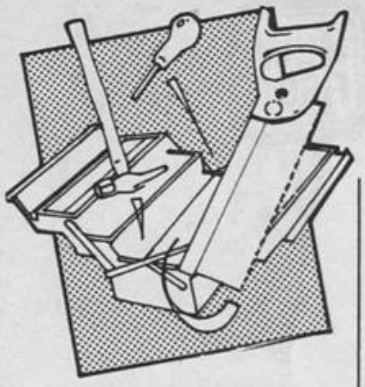
The instructions give you a brief for your mission and tell you the keys that may be used; a joystick is optional. Along with these there are some examples of the playing screens printed on the inlay card — they might even persuade you to buy the game. **K.I.**

Price: £1.99

Publisher: Mastertronic

Address: Park Lorne, 111 Park Rd, London NW8 7JL

C64



Azimuth Head Alignment Tape

All cassette players used with computers have an adjustment which should be accurately set. This is angle between the vertical gap in the recording head, and the path of the tape. If your head is out of alignment you may have loading problems, or tapes you make won't load on friend's machines. This package allows you to make the adjustment without expensive equipment.

A detailed manual shows the screw to be turned with the nicely made jewellers screwdriver included. A cardboard pointer is slipped over the shank, then the tape loaded. An index counts to 1000. Noting the starting position, the screwdriver is turned until the index fails to register, then just back far enough to allow accurate registration. The pointer angle is marked. The same operation is carried out in the opposite direction, and the screwdriver finally turned to the midpoint of the marked angle. And that's it! After careful study of the manual, it took me 5 minutes. A test game — Chopper Squad, recently reviewed — is included with a fast loader. Any problems... try again, though I didn't have any.

Does it work?... the side of Sorcery — the fastest loader I've seen — which wouldn't load, now does so with ease, and my old tapes recorded with the head out of alignment still function perfectly.

Great product, but don't get into a pickle using it, or your warranty, and your adjustment may be lost! Study the manual first. **D.M.**

Price: £8.99

Publisher: Interceptor

Address: Lindon House, The Green, Tadley, Hants

AMSTRAD

Lazy Jones

This is one of the better games to be converted from the Commodore. It will appeal to the arcade fan who enjoys variety.

The cassette inlay provides an amusing introduction telling how Lazy Jones tries to avoid work. He works in a hotel and has to deal with his manager and the ghost of his previous manager! There is also a trolley of cleaning equipment. The sight of this gives Jones a heart attack — the thought of all that work!

If he can avoid these he enters various rooms on three levels — there are 18 altogether — most of which contain a game. You have to accumulate points by scoring on these games. One or two rooms do contain surprises that make the game very entertaining.

The animation is excellent. As Jones walks into a room it is filled with an enormous screen on which you play an arcade game. There are versions of breakout, scramble, invaders — all the old favourites — and one or two new versions like Cocktail Bar. Each is detailed but quite straightforward.

You can only enter a room once but if you survive all 18 then you start again with the increased difficulty.

Each time you play the rooms are relocated making it more interesting. You can also govern the difficulty by choosing the number of lives you have — anything up to nine. Control is with joystick or keyboard and very responsive.

Very enjoyable. The children found this very watchable and entertaining. **M.P.**

Price: £8.95

Publisher: Terminal Software

Address: 28 Church Lane, Prestwick, Manchester M25 5AJ

Starion

This is a game to cater for all tastes. There is enough hish speed slaughter to appeal to the arcade freaks among us and thers an element of thought required to suit the brainier types.

In order to provide this mix, the author has come up with a slightly contrived scenario. You pilot a spaceship called Starion which has the unusual ability to travel time. You must travel through different time zones correcting the havoc wrought by some nasty aliens.

These aliens have removed items of historial significance from their correct time zone and moved them to another. You must return these items to their correct time. The first step is to destroy aliens. As you kill an alien, you are given a letter from the name of one of these items. When you have all the letters, you must find the appropriate time zone. Get it right and your fuel and oxygen are replenished and you move onto the next type of alien.

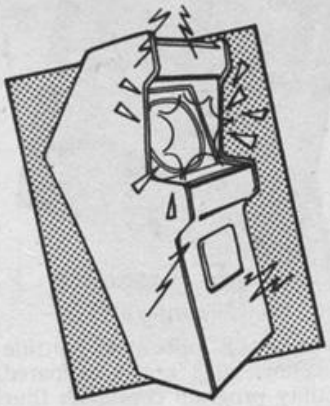
The use of graphics is excellent with fast, flicker free, 3D vector graphis. The screen gives a view out of the front of your ship, the stars give a superb feeling of motion.

This is a graphical tour de force which is testing both for the reactions and the brain. It's a shade pricier than many Spectrum games but it's worth every penny. **M.W.**

Price: £7.95

Publisher: Melbourne Hse

Address: Castle Yard House, Castle Yard, Richmond, TW10 6TF



Magic Mushrooms

From the start ther is little doubt that this game is a ladder and levels clone.

The hero is a small gent with a hooked nose named Murphy. He seems to be hooked on a diet of rather nasty looking toadstools, described in the documentation as mushrooms. They look more like Death Caps to me and I cannot applaud Acorn for encouraging children to believe that such growths are edible.

Having said that, the graphics are very attractive indeed and although the monsters have a look of previous games the whole screen is very bright and colourful. So what is there to make this game any different?

The answer is that you can customise each game to your own desires. There is a full screen design and editing facility built into the program. You can modify existing screens, create new ones from scratch, test screens to see if they are playable and then save your creations to cassette or disc for re-use later.

I say this with my tongue in my cheek, this facility is certainly provided but when I tried to make use of it the program crashed and had to be re-loaded. I cannot this being a major problem and I feel sure that by the time you read this Acornsoft will have solved the difficulty.

Whilst this is one of the most visually attractive games that I have seen this year I still feel that it is a little outdated. **R . S .**

Publisher: Acornsoft

Address: Betjeman Hse, 104 Hills Rd, Cambridge CB2 1LQ

Confuzion

Imagine a rectangle covered in short paths which lead in complex ways from one area and edge to another. Then imagine that by steering a black square about, you could change the layout of the paths. Now imagine that by changing the paths you can direct something along them towards a target. In effect that's it.

The targets are bombs along the edges, the paths are fuses, the black square is a steerable pallet, and the thing to be directed is a spark. Get the spark to the bombs before your time runs out and you amass points. Success on one level gets you another much more difficult, and even a rolling opponent, which must simultaneously be steered away from your spark. Your objective is to explode all the bombs in 64 different areas.

Graphically, this is excellent, with super smooth animation and no attribute problems. Rather like a cartoon in fact. Action is fast and furious, but not a little confusing! Every conceivable control variation is available, together with skill levels, start point choice, and multi-player facility, if you can fathom out how to get them to work from the not-too-clear instructions. Sound too is good, with music on the flipside of the tape.

Sad to report, therefore, that I found this rather a damp squib. The blurb is right. This is an original idea, and superbly implemented, but it didn't make me want to go on playing. If, however, you like the concept, it's very well done. **D.M.**

Price: £6.95

Publisher: Incentive

Address: 54 London St, Reading RG1 4SQ

The Wild Bunch

Set in the Wild West, this is by far the best adventure program I have seen in many, many months.

Instead of struggling to communicate with the program, all the available options are listed on the screen and require just one key press to provoke a response that will move you forward through the desert. With no incomprehensible messages to content with the entire game time is devoted to working out the best strategy.

Trying to track down a murderer, being hunted yourself for the crime, locating the whereabouts of the Wild Bunch and then identifying the real villain, will have you planning ahead continuously.

Clues can be bought from the telegraph office, money may be won at poker in the saloon and the store will sell you all the victuals necessary for several days journey between the five towns depicted on a map.

The realistic storyline is easy to relate to, and comes as a refreshing change from dungeons,wizards, castles and vampires.

I can't wait to return to Dry Gulch, Dodge City, Bulletville and Deadmans Creek, only next time I'll remember to buy some bullets first.

A worthy addition to your software library that will move most other adventurers to the back row.

Get this one . . . have a lot of fun, oh and don't forget to feed your horse! **D.H.**

Price: £2.50

Publisher: Firebird

Address: Wellington Hse, Upper St Martins Lane, London WC2H 9DL

Home Accounts Manager

Very much more than the title suggests, this neatly prepared utility program comprises four main options.

Home accounts, bank account, address file and utilities are all menu driven sections of the main program and themselves lead to further nested menus as appropriate.

The home accounts section is split into four further parts which allow you to tailor the records to your own personal requirements, enter all the latest expenses incurred, view the records either individually or collectively either on screen or as from the printer.

Bank account is divided into six further parts covering all main banking transactions. Included are credits and debits, standing orders, banking and interest charges.

Address file allows storage of names, addresses and telephone numbers. Additionally a very useful sort routine is included which accesses any of six different fields within the main address file. Thus sorting by name, street, town, county or even telephone number, is readily available. Again output is either to the screen or printer.

Utilities is the last section of this comprehensive home accounts program. Here a check can be made on the amount of memory and free space that is still vacant for the files, or a file may be removed from the records.

Also within this section is a very useful loan calculator that handles various interest rates, though I foxed it with a zero interest loan which caused some confusion.

To sum up then, a thoroughly worthwhile program that is exceptional value for money and ideal for anybody who takes life really seriously. **D.H.**

Price: £8.95
Publisher: Amsoft
Address: 169 Kings Rd, Brentwood, Essex

The Prize

Armed with a stock of laser pulse torpedoes, replenished by visiting a power plant, this shoot-out maze chase will keep you entertained for hours.

Exceptionally quick thinking and ultra-fast reactions are essential to avoid the four aliens known collectively as guardians.

With little or no thought for their own security, mutants fight like ants and shoot on sight without warning. One hundred points are awarded whenever a mutant is killed.

Crushers require some careful thought as they are not armed to kill which allows time to assess the best strategy to employ in passing them.

More survival problems are encountered against death drones and messengers.

Energy bases scattered throughout the maze offer immunity against the murderous guardians.

Well worth careful study are the concise instructions printed on the inlay. Complete comprehension is vital if you are to discover the secret of the maze whilst journeying in spaceship Almazoon.

Control by joystick or keyboard is optional, defining keys is not offered.

A very addictive implementation, though there is nothing original in the concept, nor in the Amsoft high price.

A quick flip back amongst recently published reviews reveals several games in this category at competitive prices. With little or no appreciable difference in quality or style, it will undoubtedly pay to shop around. **D.H.**

Price: £8.95

Publisher: Amsoft

Address: 169 Kings Rd, Brentwood, Essex

Gatecrasher

In this game you must roll barrels through a maze and into one of nine boxes at the bottom of the screen.

The vertical walls of the maze are gates that change their inclination as the barrels pass through.

The order and manner in which the barrels must enter the boxes becomes more difficult at each of eight levels. Although this change in objective adds variety, it is more suited to younger players as it becomes rather repetitive.

Penalties are invoked whenever a barrel enters a box already occupied. When the supply of barrels is depleted, the game ends.

The excellent eye catching title page is a forerunner of the splendid graphics, confirmed in the demonstration sequence.

Chasing a high score is well catered for, with the scores spiralling upwards in the higher levels. Full instructions are presented on screen and are duplicated on the cassette inlay.

This seemed best suited to the keyboard. Joystick control is available. Pressing 'E' causes all gates to be reset randomly, a useful ploy when the going gets tought as it does in the higher levels.

Another aid is the ability to scroll the centre of the maze to change the playing area.

Nice to see an original idea that works well as a result of its simplicity. **D.H.**

Price: £8.95

Publisher: Amsoft

Address: 169 Kings Rd, Brentwood, Essex

Merit Chemistry

Merit has long been producing chemistry sets for junior scientists. Now Merit and Cloud 9 software are producing a chemistry tutorial software package. The tape contains six programs, each of which requires much of the Spectrum's 48K of RAM. So in terms of bytes per £, this product appears to offer excellent value for money.

The first program is the introduction, which provides a general guide to the other five, and advertises Merit Chemistry sets. It is certainly to the advantage of the user to either have a chemistry set, or access to the booklets which come with them.

The general level of the information in the programs is around 'O' level standard, but the programs could be suitable for younger scientists. Each program, on titrations, metals, reactions, gases, and electrochemistry offers several pages of text, followed by a simulation, games, or exercise. The titration simulation is good, allowing the user effective control of a burette, and good colour imitation of actual acid/base indicators.

The games, for example a metal 'space invader', are very simple, but, of course, the object is to educate while offering mild amusement. The answers to the metal 'space invader' game were not covered in the 'notes' provided, so a chemistry text book alongside the Spectrum is a must.

Overall, this set of programs was well designed, and provided a lot of useful information in an interesting manner.

Price: £5.95

Publisher: J&L Randall Ltd

Address: Potters Bar, London

SPECTRUM

Komplex

It's taken me ages to fathom this out, and after two nights, I'm still not sure I've got it right. There is a manual, but it's laid out in a very peculiar way. Details of controls come before the object of the game, and the layout of the pages suffers from not being properly typeset; very confusing and strange from the company which brought us Valhalla.

Broadly, it's an arcade adventure. You are cast adrift on an alien-built artificial asteroid. In order to stabilise it in Earth orbit, so its secrets can be studied, you must find your way around its decks and levels, recovering lettered modules from closed racks. There are seven spread around, and they must all be returned to the central racks of the controlling computer. Travel between levels and decks is accomplished using transit tubes, and these too are found on each deck. In order to either open a rack, or gain access to a tube you must dock with them, with help from your on-board guidance system.

If the manual is poor, the graphics are superb; 3-D lines in one colour they may be, but the effect is stunningly realistic as you zap your way through guardians and monitors thus rebuilding your shields. As you move towards them, static lazers raise their heads and fire! Beneath this superb view, lies your instrument panel in colour.

Complex, addictive and frustrating — perhaps because it crashed each time I used it — great graphics, great idea, shame about the lack of finish. **D.M.**

Price: £9.95

Publisher: Legend

Address: PO Box 435, Station Rd, London E4 7LX

SPECTRUM

Knight Lore

It's a classic from Ultimate for the CPC 464! You find yourself in the unfortunate position of being a werewolf during the hours of darkness, and in order to dispel the spell you have to consult the wizard of Knightlore Castle, but you have to find him first! Not only that, you have to find your way about, and recover various charms so you can deposit them in a cauldron and thus find release.

That's the plot, which could be that of any adventure, but here, it's arcade style, and the graphics are tremendous. Your viewpoint is above and slightly to one side of all the locations, giving an incredibly realistic 3-D view.

Movement is by joystick or keyboard, and takes a bit of getting used to, but when you do the movement is so smooth it's like watching a film. In and out of stone arches, behind pillars and boxes you go to find various objects. This isn't easy either, because they are usually at the top of something requiring jumps, or worse still, you have to push things around to climb on them. The sun eventually sets, and as the moon rises you are transmogrified into the werewulf, and your quest continues.

All manner of moving objects balls, spikes, flames, guardians bar your path. Very, very good; even better than the Spectrum version because of the higher resolution graphics. It's a little disappointing that all the Amstrad's graphic superiority wasn't taken advantage of, and the music is sparse. **D.M.**

Price: £9.95

Publisher: Ultimate

Address: The Green, Ashby de la Zouch, Leics LE6 5JU

AMSTRAD

Mr Freeze

Had this program been launched about two years ago before all other ladders and levels games, it would undoubtedly have been a best seller.

At this price it should still do well, if you need one of these to complement your software library then look no further.

Good sound and fast smooth moving graphics are evident on each of six different screens.

The object is to de-freeze six refrigerated compartments by moving along the various levels and up or down the ladders to reach a button that will effectively cause the compartment to defrost.

Boredomsville has been abandoned by allowing you to start on any screen, a feature lacking in earlier versions of this popular game. This is quite a bit more difficult even amongst experienced players, which serves to increase the challenge.

A multitude of moving hazards must be avoided whilst navigating towards the target area. Additionally a laser guards the ladders intermittently, providing instant annihilation.

Use of the joystick is optional, I found it better to use the keyboard especially as this can be programmed to use keys of your own choice.

Detailed instructions are printed on the cassette inlay, augmented by a revealing demonstration sequence that provides newcomers with all but their ice-pick. **D.H.**

Price: £2.50

Publisher: Firebird

Address: Wellington Hse, St Martins Lane, London

AMSTRAD

Bounty Bob Strikes Back

Many dedicated games players will no doubt have heard of Miner 2049er. Bounty Bob Strikes Back is a follow-up to this game, and it's even tougher now!

There are 25 mines through which you must guide Bounty Bob. Each mine contains various platforms, lifts, traps, ladders, slides and mutant organisms. You must collect any special items you find, trample on the mutants and walk over every section of the platforms. Believe me — it's extremely hard.

The game includes an excellent hi-score entry method. You must select the letters of your name from a special factory and operate all of the machinery in it — it's a much fun as playing the game.

Also featured is one of the nicest self demos I have ever seen. There are numerous title screens and a variety of different sounds — not just the same tune over and over again. For those of you who have trouble playing, the demo actually shows you how to complete the first screen.

Before you start playing there is the option to set up the game parameters and configure it to your own specifications. There are a total of 13 fields which you may customise. Either joystick may be selected although the keyboard is not supported.

The graphics, sound and instructions are of an extremely high standard and cannot be criticised. The price may seem a bit steep but it is definitely worth it. **K.I.**

Price: £9.95

Publisher: US Gold

Address: Unit 10, Parkway Ind Centre, Heneage St, Birmingham B7 4LY

Roland's Rat Race

Yes, this is a winner! It's a sort of rodent Impossible Mission. In another piece of name-dropping software, it's mega-star Roland Rat whose part you take against the force of computer concocted evil.

It's a true arcade/adventure-style game, set in the sewer maze under London. Our hero has had to revert to his natural habitat to take a short cut to get to his Breakfast TV show — but things have changed!

To start with there are energy-sapping wellies to avoid. The accompanying notes don't quite explain why this is, nor why he has to collect pieces of door which are scattered around the underground caverns, other than to enter the inner sanctum for the final conflict. But then, why spoil a good game with logical justifications?

Roland is armed with a stic-o-matic glue-gun to slow the wellies down, and also to temporarily stop the underground train, so that he can hitch a ride on the circle line — this my five-year-old son considers to be the real object of the game.

The graphics are excellent and I love the continuous stop/go traffic jam carrying on above ground. It isn't difficult to stay alive and even amass a reasonably score by eating energy-replacing food or catching the train. But getting a good score and pacing your food consumption to be able to complete the door takes more skill. That's the way to make a game wide-ranging and longlasting in attraction. **B.J.**

Price: £7.95

Publisher: Ocean

Address: 6 Central St, Manchester M2 5NS

Estra

Firebird is one of a few companies that produce low-cost software. You should of course remember that you only get what you pay for. I would imagine that Estra is a game for the younger members of the family. The basic idea is simple and playing it is not complicated in any way.

The object is to collect the 24 pieces of a statue and take them to the temple in the middle of the screen. Only one piece may be transported at a time. As each portion of the statue has been deposited in the temple it is put into its correct position by the computer.

As in most games of this type there are a few meanies wandering about that will kill you if given the chance. Some of them are destructible by you although others are not.

The instructions for playing the game are given in the program. Although they are good I always like to see them printed on the inlay card as well — just in case I want to look them up in the middle of a game. Either a joystick or the keyboard may be used to play, and a pause feature is included.

The graphics and sound are very straightforward and do not hold any fantastic secrets. I would consider the game to be good value for money but not all that hot when compared with the more expensive games. **K.I.**

Price: £2.50

Publisher: Firebird

Address: Wellington Hse, Upper St Martins Lane, London WC2H 9DL

Skyjet

Skyjet is yet another game based around flying over the enemy terrain and shooting or bombing anything that moves. There are already quite a few games out that are very similar to this. Mastertronic's Skyjet is far from being the best but it is the cheapest in the range. If price is more important than quality then this might just suit you.

You control a small helicopter with the joystick. The aim is to destroy ships, submarines and aircraft. A continual flow of missiles will be fired at you from the enemy. These may be exploded in mid-air by shooting at them or simply avoided. I am still not exactly sure what I should be doing — the few instructions that are supplied don't say all that much except if it moves, shoot it!

The instructions are given in five different languages. If the English translation is anything to go by then they would have been just as well leaving the inlay card blank because they tell you nothing to help you play the game.

The graphics are quite colourful and look very nice. As you fly left and right the screen display scrolls to show more of the landscape. The game is quite noisy with all the missiles and bombs exploding and flashing on the screen, not to mention all the other sound effects.

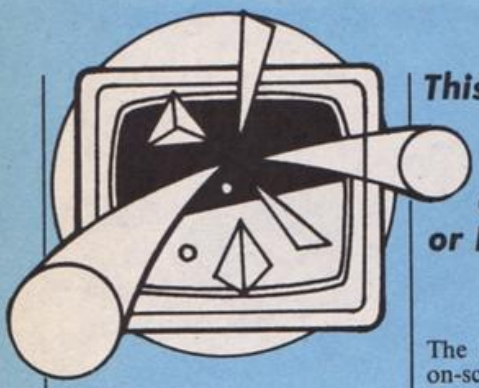
Skyjet seems playable enough, although more instructions would be a great help if it is to be understood. **K.I.**

Price: £1.99

Publisher: Mastertronic

Address: Park Lorne, 111 Park Rd, London NW8 7JL

HOW TO CENTRE



This week Jon Revis shows you how to centre heads on your Amstrad or BBC

The centring of headings and on-screen messages is a simple way of giving any of your programs a professional appearance. However the centring of such headings often requires several attempts before you get it quite right. Following each modification you must re-run the program to ensure that the correction was successful. This can be a downright nuisance if the message is only displayed when a new high score has been achieved.

To help relieve the frustration associated with this task I have written a couple of subroutines for use with Amstrad and BBC computers. They can be easily modified for other machines as they are written using very basic BASIC.

Both subroutines work in the same way. They take the length of the message and subtract this value from the total number of columns available in the screen mode being used. By printing the message at a distance of half this value from the left-hand side of the screen you will find that the text will be centred.

The following information is required by the subroutine:

1 The number of columns available in the screen mode being used. This will be constant for any one mode.

2 The line on which the message is to be printed. This is the Y co-ordinate.

3 The message that is to be displayed. This is held in the variable words.

```
1    REM **** Amstrad version ****
5    MODE 1
10   Ycoord = 5
20   word$ = "Hi there readers !!"
30   GOSUB 1000
40   END
1000 REM Centred text routine
1010 col = 40
1020 word = LEN(word$)
1030 IF word >= col THEN PRINT "Message too long for this screen
mode !" : RETURN
1040 LOCATE ((col - word)/2),Ycoord : PRINT word$
1050 RETURN
```

The routines provided are quite functional, if somewhat crude. It is quite possible to provide modifications that will cope with strings of greater length than the width of the screen. The routine could split the string roughly into two halves, at a gap between words, and then centre the two halves on successive lines. I will probably add this modification at a later date, but as such a small amount of extra effort is involved in calling the sub-routine twice with two shorter strings, it didn't seem to be worth the trouble.

The more observant of you will probably already be thinking that the routine can't cope with messages that are an odd number of characters in length, and you would be quite correct. A string containing an odd number of characters will always be offset to one side of the screen. One way of tackling this problem is to use a graphics mode and calculate the number of graphics co-ordinates required to centre the message and then print the message at the graphics cursor.

```
1    REM Text at Graphics cursor (BBC version)
5    REM Suitable for modes 0,1,2,4,5
10   MODE 4
20   PROCcentre("Hi there readers !!",5)
30 END
```

```
1000 DEF PROCcentre(word$,Ycoord)
1010   col = 40 : REM This should be equal to the number of columns
available in the mode being used
1020 len = LEN(word$)
1030 IF len >= col THEN PRINT "Message too long for this mode !" :
ENDPROC
1040 VDU 5 : REM Join text and graphics cursors
1050  Xcoord = ((col - len)/2) * 32
1055  Ycoord = 1024 - (Ycoord * 33)
1060 MOVE Xcoord,Ycoord : PRINT word$
1065  VDU 4 : REM Seperate text and graphics cursors
1070 ENDPROC
```

```
1    REM **** BBC version ****
5    MODE 7
10   PROCcentre("Hi there readers !!",5)
20   END
1000 DEF PROCcentre(word$,Ycoord)
1010 col = 40 : REM col contains the number of columns available in
the screen mode being used
1020 len = LEN(word$)
1030 IF len >= col THEN PRINT "Message is too long for this screen
mode !" : ENDPROC
1040 PRINTTAB(((col - len)/2),Ycoord) word$
1050 ENDPROC
```

The BBC version of the routine works perfectly, placing text in the exact centre of the screen. The Amstrad version however suffers from one slight drawback: when using TAG to place text at the graphics cursor the computer also displays all non-printing characters. The result is perfectly centred text followed by a couple of arrows, representing a carriage return. A quick phone call to Amstrad revealed that this quirk can be corrected by placing a semi-colon directly after the string being printed.

```
1   REM Text at graphics cursor (Amstrad version)
5   MODE 1
10  Ycoord = 10
20  word$ = "Hi there readers !!"
30  GOSUB 1000
40  END
1000 REM Centred text using graphics cursor
1010 col = 40
1020 word = LEN(word$)
1030 IF word >= col THEN PRINT "Message too long for this screen
mode !" : RETURN
1040 Ycoord = 400 - (Ycoord * 16 )
1050 Xcoord = ((col - word)/2) * 16
1060 TAG
1070 MOVE Xcoord,Ycoord : PRINT word$;
1080 TAGOFF
1090 RETURN
```

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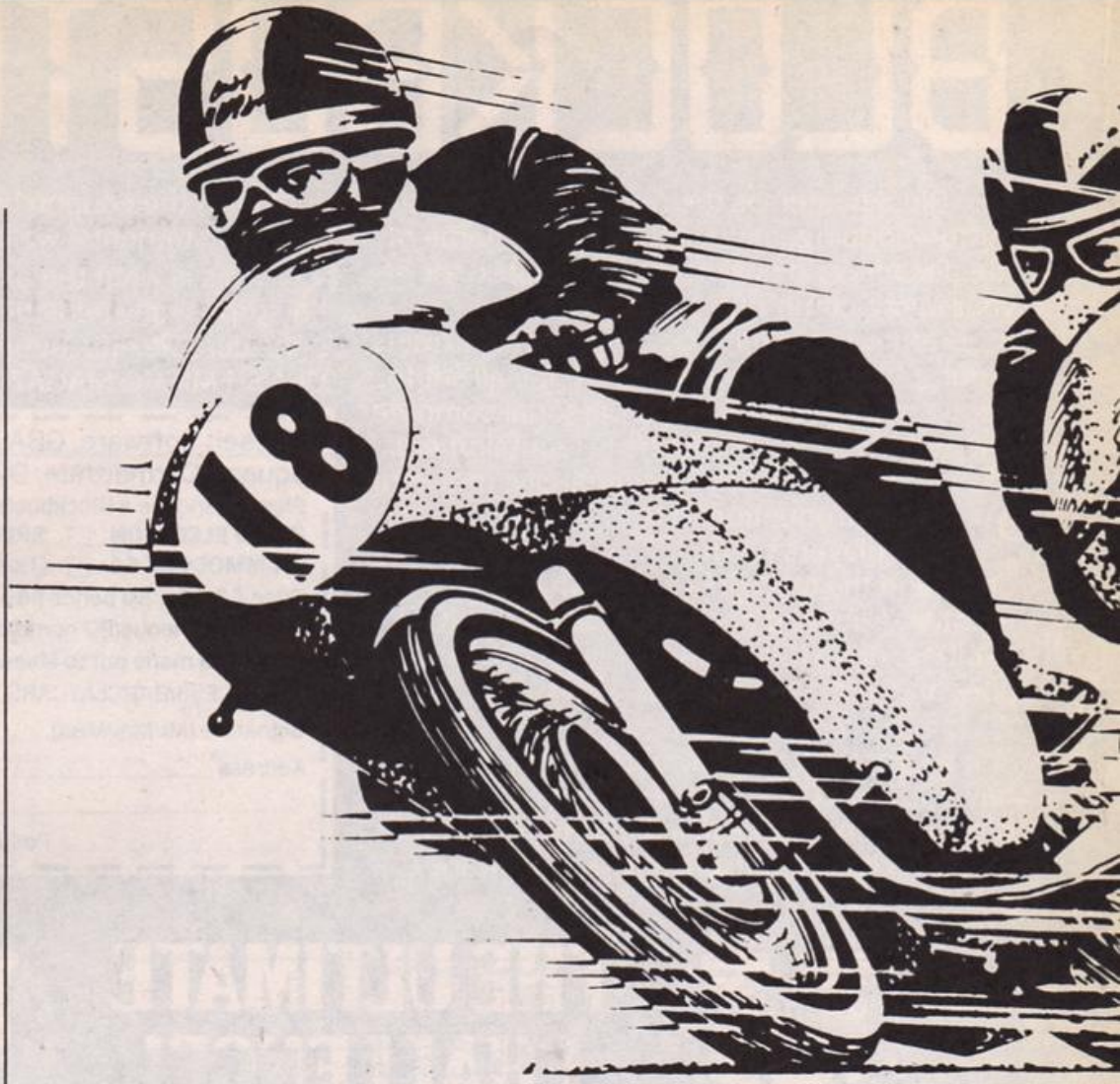

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What you must do is steer your bike around three laps of the TT circuit without crashing off the road or into other hazards.

Check your time at the top of the screen. Good luck and a safe ride!

How it works

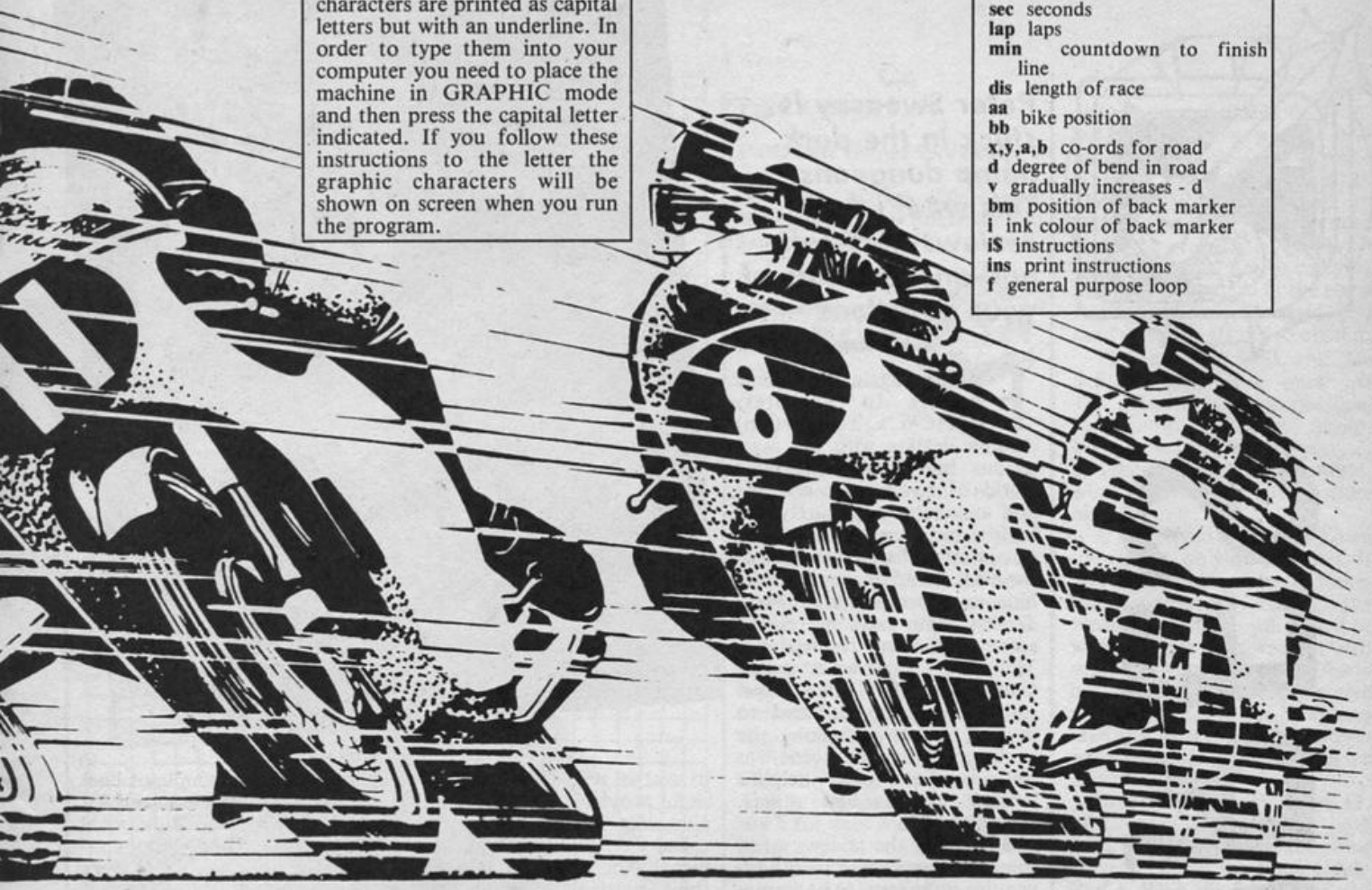
1-40 initialising, variables
50-500 main loop of game
1000-1020 prints back markers
6000-6050 crash routine
6500-6540 win routine
7000-7480 instructions
9000-9010 graphics
9100 set clock to zero

```
  1 REM  TT Race  By A.G.Bird
  3 POKE 23609,40
  4 BORDER 7: PAPER 7: INK 1: CLS
  5 RANDOMIZE
  6 GO SUB 9000: GO SUB 7000
  8 DEF FN t()=INT ((65536*PEEK 23674+256*PEEK 23
673+PEEK 23672)/50)
 10 GO SUB 9100
 15 LET fin=21: LET min=0: LET sec=0: LET lap=0:
LET v=1: LET aa=10: LET bb=13
 20 LET x=1: LET y=90
 30 LET a=1: LET b=140
 40 PRINT AT 20,4;"Start"
 49 REM  Main loop
 50 INK 4: PRINT AT 21,0;
 80 PRINT '
100 POKE 23692,2
110 PRINT '
120 IF SCREEN$ (aa+1,bb)<>" " THEN  GO TO 6000
140 PRINT AT aa,bb; INK 2;"A";AT aa+1,bb;"B"
150 LET sec=FN t()
160 IF sec=59 THEN  LET min=min+1: LET sec=0: GO
SUB 9100
170 PRINT AT 0,24; INVERSE 1;min;":";sec
180 PLOT y-x,8: DRAW -y+x,0
185 PLOT y-x,8: DRAW x,-8
190 PLOT b-a,8: DRAW a,-8
195 PLOT b-a,8: DRAW 254-b+a,0
200 PRINT AT aa,bb; INK 2;"A";AT aa+1,bb;"B"
210 BEEP .0005,25
220 IF RND>.95 THEN  GO SUB 1000
230 LET d=INT (RND*v)-(v/2)
240 IF y<30 THEN  LET d=8
250 IF b>220 THEN  LET d=-8
260 LET x=d: LET a=d
270 LET y=y+x
280 LET b=b+a
290 PRINT AT aa,bb;" ";AT aa+1,bb;" "
300 LET bb=bb+(INKEY$="8")-(INKEY$="5")
310 IF RND>.2 THEN  GO TO 400
320 LET aa=aa+(INT (RND*3)-1)
330 IF aa<5 THEN  LET aa=5
340 IF aa>15 THEN  LET aa=15
400 LET v=v+.2
410 IF v>dis THEN  LET v=1: LET lap=lap+1: PRINT
AT 21,b/8+2;"Lap ";lap
420 IF lap=3 THEN  LET fin=fin-1: IF fin=aa THEN
```

Please note: All the Spectrum listings in HCW are printed to a special format. All user defined characters are printed as capital letters but with an underline. In order to type them into your computer you need to place the machine in GRAPHIC mode and then press the capital letter indicated. If you follow these instructions to the letter the graphic characters will be shown on screen when you run the program.

Variables

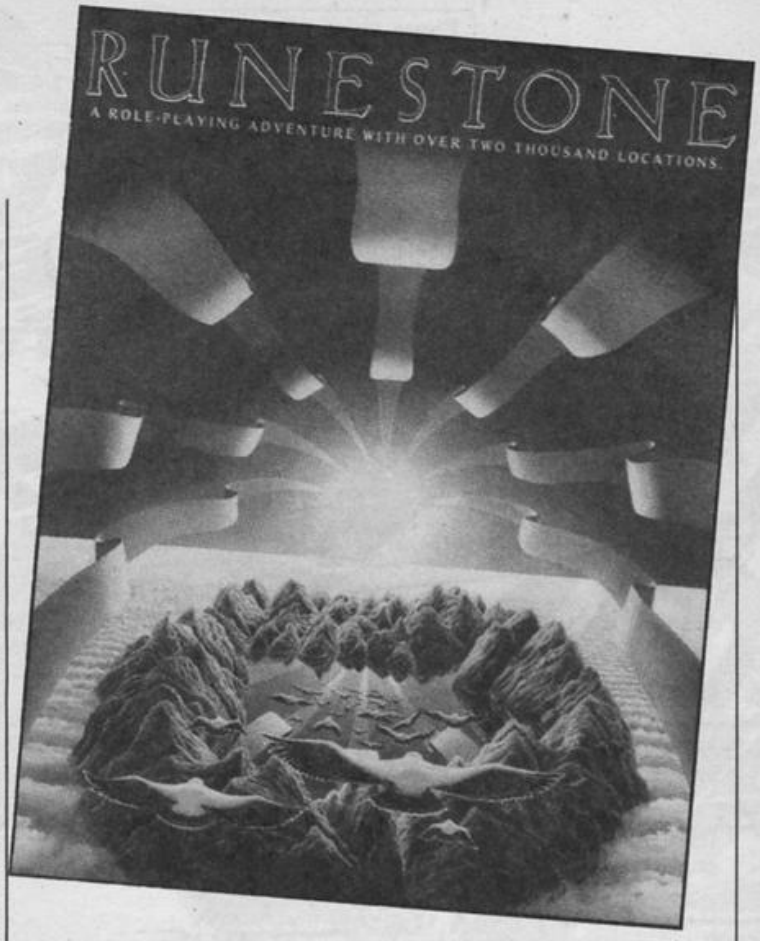
FN t() clock
min minutes
sec seconds
lap laps
min countdown to finish line
dis length of race
aa **bb** bike position
x,y,a,b co-ords for road
d degree of bend in road
v gradually increases - d
bm position of back marker
i ink colour of back marker
i$ instructions
ins print instructions
f general purpose loop



```
 GO TO 6500
 500 GO TO 50
 999 REM  Back markers
1000 LET bm=3+(y/8)
1005 LET i=INT (RND*4)
1010 PRINT AT 20,bm; INK i;"A";AT 21,bm;"A"
1020 RETURN
5999 REM  Crash
6000 PRINT AT aa,bb; PAPER 2; INK 6; FLASH 1;"A";A
T aa+1,bb;"A"
6010 FOR f=30 TO -30 STEP -3: BEEP .01,f: NEXT f:
BEEP .5,-40
6020 BORDER 3: PAPER 3: INK 7: CLS
6030 PRINT AT 8,4;"BAD LUCK ... You managed";AT 11
,4;"to stay on your bike for";AT 15,8;min;" min ";
sec;" seconds"
6040 PRINT AT 21,2;"Press any key for another go"
6050 BEEP 1,0: PAUSE 0: RUN
6499 REM  Win
6500 FOR f=1 TO 100: OUT 254,f: NEXT f
6510 BORDER 0: PAPER 7: INK 0: CLS : FOR f=0 TO 21
: PRINT AT f,0; FLASH 1;"                              
                ": BEEP .01,f: NEXT f
6520 PRINT AT 10,10; PAPER 6;" WELL  DONE ";AT 12,
9;" YOU  DID  IT "
6530 FOR f=0 TO 50: BEEP .01,f: BEEP .01,f-1: BEEP
 .01,f-2: NEXT f
6540 PRINT AT 21,0; PAPER 4;"  Press any key for a
nother go  ": PAUSE 0: RUN
6999 REM  Instructions
7000 PRINT AT 0,0; PAPER 6; INK 0;"  TT Race   By
A.G.Bird.  1985  "
7010 INK 1: CIRCLE 64,82,12
7020 PLOT 36,64: DRAW 56,0,3: DRAW -56,0,-1
7030 PLOT 56,40: DRAW 16,0,-2
7040 INK 0: PLOT 60,0: DRAW 8,0: DRAW 0,34: DRAW -
8,0: DRAW 0,-34
7050 FOR f=34 TO 2 STEP -2: PLOT 60,f: DRAW 4,-2:
DRAW 4,2: NEXT f
7060 PLOT 56,40: DRAW 0,-26: DRAW -4,0: DRAW 0,27:
 PLOT 72,40: DRAW 0,-26: DRAW 4,0: DRAW 0,27
7070 INK 1: PLOT 40,63: DRAW 16,40,-1: DRAW 16,0,-
1: DRAW 16,-40,-1
7080 PLOT 46,60: DRAW 7,17,-1: PLOT 82,60: DRAW -7
,17,1
7090 INK 0: PLOT 50,100: DRAW 28,0,-3.5
7100 PLOT 55,115: DRAW -2,16: DRAW 22,0,-2: DRAW -
2,-16
7110 PLOT 60,137: DRAW 0,20: DRAW 8,0: DRAW 0,-20
7120 FOR f=157 TO 139 STEP -2: PLOT 60,f: DRAW 4,-
2: DRAW 4,2: NEXT f
7130 PLOT 57,73: DRAW 2,2: DRAW 10,0,2: DRAW 2,-2
7140 PLOT 56,135: DRAW 0,10: DRAW -6,0: DRAW 2,-35
: PLOT 72,135: DRAW 0,10: DRAW 6,0: DRAW -2,-35
7150 PLOT 59,70: DRAW -2,-4: DRAW 0,-8: PLOT 70,70
: DRAW 2,-4: DRAW 0,-8
7200 LET i$="Steer your bike  round 3 laps of  the
 TT circuit   without crashing off the road or  in
to those slow  back markers whom"
7210 LET i$=i$+"you must get pastYour time will be
displayed at the top of the screenSo good luck and
 be careful !     Controls for left& right are 5 &
 8"
7300 LET ins=-16
7310 FOR f=3 TO 17 STEP 2
7320 LET ins=ins+17
7330 PRINT AT f,15;i$(ins TO ins+16)
7340 BEEP .0005,40: PAUSE 3
7350 NEXT f
7360 PRINT AT 21,17; INK 4;"Press any key": BEEP .
1,-30: PAUSE 0
7370 FOR f=3 TO 17 STEP 2: PRINT AT f,15;"
        ": BEEP .0005,40: PAUSE 4: NEXT f
7380 FOR f=4 TO 16 STEP 2
7390 LET ins=ins+17
7400 PRINT AT f,15;i$(ins TO ins+16)
7410 BEEP .0005,40: PAUSE 3
7420 NEXT f: BEEP .1,-30: PAUSE 0
7450 FOR f=4 TO 21: PRINT AT f,15;"
  ": NEXT f
7460 PRINT AT 8,16;"Input length";AT 10,16;"of rac
e";AT 12,16;"5 to 9 miles.": INPUT dis
7470 IF dis<5 OR dis>9 THEN  GO TO 7440
7480 LET dis=dis*5: CLS : RETURN
8889 STOP
8999 REM  Graphics
9000 FOR f=USR "a" TO USR "b"+7: READ a: POKE f,a:
 NEXT f: RETURN
9010 DATA 24,24,36,60,24,24,24,60,90,102,60,0,24,2
4,24,24
9099 REM  Set clock
9100 POKE 23674,0: POKE 23673,0: POKE 23672,0: RET
URN
9999 SAVE "TT Race" LINE 1
```

VENTURES

Peter Sweasey is stuck in the dark, damp dungeons. This weeks he reviews Runesoft and answers lots of your questions



Hello again. Welcome back to Ventures, HCW's regular(ish) column dealing with the mysterious but always enjoyable world of adventures, and the odd arcventure too (surely you know what an arcventure is by now, dear reader?). I'm stuck in the dark, damp dungeons of the hideous, enormous Argus Press Towers, with only my elfling secretary Gorand to help me. This time I shall be reviewing Games Workshop's new Runesoft, a program destined to make an impact on the Spectrum software scene, as well as the regular helpline looking at, amongst others, Valhalla.

But before the review, a few things to mention. Firstly, adventure clubs seem to be springing up all around. I shall be mentioning Simon Martin Clarke's International Adventure Club in a future issue, but recently news came to me of another body, called The Adventurers' Club (original name, huh?). For a modest price you receive a monthly dossier containing adventure reviews, solutions and news; a helpline service; discounts off games; and the chance to enter a Master Adventurer competition with first prize of £5000. It all sounds an admirable affair, particularly as the club promises to support the less popular machines like the Texas and Lynx (does anyone really own a Lynx?) For more information, 'phone 01 794 1261.

Secondly, you may have noticed a slight change with Ventures. Now you get a bigger helpline, more general chat, longer reviews and less arcade type games. This is what you want . . .

Runestone is a new game from the company that brought you, amongst others, Tower Of Despair. It is written by Alan Davis who wrote the acclaimed Journey, and published by Temptation. With that pedigree it should be good, and I'm glad to say that it is. There is just one slight problem; it looks remarkably like a certain bestseller called . . . The Lords Of Midnight! Not that that is a bad thing, particularly as this game is in some ways more sophisticated, but a few buyers might feel a bit ripped off.

You control three different characters in an epic quest to find the Runestone of Zaphir, and with it defeat the Dark One, Kordmir, a nasty piece of work if ever there was one. You must also seek some mages and discover the secrets of the Saromunder. To hinder you, orcs are afollowing, but to help you are various amiable people: princes, princesses, merchants and other folk with generally silly names (why is no-one called Peter in middle earth?) There are 2000 locations, stretching over forests, lakes and mountains, 40 different characters, and the game is played in real time.

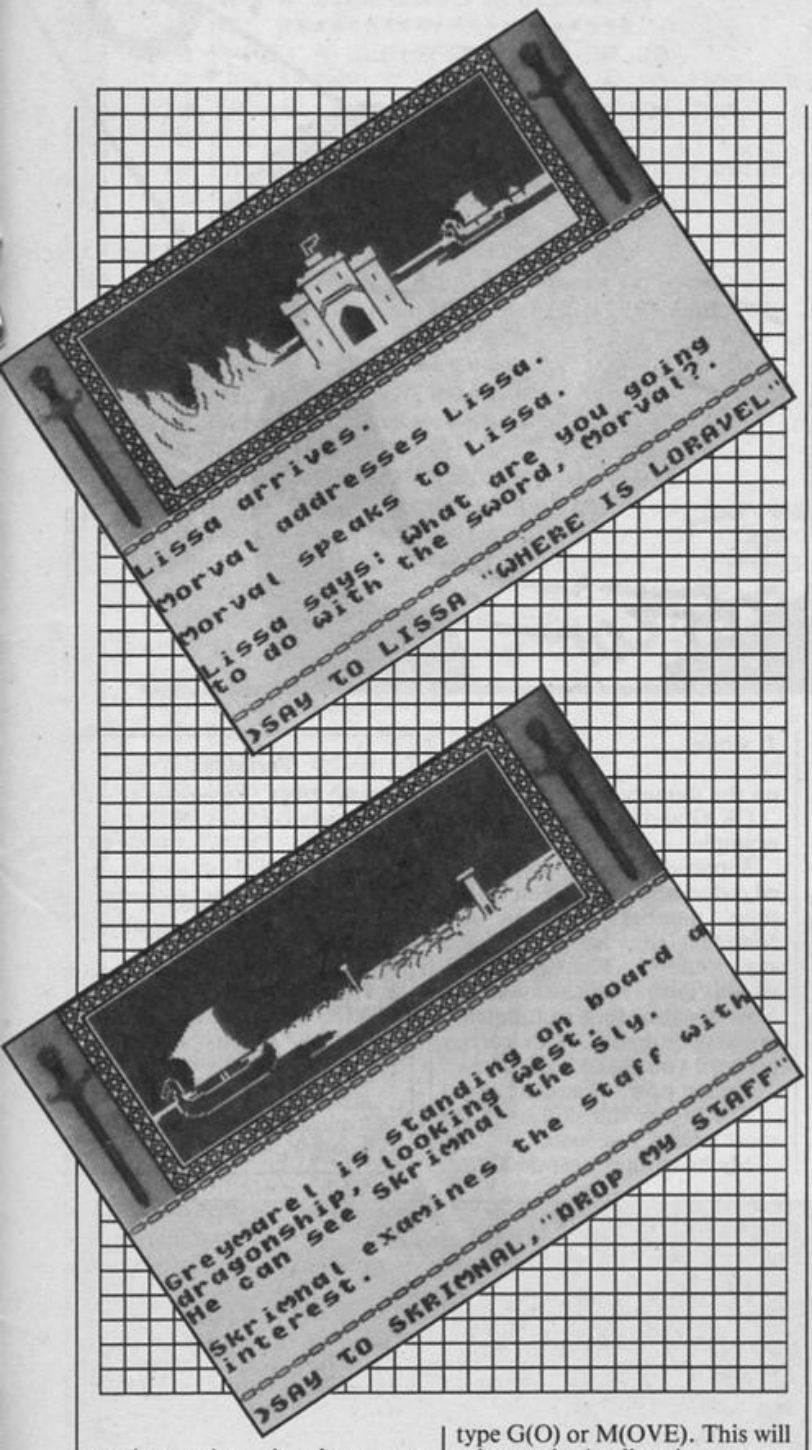
The three characters you can control are Morval the warrior, Eliador the elf, who shoots a mean bow and arrow, and Greymare the wizard, who can eventually cast spells. You can change from one to another at any time. Within the one task are many other problems to be solved, plus some wargaming is needed to defeat the orcs, and there is plenty of treasure to be hunted down.

The screen is divided into three sections: a couple of lines at the bottom of the screen for input, then two roughly equal halves above. The top half contains the graphics, and very pretty they are too. There are 8000 different views, all quite similar though ... made up of different sized mountains, lakes, tress, huts, towers and so on. They are attractive, although rather cold looking, since they are almost entirely in blue. Only inside the towers do they change colour — but here the graphics are a let-down, dull and flat, and tend to all look the same.

The middle section of the screen is where this game differs from the Midnight programs. Here, reams of text unfold in front of your eyes; descriptions, conversations and battles all appear. The characters interact with each other, and you, in the slightly random Hobbit style.

Input is generally good. No more fiddling with one-letter commands; full sentence input is allowed. This is a bit fussy, in that it won't allow you to type 'ELDRIC FOLLOW ME' à la Valhalla; and the vocabulary isn't massive by any stretch of the imagination, but generally acceptable.

There are a few other flaws. If the program doesn't understand your input, it simply prints '(your character) scratches his head and wonders what to do next' rather than



stating what it does not understand — frustrating. Once again, the computer game industry shows outstanding sexism in making not one of the lead characters female. Also, there is a daft character called Skrimnir who will appear from time to time, steal something of yours, and grin. You then have to go through a laborious process to regain it — a pointless touch.

The movement routine is non-standard, and takes a little getting used to. Typing N, S, E, or W will simply swivel you round in that direction. To do something, you first have to type G(O) or M(OVE). This will take you in the direction you are facing. Typing something like GO E will cause you to first look east, then move. Rather unnecessarily complex.

The packaging to Runestone is very attractive. To a certain extent the obligatory hype is right for once too. This is a very high-class, polished piece of software. Features like a pause control, excellent editing facilities, a redesigned character set and superb screen display all add up to make a great game. Runestone is wonderful; it is all the excellent features of Lords of Midnight combined with a decent adventure. I loved it!

Price: £7.95

Publisher: Games Workshop

Address: Games Workshop Mail Order, 27-29 Sunbeam Rd, London NW10 6JP

Helpline

The letters have been flooding in — keep them coming. You seem divided about whether I should give direct solutions, or clues, to games. Well, for now, I will continue with straightfoward answers, unless a large number of you object. One thing I won't be doing, however, is coding answers — something totally pointless in my opinion.

Firstly, congratulations to Chris Lovelace who has solved Artic's Golden Apple. He was stuck for ages with a ball, a can of spray paint and Medusa. The solution, for anyone else stuck at such an advanced stage, is to roll the sphere down the slope. It will smash into glass fragments. Spray these and you have a mirror. If you make sure you are holding the mirror when you go to the chamber from the safe, Medusa's stare will be deflected.

One surprisingly popular game is Legend's Valhalla, even though it is one and a half years old. Nigel Yarranton of Kent can't even get started, Kormal O'Conner of Dublin can only get Ofnir, and Simon Heighes of Sheffield can reach the next quest, but no further. Well, for these people and the rest of you Norse fans, here are some very comprehensive tips from Aldershot resident John W. Rundle.

OFNIR: From the start (Valheim) go to the plain in Midgard (SW,SW,W,W,N,N, N,W,W,SW,S,E!) You need Boldir before you can go North to Krank's hall. It is a good idea to wait a minute or so before summoning someone. Once in Krank's Hall, fight and defeat Krank. Once he's gone, you can go NW, where Ofnir can be found — if you can open the chest. You need the help of someone strong; John suggests Boldir, although I found Thor or Odin more reliable.

DRAPNIR: Now go SE, and jump. Go SW,SE, and W. Give Ofnir to Tyr once he turns up. Then SW,E,E, jump. To go North from Hel's hall, you need Hel to be present. To go North again, you must not be carrying a sword. Drapnir is in the chest North from Despair: again, you need someone strong to open it.

The next quest is Skornir. Go E,S,SE. Get Ofnir back off Tyr. Head E as far as possible, then jump, go north, jump. From now on, it's up to you . . . at least until the next column, when John will be giving more hints.

A few trivial hints of my own to help you on your way first. If you want someone to do something particularly Saga, say please. And if you want food or wine — trade your weapon with someone who obviously already has one. They will accept, give you the food, but not be able to take the weapon! Pretty dumb people, considering they're ancient gods . . .

Graeme Davidson, aged 13, of Glasgow, wants some help with Fantasy's spacebound arcventure, Backpackers Guide Part 1. Well, the double-headed emu needs love poems, the unidragon hydrogen, the snottoid a handkerchief, and the ice monster a fridge. And the crystals act as teleports. These tips were supplied by Tim Lawes and should help improve your score, Graeme, which is pretty good anyway at 42%.

Technician Ted is still causing problems, and I have yet to hear of anyone completing it. Still, I managed to reach the eighth task. After the Fuming Cupboard, go to The Clean Room, then The Silicon Etching Tank, then The Canteen.

And now a few pleas for help. Although Gorand and I can defeat Level 9, Scott Adams, Artic and more, some games just have us stumped. So if anyone can send in part or complete solutions to the following, we would be extremely grateful . . .

Valkyrie 17 (stuck with the plane), Heroes Of Karn, Forest At The World's End, Sim Zala Bim (have yet to play these), Everyone's A Wally (morning tea break) and Technician Ted (after The Canteen).

That just about winds it up for this time. Happy Venturing!

AMSTRAD GAME

SIMPLE SIMON

This old favourite is cleverly executed for the Amstrad by Liam Warder

For all you people out there who have never played Simon before listen up, yes you too Grandad.

Simon is a game of memory. The computer sets up a random sequence which you must follow using the keys:

4 yellow
5 red
2 light cyan
1 white

on the numeric pad.

OK Grandad, I'll give you an example.

Suppose the computer flashed red to begin with. You would press number 5. Then the computer adds another colour, say yellow. The computer would flash red then yellow. Now it's your turn to follow by pressing 5 then 4. This carries on until you make a mistake.

Happy now, Grandad?

The higher the skill level the more points you score.

My hi-score is near 3500.

Variables

Simon (100) computer's sequence
HIS$ (10) Player's names on hi-score table
HIS (10) scores
SC score during game
SCI score increment, increments by 5 each correct go
SIM number of goes in sequence
L,T,R,U,A$ general variables
LEVEL player's level x 30. Used for delay
PLAY player's input
NAME$ player's name for hi-score table
PIT pitch for sound
Z,X colour changes for INKs

```
10 REM ********************
20 REM * set up variables *
30 REM ********************
40 DATA He Man,2000,Me,1750,Sabre Wulf,1600,Miner Willy,1400,
Ernie,1250,Wart Face,800,Eugene,500,Roland Rat,475,Anomynous,
200,Pet Hamster,75
50 DIM simon(100),his$(10),his(10)
60 FOR t=1 TO 10:READ his$(t),his(t):NEXT
70 sc=0:sci=5:sim=0
80 REM  *****************
90 REM  * print titles *
100 REM *****************
110 MODE 0:PAPER 4:CLS:BORDER 26
120 FOR l=1 TO 16 STEP 15:FOR t=1 TO 24
130 LOCATE l,t:PEN 5:PRINT"SIMON"
140 SOUND 1,200,3:FOR r=1 TO 200:NEXT
150 NEXT:NEXT
160 LOCATE 8,10:PEN 3:PRINT" MK 1"
170 LOCATE 6,17:PEN 2:PRINT"written by"
180 PEN 3:LOCATE 8,19:PRINT" LIAM"
190 LOCATE 8,20:PRINT"WARDER"
200 LOCATE 6,24:PRINT"PRESS  'C'"
210 WHILE INKEY$="":WEND
220 REM ********************
```

```
230 REM * like instructions *
240 REM **********************
250 PAPER 4:CLS:SPEED INK 20,20
260 PEN 1:INK 1,1,6:LOCATE 6,10:INPUT"Would you like instructions (Y,N)";A$
270 IF A$<>"Y" AND a$<>"y" THEN 380
280 CLS:INK 1,16
290 PRINT"The computer sets upa random sequence   which you must      follow usi
ng the    keys:-"
300 LOCATE 7,10:PRINT"4      5"
310 LOCATE 7,16:PRINT"1      2
320 PEN 3:PRINT"On the numeric pad"
330 LOCATE 15,20:PEN 2:PRINT"PRESS ANY KEY
340 WHILE INKEY$="":WEND
350 REM ***************
360 REM * input level *
370 REM ***************
380 PAPER 0:CLS:PEN 3
390 LOCATE 5,5:PRINT"(5) Beginner"
400 PEN 5:PRINT:PRINT TAB(5)"(4) Average"
410 PEN 12:PRINT:PRINT TAB(5)"(3) Good"
420 PEN 7:PRINT:PRINT TAB(5)"(2) Very Good"
430 PEN 4:PRINT:PRINT TAB(5)"(1) Brilliant"
440 LOCATE 1,24:INPUT "What skill level";level
450 IF level<1 OR level>5 THEN 380
460 lev=level
470 level=level*30
480 REM ***************
490 REM * draw circle *
500 REM ***************
510 PAPER 5:CLS
520 a=3
530 FOR t=1 TO 360:DEG
540 PLOT 320,200,a
550 DRAW 320+190*COS(t),200+190*SIN(t)
560 IF t=90 THEN a=12:GOSUB 1160
570 IF t=180 THEN a=4:GOSUB 1160
580 IF t=270 THEN a=2:GOSUB 1160
590 NEXT
600 GOSUB 1160
610 INK 2,1:INK 3,1:INK 4,1:INK 12,1
620 FOR t=1 TO 1000:NEXT
630 REM ***********
640 REM * SEQENCE *
650 REM ***********
660 simon(sim)=INT(RND(1)*4+1)
670 FOR t=0 TO sim
680 GOSUB 910
690 SOUND 1,pit,level/3
700 INK z,x
710 WHILE SQ(1)>128:WEND
720 INK z,1
730 NEXT
740 REM ****************
750 REM * player input *
760 REM ****************
770 FOR t=0 TO sim
780 a$=INKEY$:IF a$="" THEN 780
790 play=VAL(a$)
800 IF play<1 OR play>5 THEN 780
810 IF play=4 OR play=5 THEN play=play-1
820 GOSUB 910
830 IF simon(t)<>play THEN :SOUND 1,2500,200,15:INK z,x:GOTO 990
840 SOUND 1,pit,level/3
850 INK z,x
860 WHILE SQ(1)>128:WEND
870 INK z,1:FOR p=1 TO 50 :NEXT
880 NEXT
890 FOR u=1 TO 500:NEXT
```

```
900 sc=sc+sci:sci=sci+5:sim=sim+1:GOTO 660
910 IF simon(t)=4 THEN z=3:x=6:pit=50
920 IF simon(t)=3 THEN z=12:x=18:pit=100
930 IF simon(t)=1 THEN z=4:x=26:pit=150
940 IF simon(t)=2 THEN z=2:x=20:pit=200
950 RETURN
960 REM ******************
970 REM * hi score table *
980 REM ******************
990  WHILE SQ(1)>128:WEND
1000 INK 1,16:INK 2,20:ZONE 17:MODE 1:CLS
1010 sc=sc*(6-lev)
1020 IF sc<=his(10) THEN PRINT"You're not on the hiscore table with a  score of"
;sc"SORRY!!!":FOR t=1 TO 3000:NEXT:GOTO 1100
1030 PEN 3:PRINT"*************** HISCORE ****************"
1040 FOR t=1 TO 10
1050 PRINT t;his$(t),his(t):NEXT
1060 PEN 2:PRINT:PRINT"You're on the hiscore table"
1070 PRINT:PRINT:INPUT"In no more than 14 letters state your   name";name$
1080 t=1
1090 IF sc>his(t) THEN FOR 1=10 TO t STEP-1:his$(1)=his$(1-1):his(1)=his(1-1):NE
XT:his$(t)=name$:his(t)=sc:GOTO 1100 ELSE t=t+1:GOTO
 1090
1100 CLS:FOR t=1 TO 10
1110 PRINT t;his$(t),his(t):NEXT
1120 LOCATE 3,19:PRINT"press any key to play"
1130 WHILE INKEY$="":WEND
1140 MODE 0:INK 4,26:INK 3,6:INK 12,18
1150 sc=0:sim=0:sci=5:GOTO 250
1160 FOR j=1 TO 15
1170 SOUND 2,235,5,7
1180 SOUND 2,245,5,7
1190 SOUND 2,200,5,7
1200 SOUND 2,230,5,7
1210 NEXT
1220 RETURN
```

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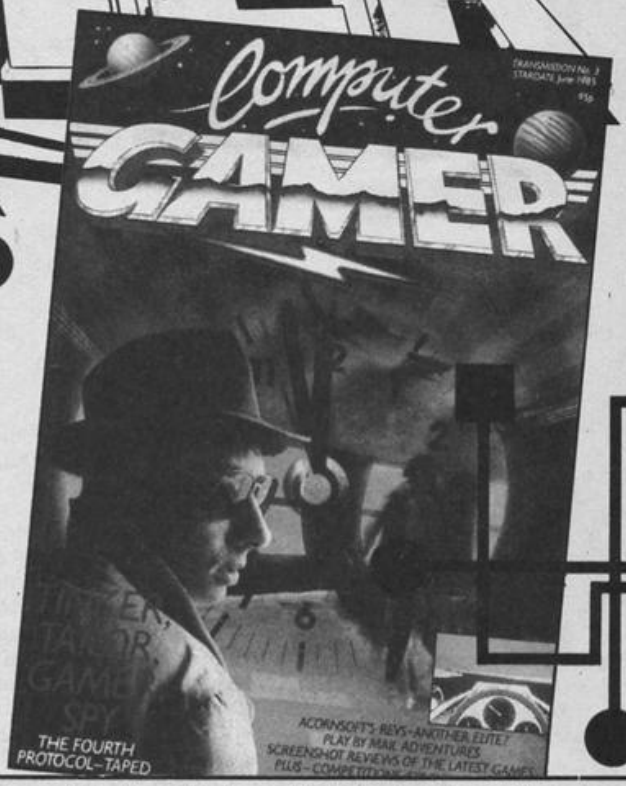
Computer GAMER



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C64 UTILITY

MINI-MICRO

This program by David Rees gives you a valuable insight into how your computer works

One of the probems with learning machine code is that when you try out a new routine, it's not easy for you to see what it is doing. In BASIC, a PRINT will allow you easy access to the program, but all you can do in code is POKE. Another problem is that when you mess around with some code for fun, you can easily make a mistake and trap the computer in code. To escape, you have to switch the computer off and on again, and so you can't see what the mistake was.

The following program is intended to help solve these problems by creating a fictitious computer, where you can see everything that is going on inside it. I call it a mini-micro as it has a meagre 64 bytes of RAM! It also uses a set of simple instructions, based on real 6502/6510 instructions, which means that many of the routines made in the mini-micro can be used in the real Commodore machines (except those routines with JMP and JSR instructions).

On running the program, it will tell you how to enter machine code and what the instructions mean. There are about 20 instructions, each having at least one mode. The mode tells the computer how the instruction is to be used. For example: "Is there supposed to be a number following the instruction, and if so, how is it to be used (as a number for sums, or as a location for where to PEEK or POKE)?"

After instructions, you come to the main screen. At the top are a row of numbers showing contents of the registers of the main chip. These are the units of memory that the computer uses to do most of the work. PC is the program counter, which tells the central processing unit where to get the next instruction from. A and X are explained in the program, and are where the computer does all its sums (PEEK or load from memory to A, do a sum, and POKE or store the number back). C is the carry register, and is set if you do a sum that involves more than one byte of space (acting as a ninth bit). Z shows whether the last number used was zero or not. Finally, ST is the stack pointer, showing how many numbers the CPU has to remember (for JSRs).

Below this lies a grid, showing all the memory locations in the mini-micro. As soon as you put in some code or run a routine, changes will instantly be shown on this grid. It also indicates the grid position of where your code is to be placed. Whenever a routine is run, the instruction being used is highlighted on the grid.

At the bottom lies the space for you to type in your code (one instruction at a time) and room for error messages. There is also a line for showing the instruction mnemonics while they are being executed. The lowest line indicates what each function key can do.

Now you can freely use the commands, with no fear of fouling up the computer, with only one restriction. All routines must end with RTS. You GOSUB to a code program, so RTS acts as a RETURN to BASIC.

One added advantage of the mini-micro is that the machine code instruction numbers are the same as those used in the real machine. This means that you can use some routines created in the mini-micro in the Commodore 64. Also, if you want to know how other people's routines work, you can compare them with the routines you have made in the grid.

Hopefully, by using this program, you will be able to gain a much better understanding of code and how it works than from books or from using the real thing.

How it works

10-50 set variables and display mode
60-140 show instructions and computer
1000-1360 code names and numbers
2000-2960 instructions sub-routine
3000-3030 read data
3040-3090 key press subroutine
3100-3340 print computer display
3400 move cursor
4000-4200 input text
5000-5920 interpret instruction entered
6000-7910 run code
6000-6070 input start
6080 set registers
6100-6117 print registers and instruction
6118-6140 error
6150-6640 what each instruction does
6700-6715 stop code
6720-6750 error
7000-7630 instruction subroutines
7800-7910 errors
8000-8020 end program

Variables

AR accumulator register
C carry
MC start of a real code routine
P program counter
SU stack pointer
XR X register
Z Z register

Conversion

Only the basic idea could be transferred to other micros, as some have different CPUs and all of them have different displays from that of the Commodore 64.

```
 1 REM****************
 2 REM*  MINI MICRO  *
 3 REM*      BY      *
 4 REM*  DAVID REES  *
 5 REM*              *
 6 REM*  JAN   1985  *
 7 REM****************
10 DIMC$(255),L%(63),T%(255),CC$(37),N(37)
20 V=53248:POKEV+32,0:POKEV+33,6
30 POKEV+17,PEEK(V+17)OR64
40 POKEV+34,5:POKEV+35,2:CO=55296:SC=1024
50 POKEV+36,0:MC=65520
60 GOSUB 3000:GOSUB 2000
80 S$="":FOR N=0 TO 39:S$=S$+" ":NEXT
90 GOSUB 3100
100 X=0:Y=19:GOSUB3400
110 FOR N=0 TO 2:PRINTS$;:NEXT
120 GOSUB3400
130 PRINT"INPUT INSTRUCTION"
140 I$="":L=0
150 GOSUB4000:IF A=13 THEN 5000
160 IF A=20 THEN 4100
170 IF A=29 THEN A$=" "
180 IF A=133 THEN 6000
190 IF A=134 THEN 8000
200 IF A=135 THEN GOSUB 2000:GOTO 90
210 L=L+1:IF L>20 THEN L=20:GOTO150
220 PRINTA$;:I$=I$+A$:GOTO 150
1000 DATA169,LDA II,6
1010 DATA165,LDA ZZ,2
1020 DATA181,LDA ZX,3
1040 DATA133,STA ZZ,2
1050 DATA149,STA ZX,3
1070 DATA96 ,RTS IM,5
1080 DATA232,INX IM,1
1090 DATA202,DEX IM,1
1100 DATA230,INC ZZ,2
1110 DATA246,INC ZX,3
1120 DATA198,DEC ZZ,2
1130 DATA214,DEC ZX,3
1140 DATA162,LDX II,6
1150 DATA166,LDX ZZ,2
1160 DATA134,STX ZZ,2
1170 DATA224,CPX ZZ,2
1180 DATA170,TAX IM,1
1190 DATA138,TXA IM,1
1200 DATA105,ADC II,6
1210 DATA101,ADC ZZ,2
1220 DATA117,ADC ZX,3
1230 DATA233,SBC II,6
1240 DATA229,SBC ZZ,2
1250 DATA245,SBC ZX,3
1260 DATA201,CMP II,6
1270 DATA197,CMP ZZ,2
1290 DATA240,BEQ RE,4
1300 DATA208,BNE RE,4
1310 DATA 76,JMP ZZ,2
1320 DATA 32,JSR ZZ,2
1330 DATA144,BCC RE,4
1340 DATA176,BCS RE,4
1350 DATA 24,CLC IM,1
1360 DATA 56,SEC IM,1
```

```
1999 REM*[CLS][YELLOW][RVS ON]
2000 PRINT"■■■"TAB(10)"INSTRUCTIONS"
2010 PRINT:PRINT
2019 REM*[CYAN]
2020 PRINT"■COMMAND FORMAT:■"
2030 PRINT
2039 REM*[YELLOW]
2040 PRINT"■     15 LDA II 32■"
2049 REM*[PURPLE]
2050 PRINT"■     ↑↑  ↑  ↑    ↑NUMBER"
2060 PRINT"      ↑↑  ↑  MODE"
2070 PRINT"      Y↑  COMMAND"
2080 PRINT"       X POSITION OF COMMAND"
2090 PRINT
2099 REM*[L.BLUE]
2100 PRINT"■  COMMANDS MAY BE ENTERED IN";
2110 PRINT" INPUT MODE.TO RUN THE ";
2120 PRINT"ROUTINE, PRESS 'F1' AND ";
2130 PRINT"ENTERTHE GRID ";
2140 PRINT"POSITION START."
2150 PRINT"  TO ESCAPE FROM THE CODE ";
2160 PRINT"WHILE IT IS   RUNNING, OR ";
2170 PRINT"FROM THE MAIN PROGRAM, PRESS";
2180 PRINT"'F3'."
2190 PRINT
2200 GOSUB 3040
2209 REM*[CLS]..[RVS ON]
2210 PRINT"■"TAB(14)"■COMMANDS"
2220 PRINT
2230 FOR N=0 TO 16
2240 PRINTCC$(N),,CC$(N+17)
2250 NEXT
2260 GOSUB 3040
2270 PRINT
2279 REM*[CLS][RVS ON]
2280 PRINT"■■■"TAB(8);"ADDRESSING MODES"
2290 PRINT
2300 PRINT"IM:  IMPLIED"
2310 PRINT"   NO EXTRA NUMBER NEEDED"
2319 REM*[DWN]
2320 PRINT"■II:  IMMEDIATE"
2330 PRINT"   USE THE FOLLOWING NUMBER"
2340 PRINT"   DIRECTLY FOR CALCULATIONS"
2349 REM*[DWN]
2350 PRINT"■ZZ:  ZERO PAGE"
2360 PRINT"   USE THE FOLLOWING NUMBER"
2370 PRINT"   AS A ZERO PAGE LOCATION"
2379 REM*[DWN]
2380 PRINT"■ZX:  ZERO PAGE+X"
2390 PRINT"   USE THE FOLLOWING NUMBER + X"
2400 PRINT"   REGISTER AS A ZERO PAGE LOCATION
2409 REM*[DWN]
2410 PRINT"■RE:  RELATIVE"
2420 PRINT"   GOTO LOCATION RELATIVE OF"
2430 PRINT"   THE PRESENT LOCATION"
2440 PRINT
2450 GOSUB 3040
2499 REM*[CLS][YELLOW][RVS ON]
2500 PRINT"■■■"TAB(8)"COMMAND MEANINGS"
2510 PRINT
2519 REM*ALL [YELLOW]...[L.BLUE]
2520 PRINT"■LDA■ LOAD ACCUMULATOR (A)"
2540 PRINT"■LDX■ LOAD X REGISTER  (X)"
2560 PRINT"■STA■ STORE ACCUMULATOR"
2580 PRINT"■STX■ STORE X REGISTER"
2600 PRINT"■DEX■ X REGISTER-1"
2620 PRINT"■DEC■ MEMORY LOCATION-1"
2640 PRINT"■INX■ X REGISTER+1"
2660 PRINT"■INC■ MEMORY LOCATION+1"
2680 PRINT"■CPX■ COMPARE X WITH.."
2700 PRINT"■CMP■ COMPARE A WITH.."
2720 PRINT"■TAX■ TRANSFER A TO X"
2740 PRINT"■TXA■ TRANSFER X TO A"
2760 PRINT"■ADC■ ADD TO ACCUMULATOR"
2780 PRINT"■SBC■ SUBTRACT FROM A"
2800 PRINT"■JMP■ JUMP (OR GOTO)"
```

```
2820 PRINT"■JSR□ GOSUB"
2840 PRINT"■BEQ□ BRANCH IF RESULT ZERO"
2860 PRINT"■BNE□ BRANCH IF NOT ZERO"
2880 PRINT"■BCC□ BRANCH ON CARRY CLEAR"
2900 PRINT"■CLC□ CLEAR CARRY"
2920 PRINT"■SEC□ SET CARRY"
2940 PRINT"■RTS□ RETURN (TO END CODE)"
2960 GOTO 3040
3000 FOR N=0 TO 33
3010 READA:READC$(A),T%(A):N(N)=A:CC$(N)=C$(A)
3020 NEXT
3030 RETURN
3039 REM*..[HOME]
3040 PRINT"PRESS ANY KEY TO CONTINUE■"
3050 GETA$:IFA$=""THEN3050
3090 RETURN
3099 REM*[CLS][YELLOW]
3100 PRINT"■■";
3109 REM*[RVS ON]
3110 PRINT"■PC:    A:    X:    ";
3120 PRINT"C:    Z:    ST:      "
3129 REM*[HOME][DWN]
3130 PRINT"■■■";
3139 REM*[RVS ON]
3140 PRINT"■  ";
3150 FOR N=0 TO 7:PRINTN"■■ ";:NEXT
3160 PRINT"      ";
3170 FOR N=0 TO 39:P=SC+40+N
3180 POKEP,PEEK(P)+64:NEXT
3190 FOR N=0 TO 7
3199 REM*[RVS ON]..[RVS ON]
3200 PRINT"■ ":PRINT"■"N
3210 NEXT
3219 REM*[RVS ON][L.BLUE]
3220 PRINT"■□";
3230 FOR N=0 TO 39:PRINT" ";:NEXT
3239 REM*[HOME][DOWN]
3240 PRINT"■■";
3250 FOR N=0 TO 7:PRINT:PRINT
3260 FOR M=0 TO 7
3269 REM*..[UP]
3270 PRINTTAB(M*4+2);L%(M+N*8)"□";
3280 PRINT:NEXT
3290 NEXT
3299 REM*[DWN*6]
3300 PRINT"■■■■■■■"
3309 REM*[RVS ON]
3310 PRINT"■ F1: RUN  F3: STOP  F5: HELP ";
3319 REM*..[UP*2]
3320 PRINT" F7: PAUSE□□"
3340 RETURN
3400 POKE781,Y:POKE782,X:SYSMC:RETURN
3999 REM*[RVS ON]
4000 PRINT"■ ";
4010 GETA$:IF A$="" THEN 4010
4020 A=ASC(A$):IF A=13 THEN 4200
4030 IF A>31 AND A<91 THEN 4200
4040 IF A=29 OR A=20 THEN 4200
4050 IF A>132 AND A<136 THEN 4200
4060 GOTO 4010
4100 IF L<1 THEN 150
4110 L=L-1:PRINTA$;:I$=LEFT$(I$,L):GOTO150
4199 REM*[LEFT][RVS OFF].[LEFT]
4200 PRINT"■■ ■■";:RETURN
5000 C$=""
5010 YY$=MID$(I$,1,1):YY=VAL(YY$)
5015 IF YY=0 AND YY$<>"0" THEN 7900
5020 XX$=MID$(I$,2,1):XX=VAL(XX$):P=XX+8*YY
5025 IF XX=0 AND XX$<>"0" THEN 7900
5026 IF XX>7 OR YY>7 THEN 7800
5030 IF P<63 THEN 5060
5040 E$="POSITION TOO HIGH"
5050 GOTO 5900
5060 FOR N=3 TO L
5070 IF MID$(I$,N,1)<>" " THEN 5100
5080 NEXT
5090 E$="COMMAND MISSING":GOTO 5900
5100 C$=MID$(I$,N,6):D$=MID$(I$,N+4,2)
5110 FORM=0TO33:IFC$=CC$(M)THEN5140
5120 NEXT
5130 E$="NONEXISTANT COMMAND ":GOTO 5900
5140 IF D$<>"IM" AND P+1>63 THEN 5040
5150 L%(P)=N(M):X=2+XX*4:Y=3+YY*2
5159 REM*..[LEFT*4]
5160 GOSUB 3400:PRINT"    ■■■■■"N(M)
5170 IF D$="IM" THEN 100
5180 V$=MID$(I$,N+6,L-N+6):V=VAL(V$):XX=XX+1
5190 IF V>255 OR V<0 THEN 5300
5200 IF XX>7 THEN XX=XXAND1:YY=YY+1
5210 X=2+XX*4:Y=3+YY*2
5220 IF D$="RE" THEN V=(V-P-1)AND255
5230 IF D$="RE" AND V<128 THEN V=V-1
5240 L%(P+1)=V:GOSUB 3400
5249 REM*..[LEFT*4]
5250 PRINT"    ■■■■■"V
5260 GOTO 100
5300 E$="NUMBER OUT OF RANGE":GOTO5900
5900 X=0:Y=19:GOSUB 3400
5910 FOR N=0 TO 3:PRINTS$;:NEXT
5919 REM*[UP]
5920 PRINT"□"E$:GOTO 120
6000 X=0:Y=19:GOSUB 3400
6010 PRINT"START WHERE(Y,X)?  "
6020 GOSUB 4000:V=VAL(A$)
6030 IF A<48 OR A>55 THEN 6020
6040 PRINTA$;:YY=V
6050 GOSUB 4000:V=VAL(A$)
6060 IF A<48 OR A>55 THEN 6050
6070 PRINTA$:XX=V:P=XX+YY*8
6080 Z=1:C=0:A=0:X=0:SU=1
6089 REM*[HOME][RIGHT*3][RVS ON].[LEFT*3]
6100 PRINT"■■■■■  ■■■■"P
6102 REM*[HOME][RVS ON]..[LEFT*4]
6103 PRINT"■■"TAB(9 );"    ■■■■■"AR
6105 REM*[HOME][RVS ON]..[LEFT*4]
6106 PRINT"■■"TAB(15);"    ■■■■■"XR
6108 REM*[HOME][RVS ON]
6109 PRINT"■■"TAB(21);C
6111 REM*[HOME][RVS ON]
6112 PRINT"■■"TAB(27);Z
6114 REM*[HOME][RVS ON]
6115 PRINT"■■"TAB(34);SU
6116 CC=L%(P)
6117 X=17:Y=23:GOSUB3400:PRINTC$(CC)
6118 X=(PAND7)*4+2:Y=INT(P/8)*2+3
6119 GOSUB3400:PRINT"■"CC
6120 IF T%(CC)<>0 THEN 6150
6130 E$="NO SUCH COMMAND"
6140 GOSUB 3400:PRINTCC:GOTO 5900
6150 IF T%(CC)<>1 THEN 6250
6160 P=P+1
6170 IFCC=232THENA=1:GOTO7000
6180 IFCC=202THENA=-1:GOTO7000
6190 IFCC=170THENXR=AR:Z=1-SGN(XR)
6200 IFCC=138THENAR=XR:Z=1-SGN(AR)
6210 IFCC=24THENC=0
6220 IFCC=56THENC=1
6230 GOTO6500
6250 IF T%(CC)<>2 THEN 6390
6260 P=P+1:N=L%(P):P=P+1
6270 IFCC=165THENAR=L%(N):Z=1-SGN(AR)
6280 IFCC=133THENK=AR:GOTO7600
6290 IFCC=230THENA=1:GOTO7300
6295 IFCC=198THENA=-1:GOTO7300
6300 IFCC=166THENXR=L%(N):Z=1-SGN(XR)
6310 IFCC=134THENK=XR:GOTO7600
6320 IFCC=224ANDL%(N)=XRTHENZ=1
6330 IFCC=197ANDL%(N)=ARTHENZ=1
6340 IFCC=101THENN=L%(N):GOTO7100
6350 IFCC=229THENN=L%(N):GOTO7200
6360 IFCC=76THENP=N
6370 IFCC=32THEN7500
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```
6380 GOTO6700
6390 IF T%(CC)<>3 THEN 6480
6400 P=P+1:N=(L%(P)+XR)AND63:P=P+1
6410 IFCC=181THENAR=L%(N):Z=1-SGN(AR)
6420 IFCC=149THENK=AR:GOTO7600
6430 IFCC=246THENA=1:GOTO7300
6440 IFCC=214THENA=-1:GOTO7300
6450 IFCC=117THENN=L%(N):GOTO7100
6460 IFCC=245THENN=L%(N):GOTO7200
6470 GOTO6700
6480 IF T%(CC)<>4 THEN 6560
6490 P=P+1:N=L%(P):P=P+1:IFN<128THENN=N+P
6500 IFN>127THENN=P-(257-N)
6510 IFCC=240ANDZ=1THENP=N
6520 IFCC=208ANDZ=0THENP=N
6530 IFCC=144ANDC=0THENP=N
6540 IFCC=176ANDC=1THENP=N
6550 GOTO6700
6560 IF T%(CC)<>5 THEN 6590
6570 SU=SU-1:P=S(SU):IFSU>0THEN6700
6579 REM*..[RVS OFF]
6580 GOSUB 3400:PRINT"■"CC
6585 E$="FINISHED":GOTO5900
6590 P=P+1:N=L%(P):P=P+1
6600 IFCC=169THENAR=N:Z=1-SGN(N)
6610 IFCC=162THENXR=N:Z=1-SGN(N)
6620 IFCC=105THEN7100
6630 IFCC=233THEN7200
6640 IFCC=201ANDAR=NTHENZ=1
6700 GETA$:IFA$=""THEN6720
6704 REM*[F3]
6705 IF A$="■" THEN 6580
6710 GETA$:IFA$=""THEN6710
6714 REM*[F3]
6715 IF A$="■" THEN 6580
6719 REM*[RVS OFF]
```

```
6720 GOSUB3400:PRINT"■"CC
6730 IFP<63THEN6100
6740 E$="POSITION TOO HIGH"
6750 GOTO5900
6999 END
7000 XR=XR+A:IFXR<0THENXR=XRAND255:C=0
7010 IFXR>255THENXR=XRAND255:C=1:Z=1
7020 IF XR<>0 THEN Z=0
7030 GOTO6700
7100 AR=AR+N:IFAR>255THENAR=ARAND255:C=1
7110 Z=1:IF AR<>0 THEN Z=0
7120 GOTO6700
7200 AR=AR-N:IFAR<0THENAR=ARAND255:C=0
7210 Z=1:IF AR<>0 THEN Z=0
7220 GOTO6700
7300 K=L%(N)+A:IFK>255THENZ=1
7310 IFK<0THENN=0
7320 K=KAND255:GOTO7600
7500 S(SU)=P:SU=SU+1:P=N
7510 IFSU>9THEN7530
7520 GOTO6500
7530 GOSUB 3400:PRINTCC
7540 E$="TO MANY JSR'S":GOTO5900
7600 X1=X:Y1=Y
7610 X=(NAND7)*4+2:Y=INT(N/8)*2+3
7619 REM*..[LEFT*4]
7620 GOSUB 3400:L%(N)=K:PRINT"          "K
7630 X=X1:Y=Y1:GOTO 6700
7800 E$="LINE NUMBER TOO LARGE"
7810 GOTO 5900
7900 E$="LINE NUMBER MISSING"
7910 GOTO 5900
7999 REM*..[CLS]
8000 V=53248:PRINT"■":POKE V+32,14
8010 POKE V+17,PEEK(V+17)AND191
8020 END
```

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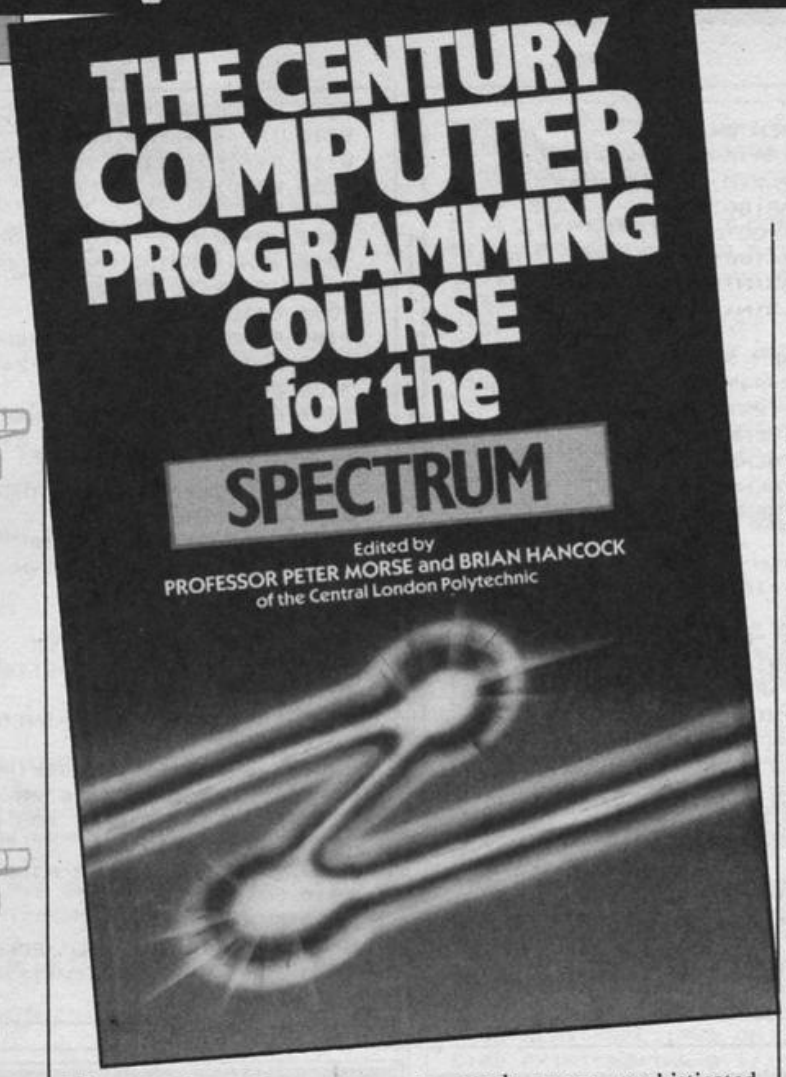

The Century Computer Programming Course for the Spectrum

This huge, expensive book, running to 544 pages is a first. Instead of trying to give a superficial overview of a machine, and throwing in a few listings, it seeks to teach the art of structured programming and complete program documentation, using the Spectrum as its vehicle. Certainly all the Spectrum commands are well explained, and a good deal of information missing from the Spectrum+ handbook is included, in addition to ROM routines and Microdrive operations.

What is particularly praiseworthy, however, is the use of the Spectrum as an introduction to "real" computing. Nothing appears to be missed in the 24 sections. With this sound basis, the authors claim, you could go on to learn another language on a much more sophisticated machine, applying the good practices taught here without having to "unlearn" bad habits. Even so, it's not easy. The language needed to handle such an abstract subject is often complex, and needs reading twice. Exercises and explanations abound, each requiring serious study.

It isn't perfect, however. There are some rather confusing typographical errors, and exemplifying REPEAT-UNTIL and IF-THEN-ELSE etc. on the Sinclair isn't easy, given that Sinclair BASIC doesn't have them. As a result, the authors simulate them fairly successfully. All illustrations and explanations feature the Spectrum 48K keyboard, not the Plus, and there are a lot of mathematical examples.

Everything you need to know about serious programming, and the Spectrum. Well worth checking out to see if it suits your purpose. **D.M.**

Price: £12.95

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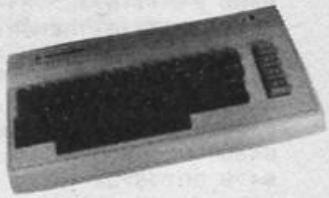
SPECTRUM



The Anatomy of a Commodore 64

I view any book which, like this one, has four authors, three editors and one translator, with a great deal of trepidation. The first glance would put most C64 owners off — almost half the book is a ROM listing from A000 to BFFF and E000 to FFFF — not exactly bedtime reading!

But this book isn't really for most C64 owners. Mind you, some of the sections, like the explanation of hexadecimal and the introduction to the machine code monitor and machine code programming are very clearly written and can be understood by a novice.

However, the book is aimed at the serious programmer wanting to stretch the 64 to its considerable limits. This of course involves working in machine code, or more likely, in assembly language, and making use of the routines already available in the machine's operating system.

If that's what you'd like to do, this book will take you through a multitude of applications, including input and output to peripheral devices, programming the RS232 interface, the SID sound controller chip, analog/digital conversion, graphics with the VIC chip, sprites and getting behind the BASIC interpreter. There's also a short chapter on converting VIC and PET routines to the 64.

Specialist authors can often get too carried away into unintelligible terminology, understandable only to those in the know. Here complicated topics are handled in plain English — perhaps that's where they used the translator. A first class publication from First Publishing.

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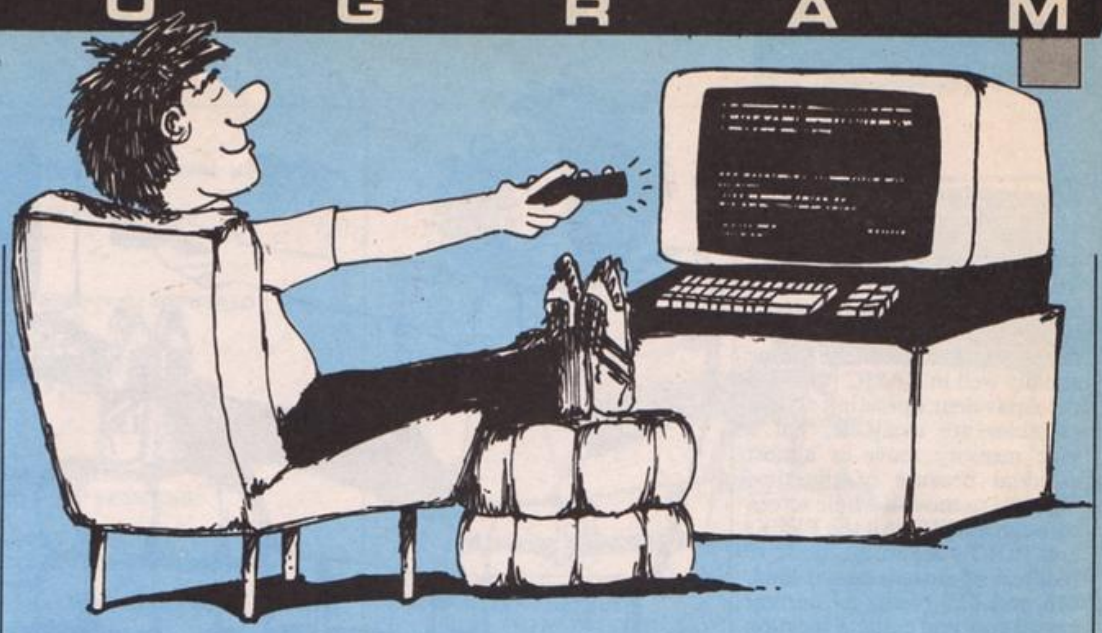
C64

ORIC PROGRAM

WORD PROCESSING THE EASY WAY



This basic word processor, by Steve Hunt, holds 25 pages in memory so that you can edit them at will

TEXTOR is a program which allows entry of up to 20 pages of text into the memory of the 48K Oric. The text is entered directly from the keyboard, and can be edited on screen using a simple set of commands and the cursor keys. Once the text is finalised, it can be recorded to cassette for subsequent reloading and further editing if required.

How it works

400-440 initialisation
500-550 main loop
600-800 subroutine calls
1000-1130 machine code loader and data
2000-2030 page index display
2040-2150 enter new page title/ select page number
2500-2550 delete page routine
3000-3110 key entry and command separation
4000-4080 display selected page from memory
4500-4590 load data from tape
5000-5070 save data to tape
6000-6540 display menu and select
10000-12000 command subroutines

The main cycle of the program is conventional and largely self-explanatory, using menu selection of function and prompts to request information. When entering data a title for each page is requested, and this is then entered automatically into the page index before a blank page is displayed with the title at the head.

Text can be entered at any position on the page by normal use of the cursor control keys and alpha-numeric keys. The only character which is not accepted is the apostrophe, and my Oric refuses to process this, though I may have a defect!

Limited text manipulation is provided for, in that a blank line may be inserted at the cursor position by typing CONTROL-B, the word following the cursor position may be deleted and succeeding text on the same line closed up by typing CONTROL-N, and all text to the right of the cursor and on the same line can be moved one space right by typing CONTROL-O. CONTROL-T and CONTROL-L have their normal functions. Cursor movement does not overwrite any text, but individual characters can be deleted by use of SPACE. When finished, the page is stored by pressing the backslash key twice.

When a page has been completed, the data entered is moved by a simple machine code routine into an area of memory above the program. This move is very quick — but the routines which carry out the editing commands above are all in BASIC, and are slower. Both sets of routines make use of the cursor current address locations at DEEK(18) (address at start of current line) and PEEK(617) for current cursor column.

I have omitted all REMs from the program in order to make the maximum space available for text — in fact over 25 pages can be comfortably accompanied with a little redimensioning and adjustment of the odd variable.

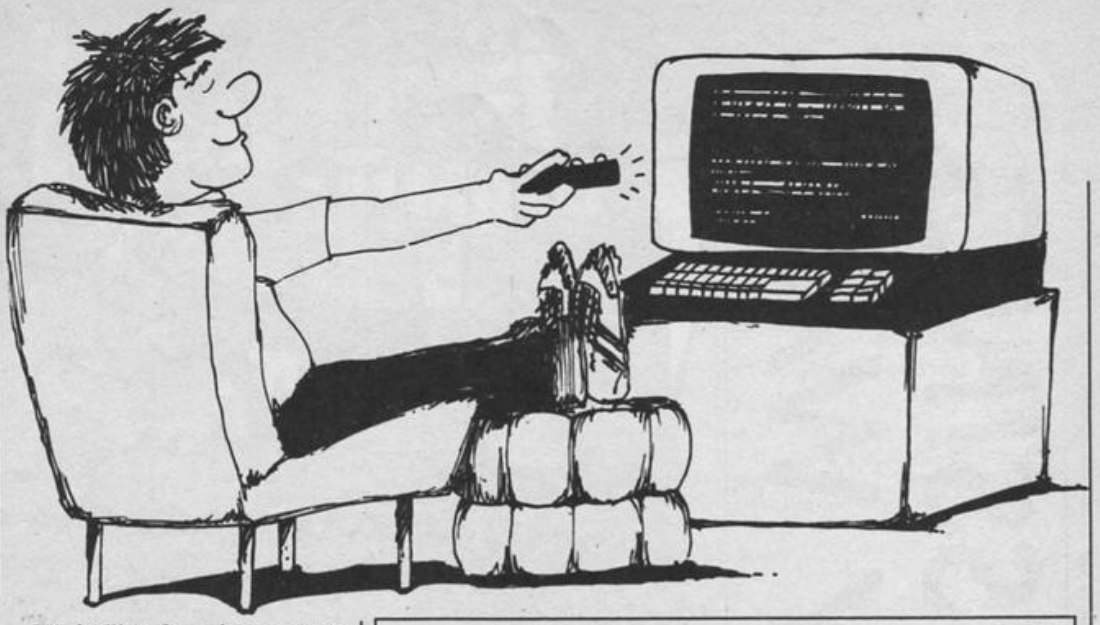
I have found the program reliable, but here are a couple of hints. My tape recorder has a preset and accurate DIN output which is a perfect match to Oric. Consequently I have no trouble with loading at high speed. A little adjustment of the machine code would allow low-speed recording of the data, but the time taken would be frightening! There are few keystrokes which cause any problems with the program — I have mentioned the apostrophe. Use of CONTROL-L will totally destroy the contents of the current page beyond recovery. Any text which is pushed off the screen during editing will also be lost — there is no automatic transfer on to the next line or screen, so beware!

Variables

A$ general answers to prompts
AD address variable for m/c
POS,PO m/c value to be POKEd
FLAG flag to route the program for new page or edit routines
N general count variable
TI$ page name
M page number
T$ input text/command character
Z general count variable, command sorting value
NAME$ page index entry of page name
F$ tape file name
W address for name search and cursor address
X general count variable
E address of end of text file
SEL menu selection
WW cursor address memory for temporary use
WX ASCII of character to be moved

Conversion for other machines would require a fair amount of adjustment to address values, and would be difficult for any machine which did not have a memory-mapped screen. The BASIC code uses no out-of-the-ordinary tricks, and the standard methods of avoiding the REPEAT-UNTIL and similar routines not available to all users should work.

The machine code is only a



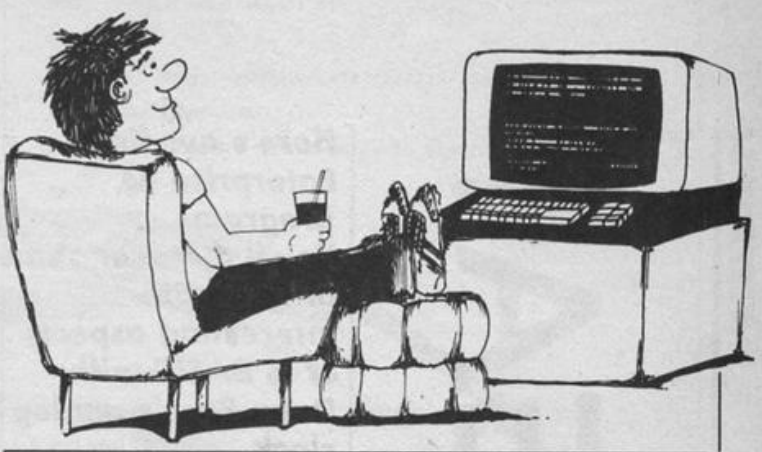
memory-move routine which incorporates an address calculation to place pages in sequence above one another in memory. This can be done equally well in BASIC provided the equivalent operating system variables are available, but a m/c memory move is almost essential because of the time required to move a whole screen through BASIC. All the PEEKs and POKEs are to locations 18 (address of current cursor line), 616 and 617 (value of current cursor row and column location respectively) or to screen areas. The screen used is 28 lines by 40 characters. The odd codes used in initialising are purely to preset the Oric screen attributes, and are unnecessary for other machines. DEEK and DOKE merely provide double-byte PEEK and POKE in a single operation.

No facility, for printer output is provided, simply because I have no printer, and cannot therefore test any routines. Printout could very easily be arranged, however — a simple screen dump would be the simplest method.

```
400 GOSUB1000:REM INITIALISE MACHINE CODE
410 DIM NAME$(20)
420 PAPER0:INK7:CLS:PRINTCHR$(29)
430 FORP=1TO20:CLS:DOKE#405,48000
440 DOKE#408,(10200+P*1120):CALL#400:NEXT
500 GOSUB 6000:REM MENU AND SELECT
510 ON SEL GOSUB 600,650,700,750,800,850
520 CLS:PLOT17,10,"EXIT?"
530 GET A$:IF A$="Y" OR A$="y"THENSTOP
540 IFA$<>"N"ANDA$<>"n"THEN520
550 GOTO500
600 GOSUB2000:GOSUB3000:RETURN
650 GOSUB4000:GOSUB3010:RETURN
700 GOSUB2500:RETURN
750 GOSUB5000:RETURN
800 GOSUB4500:RETURN
850 GOSUB2000:PT=M:M=1:GOSUB6500:RETURN
1000 FOR AD=1024TO1215:READPO$:PO=VAL(PO$):POKEAD
,PO:NEXT
1010 DATA#A2,#00,#A0,#00,#AD,#FF,#FF,#8D,#FF,#FF,
#E8,#E0,#00,#D0,#01,#C8,#C0
1020 DATA#04,#D0,#05,#E0,#60,#D0,#01,#60,#EE,#05,
#04,#AD,#05,#04,#C9,#00,#D0
1030 DATA#03,#EE,#06,#04,#EE,#08,#04,#AD,#08,#04,
#C9,#00,#D0,#03,#EE,#09,#04
1040 DATA#4C,#04,#04,#00,#00,#A2,#00,#BD,#EF,#04,
#95,#35,#E8,#E0,#0F,#D0
1050 DATA#F6,#A9,#00,#85,#5F,#85,#67,#A9,#2C,#85,
#60,#A9,#01,#85,#63,#85,#64
1060 DATA#20,#CA,#E6,#20,#7B,#E5,#20,#04,#E8,#60
1070 DATA#00,#00,#A2,#00,#BD,#EF,#04,#95,#35,#E8,
#E0,#0F,#D0,#F6,#A9,#00,#85
1080 DATA#67,#20,#CA,#E6,#20,#A8,#E4,#20,#04,#E8,
#60,#00,#A0,#28,#A2,#00,#8E
1090 DATA#F0,#04,#8E,#F1,#04,#AD,#68,#02,#18,#6D,
#F0,#04,#90,#02,#A2,#01,#8D
1100 DATA#F0,#04,#8A,#18,#6D,#F1,#04,#8D,#F1,#04,
#A2,#00,#88,#D0,#E5,#A9,#80
1110 DATA#18,#6D,#F0,#04,#90,#02,#A2,#01,#8D,#F0,
#04,#8A,#18,#6D,#F1,#04,#8D
1120 DATA#F1,#04,#A9,#BB,#18,#6D,#F1,#04,#8D,#F1,
#04,#60,#00
1130 RETURN
2000 FLAG=0
2010 CLS:PLOT17,0,"INDEX":FORN=1TO20
2020 PLOT3,N+1,STR$(N):PLOT10,N+1,NAME$(N)
2030 NEXT:IF FLAG=1 THEN FLAG=0:RETURN
2040 POKE616,25:PRINT:POKE617,0
2050 INPUT"New page name";TI$
2052 POKE616,25:PRINT:POKE617,0:PRINT"
                                    "
```

```
2060 FORM=1TO20:IFTI$=NAME$(M)THEN2070ELSENEXT:GO
TO2080
2070 POKE616,25:PRINT:POKE617,0:PRINT"Already use
d":WAIT200:GOTO2040
2080 POKE616,25:PRINT:POKE617,0
2090 INPUT"Page number";M
2100 IFNAME$(M)<>""THEN2110ELSE2140
2110 POKE616,25:PRINT:POKE617,0:PRINT"Page alread
y filled - OK?"
2120 A$=KEY$:IFA$="N"THEN2090ELSEIFA$<>"Y"THEN211
0
2140 NAME$(M)=TI$
2150 FLAG=1:GOTO2010
2500 FLAG=1:GOSUB2010
2510 POKE616,25:PRINT:POKE617,0:INPUT"Number of p
age to delete";M
2520 CLS:PRINT:PRINT"Page to delete:"
2530 PRINT:PRINT:PRINTNAME$(M);" - OK?":GET A$:IF
A$<>"Y"THEN2500
2540 NAME$(M)="":CLS:DOKE#405,48000:DOKE#408,(102
00+1120*M)
2550 CALL#400:FLAG=1:GOSUB2010:RETURN
3000 CLS:PRINTNAME$(M):PRINT
3010 GET T$:IFT$="\"THENPRINTCHR$(17);:GOTO3100
3011 IFASC(T$)=90R(ASC(T$)>12ANDASC(T$)<27)THEN10
000
3012 IFASC(T$)=31THENFORN=1TO5:PRINTCHR$(9);:NEXT
3013 IFASC(T$)=2THENCALL1147:DOKE621,DEEK(#4F0):L
S=PEEK(616)
3014 IFASC(T$)=2THENPOKE616,0:PRINTCHR$(11):DOKE6
21,48000:POKE616,LS:PRINT
3016 IFASC(T$)=2THENGOTO3010
3018 IFASC(T$)=4THENFORZ=DEEK(18)TO49080:POKEZ,PE
EK(Z+40):NEXT
3019 IFASC(T$)=4THENFORZ=49081TO49120:POKEZ,32:NE
XT:GOTO3010
3020 PRINTT$;:GOTO3010
3100 DOKE#405,48000:DOKE#408,(10200+1120*M):CALL#
400:PRINTCHR$(17);
3110 RETURN
4000 FLAG=1:GOSUB 2010
4010 POKE616,25:PRINT:POKE617,0:PRINT"Which page
number?"
4020 INPUTM:IFM<10RM>25THEN4000
4022 IFNAME$(M)=""ANDM=1THENCLS:PRINT"No document
is held - restarting"
4024 IF NAME$(M)=""ANDM=1THENWAIT200:POP:GOTO500
4030 IFNAME$(M)=""THEN4040ELSE4060
4040 POKE616,25:PRINT:POKE617,0:PRINT"Empty page
- reselect":WAIT200
4050 GOTO4000
4060 DOKE#405,(10200+M*1120):DOKE#408,48000
4070 CALL#400:GOSUB3010
4080 RETURN
4500 CLS:PRINT:PRINT:PRINT"Enter name of file to
load"
4510 INPUT F$
4520 FORM=1TOLEN(F$):IFM=16THEN4540
4530 POKE#4EE+M,ASC(MID$(F$,M,1)):NEXT
4540 POKE#4EE+M,0
4550 CALL#460
```

```
 4560 W=11359:X=1:N=1:NAME$(N)=""
 4568 IFW>31510THENRETURN
 4570 IFPEEK(W+X)<33ORPEEK(W+X)>127THENW=W+1120:X=
1:N=N+1:NAME$(N)="":GOTO4568
 4572 NAME$(N)=NAME$(N)+CHR$(PEEK(W+X))
 4580 IFW>31510THENRETURN
 4590 X=X+1:GOTO4570
 5000 M=20
 5010 IFNAME$(M)=""ANDM>1THENM=M-1:GOTO5010
 5020 E=11320+1120*M:DOKE#61,E
 5030 CLS:INPUT"Name of tape file";F$
 5040 FORM=1TOLEN(F$):IFM=16THEN5052
 5050 POKE#4EE+M,ASC(MID$(F$,M,1)):NEXT
 5052 POKE#4EE+M,0
 5060 DOKE#61,E:CALL#438
 5070 RETURN
 6000 CLS:PLOT12,4,"TEXTOR OPTIONS"
 6010 PLOT12,5,"--------------":RESTORE
 6020 FORSEL=1TO6
 6030 PLOT4,8+2*SEL,STR$(SEL)
 6040 ONSELGOSUB6090,6100,6110,6120,6130,6140
 6050 NEXT
 6080 POKE616,25:PRINT:POKE617,4:PRINT"Number of s
election?":GET SEL$
 6084 IF ASC(SEL$)<48 OR ASC(SEL$)>54THEN6080
 6088 SEL=VAL(SEL$):RETURN
 6090 PLOT8,10,"Insert page":RETURN
 6100 PLOT8,12,"Display page":RETURN
 6110 PLOT8,14,"Delete page":RETURN
 6120 PLOT8,16,"Save Document":RETURN
 6130 PLOT8,18,"Load Document":RETURN
 6140 PLOT8,20,"Display form (page 1)":RETURN
 6500 DOKE#405,(10200+M*1120):DOKE#408,48000
 6510 CALL#400
 6520 M=PT:POKE616,0:PRINT:POKE617,0:PRINTNAME$(M)
 6530 GOSUB3010
 6540 RETURN
 10000 Z=ASC(T$)
 10010 IFZ=15ORZ=12ORZ=13ORZ=14ORZ=20THENGOSUB1000
```



```
0+100*Z:GOTO3010
 10020 PRINTT$;:GOTO3010
 11200 PRINTT$;:RETURN
 11300 PRINTCHR$(10)+T$;:RETURN
 11400 W=DEEK(18)+PEEK(617):WW=W:REPEAT
 11410 POKEW,32:W=W+1:UNTILPEEK(W)=32
 11420 REPEAT:WW=WW+1:W=W+1:WX=PEEK(W):POKEWW,WX
 11430 UNTIL((W-47999)/40)=INT((W-47999)/40)
 11440 FOR W=WW+1 TO DEEK(18)+39:POKE W,32:NEXT W:
RETURN
 11500 PRINTCHR$(17);:W=DEEK(18)+PEEK(617):WW=W:RE
PEAT:W=W+1
 11510 UNTIL((W-48000)/40)=INT((W-48000)/40)
 11520 W=W-1:REPEAT:WX=PEEK(W-1):POKEW,WX:W=W-1:UN
TILW=WW:POKEW,32
 11530 PRINTCHR$(17);:RETURN
 12000 PRINTT$;:RETURN
```

HCW needs you

Have you ever looked at the articles and programs in HCW and thought you could have written that?

Why not try? We welcome submissions from readers and are always interested in your ideas and suggestions.

Submissions tend to fall into one of three categories...

Programs are always supplied on cassette and are accompanied by full details of the program variables. Please type these details double-spaced. Listings are helpful, but not essential. What is vital is that the programs should be completely error free, so please double check.

Articles on certain aspects of using home computers should be no longer than 1000 words. Try to keep to the style you see in HCW and include programming examples where they will help the reader understand the subject. We will convert your sketched illustrations into final artwork.

We also use **short** tips, articles and **brief** programming routines. Any discoveries you have made about your machine might be of interest to other readers.

All contributions are acknowledged and those accepted for publication are paid for at competitive rates. The copyright in such work will pass to Argus Specialist Publications Ltd. Keep a copy of your work and include a telephone number and an SAE. Please label everything clearly with your name and the machine concerned.

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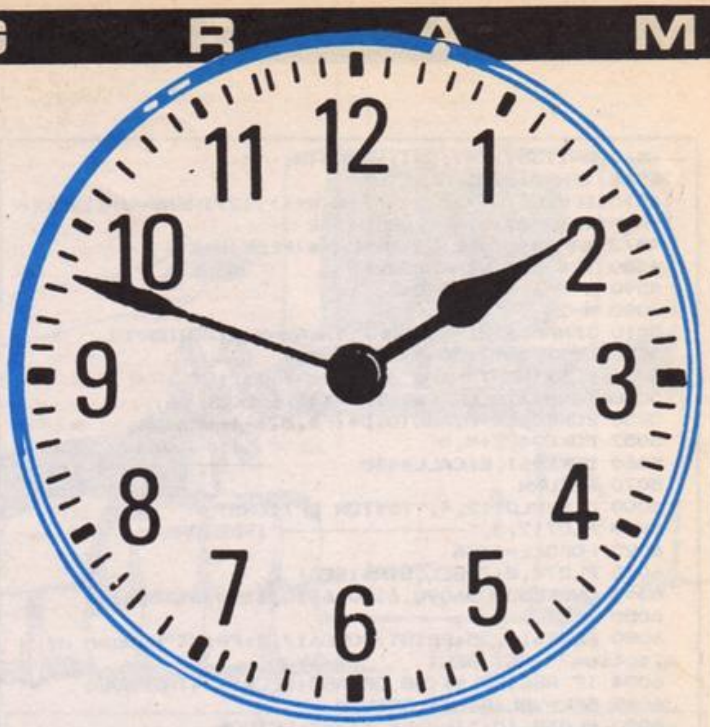
TIME FOR TEA?



Here's our first Enterprise 64 program! You'll discover some of the more interesting aspects of IS BASIC with Dave Race's analog clock

The Enterprise is a very powerful computer with a suitably advanced BASIC, close to 100 commands and statements, including turtle-type graphics, well over 60 built-in functions, many of which I have not seen on other machines, fully accessible machine options and a complete channel system. The graphics and sound are excellent, certainly as good as any other machine in its price bracket, and its ability to handle multiple programs is unrivalled.

The following program produces an analogue clock on the Enterprise 64, and demonstrates some of the above features of IS BASIC.

The program is fully procedured except for REM statements, global variable declarers and the PROGRAM statement, which has to be at the beginning of the program to be recognised.

The full keyword entry system on the Enterprise makes program listings very readable, however for those who are new to computing or possibly unsure of some of the features of this very advanced BASIC here is a full program description.

How it works

100 sets program name, this is now the default filename for saves

175 switches status line off

180 declares variables and array following NUMERIC as global, i.e. to be used in procedures

190 STRING*8 declares T$ as a global string of eight characters

250-270 set up a high resolution screen, with colour 0 as white (normally paper) and colour 1 as black (normally ink)

280 draws a circle in the middle of the graphics screen; notice the constant co-ordinate system, this statement would produce the same circle (with differing line widths) on any resolution screen

290-310 uses turtle graphics to produce 60 divisions around the circle; notice that the beam is off for FORWARD 260 due to the preceding comma, but on for FORWARD 20 and FORWARD 30 due to the preceding semi-colon

330 sets ink colour to white

340-370 this FOR/NEXT loop prints the digits around the clock, the round statements in line 350 remove errors caused by mathematical inaccuracies; e.g. the Enterprise gives COS(PI/2) as 1E-11 which would cause problems in this routine; notice the PRINT is to channel 101, the graphics screen

380 sets ink back to black

390 sets line mode to "exclusive or" i.e. ink will only be printed on paper, not over ink that is already there

430 initiates error-trapping so that if an error occurs the error handler WRONG_TIME is jumped to; this makes for an easy method to ensure a valid time is entered

440 inputs T$, using a different prompt from the normal "?"

450 sets time to whatever was entered as T$. If an error occurs then the program will jump to WRONG_TIME

470 switches error-trapping off

480-530 calculates angle of each hand and passes that angle and the number of the hand to the procedure HAND, which then draws that hand

540-550 asks operator to start clock and resets TIME to T$, as the time will by now have advanced a few seconds

560 clears bottom area of text leaving just the clock

565 calls procedure CLOCK. It is necessary to call CLOCK from here due to the fact that, if an error occured during the input of the time; then START would have been called from within the exception handler, so when START finished the program would jump back into the handler, thus causing an error

590 draws a line of correct angle and length as defined by ANG and L; notice that these are dummy variables and do not have to be referred to by these names, e.g. in line 530 ANG(1) and the value 1 are passed to HAND

620-690 this is the main part of the program, it works by LOOPing lines 630 and 640 until TIME$ (the time string) changes, then it sets T$ to the new time and calls the second-hand routine. It then checks to see whether the seconds hae just reached zero and if they have, calls the minute-hand routine. It then does the same check for both minutes and seconds to see if it needs to call the hour-hand routine. Line 690 causes the program to go back to the DO statement at line 630, as no WHILE or UNTIL checks are made, this process continues indefinitely

720 calls HAND procedure for the second-hand's angle, as the program is in line mode 3 this erases the second-hand

730 works out new angle for the second-hand and keeps this angle below 2xPI by using the REM function. This is necessary to stop the computer from crashing, which it does if the angle for trignometric or drawing functions becomes high

740 calls HAND for new angle, so drawing the second-hand **Note:** the above could have been done by working out the angles directly from TIME$ as in line 490, but this then takes too much time for the program to draw the second-hand every second

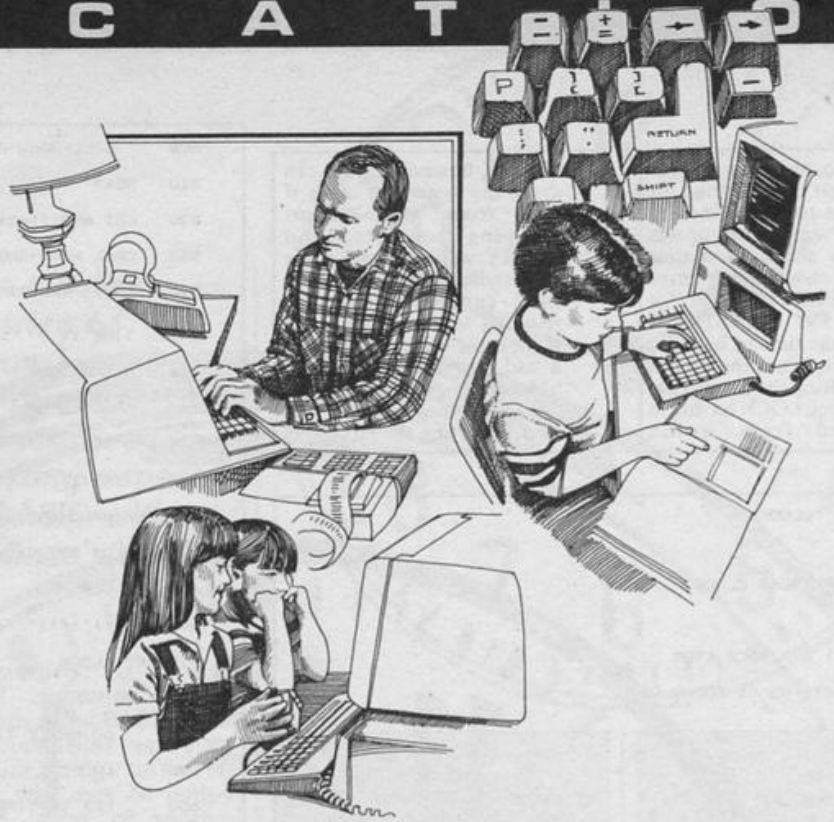
770-790 as lines 720 to 740 except for minute-hand

820-840 again as above, but notice that the angle in line 830 is different

870-940 error-trapping routine that can get called during the time input routine. Line 880 checks to see if the error was caused by an incorrect time input by checking the error number (EXTYPE), and if it was line 890 calls START, allowing the time to be input again. This is not the neatest way of exiting the handler, as it results in CLOCK having to be called from within START, however GOTO can cause the system to crash if used from within error-trapping routines, and RETRY would simply cause the handler to exit to the line that caused the error, resulting in an infinite loop. If the error was not caused by a bad time input, the error handler is exited at line 920, and the program will stop, reporting the error

```
100 PROGRAM "CLOCK"
110 !
120 ! ENTERPRISE64 CLOCK
130 !
140 !     (c) D.M.RACE 1985
150 ! STARDATE 85 01 POINT 09
160 !
170 !
175 SET STATUS OFF
180 NUMERIC ANG(3),PI2,PI6,PI30,TWOPI
190 STRING $8 T$
200 LET PI2=PI/2:LET PI6=PI/6:LET PI30=PI/30:LET TWOPI=2*PI
210 CALL FACE
220 CALL START
235 !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
240 DEF FACE
250   GRAPHICS HIRES 2
260   SET PALETTE WHITE,BLACK
270   !
280   PLOT 632,360,ELLIPSE 280,280
290   FOR F=0 TO 2*PI-PI/30 STEP PI/6
292     PLOT 632,360,ANGLE F,FORWARD 250;FORWARD 30
295     FOR N=1 TO 4
300       PLOT 632,360,ANGLE F+N*PI/30,FORWARD 260;FORWARD 20
305     NEXT
310   NEXT
320   PLOT 0,0,PAINT
330   SET INK 0
340   FOR C=1 TO 12
350     LET X=11-9*COS(C*PI/6):LET Y=39+20*SIN(C*PI/6)
360     PRINT £101,AT X,Y:C
370   NEXT
380   SET INK 1
390   SET LINE MODE 3
400 END DEF
405 !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
410 DEF START
430   WHEN EXCEPTION USE WRONG_TIME
440     INPUT AT 2,1,PROMPT "TIME [HH:MM:SS] ":T$
450     TIME T$
470   END WHEN
480   FOR F=3 TO 2 STEP-1
490     LET ANG(F)=VAL(T$(3*F-2;3*F-1))/30*PI
500     CALL HAND(ANG(F),F)
510   NEXT
520   LET ANG(1)=5*MOD(VAL(T$(;2)),12)/30*PI
530   CALL HAND(ANG(1),1)
540   INPUT PROMPT "PRESS ENTER TO START":DUMMY$
550   TIME T$
560   CLEAR TEXT
565   CALL CLOCK
570 END DEF
575 !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
580 DEF HAND(ANG,L)
590   PLOT 632,360;ANGLE PI2-ANG;FORWARD L*80
600 END DEF
605 !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
610 DEF CLOCK
620   DO
630     DO WHILE TIME$=T$
640     LOOP
650     LET T$=TIME$
660     CALL SECOND
670     IF T$(7:)="00" THEN CALL MINUTE
680     IF T$(4:)="00:00" THEN CALL HOUR
690   LOOP
700 END DEF
705 !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
710 DEF SECOND
720   CALL HAND(ANG(3),3)
730   LET ANG(3)=REM(ANG(3)+PI30,TWOPI)
740   CALL HAND(ANG(3),3)
750 END DEF
755 !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
760 DEF MINUTE
770   CALL HAND(ANG(2),2)
780   LET ANG(2)=REM(ANG(2)+PI30,TWOPI)
790   CALL HAND(ANG(2),2)
800 END DEF
805 !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
810 DEF HOUR
820   CALL HAND(ANG(1),1)
830   LET ANG(1)=REM(ANG(1)+PI6,TWOPI)
840   CALL HAND(ANG(1),1)
850 END DEF
855 !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
860 END
865 !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
870 HANDLER WRONG_TIME
880   IF EXTYPE=9235 OR 1106 THEN
890     CALL START
910   ELSE
920     EXIT HANDLER
930   END IF
940 END HANDLER
945 !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
```

SWOT SPOT



This week Margaret Webb takes a close look at Macmillan software for the Spectrum

In the past Macmillan, in collaboration with Sinclair, has produced educational software for the 48K Spectrum. Some was given away when you bought the computer. Macmillan has now released a new range of material dealing with a wide range of educational topics.

Three packages, devised by Betty Root (one of the country's leading authorities on the teaching of reading), deal with aspects of early reading skills. Castles and Clowns teaches the initial sounds. Two games are provided, one on each side of the cassette. In the first, two castles are shown, each with six windows. You see a picture at each window, as well as a random number corresponding to a window displayed on screen. The initial letter of the picture on the indicated window must be correctly entered. A correct entry closes the window. Two children or a child playing against the computer take turns and the first to close all windows wins.

In Clowns, a letter is shown followed by a series of pictures. The first player to match the letter to a picture starting with the same letter wins a balloon. Get six balloons and you win the game.

Snapple Hopper also comprises two games. Snapple is an initial sound game based on snap. If both pictures start with the same two letters (dipthong), snap is called and an apple awarded. The first to get six applies wins. Hopper deals with rhyming words. Nine lilypads are displayed on the screen. Match the picture on the centre pad to one on the outer pads which sounds the same by entering the appropriate number and win a water lily.

Tops and Tails teaches and tests initial sounds and word endings. The first game is a variation on Snakes and Ladders. A dice is thrown and the move made. Should you land on a picture square and you type the initial diphthong correctly, you move on an extra square. Tailend involves entering the last letter of the name of a picture to win dogs or cats.

All of these games are beautifully illustrated and smoothly executed. My only criticism is that some of the illustrations are rather ambiguous, such as: "Is it a boot or a shoe?" This could lead to a little confusion, but is really only a minor fault.

The Sunflower Number Game deals with all aspects of basic arithmetic. Addition, subtraction, multiplication and division all have test modes and there is a tables practice section. You can also vary the difficulty levels, thinking time and numbers of correct answers to win a game. The graphics depict various gardens. By answering a question correctly, beautiful flowers are grown. Incorrect replies allow insects to kill the flowers.

All of these four packages are aimed at the primary age range. Star Scan and Quiztimer are for the older user. Star Scan is a teach and test program which helps build your knowledge of the constellations and stars of the northern skies. The graphics are simple but very effective. You have a number of options which allow you to examine specific constellations, search for any one of 75 stars, nebulae etc, spot constellations or test your knowledge. A glossary is provided which explains commonly encountered astronomical terms.

Quiztime has 10 quizzes for one or two players. The topics range through words, games and pastimes, science, general knowledge and Greek mythology. Questions are asked and if you enter the correct answer, a part of a picture is drawn. For those who find the quiz too difficult, or for those who like to cheat, there is a mode in which you can peek at the questions and answers. There is a further option which enables you to add new databases. The quiz is fun to play and can be made more difficult by altering the thinking time.

All of the packages offer the option of making a single backup copy on Microdrive and three of them (Space Scan, Quiztimer, Sunflower Number Show) have printer options.

Overall this is a good selection of educational games. The use of good quality graphics and the wide range of subject matter ensure that childrens' interest can be maintained. At £5.95 each, they are well worth looking at.

TOP 20 SOFTWARE

Compiled by Gallup

Fortnight Ending May 14, 1985

LAST WEEK	MOVE	THIS WEEK	TITLE	PUBLISHER	SPECTRUM	CBM 64	BBC	ELECTRON	VIC 20	AMSTRAD	ATARI	OTHERS
1	●	1	Soft Aid	Various	●	●						
3	▲	2	Spy Hunter	US Gold	●	●						
2	▼	3	World Series Baseball	Imagine	●	●						
10	▲	4	Combat Lynx	Durell	●	●		●	●		●	
22	▲	5	Brian Jacks' Superstar Challenge	Martech	●	●		●	●			
RE	□	6	Knight Lore	Ultimate	●	●					●	
7	●	7	Bruce Lee	US Gold	●	●						●
14	▲	8	Starion	Melbourne Hse	●							
6	▼	9	Gremlins	Adventure Int	●	●		●	●			●
4	▼	10	Ghostbusters	Activision	●	●					●	●	●
12	▲	11	Pitstop 2	CBS		●						
13	▲	12	Shadowfire	Beyond	●	●						
11	▼	13	Football Manager	Addictive Games	●	●		●	●			●
5	▼	14	Daley Thompson's Decathlon	Ocean	●	●					●	●
29	▲	15	Sorcery	Virgin	●	●					●	●
21	▲	16	Mini Office	Database	●	●		●	●		●	
9	▼	17	International Basketball	Commodore		●						
20	▲	18	Impossible Mission	CBS		●						
38	▲	19	Cauldron	Palace	●	●						
NE	□	20	Entombed	Ultimate		●						

Up and coming

Soft Aid is still top of the pops at number one, with the numbers two and three positions swopping places.

Only one new entry in the top 20 this week — Ultimate's Entombed. And dk'tronics' Minder has just about made it into the top 50 — at position 47. These are the only two newcomers to the chart this week.

Mastertronic is doing exceptionally well in the Gallup top 50, not shown here in its entirety, with five games in the range from 22-39. And longest runners Daley Thompson's Decathlon and Football Manager are still hanging on in there, each having featured in the chart 31 times. Next in line are Anirog's Flight Path 737 and Elite, from Acornsoft, with 30 appearances each.

On the whole, not many surprises this week.

SPECTRUM Top Ten

1	Soft Aid	Various
2	Spy Hunter	US Gold
3	World Series Baseball	Imagine
4	Starion	Melbourne Hse
5	Shadowfire	Beyond
6	Bruce Lee	US Gold
7	Chuckie Egg 2	A 'n' F
8	Finders Keepers	Mastertronic
9	Brian Jacks' Superstar Challenge	Martech
10	Gyron	Firebird

BBC Top Ten

1	Combat Lynx	Durell
2	Knight Lore	Ultimate
3	Wizardore	Imagine
4	Castle Quest	Micro Power
5	Brian Jacks' Superstar Challenge	Martech
6	Elite	Acornsoft
7	Kissin' Kousins	English
8	Mini Office	Aardvark
9	Gremlins	Adventure Int
10	Football Manager	Addictive Games

COMMODORE Top Ten

1	Soft Aid	Various
2	Pitstop 2	CBS
3	International Basketball	Commodore
4	Impossible Mission	CBS
5	Cauldron	Palace
6	Entombed	Ultimate
7	World Series Baseball	Imagine
8	Grogs Revenge	US Gold
9	Air Wolf	Realtime
10	Brian Jacks' Superstar Challenge	Martech

C16/plus 4

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ENGLISH SOFTWARE

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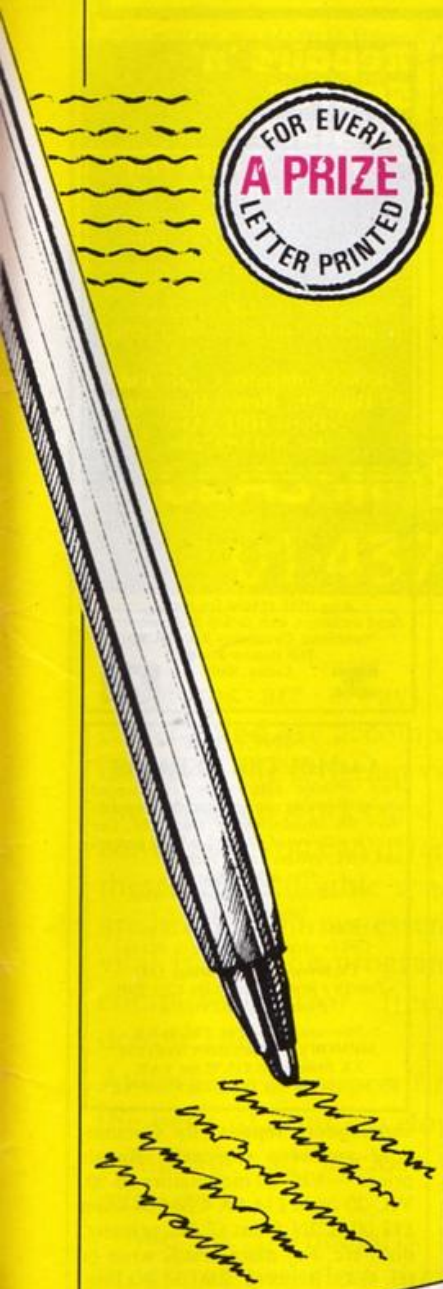

Times are changing

I'm 27 years old and I feel that I'm fairly sensible and in control. These are the main reasons why I haven't written to anybody in my whole life. But times they are a changing. After having purchased a TI-99/4A some 18 months ago to get started, I've enjoyed new friendships, had good support from various magazines (especially HCW) etc., etc.

However, reading drips from TI users has prompted me to inform the world through your pages that I will be purchasing a new Amstrad, complete with disc drive and colour monitor. Having read various reviews it is obviously the right choice for the average computer buff, and all of us TI-ers.

So get out there and join me. It's everything we ever wanted, this time with plenty of support and at the right price.

One last thing — at a famous high street store you can get interest-free credit, brilliant! This means you only pay for the price asked, not like some stores which charge up to 30% APR.

Having bought our Amstrads we can still enjoy the hospitality HCW offers. Incidentally, my little sister will be getting my TI and £500-worth of its bits. . . to get started!

Colin Kirkwood, Cornwall

Flag won't raise

I'm writing for help on Chequered Flag. When I load it, it gets as far as after you have chosen your lap. Then it goes back to 1982 Sinclair Research Ltd. If anyone can help I would be very grateful.

Lee Goddard, Chesterfield

It sounds as if you've either got a loading error or a faulty tape. Take your tape back to the shop and ask them to check it.

Weekly, not a dictionary

I am a regular buyer of your magazine, though my job (CPO in the Royal Navy) necessitates a lot of travel.

I find your magazine has excellent content, with plenty for all, although I would like to see more on the CPC464. No doubt, if you conformed to every letter and followed up their comments, you would end up with a magazine the size of the Oxford Dictionary! Perhaps you are better to leave well alone and cater for all as you do.

G V White, Bayswater

Missing the point?

I like the new look HCW but I would like more program listings for the Spectrum, instead of the BASIC tutor.

Secondly, in the reviews section for HCW 111, your reviewer completely missed the point of the Firebird release Don't Buy This. It was supposed to be dreadful and contain examples of the worst programs submitted to them for publication.

J C Peach, London N21

Sorry, I think you've missed the point. Our reviewer did know what was going on, and reviewed the program accordingly.

Bright spark

With regard to Mr A Clarke's idea in HCW 111, which was to repeat reviews of games that readers wanted to see again: I think I have a better idea. Why not, based on your software reviews, print a page of the games which you reckon to be good buys? Each game would have a brief clear description of what the game is like. You could have 10 for each of the top micros, say the Amstrad, BBC, Commodore, Spectrum and maybe Atari.

These could be continually updated, as better games are produced. You could print these in conjunction with your Gallup chart: each would appear fortnightly.

I personally own an Amstrad, and would like to thank you for the support you have started to give to my comparatively good micro. Keep up the good work!

Billy Stewart, Belfast

PS: Has anyone beaten the computer at Centre Court?

Binding us together

I have been buying your magazine for a while now and I thoroughly enjoy every bit of it. It must be one of the few items on sale that really does provide vfm (value for money). Well done!

Although I don't own a computer (yet) I have learned a great deal from this mag. Thanks. Can I get a binder for keeping copies in?

P Ramsay, Angus

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Users' clubs

Christopher Bryant and Mike Moores write to tell readers of their Amstrad Users group. They say it offers a monthly newsletter, round robin groups, discounted software, cheap tapes, competitions and free gifts. You have to pay £1 per issue or £10 per year. Write to: CA Bryant, 11 Havenview Rd, Seaton, Devon EX12 2PF.

Gary Ramsay has set up the Independent Oric Users' group, and produced its first newsletter. If you're interested, send an SAE suitable for holding the A5 newsletter (210 x 148 mm) and 20p to Gary at 1 Kingsway Cresc, Burnage, Manchester M19 1GA. He would also like to hear from readers who have written their own reviews which he would be interested in including in the newsletter.

David O'Grady has been involved in forming the M5 Users' Group, in Dublin. He writes: "If any readers wish to join a software library or want any leaflets then they should send an SAE to this address: 19 Balally Close, Dundrum, Dublin 16. We also have details of software available from independent software houses".

Wayne Kersh

James Adams engrossed in Beamrider

Readers' hi-score table

Name	Game	Machine	Score
Stephen Crane	Pacmania	C16	12,660
	Skramble	C16	70,540
James Lee	Beamrider	C64	27,360
	Bruce Lee	C16	125,875
Wayne Kersh	Castle Quest	BBC	2,180
Richard Burton	Pyjamarama	Amstrad	96%
	Jet Set Willy	Amstrad	97 objects
Dave Whittaker, Jonathan Parr	Ghostbusters	C64	£999.900
Steve Clark	Moon Crest	Spectrum	28,970
Dean Moxon	The Attack	TI-99/4A	175,600
Lee Caller	Galaxian	Atari	40,850

Help!

Glenn Cowan, of 11 Ladyshot, Harlow, Essex wants to know which is the best repair firm for the Spectrum. Some of his keys don't work.

Adrian Porrit writes in with news which may be of help to TI-99/4A users. He's found a company which sells Extended BASIC at around £39. The company concerned is Gravesend Home Computers, tel. 0474 23871. He's also interested in swapping games, so if you're interested call him on 01-302 9013.

Richard Walker, of Marlford, 11 Wombourne Close, Sedgley, W Midlands DY3 3SB wants to know if anyone can provide him with a set of instructions for Graphic Editor on the C64 by Rabbit.

JR Wood is having problems building a sound-to-light unit for a disco. He's using an EPROM chip and his problem is to find somewhere where he can have the chip programmed to his requirements. He says there is no chip on the market suitable. The chip in question is a 16K 16-pin EPROM. If you can help, write to him at Pengarth, Grampound, Truro, Cornwall TR2 4RX.

Personality pics

James Adam's dad writes: "Here's a photo of my son James, a games addict on the C64. The only time I get to use it is when he's in bed. The high scores he's most pleased with are on Beamrider and Bruce Lee, only getting caught on the blue platforms the second time round.

"Maybe these aren't records but they're better than I have done and he's still only six years old. His brother Thomas, at four years old, is quite a mean player on Beamrider too.

"A quick well done to all software houses for Soft Aid. It would be cheap at twice the price."

Wayne Kersh writes: "I am 14 and a pupil at Bury Grammar School where I have recently started computer studies. I have had a home computer since 1982 and I have always been extremely interested.

"The first computer I bought was an Atari 800 and later I added a disc drive and printer to it, before buying a BBC. I have made up several games including one which provides data on each of the first division football clubs in great detail — from the year they were formed to the colours they play in! Though I couldn't include my favourite club Manchester City because they aren't in the first division — yet!

"Castle Quest nearly drove me insane, though after a lot of thought and a little help from my Dad I finally cracked it, and how pleased I was. In all it took me nine days, which was really such a short time I surprised myself."

READERS PAGE

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Fantastic Voyage
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JUMP JET

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Written by
Vaughan Dow
Jump Jet Pilot

Every pilot has the dream of flying one of these unique and complex fighting machines. Here is your chance to do what few pilots have the privilege to try.
Depending on your skill, confidence and courage, you have the choice of remaining near the landing pad, learning to hover and land, or venturing higher to practise your approaches.
When you think you have mastered these, then accelerate the Jump Jet into an attack fighter. Use the radar and range finder to seek and destroy the enemy, by launching heat-seeking air-to-air missiles. Beware! His radar and missile systems are as good as yours. Reckless pursuit is ill-advised: you must maintain a fuel level that will enable you to relocate and return to the aircraft carrier, executing the skills you have learned to achieve a successful landing.
You are now ready to proceed to the next skill level to face additional hazards, such as unpredictable swell and treacherous cross-winds.
Be warned, this program is not a toy or game. You will need to co-ordinate your hands, eyes and mind to successfully complete each mission. Do not hope to achieve in a short time that which took the author three years to learn as a Jump Jet pilot, and over a year to record on this computer program.

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