POPULAR Computing WEEKLY

SPECIAL TAPE OFFER

35p 2-8 February 1984 Vol 3 No 5

This Week

Programming
R G Luxton explains how to create a program to keep file records on the ZX81. See page 18.

Reviews
Brian Cadge looks at the latest Dragon software including *Shaft* from Dragon Data and *Ugh!* from Softek. Page 14.

Commodore 64
Milosc Versipellis presents a program to turn your computer into a synthesiser using the SID chip. See page 28.

New Releases
Included in this week's selection are *How Long Have You Got* by Eastmead and *Megawarz* from Paramount Software. Page 56.

STAR
Follow on BBC B
See page 10
GAME

News Desk

Laser's future in doubt

THE future of the Laser 200 computer now looks uncertain, following the collapse of its UK distributor, Computers For All.

The company formally notified its dealers last Thursday that "due to financial difficulties" it had ceased trading.

The crash could prove fatal for the £69.95 Laser 200. The machine has not been adopted by any of the major high-street chains, and software for the machine is in very short supply.

The Laser 200 has had a

Continued on page 5

CBM micros in UK by the summer

COMMODORE is to sell its new range of microcomputers — the successors to the Commodore 64 — in the UK by the early summer.

The most sophisticated of the new machines will be priced well under £400 although the choice of models to be offered in Britain has still to be decided.

There is more to Commodore's new range than the two micros — the 264 and the V364 — previewed at the CES trade fair in Las Vegas last month.

These machines are just two options from a whole range of computers. Using a modular design Commodore can produce a new micro with a choice of three types of keyboard and anything from 16K to 64K Ram, in 8K steps.

The three-figure code numbers for the computers denote the keyboard type in the first number and memory capacity in the other two. For example, the Commodore 116 has a calculator-type keyboard and 16K Ram. The 264 has a professional keyboard and 64K Ram while the V364 has a built-in voice synthesis, a professional keyboard with separate numeric pad, and 64K Ram. All of the machines are built around the 7501 processor chip — an 8-bit development of the 6502 with built-in video processor.

Commodore has chosen a modular design because computer markets around the world are at different stages of development and Commo-

Continued on page 5

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AQUARIUS
SEE PAGE 52

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All submissions should be typed and a double space should be left between each line. Please leave wide margins.

Programs should, whenever possible, be computer printed.

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Accuracy

Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

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Editorial

THE announcement that Timex will neither manufacture Sinclair's QL computer nor market it in the US has led to speculation that the three-year association between the two companies may be nearing an end.

Yet the reason Timex will not manufacture the QL is a technical one. Timex's plant in Dundee would not have been suitable without considerable further investment in the site — a step Timex are unwilling to make.

As for the reason the QL will not be sold by Timex in the States, most observers point to Timex's poor handling of the previous American Sinclair machine, the 2068 version of the Spectrum. By dithering for almost a year Timex has denied the 2068 wide distribution and, by early December, only around 40,000 had been sold.

Timex proved to be too big an organisation to move quickly, and speed — as others like Atari and TI have found to their cost — is vital for a successful micro company.

But it is not Timex's performance which has been the main deciding influence on Sinclair choosing to sell the US QL itself. The reason for going it alone is simple: Sinclair is a far stronger company now than it was two years ago and — never shy of a challenge — it now wants to see if it can crack The Big One.

Unfortunately, Timex's record with the 2068 will not have helped Sinclair's job of selling the QL in America.

And Timex, without the QL, seems unlikely to be able to continue as a force in the micro world, except as an assembly facility.

Next Thursday

You must guide your unarmed robot around the screen, avoiding the deadly red blocks — at the same time you are being followed by a red droid. Follow — next week's game for BBC model B by Andrew Pfahler.

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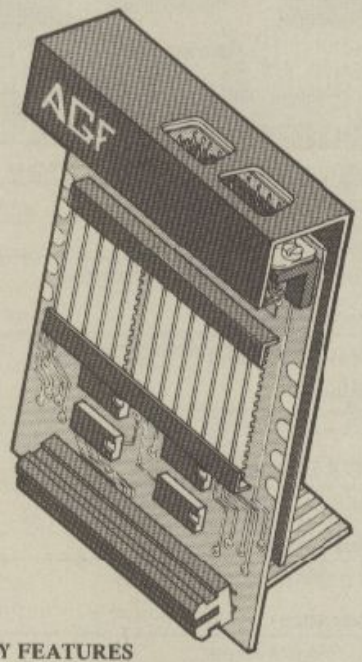

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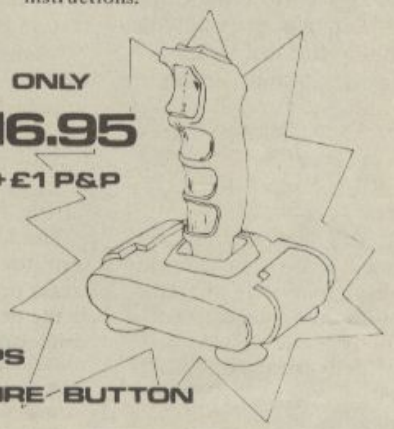

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Off the board for Scrabble

BOARD game makers Waddingtons and J W Spear have teamed up with a new company — Leisure Genius — to produce microcomputer versions of their famous titles.

This follows a first successful venture by Leisure Genius' associate company Little Genius last year — the top-selling program of P Spear's *Scrabble* for the Spectrum. That project was programmed by Psion and marketed by Sinclair. Now, Leisure Genius has established its own programming team to develop *Scrabble* for other computers. A Commodore 64 version will appear in March, to be followed by a BBC Model B program.

In what appears to be a major change of policy, Waddingtons has also signed up with Leisure Genius. Waddingtons had previously seemed to view micros as a threat to its board game trade rather than as a new development in games.

Leisure Genius will sell a version of *Cluedo* for the Commodore 64 in March, to be followed by a Spectrum conversion in May.

The company is also to sell a micro title based on the Invicta game *Mastermind*.

All programs will sell for between £7.95 and £14.95.

Says Peter Deutsch, managing director of Leisure Genius: "What we are doing is an extension of what Melbourne House has done with *The Hobbit*. We now have considerable experience of dealing with board game manufacturers and we see ourselves very much as an extension of those companies.

"We also hope these relationships will continue. For Waddingtons we are currently developing computer programs based on their new range of pre-school educational toys."

Laser 200

Continued from page 1

chequered career. It is one of a number of machines — including the Comex 35 — designed and built by a Hong Kong-based company, Video Technology. It made its first appearance in an earlier guise as the Texet. Then Video Technology linked up with Leisure Zone to promote both machines to be distributed by Computers For All.

In the middle of last year Leisure Zone and Video Technology parted and Computers For All became sole distributor for the Laser 200 and Comex 35 computers.

Computers For All — the trading name of Moranbrook — was formed by Jeff Weinrich in 1980 and began by producing software for the ZX80. The company switched to retail distribution of computers, beginning with the Dragon, Oric and more recently the Tandy Model 10.

First deliveries of the Laser through Computers For All began in September 1983.

Commodore

Continued from page 1

dore's many subsidiaries each have different requirements for a new machine.

It has apparently still not been decided which machines from the range will appear here in the early summer. Commodore UK is known to be keen on the 116 machine as a competitor for the Sinclair Spectrum. It also seems likely that the 264 will be sold in Britain.

Single-board 6809 system for BBC

SOMEWHAT in advance of Acorn's own expected Z80 and 6502 second processors for the BBC micro comes a single-board 6809 system from Cambridge Microprocessor Systems.

The board can either sit inside the machine connecting via the tube interface or be connected using a Eurorack if expansion of the 6809 bus interface is required.

Once installed, the system allows disc software written for the Flex operating system to be run on the BBC — including a number of high-level languages like PL9, C, BCPL, Forth and Fortran.

The 6809 system includes a monitor Rom and a BBC Basic program on disc to link in the new processor card. The price for the board is £249 and the Flex operating system costs another £130. Details from Cambridge Micro-Processor Systems, 11 St Margaret's Road, Girton, Cambridge.

Speech cartridge for the 64

COMMODORE is working on a Text/Speech cartridge for the Commodore 64.

The software Rom will plug into the Magic Voice sound synthesiser unit and convert text simply keyed-in to speech.

IBM college scheme

IBM has announced a £400,000 scheme to provide colleges with microcomputers.

Ninety-two selected universities and polytechnics will each receive a free IBM PC machine under the plan.

Macintosh micro from Apple

APPLE has formally announced its new Macintosh computer.

It offers the same window graphics and 'mouse' cursor control as Apple's Lisa machine, but at around a third of the price.

The Macintosh uses the 68000 processor, from the same family of chips as that used in the new Sinclair QL.

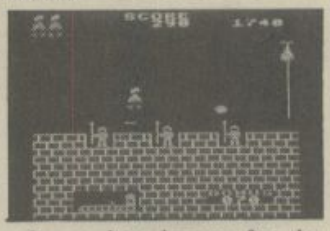
It has a built-in 9-inch black-and-white screen, single 3½-inch disc drive, 128K Ram, 64K Rom, built-in clock, and external disc, RS-232 and RS-422 interfaces.

The machine will sell in the US for between $3,000 and $3,500. It is expected to arrive over here in April, priced around £2,500.

Century collapses

CENTURY Electronics, the only UK company designing arcade game machines, has gone into liquidation.

The company, based in Manchester, was the largest originator of coin-operated video games outside Japan and the US.



It was best known for the development of one of last year's most successful arcade titles — *Hunchback*. The game was also successfully licenced to two home computer software houses — Superior Software for the BBC version and Ocean for the Spectrum, Oric and Commodore 64 conversions.

Century was one of the first arcade game companies to licence its titles for home computers and its managing director David Jones campaigned vigorously against unauthorised home computer versions of coin-operated games.

Philips talk to Atari

WISSE Dekker, President of the Dutch electronics giant Philips, has confirmed that his company has been involved in talks with the troubled US microcomputer manufacturer Atari, concerning a number of possible joint ventures.

The preliminary discussions have dealt mainly with Atari's interests outside the US. Under consideration has been the possibility of a joint venture in Europe to expand Atari International and the idea of a research effort by the two companies to develop video-disc games using Philips' Laservision technology.

Both Dekker and Atari's chief executive James Morgan have denied rumours concerning a possible takeover of Atari International by Philips (see *Popular Computing Weekly*, December 15).

Over the last nine months Atari has produced a deficit of over $500m.

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Ideal language

I write in response to Jeremy Ruston's outline of an ideal high-level language (*PCW* 12-18 January). The @ indirection operator he describes is in fact simply the Spectrum's *Val* function! The Spectrum does *Val* x$ by looking at x$ and using it as an indirect pointer to the variable or other expression whose name is written there. If the expression is a string you must of course use *Val*$ provided by Sinclair for this purpose. The method can be applied to any depth.

My own ideal language would be a sort of hybrid of BBC and Spectrum Basic — it should have the huge array of structures provided on the BBC, but also the unique flexibility of the Spectrum's interpreter which manages to understand things you intuitively feel Basic ought to understand, like *Goto* variable, *Gosub* variable, and so on. Do any other readers have views on what they would consider an ideal language?

Iain D Stewart
17 Torry Drive
Alva
Central Region
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Very average

I'm getting sick and fed up with your correspondence on high scores on Arcade-style games. I'm very average indeed at these games and I'm proud of it.

I mean what imaginative person wants to go through the repetitive motions of playing a game just to achieve 999,990. Surely the game ceases to be a challenge at around the 100,000 mark. Personally I prefer adventures, it took me just over eight hours to complete the excellent Black Crystal — beat that, arcade junkies!!

Gareth P Jones
6 Victor Road
South Kirkby
Pontefract
W Yorks
WF9 3DF

If any arcade junkies can beat that, perhaps they would just like to smile knowingly to themselves.

Down under

In a recent issue of *PCW* Andy Wilson asked what a Bunyip was. Well, it's a creature of Australian Aboriginal folklore. The story is (roughly) this: the Bunyip lived with its mother at the bottom of a deep pool but was kidnapped by some Aborigines. I think its mother was something to do with water or rain. Anyway she got a bit upset and nasty and got her Bunyip back. I can't remember why, but now Aborigines treat some waters with respect.

Brian Langley
34 Royal Sussex Crescent
Eastbourne
E Sussex

Commodore tip

Here is a tip for Commodore 64 owners: Whilst it is true that you cannot enter more than two lines of text from the keyboard, a program typed in on a Vic20 and saved on disc or tape and then loaded into the 64 will be accepted and will also Run (provided, of course, that *Peek* and *Poke* commands do not clash).

Richard Barton
133 Stamford Road
Dagenham
Essex

"We'd better settle the matter before we begin manufacturing"

A mirror image on screen

I've seen a program in a past issue of your magazine that copies a third of the screen of the Spectrum to the middle. The author of the program suggests that a routine like this could be used to produce a mirror image of the top third of the screen to the bottom third.

On writing such a routine, I decided that it was too slow to use usefully in a program. However, the following machine code routine provides an almost instant reflection of the top eight lines to the bottom eight. This leaves eight lines in the middle as the routine uses the bottom two lines not normally available in Basic.

The routine is totally relocatable, making it suitable for both 16K and 48K Spectrums. To activate, type Randomise USR 'start address'.

David Channon
5 Bowland Drive
Walton Park
Chesterfield

```
  10 PRINT "WHERE DO YOU WISH TH
E ROUTINE   TO BE LOCATED."
  20 INPUT a
  30 FOR n=a TO (a+33)
  40 READ d: POKE n,d
  50 NEXT n
  60 DATA 33,0,64,17,224,87,6,64
,197,6,32,126,213,229,213,225,11
9,225,209,35,19,16,244,197,6,64,
27,16,253,193,193,16,231,201,0
```

Sadistic preview

I read with great interest Andy Pennell's preview of the Sinclair QL. As a Spectrum owner I was particularly interested in his comments concerning provision on the Spectrum for a colour composite monitor. How sadistic can you get!

You fed me the sprat and left the mackeral unhookable! Please put me out of my misery, document the undocumented and tell me what needs to be done to hook up my Spectrum to a colour composite monitor.

To change the subject I do agree with Steven Mason that you tend to concentrate too much on games and not enough on more serious software. I think there are more of us using our micros for things other than games than you realise.

J R Ryder
Greenfields
Greenfields Close
Heath Green Lane
Horley
Surrey

Andy Pennell writes:
The answer depends on which model of Spectrum you have. In models one and two there is a line marked *Video* on the PCB which you simply have to connect up to the edge connector with a blob of solder. Most model threes already have this connection made. Once done, simply hook up a lead from the edge connecter to the monitor.

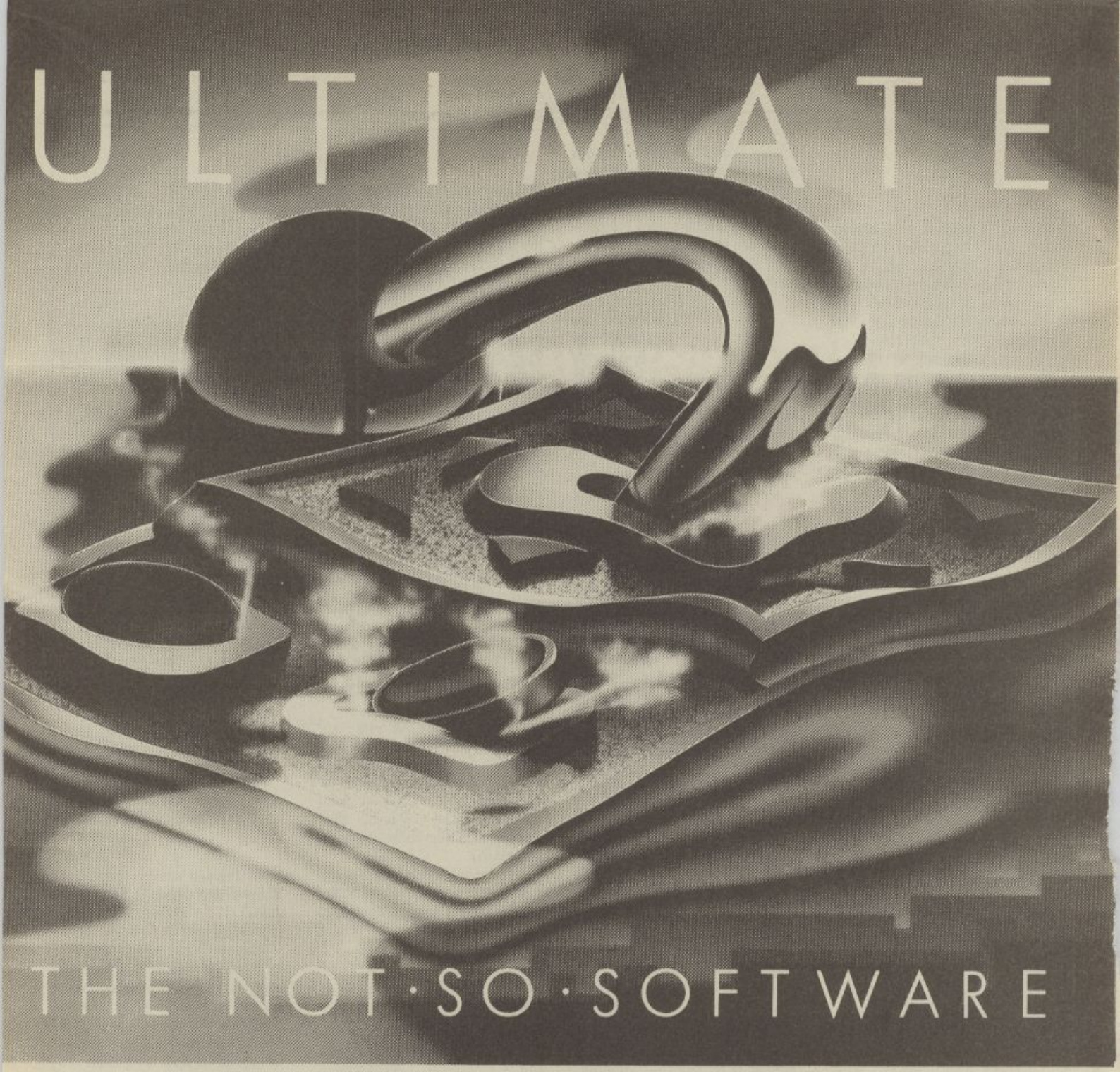
Ace enthusiasts

In reply to John Noyce's letter regarding the Ace Users' Club, what I and many Ace users want is an independent club, where ideas and programs can be exchanged freely. We do not want a club that is just a front for a software house trying to boost its sales.

More power to Phil Murray — let's get the Ace Club for Enthusiasts on the road.

Derek Thomas
32 Bathurst
Orton Goldhay
Peterborough
Cambs

ULTIMATE



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THE UNORTHODOX ENGINEERS: THE PEN AND THE DARK

Adventure game program by Keith Campbell
Based on the story by Colin Kapp

Book/cassette pack
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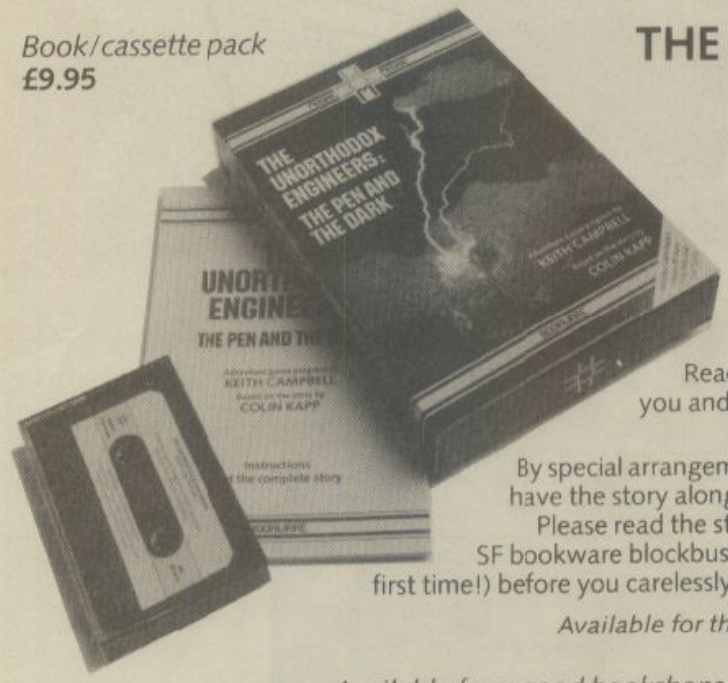


Colin Kapp created the classic SF stories about the Unorthodox Engineers – and now you can try to solve the mystery of the indestructible pillar of darkness and the riddle of contra-energy in this mind-bending text adventure game.

Reading Colin's story in this pack should help you. But once you and your micro are locked into the problem, not even Colin could get you out.

By special arrangement with an unspecified alien culture, Mosaic will let you have the story along with the program – so at least you're in with a chance. Please read the story carefully . . . because we'd like to release our Spring SF bookware blockbuster (Harry Harrison's Stainless Steel Rat on micro for the first time!) before you carelessly unleash contra-energy across the universe. Thank you.

Available for the: **Spectrum 48K** ISBN 946855 15 3 **BBC Micro B** ISBN 946855 20 X

Available from good bookshops and computer stores.

Published by Mosaic Publishing Ltd
Marketed by John Wiley & Sons Limited, Baffins Lane, Chichester, Sussex PO19 1UD

Bandit

A new game for 16/48K Spectrum by K Deakes

Bandit is a fruit machine for both the 16K and 48K Spectrum which has all the features of the real thing, except, of course, actually paying out. It is written in two parts in order to fit it into the 16K machine, which would otherwise be difficult.

You begin with £1 and each go costs 10p. Apart from just spinning the reels, there are also random hold and nudge features indicated by relevant noises and flashing lights. The holds allow you to hold any of the reels on the following go by pressing keys *1*, *2* or *3* as appropriate. Before a reel can be nudged, key *N* must be pressed to determine the number of nudges available. Then, by pressing keys *1*, *2* or *3* again the reels are nudged until a win occurs or your quota has been used. There is also the option to cancel holds and remaining nudges. If required, instructions are displayed as necessary.

Listing 1 is the main program and should be typed in first and then Run to *Save*. After *Verify*ing it, stop the tape and type in listing 2. When Run, this program will *Save* the user defined graphics, arrays *a$* and *c*, and screen, and these should be *Saved* on tape just after the main program. Finally, the program will *Save* itself as a precaution. Everything should now *Load* automatically.

Notes:

Listing 1

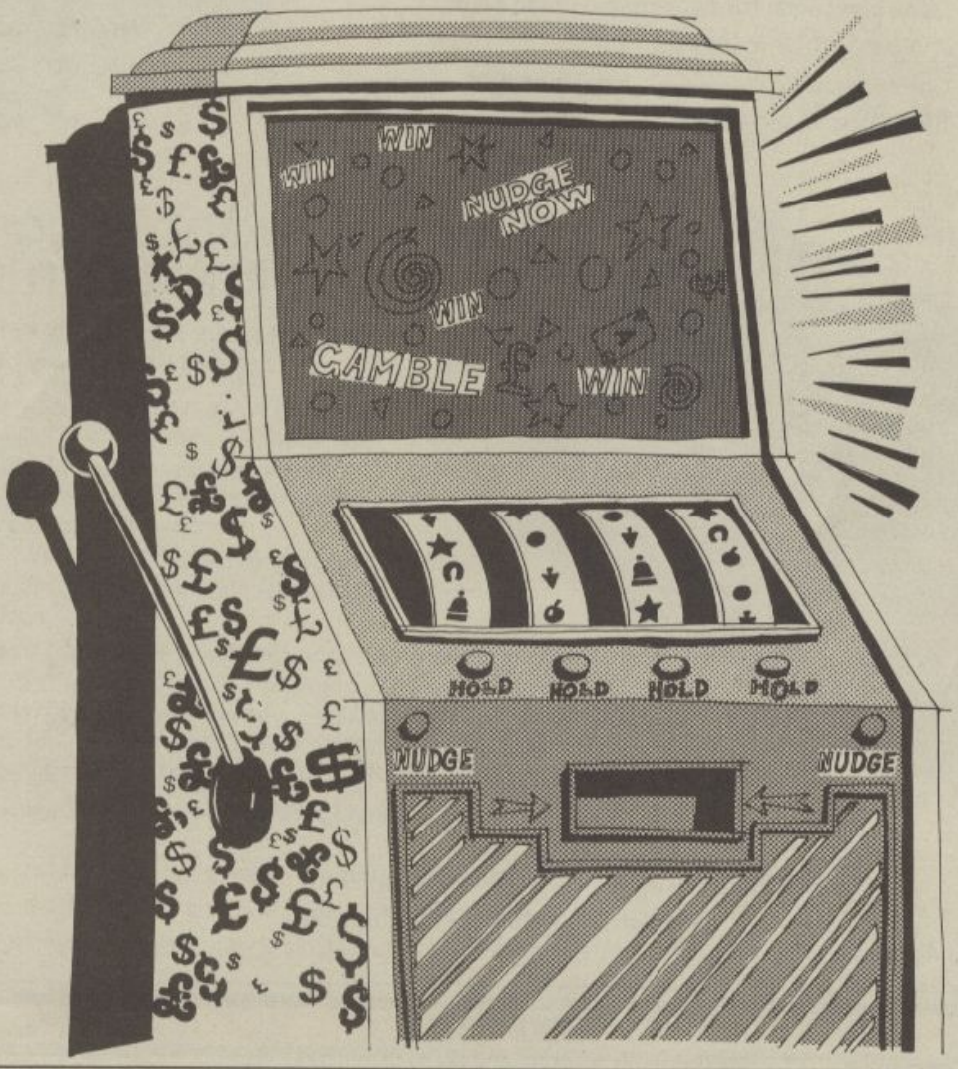
Lines:

10	Saves the program to run automatcally on loading
40-110	Start the game and take it through the various subroutines
500-540	A series of For-Next loops to 'rotate' the reels and to check which parts of the arrays (a$ and c) are in use
700-880	Since SCREEN$ cannot be used for distinguishing user defined graphics on the screen, the display file is PEEKed to check for a win
900-1250	Nudge subroutine. Line 900 determines if there is to be a nudge. Lines 1000-1100 determine the number of nudges and lines 1120-1250 count the nudges used and check which keys are pressed
2000-2130	Hold subroutine, checking keys pressed and taking the appropriate action
5000-6200	Win subroutine, working out the win and new credit total
6300-6320	Play tune during win
7000-7040	Reduce credits and check if there are any left
8000-8030	End of game subroutine
8040-8050	Clear instructions
9000-9100	Load graphics, arrays and screen. Set up the variables and give the options of instructions. Poke 23658, 8 sets Caps Shift on

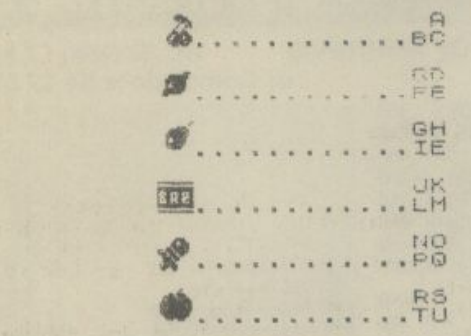
Listing 2

Lines:

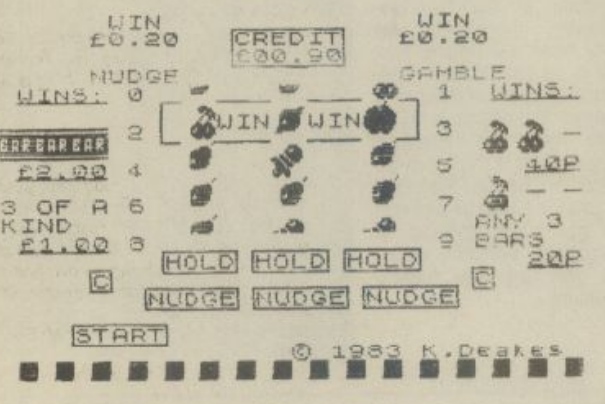
10-430	Draw Screen. This includes six user defined graphics in line 280 which are graphics ABC and DEF respectively. The graphics in lines 350-400 are part of the main graphics set shown below, and those in line 120 are alternating graphic 8s and shifted graphic 8s
500-570	Define user graphics using one For-Next loop
600-740	Set up arrays defining the reels. For graphics see below
750-780	Save relevant parts of the program
790	Saves the program itself ■



GRAPHICS



BANDIT



1. MAIN PROGRAM

```
  1 REM ************
  2 REM *  BANDIT   *
  3 REM ************
  4 REM *** © 1983 K.Deakes ***
 10 SAVE "BANDIT" LINE 9000
 20 STOP
 30 REM ***START***
 40 PRINT AT 19,4; INK 2;"START
": FOR A=1 TO 3: LET R(A)=2*(INT
 (RND*10)+1): NEXT A
 45 IF Y=1 THEN PRINT AT 19,15;
 INK 7; PAPER 1;"PRESS 2"
 50 LET H=INT (RND*10): IF H=3
THEN GO TO HOLD
 60 IF INKEY$="3" THEN GO SUB 8
040: GO TO 75
 70 GO TO 60
 75 PRINT AT 19,4; INK 5; PAPER
 2;"START"
 80 GO SUB SPIN
 90 GO SUB CHECK
100 GO SUB NUDGE
110 GO TO 40
490 REM ***TURN REELS***
500 FOR A=1 TO 3: FOR G=2 TO R(
A) STEP 2: FOR I=1+G TO 8+G
510 LET J(A)=D(A)+I: FOR B=20 T
O 60 STEP 20
520 IF J(A)>B AND J(A)<=B+20 TH
EN LET J(A)=J(A)-B
525 NEXT B
530 PRINT AT 5+I-G,5*A+5; INK C
(J(A)); A$(J(A)),A,1 TO 2)
540 NEXT I: NEXT G: LET D(A)=J(
A)+10: NEXT A: RETURN
590 REM ***CHECK FOR WIN***
700 LET P1=18954: LET P2=P1+5:
LET P3=P2-5
710 IF PEEK P1<>PEEK P2 THEN GO
 TO 750
720 IF PEEK P1=PEEK P2 AND PEEK
 P3<>PEEK P3 THEN GO TO 750
740 IF PEEK P2=PEEK P3 THEN GO
TO 870
750 IF PEEK P1<>6 THEN GO TO 78
0
760 IF PEEK P1=5 AND PEEK P2<>6
 THEN GO TO 5050
770 IF PEEK P2=6 THEN GO TO 507
0
780 FOR P=P1 TO P1+128 STEP 64
790 IF PEEK P=141 THEN GO TO 81
0
800 NEXT P: RETURN
810 FOR P=P1+5 TO P1+133 STEP 6
4
820 IF PEEK P=141 THEN GO TO 84
0
830 NEXT P: RETURN
840 FOR P=P1+10 TO P1+138 STEP
64
850 IF PEEK P=141 THEN GO TO 50
50
860 NEXT P: RETURN
870 IF ATTR (8,10)=ATTR (8,15)
AND ATTR (8,10)=ATTR (8,20) THEN
 GO TO 5000
880 GO TO 750
890 REM ***NUDGE***
900 LET N=INT (RND*10): IF N=3
THEN GO SUB 1000
910 GO SUB 7000: RETURN
1000 PRINT AT 5,5; INK 1; PAPER
5; FLASH 1;"NUDGE";AT 5,22;"GAMB
LE"
1010 FOR A=0 TO 8 STEP 2: PRINT
AT A+6,7; INK 1; PAPER 5; FLASH
1;A;AT A+6,24;A+1: NEXT A
1040 FOR A=8 TO 20 STEP 6
1050 PRINT AT 17,A; INK 3; FLASH
 1;"NUDGE": NEXT A
1060 PRINT AT 16,5; INK 3; FLASH
 1;"C";AT 16,26;"C"
1070 FOR A=1 TO 3: LET R(A)=0: N
EXT A: IF Y=1 THEN PRINT AT 19,1
0; INK 7; PAPER 1;"PRESS N"
1080 LET N=INT (RND*10): IF N=0
THEN GO SUB 8040: GO TO 1220
1090 BEEP .2,6: IF INKEY$="N" TH
EN GO SUB 8040: GO TO 1120
1100 GO TO 1090
1120 IF N/2=INT (N/2) THEN PRINT
 AT N+6,7; INK 1;N;AT N+6,24; PA
PER 5; FLASH 1;N+1
1130 IF N/2<>INT (N/2) THEN PRIN
T AT N+5,24; INK 1;N: IF N>9 TH
EN PRINT AT N+7,7; INK 1; PAPER
5; FLASH 1;N+1
1135 IF Y=1 THEN PRINT AT 19,10;
 INK 7; PAPER 1;"PRESS KEYS 1,2,
3 OR C"
1140 BEEP .2,0: LET B$=INKEY$
1150 IF B$="" OR B$<CHR$ 49 OR B
$>CHR$ 51 THEN GO TO 1210
1160 GO SUB 8040
1170 LET N=N-1: LET R(VAL (B$))=
2: GO SUB SPIN: LET R(VAL (B$))=
0
1180 GO SUB CHECK
1190 IF N=0 THEN GO TO 1220
1200 GO TO 1120
1210 IF B$="C" THEN GO SUB 8040:
 GO TO 1220
1215 GO TO 1140
1220 LET N=0: PRINT AT 16,5; INK
 5; PAPER 1;"C";AT 16,26;"C"
1230 FOR A=8 TO 20 STEP 6: PRINT
 AT 17,A; INK 3; PAPER 1;"NUDGE"
: NEXT A
1240 PRINT AT 5,5; PAPER 5;"
";AT 5,22;"
1250 FOR A=0 TO 8 STEP 2: PRINT
AT A+6,7; PAPER 5;"  ";AT A+6,24;
"  ": NEXT A: RETURN
1990 REM ***HOLD***
2000 IF e=1 THEN LET e=0: GO TO
60
2010 FOR A=9 TO 19 STEP 5: PRINT
 AT 15,A; INK 3; FLASH 1;"HOLD":
 NEXT A
2040 PRINT AT 16,5; INK 3; FLASH
 1;"C";AT 16,26;"C"
2050 BEEP .2,0: LET B$=INKEY$
2055 IF Y=1 THEN PRINT AT 19,10;
 INK 7; PAPER 1;"PRESS 1,2,3,C O
R 5"
2060 IF B$="" OR B$<CHR$ 49 OR B
$>CHR$ 51 THEN GO TO 2080
2065 GO SUB 8040
2070 PRINT AT 15,VAL (B$)*5+4; I
NK 3;"HOLD": LET R(VAL (B$))=0
2080 IF B$="C" THEN GO SUB 2110:
 GO SUB 8040: GO TO 40
2090 IF B$="5" THEN GO SUB 2110:
 GO SUB 8040: GO TO 75
2100 GO TO 2050
2110 FOR A=9 TO 19 STEP 5: PRINT
 AT 15,A; INK 5; PAPER 1;"HOLD":
 NEXT A
2130 PRINT AT 16,5; INK 5; PAPER
 1;"C";AT 16,26;"C": RETURN
4990 REM ***PAYOUT***
5000 LET WIN=100: IF ATTR (8,10)
=56 THEN LET WIN=200
5020 GO SUB 6000: RETURN
5050 LET WIN=20: GO SUB 6000: RE
TURN
5070 LET WIN=40: GO SUB 6000: RE
TURN
6000 PRINT AT 2,6; INK 3;"WIN";A
T 2,23;"WIN";AT 3,5;"£";AT 3,22;
"£"
6020 LET N=0: LET CREDIT=CREDIT+
WIN
6030 IF WIN>=100 THEN PRINT AT 3
```

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BLASTERMIND

SPECTRUM 48k £5.95

At first glance this might seem to be just another version of a very popular game. How wrong can you be!!! True, the start is simple enough. The Spectrum picks a code of numbers or colours with a selection of levels of difficulty — and invites you to do the same. You then take it in turns to guess each others code from the clue supplied after each guess. An extremely well written, fast and very clearly displayed game, with almost inevitable defeat.

This was exactly as intended but unfortunately *something went wrong*. During the programming strange uncomplimentary messages began to appear on the screen. At first they were so few they were not taken too seriously, but soon they could no longer be ignored. Somehow the Spectrum had been given a personality — a rather devious, supercilious, dislikeable, hateful, horrible mind.

✱ Side B contains a version of the game compatible with the excellent Currah µSpeech unit — even worse!! ✱

THE QUEST OF MERRAVID

VIC 20 (16k) £7.95
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A really challenging and enjoyable adventure, written by a confirmed adventure addict who grew tired of the ease with which he solved other adventures himself. Will accept and act on sentences containing up to nine words.

The adventurer becomes Merravid, charged with the task of finding, taking and then returning the magic Firestone of the Dwarves. However, overcoming the many novel and original hazards is no easy matter. Careful and imaginative thought is required if progress is to be made and the Firestone tracked down to the lair of the Dragon of Thargon. Even then the Dragon has to be defeated and the stone retrieved. A compulsive, extremely enjoyable and very user friendly adventure.

HARRIER ATTACK

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Pure machine code, superfast, action-packed, highly addictive arcade-style game requiring great skill. The harrier takes-off from an aircraft-carrier and flys over seaborne defenses to attack enemy installations on a nearby island. The harrier may fly faster, slower, higher or lower, and has bombs and cannon fire with which to protect itself and make its own attack. If it flies too high it is detected by enemy jet-fighters (which it may counter-attack) — so it needs to hug the mountainous terrain which also varies with every new game. But the island is heavily defended by anti-aircraft rockets and tanks, which again the harrier may counter-attack or try to fly through. A tally is kept of fuel, speed, altitude, ammunition, plus player score and high score. Finally the harrier must make its bomb-run over the enemy base before returning past more hostile shipping to its own carrier.

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Pure machine code with super cartoon graphics. You are in control of a diver who must swim down through jellyfish, sharks, barracuda and a host of other under-sea nasties to locate the entrance of a submarine cave. He must then follow its twisting and branching passages which change with every new game, to locate the magical giant oysters with their fabulous treasure of enormous pearls. Many of the passages lead to dead-ends, while some are filled with horrible underwater monsters. Each dive has to be timed carefully so that there is enough oxygen left for the return journey, which is further frustrated by the diver's boat shifting anchor and threatening to decapitate him with its propellor. This game which features three divers, player score, high score, hall of fame and sound effects, presents perhaps the ultimate epic arcade adventure.

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```
,5; INK 3;WIN/100;".00";AT 3,23;
WIN/100;".00"
6040 IF WIN<100 THEN PRINT AT 3,
5; INK 3;"0.";WIN;AT 3,23;"0.";W
IN
6050 GO SUB 6300: IF CREDIT>9990
 THEN LET CREDIT=100
6060 GO SUB 6070: GO TO 6090
6070 PRINT AT 4,14; INK 7; PAPER
 2;"00.00": LET A=15: IF CREDIT>
=1000 THEN LET A=14
6080 PRINT AT 4,A; INK 7; PAPER
2;CREDIT/100
6085 RETURN
6090 GO SUB 6300
6100 FOR A=5 TO 22 STEP 17: PRIN
T AT 2,A;"      ";AT 3,A;"      ";
 NEXT A
6200 RETURN
6300 FOR A=-24 TO 24: BEEP .02,A
: NEXT A: FOR A=23 TO -24 STEP -
1: BEEP .02,A: NEXT A
6320 RETURN
6990 REM ***NO WIN***
7000 LET CREDIT=CREDIT-10
7010 GO SUB 6070
7030 IF CREDIT=0 THEN GO TO 8000
7040 RETURN
7990 REM ***END OF GAME***
8000 GO SUB 6070: PRINT AT 19,10
; INK 1; FLASH 1;"PRESS ANY KEY
TO BEGIN"
8010 FOR N=0 TO -48 STEP -1: BEE
P .02,N: NEXT N
8020 PAUSE 0: PAUSE 0: LET CREDI
T=100: PRINT AT 4,13; INK 7; PAP
ER 2;"£01.00"
8030 GO SUB 8040: RETURN
8040 PRINT AT 19,10; PAPER 1;"
                "
8050 RETURN
8990 REM ***INITIALISE***
9000 BORDER 1: INK 0: PAPER 7: C
LS : PRINT AT 11,10; FLASH 1; IN
K 2; PAPER 0;"PLEASE WAIT"
9010 LOAD ""CODE USR "a": LOAD "
" DATA a$(), LOAD "" DATA c(): L
OAD ""SCREEN$
9020 DIM d(3): DIM g(3): DIM r(3
): POKE 23658,8: LET credit=100
9030 FOR a=1 TO 3: LET d(a)=0: N
EXT a
9040 LET e=1: LET hold=2000: LET
 nudge=900: LET spin=500: LET ch
eck=700
9050 PRINT AT 19,10; PAPER 1; IN
K 7;"INSTRUCTIONS ? Y OR N"
9060 IF INKEY$="Y" THEN LET Y=1:
 GO TO 9100
9070 IF INKEY$="N" THEN LET Y=0:
 GO TO 9100
9080 GO TO 9060
9100 RANDOMIZE : GO SUB 8040: PR
INT AT 19,10; INK 7; PAPER 1;"O.
K.": GO TO 40
```

2. GRAPHICS, ARRAYS & SCREEN

```
  1 REM Bandit Screen
 10 BORDER 1: PAPER 1: INK 9: C
LS
 20 FOR a=5 TO 22 STEP 17
 30 FOR b=2 TO 3
 40 PRINT AT b,a; PAPER 7;"
  "
 50 NEXT b: NEXT a
 60 PRINT AT 5,5; PAPER 5;"
  ";AT 5,22;"  "
 70 FOR a=7 TO 24 STEP 17
 80 FOR b=6 TO 14 STEP 2
 90 PRINT AT b,a; PAPER 5;" "
100 NEXT b: NEXT a
110 PRINT AT 20,16; INK 5;"© 19
83 K.Deakes"
120 PRINT AT 21,0; INK 6; FLASH
1;"■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■"
130 PRINT AT 0,13; FLASH 1; PAP
ER 7; INK 2;"BANDIT"
140 PRINT AT 3,13; PAPER 2;"CRE
DIT";AT 4,13;"£01.00"
150 INK 9
160 PLOT 103,152: DRAW 49,0: DR
AW 0,-17: DRAW -49,0: DRAW 0,17
170 FOR a=71 TO 161 STEP 40
180 PLOT a,55: DRAW 33,0: DRAW
0,-9: DRAW -33,0: DRAW 0,9: NEXT
 a
190 FOR a=63 TO 159 STEP 48
200 PLOT a,40: DRAW 41,0: DRAW
0,-9: DRAW -41,0: DRAW 0,9: NEXT
 a
210 FOR a=39 TO 207 STEP 168: P
LOT a,48: DRAW 9,0: DRAW 0,-9: D
RAW -9,0: DRAW 0,9: NEXT a
220 PLOT 31,24: DRAW 41,0: DRAW
 0,-9: DRAW -41,0: DRAW 0,9
230 INK 6: PLOT 71,120: DRAW 11
3,0: DRAW 0,-17: DRAW -113,0: DR
AW 0,17
240 FOR a=10 TO 20 STEP 5: FOR
b=6 TO 13
250 PRINT AT b,a; PAPER 7;"  ":
 NEXT b: NEXT a
260 DATA 0,0,0,0,0,66,66,66,0,0
,0,0,0,82,8,8,0,0,0,0,66,98,80
,66,80,36,0,0,0,0,8,8,82,0,0,0
,0,0,74,70,66,0,0,0,0,0
270 LET p=PEEK 23675+256*PEEK 2
3676: FOR a=p TO p+47: READ b: P
OKE a,b: NEXT a
280 FOR a=12 TO 17 STEP 5: PRIN
T AT 7,a;"■■";AT 8,a;"■■": NEX
T a
290 INK 5: PAPER 1: FOR a=9 TO
19 STEP 5: PRINT AT 15,a;"HOLD":
 NEXT a
300 FOR A=8 TO 20 STEP 6: PRINT
 AT 17,A;"NUDGE": NEXT A
310 PRINT AT 16,5;"C";AT 16,26;
"C"
320 PRINT AT 19,4;"START"
330 GO SUB 500
340 PRINT AT 6,1;"WINS:";AT 6,2
7;"WINS:";AT 6,1; OVER 1;"_____"
;AT 6,27;"_____"
350 PRINT AT 8,0; INK 0; PAPER
7;"■■■■■■■■";AT 9,0;"■■■■■■■■"
360 PRINT AT 10,1;"£2.00";AT 10
,1; OVER 1;"_____"
370 PRINT AT 12,0;"3 OF A";AT 1
3,0;"KIND";AT 14,1;"£1.00";AT 14
,1; OVER 1;"_____"
380 PRINT AT 8,26; INK 4;"■■■"
;AT 8,31; INK 7;"_";AT 9,26; INK
2;"■■■"
390 PRINT AT 10,29;"40P";AT 10,
29; OVER 1;"___"
400 PRINT AT 11,26; INK 4;"■■";
AT 11,29; INK 7;"_ _";AT 12,26;
INK 2;"■■"
410 PRINT AT 13,26;"ANY 3";AT
14,26;"BARS";AT 15,29;"20P";AT 1
5,29; OVER 1;"___"
420 INK 9
430 GO TO 600
500 REM Graphics
510 FOR a=p TO p+167: READ b: P
OKE a,b: NEXT a
520 DATA 0,112,252,110,27,39,69
,136,1,3,6,4,7,3,1,0,220,254,247
,247,255,254,220,0,0,0,14,252,25
2,248,248,248,248,248,240,224,0,
0,0,0,9,15,31,31,56,0,0,0,0,0,0,
3,7,15,15,13
530 DATA 1,2,120,252,252,252,25
2,248,9,15,15,7,0,0,0,0,0,0,255,
0,255,255,140,173,0,0,255,0,255,
255,99,107,157,172,141,255,255,0
,255,0,99,103,107,255,255,0,255,
0,0,0,0,1,3,3,13,236
540 DATA 0,0,240,184,60,252,252
,252,247,123,61,30,63,95,123,49,
120,176,192,192,0,128,128,128,0,
0,6,31,63,63,127,127,32,64,240,1
20,252,254,254,254,127,127,127,6
3,31,14,0,0,254,254,252,252,248,
112,0,0
560 INK 6
570 RETURN
600 REM Reels
610 DIM a$(20,3,2): DIM c(20,3)
620 REM Reel 1
630 DATA "■■",2,"■■",6,"■■",6,"
■■",6,"■■",6,"■■",1,"■■",4,"■■"
,2,"■■",0,"■■",0,"■■",1,"■■",1
,"■■",4,"■■",4,"■■",2
640 REM Reel 2
650 DATA "■■",2,"■■",6,"■■",6,"
■■",6,"■■",6,"■■",1,"■■",6,"■■"
,6,"■■",4,"■■",6,"■■",0,"■■",6
,"■■",2,"■■",4,"■■",2
660 REM Reel 3
670 DATA "■■",6,"■■",4,"■■",4,"
■■",4,"■■",2,"■■",3,"■■",0,"■■"
,0,"■■",0,"■■",4,"■■",2,"■■",1
,"■■",5,"■■",6,"■■",6
680 FOR a=1 TO 3: FOR b=1 TO 20
690 READ a$(b,a,TO 1),c(b,a)
700 NEXT b: NEXT a
710 PAPER 7
720 FOR a=1 TO 3: FOR b=1 TO 8
730 PRINT AT b+5,a*5+5; INK c(b
,a);a$(b,a,TO )
740 NEXT b: NEXT a
750 SAVE "GRAPHICS"CODE USR "a"
,168
760 SAVE "REELS" DATA a$()
770 SAVE "COLOUR" DATA c()
780 SAVE "SCREEN"SCREEN$
790 SAVE "SCREENPLOT"
```

Enter the Dragon

***Brian Cadge** picks his way through a New Year selection of Dragon software*

At the recent Christmas fair at Wembley, a lot of new Dragon software was on display, not least from Dragon Data themselves who have recently released new titles in new style packaging. Most of these titles have been licensed from US software houses which write for the Tandy Coco, and the two featured here are no exception.

Shaft is a game originally written by Prickly Pear Software which includes high resolution colour grahics and a little sound. The game begins by requesting skill level to be entered via the joystick — there are only two levels and these don't differ a lot. The title display is only black and white, but is a very impressive use of mode 4 graphics.

On to the game itself. Across the screen are eight lifts, moving up and down at various speeds. Your job is to negotiate the lifts, avoiding all but the last one which is yellow and which moves you up to the next floor. The sound effects are a bit half-hearted, but the grahics (mode 3) are not bad, especially the player's cowboy (why he is a cowboy is not made clear). If you do manage to reach the top right-hand corner of the screen, a parachute opens to bring you back to the bottom to start all over again.

Although *Shaft* is quite an original game and enjoyable at the beginning, the novelty soon wears off when you realise that getting to the top depends more on the random arrangement of lifts than on the player's skill. The graphics could be a little less fuzzy and so could the sound.

The second game featured here from Dragon Data is *Cimeeon Moon*. The back of the box enthuses: "A real time sci-fi adventure set in deepest space — fantastic 3D grahics and surrealistic sound effects create this weird and wonderful experience."

Well, you'll have to use your imagination a bit to go that far as this is yet another 3D maze game! Escaping from your cell on the alien ship, you roam the many corridors collecting laser guns, etc, hoping ultimately to find the way out. Joysticks cannot be used, as all commands are entered via the keyboard as in *Open, Take, Search,* etc. The main problem I had was that I couldn't pick up anything — typing *Take Lasergun* when one is hanging on the wall resulted in nothing happening! Maybe I am missing something, which is not surprising as the manual is not exactly detailed.

The sound effects are quite good, but as in *Shaft,* the graphics could have been better, and they are nowhere near as smooth as *Escape,* the 3D maze game from Microdeal.

Dragon Data's new packaging is in giant 7" × 9" plastic boxes with full colour inlays, manuals and space for two cassettes and a disc. This is certainly impressive, especially when the games are still only £8 each, but remember it is the software not the packing that counts!

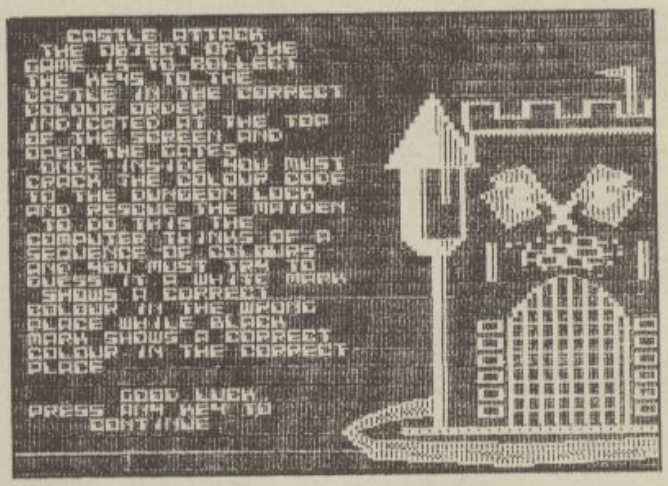
Castle Attack from M & D Systems is another arcade game using hi-res colour graphics, but very little sound. The program is a hybrid of Basic and machine code which seems to run at quite an aceptable speed.

Side one of the tape contains only instructions and title screens, while side two contains the game itself. The graphics are quite outstanding, my only grumble is that the keyboard has to be used with no option for joysticks. The object of this game is to guide our hero round the castle walls, collecting three coloured keys in the correct order, and avoiding the barrels being tossed at him from the battlements and the arrows from the windows.

Once all three keys are collected, you enter the castle to rescue the princess. To do this, our hero is confronted by yet another version of *Mastermind,* using shapes instead of colours. After such a good start to the game, it was disappointing to find this as the finale. If he fails to find the correct combination in time, the princess gets the knife, if he succeeds the game restarts.

Castle Attack seems to have been hastily finished off, a bit more sound, a better end to the game and an option for joysticks would make this very good game into an excellent one. In any case, at the reaonable price of £6.50, this piece of software is still a worthwhile buy.

Super-Spy is a "modern history simulation" in the Cheshire Cat educational series. It contains two double-sided cassettes neatly packed with an instruction card. The front of the box has the familiar red Dragon logo with the usual wording and looks more like a Dragon Data program than bona fide Dragon ones do!



Part one of the software starts with an assault course in black and white graphics in which you must duck and jump over various obstacles to get on to the next section of the program where facts about wartime Britain are thrown at you, followed by ten questions for the 11-year-old to answer. Get five right and you go on to the parachute game. This particular game section has got to be the most boring and monotonous of its type I have ever seen. If you stick it out, a code letter is given to help you later on in your secret mission. The programs continue in a similar vein from here on.

By now you will have realised that these programs attempt to educate youngsters while keeping them interested with games in between the facts. Unfortunately, the games are of a very low standard indeed and would have trouble keeping a five-year-old amused, let alone an average 11-year-old.

Super-Spy is a good idea which could have been rather better. In its present form, the average parent will not want to pay out £20 for it.

For those users who love playing maddening word puzzles in newspapers, where a number of words are hidden in a word grid, there is *Searchword* from Temptation Software. The program allows

words from three to 12 letters to be entered and will then produce a word grid for you to play on. The words can be saved and loaded from cassette and there is also an option to list the concealed words if you forget them.

Not perhaps a game that will appeal to everyone, but if you like doing word puzzles, this program should be of interest to you.

The only way of classifying the next game is to call it a sort of strategy/simulation, for *UXB* from Virgin Games is a very original idea. Essentially, the idea is to defuse an old wartime bomb. There is a choice of six tools from 12 to take along, these include hammer, spanners, pliers, screwdrivers etc. The game consists of a number of set stages, most involving choosing which action to do next with what tools. Making one wrong move causes the bomb to explode. A nice feature of the game is that if you do get killed, you can restart the game from that point.

High resolution colour graphics are used to display the bomb and its circuits from all angles as the game progresses. Graphics also form part of the action in two sections of the defusing cycle, together with the arrow keys to move detonator out.

Typing *Help* will sometimes give you a clue as to what to do next and *Tools* will list what you have with you. The game is written in Basic with some machine code routines from various magazines (including *PCW*) for handing the text, sound and autorunning the program.

Mastering the game is really a matter of patience, trial and error. Of course, once you have found the correct method of defusing the bomb (which took me about two hours to find) the game loses all of its appeal as there is no random element in the program.

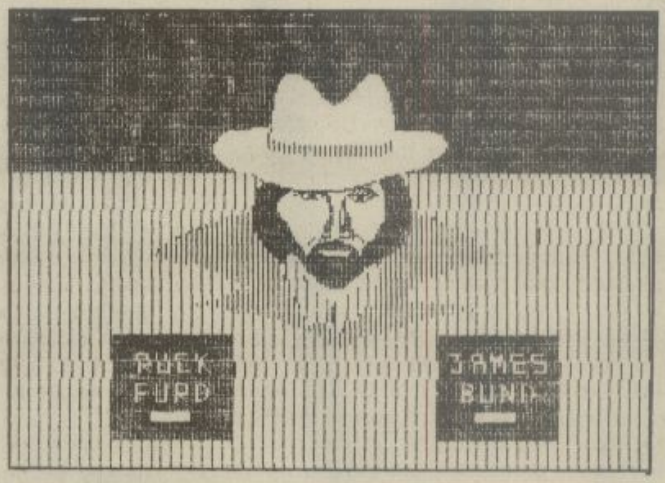
Unfortunately, there are a number of bugs in the program. For example, if one chooses to use the same tool twice, the program counts it as two tools. The restart option doesn't always work correctly, there is a simple way to cheat on the first graphic section and on the minefield you can walk straight through mines. Finally, as the program uses nearly all the memory, it occasionally crashes with an *Out of Memory* error.

With this number of bugs you will probably not be too keen on *UXB*, but don't be put off. The program makes a refreshingly original change from run-of-the-mill adventures or arcade games, and a 32K program with good graphics and sound for £7 is worth a second look at least.

Finally, in this review, are two games from Softek. *Monsters* is yet another version of *Space Panic*, also available on the Dragon in versions called *Bonka* and *Cuthbert goes Digging*. In case you aren't familiar with this game, it involves guiding a small figure up and down ladders, bashing holes in the floor for the baddies to fall through before they get you. Also, you are running out of air all the time. In this version of the game, you do not need to bash the robot on the head to make him fall, as in the original arcade game.

Monsters is a good version of this classic game, which uses the keyboard only, as does *Bonka*, and is similarly priced to the other versions mentioned. So, it is really a matter of taste and whether or not you want to use joysticks, as to which you choose.

As has become traditional, I have left by far the best game until last. *Ugh*, also from Softek, is certainly one of the best arcade games to be released for the Dragon.



Ugh is a caveman, whom you control via joystick or keyboard, who knows that with the coming of the ice age he must stock his cave with food. Stealing eggs from the pterodactyl's nest at the top of the mountain seemed a good idea, until pterry arrives dropping boulders on poor *Ugh*. To top it all, along plods Rex, a giant tyrannosaurus to aid pterry by chasing and jumping on *Ugh*.

Armed with only a spear, which *Ugh* drops when he gets a egg, he must climb the mountain to the nest, get an egg and get it back to his cave, avoiding pterry and Rex, and if possible killing them for bonus points.

A bonus *Ugh* is awarded for every 5,000 points on the first screen and every 10,000 on the screen. At 10,000 points you move on to the next screen, which is a harder route up the mountain. Each screen contains 16 integral skill levels. A demo game is available on loading to give you the idea and show you all three screens.

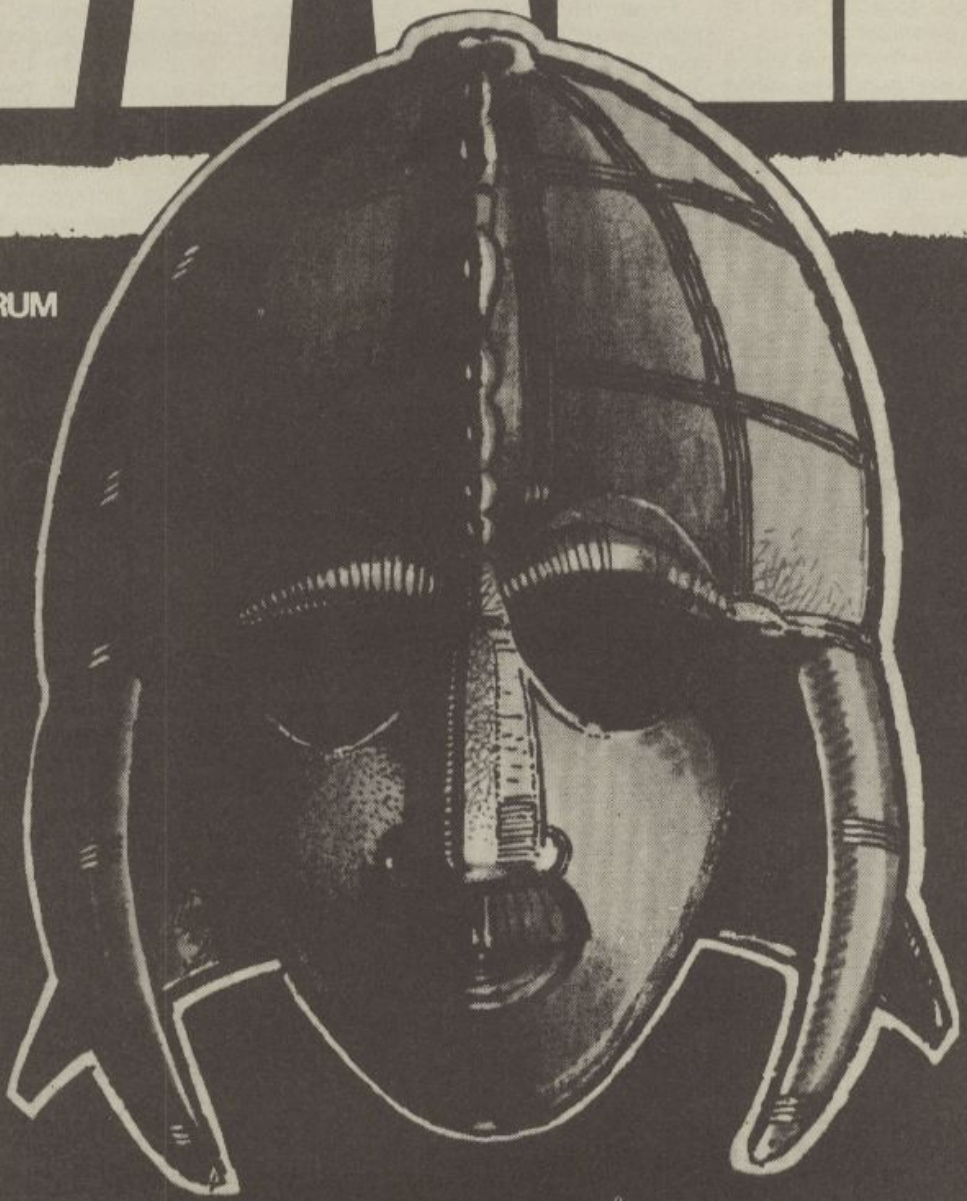
The graphics in this game, which are in mode 3, show just what can be done with a lot of effort by the programmer and the animation is rivalled by no other game that I've seen. The sound is also a string part of this piece of software. For originality and graphics, *Ugh* surely beats Microdeal's *The King*, but lacks as many different screens. At £7, this is the best game for the Dragon in a long time and with the option of joystick or keyboard, and the ability to be easily transferred to disc, it is a must for every user's game collection.

Looking at this batch of software, it is evident that the general standards are still rising, slowly but surely. It is particularly good to see Dragon Data making an effort to get in on the software market once again. ■

Supplier	Program	Price	Value (1-10)
Dragon Data Kenfig Industrial Estate Margam Port Talbot W Glamorgan	*Shaft* *Cimeeon Moon*	£7.95 £7.95	6 6
M & D Systems 39 Sheridan Road Frimley Surrey GU16 5DU	*Castle Attack*	£6.50	7
Ampalsoft PO Box 19 Knutsford Cheshire WA16 0HE	*Super-Spy*	£19.95	5
Temptation Software 58 Poland Street London	*Searchword*		7
Virgin Games 61-63 Portobello Road London W11	*UXB*	£6.95	7
Softek 329 Croxted Road London SE24	*Monsters* *Ugh*	£6.95 £6.95	7 10

VALH

48K SPECTRUM



ALLA

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POP. W. 5

Search and find

***Ron Luxton** demonstrates how to store and list recorded programs*

After the honeymoon period with my ZX81, I quickly found that I needed an orderly way of listing my increasing number of recorded programs, or I would have to spend hours searching through a motley collection of tapes each time I needed one.

The answer for me has been to use one side of a C10 or C12 cassette for each program, recording each one two or three times, and to store the tapes in the special stackable drawer units made for the purpose. These are often advertised at reasonable prices and can be added to as required.

Another way is to store programs on longer tapes — C60 or C90 — recording each program two or three times in succession. This is cheaper, but does require a recorder with a tape counter to make searching along the tapes a practical proposition.

Program List for the ZX81 (16K) is designed for use with either method of storage and provides an opportunity to search for your programs either by number or by name. It has the added facility of obtaining a print-out, via the ZX printer, of a complete list in either numerical or alphabetical order should you require one.

It will allow you to list and search for your programs under three main headings, Games, Utility, and Programming, and a "Special Instructions" entry to enable a single character code to be entered against programs for whatever purpose you want — to identify those programs in machine code, confidential files, or perhaps merely to identify your favourites.

Program List A is intended for users of single tapes for each program, while *Program List B* is for use where many programs are recorded, one after another, on longer tapes. The second program is a list of the line changes to convert *Program List A* to *Program List B*.

Program List B additionally allows entries for the number of each tape and the position on the tape of each program. It will search for and list these numbers, and both programs will list all entries with the same name, such as *Bank Account*, but will separately identify *Bank Account 1* from the rest if this is called for.

The program in Basic makes plentiful use of *Inkey$* for rapid access and only the alphabetical order call, which puts the entries through a sort, takes any appreciable time. To limit this to 60 seconds or so, it will search through only the first three letters and three digits of the number of each line (line 1300). This may mean that *Analysis* appears above *Anagram* for example, but is a small price to pay for a rapid sort. Some of the multiple instructions lines are long — lines 580, 630 and 1090 — and care should be taken to enter

```
 10 REM "PROGRAM LIST"
 20 REM ==================
 30 REM     SET UP FILE
 40 REM ==================
 50 GOTO 530
 60 DIM A$(100,32)
 70 FAST
 80 LET A=0
 90 FAST
 95 IF A>100 THEN GOTO 635
110 LET A=A+1
140 FAST
150 CLS
160 SCROLL
170 PRINT "PROGRAM NUMBER";TAB
16;A
180 LET P$=STR$ A
190 LET P$=("  "+P$ AND VAL P$<
=9)+(" "+P$ AND VAL P$>=10 AND V
AL P$<=99)+(P$ AND VAL P$>=100)
200 SCROLL
210 PRINT "PROGRAM NAME?"
220 INPUT N$
230 IF LEN N$>24 THEN GOTO 970
240 IF N$="" THEN GOTO 180
250 IF N$="  " THEN LET N$="
260 IF N$="END" THEN GOTO 530
270 SCROLL
280 PRINT N$
290 SCROLL
300 PRINT "PROGRAM CATEGORY KEY
?"
310 INPUT C$
320 PRINT AT 21,22;;C$
330 SCROLL
340 PRINT "SPECIAL INSTRUCTIONS
KEY?"
350 INPUT X$
360 PRINT AT 20,16;X$
370 LET A$(A)(1 TO LEN N$)=N$
380 LET A$(A)(LEN N$+1 TO 23)="
........................"
400 LET A$(A)(26 TO 28)=P$
410 LET A$(A)(30)=C$
420 LET A$(A)(31)=X$
430 CLS
440 SCROLL
450 PRINT A$(A)
460 SCROLL
470 SCROLL
480 PRINT "IS THIS O.K. (Y/N)?"
483 IF A=100 THEN GOTO 635
490 SLOW
500 IF INKEY$<>"Y" AND INKEY$<>
"N" THEN GOTO 500
510 GOTO (90 AND INKEY$="Y")+(1
40 AND INKEY$="N")
520 REM ================
530 REM       MENU
540 REM ================
550 FAST
560 CLS
570 PRINT AT 0,4,"PROGRAM LIST"
,AT 0,18;"MENU";
580 PRINT AT 2,2;"A TO SET UP F
ILE",AT 3,2;"B THIS CLEARS PREVI
OUS ENTRIES",,AT 4,2;"C INSTRUCT
IONS",AT 5,2;"D CALL - PROGRAM N
UMBER",AT 6,2;"E CALL - PROGRAM
NAME",AT 7,2;"F CALL - PROGRAM C
ATEGORY",AT 8,2;"G CALL - SPECIA
L INSTRUCTIONS",AT 9,2;"H TO MAK
E FURTHER ENTRIES",AT 10,2;"I TO
LIST IN.....",AT 11,2;"J NUMBE
R ORDER",AT 12,2;"K ALPHABETICAL
 ORDER",AT 13,2;"L TO SAVE PROGR
AM"
590 PRINT AT 19,6;"M SELECT A L
ETTER M"
600 SLOW
610 IF INKEY$="" THEN GOTO 610
620 LET Q$=INKEY$
630 GOTO (60 AND INKEY$="A")+(1
050 AND INKEY$="B")+(660 AND INK
EY$="C")+(660 AND INKEY$="D")+(6
60 AND INKEY$="E")+(660 AND INKE
Y$="F")+(140 AND INKEY$="G")+(16
10 AND INKEY$="H")+(1030 AND INK
EY$="I")+(1770 AND INKEY$="J")
635 CLS
638 PRINT AT 10,0;"FILE FULL FI
LE FULL FILE FULL"
640 STOP
650 REM ========================
660 REM     SEARCH ROUTINES
670 REM ========================
680 FAST
690 CLS
700 PRINT "ENTER DETAILS"
710 INPUT Z$
720 CLS
730 LET Y=LEN Z$
750 IF Y=1 THEN LET Z$="  "+Z$
760 IF Y=2 THEN LET Z$=" "+Z$
770 GOTO (780 AND Q$="C")+(820
AND Q$="D")+(850 AND Q$="E")+(91
0 AND Q$="F")
780 LET W=VAL Z$
785 IF W+1>A THEN PRINT "NO ENT
RY FOR THIS NUMBER"
787 IF W+1>A THEN GOTO 1700
790 PRINT A$(W)
810 GOTO 1700
820 LET X=0
825 FOR B=1 TO A
830 IF Z$=A$(B)(1 TO (1+Y)-1) T
HEN PRINT A$(B)
835 IF Z$=A$(B)(1 TO (1+Y)-1) T
HEN LET X=X+1
840 NEXT B
842 IF X>=1 THEN GOTO 1700
843 PRINT "NO ENTRY UNDER THAT
NAME"
850 GOTO 1700
860 LET Z$=Z$(3)
865 GOSUB 1860
867 GOTO (870 AND Q$="S")+(892
AND Q$="P")
870 FOR B=1 TO A
880 IF Z$=A$(B)(30) THEN PRINT
A$(B)
885 NEXT B
890 GOTO 1700
892 FOR B=1 TO A
894 IF Z$=A$(B)(30) THEN LPRINT
A$(B)
896 NEXT B
```

them exactly as written.

Before typing out the program, decide how many titles you will finally want to store as this cannot be altered later, although the full number of entries does not have to be entered at once and you can add to the list at any time. About 150 titles should fit comfortably within 16K. More may be squeezed in, but the alphabetical sort soon runs out of memory beyond this number.

Line 60 should read: *"Dim A$ (number of entries, 32)"* and lines 95 and 483 should read: *"IF A + (number of entries) Then Goto 635"*.

When the program has been entered, debugged and runs satisfactorily, *Save* it against accidental crashes, enter *Run*, and follow the instructions.

The program complete with your lists can be *Saved* and will automatically go to the menu on loading. Remember, however, that *Run* or *Clear* must not be used from now on or all the entries will be lost. If you need to restart the program, enter *Goto 530*.

If you need to change any of the entries later without affecting the rest of the list, you should enter as a direct command, the following: *"LET A$* (number of entry to be changed) = new program name, full stops, numbers, letter, code" etc, with the spacing exactly as lines appear in the rest of the program, press *Newline*, and the new line will replace the old. If you get the spacing wrong, then just try it again. ■

```
  900 IF Q$="P" THEN GOTO 530
  910 LET Z$=Z$(3)
  915 GOSUB 1860
  917 GOTO (920 AND Q$="S")+(942
AND Q$="P")
  920 FOR B=1 TO A
  930 IF Z$=A$(B)(31) THEN PRINT
A$(B)
  935 NEXT B
  940 GOTO 1700
  942 FOR B=1 TO A
  944 IF Z$=A$(B)(31) THEN LPRINT
A$(B)
  946 NEXT B
  948 IF Q$="P" THEN GOTO 530
  950 GOTO 1700
  960 REM ====================
  970 REM CHECK LEN N$ ROUTINE
  980 REM ====================
  990 SCROLL
 1000 SCROLL
 1010 PRINT "SORRY,24 LETTERS ONL
Y.TRY AGAIN"
 1020 SCROLL
 1030 GOTO 220
 1040 REM ====================
 1050 REM     INSTRUCTIONS
 1060 REM ====================
 1070 FAST
 1080 CLS
 1090 PRINT "INSTRUCTIONS",,"----
--------";,,,"ENTER TITLES AS RE
QUESTED.",,,"ENTER PROGRAM CATEG
ORY AS;-",,"""P"" = PROGRAMMING,"
,"""U"" = UTILITY,","""G"" = GA
MES.",,,,"TO LEAVE ENTRY LIST,EN
TER ""END"".",,"TO LEAVE TITLE E
MPTY,ENTER TWO SPACES.",,,,"USE
 ONE CHARACTER ONLY FOR",,"SPECIA
L INSTRUCTIONS CODE.",,,"ENTER "
4""" (OR GOTO 530) TO","RETURN T
O MENU."
 1100 GOTO 1700
 1110 GOSUB 1860
 1120 REM ====================
 1130 REM  PRINT OUT AFTER SORT
 1140 REM ====================
 1150 FOR I=1 TO P-1
 1160 LET W=VAL E$(I+1)(4 TO 6)
 1170 IF Q$="S" THEN PRINT A$(W)
 1180 IF Q$="P" THEN LPRINT A$(W)
 1190 NEXT I
 1200 IF Q$="P" THEN GOTO 530
 1210 GOTO 1700
 1220 REM ====================
 1230 REM   SHELL-METZNER SORT
 1240 REM ====================
 1250 FAST
 1260 LET P=A
 1270 DIM D$(P,6)
 1280 DIM E$(P,6)
 1290 FOR I=1 TO P
 1300 LET D$(I)=A$(I)(1 TO 3)+A$(
I)(26 TO 28)
 1310 NEXT I
 1320 FOR I=1 TO P
 1330 LET E$(I)=D$(I)
 1340 NEXT I
 1350 LET C=0
 1360 LET S=0
 1370 LET M=1
 1380 LET N=P
 1390 IF 2*M>N THEN GOTO 1420
 1400 LET M=M+1
 1410 GOTO 1390
 1420 LET F=2*M-1
 1430 LET F=INT (F/2)
 1440 IF F=0 THEN GOTO 1110
 1450 LET D=N-F
 1460 LET B=1
 1470 LET H=B
 1480 LET E=H+F
 1490 IF E$(H)>E$(E) THEN GOTO 15
00
 1500 LET B=B+1
 1510 IF B>D THEN GOTO 1430
 1520 GOTO 1470
 1530 LET S=S+1
 1540 LET U$=E$(H)
 1550 LET E$(H)=E$(E)
 1560 LET E$(E)=U$
 1570 LET H=H-F
 1580 IF H<1 THEN GOTO 1500
 1590 GOTO 1480
 1600 REM ====================
 1610 REM NUMBER ORDER PRINT-OUT
 1620 REM ====================
 1630 FAST
 1640 GOSUB 1860
 1650 FOR B=1 TO A
 1660 IF Q$="S" THEN PRINT A$(B)
 1670 IF Q$="P" THEN LPRINT A$(B)
 1680 NEXT B
 1690 IF Q$="P" THEN GOTO 530
 1695 REM ====================
 1700 REM ***RETURN TO MENU***
 1702 REM ====================
 1705 POKE 16418,0
 1710 PRINT AT 23,0;"KEY ""M"" FO
R MENU"
 1712 POKE 16418,2
 1715 SLOW
 1720 IF INKEY$<>"M" THEN GOTO 17
20
 1730 FAST
 1740 GOTO 530
 1760 REM ====================
 1770 REM     SAVE ROUTINE
 1780 REM ====================
 1785 CLS
 1790 PRINT "START RECORDER AND P
RESS ""S"""
 1800 SLOW
 1810 IF INKEY$<>"S" THEN GOTO 18
10
 1820 SAVE "PROGRAM LIS■"
 1840 GOTO 530
 1850 REM ====================
 1860 REM SCREEN OR PRINTER S/R
 1870 REM ====================
 1880 CLS
 1890 PRINT "SCREEN OR PRINTER?"
 1900 SLOW
 1910 LET Q$=INKEY$
 1920 IF Q$<>"S" AND Q$<>"P" THEN
 GOTO 1910
 1930 FAST
 1940 CLS
 1950 RETURN

FOR "PROGRAM LIST (B)" -
(FOR LISTING A NUMBER OF
PROGRAMS ON LONGER
TAPES), DELETE THESE LINES
FROM LISTING FOR "PROGRAM
LIST (A)" - (FOR LISTING
INDIVIDUAL TAPES):-

230  340  350   360  380  400
410  420  580   630  770  850
880  894  910   915  920  930
944  950 1010  1090 1300

AND ENTER THE FOLLOWING
LINES:-

 332 PRINT "SPECIAL INSTRUCTIONS
?"
 334 INPUT I$
 336 PRINT AT 21,27;I$
 338 SCROLL
 340 PRINT "TAPE NUMBER?"
 343 INPUT T$
 346 LET T$=("  "+T$ AND VAL T$<
=9)+(" "+T$ AND VAL T$>=10 AND V
AL T$(=99)+(T$ AND VAL T$>=100)
 349 PRINT AT 21,16;T$
 351 SCROLL
 355 PRINT "POSITION ON TAPE?"
 358 INPUT X$
 361 LET X$=("  "+X$ AND VAL X$(
=9)+(" "+X$ AND VAL X$>=10 AND V
AL X$(=99)+(X$ AND VAL X$>=100)
 363 PRINT AT 21,16;X$
 365 SCROLL
 375 LET A$(A)(LEN N$+1 TO 17)="
                "
 380 LET A$(A)(19 TO 21)=P$
 385 LET A$(A)(23)=C$
 387 LET A$(A)(24)=I$
 390 LET A$(A)(25 TO 27)=T$
 395 LET A$(A)(28)="/"
 410 LET A$(A)(29 TO 31)=X$
```

Continued on page 21

TURN YOUR PROGRAMME UPSIDE DOWN

Now you can add another dimension to your games. Swap direction, swap functions, confuse your friends. In fact you can add almost any twist to your games with Stonechip's Programmable Joystick Interface.

You can also listen to them with Stonechip's Echo Amplifier.

Programmable Joystick Interface. This also enables any Spectrum software to be used with a joystick, irrespective of which keyboard keys have been chosen for function.

Programming is easy using only a single switch. Switch one way to program and another way to play. No tapes to load or links to worry about — all programming is achieved by hardware. Used with Atari-compatible joysticks. Simply plugs into rear expansion port of ZX-Spectrum. No other connections to make, no additional power supply required.

Echo Amplifier. How would you like to listen to the sound output from your ZX-Spectrum without ear strain? The Stonechip Echo amplifier can do this for you as well as easing the tedium of saving or loading of tapes and enlarging the range of tape recorder compatibility with the computer. The amplifier has volume control over a range adequate for most uses, and a tone control for harsh or mellow sounds. A switched interface removes the need to swap leads during 'SAVE'ing or 'LOAD'ing. Leads are left connected all the time and the desired function is selected on the three position switch by the user. Use of the 'CUE' facility enables an audio cue to precede the program being 'SAVE'd on tape, a decided advantage when searching through a multi-program tape. The Echo simply plugs into the Ear, Mic and Power sockets of the computer and does not require an additional power supply. The expansion port at the rear of the computer is left free for use with other peripherals and the unit is housed in an attractive case custom designed to complement the ZX-Spectrum.

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```
 483 IF A=100 THEN GOTO 635
 580 PRINT AT 2,2;"A TO SET UP F
ILE",AT 3,2;"B THIS CLEARS PREVI
OUS ENTRIES",AT 4,2;"B INSTRUCT
IONS",AT 5,2;"B CALL - PROGRAM N
UMBER",AT 6,2;"B CALL - PROGRAM
NAME",AT 7,2;"B CALL - PROGRAM C
ATEGORY",AT 8,2;"B CALL - TAPE N
UMBER";AT 9,2;"B CALL - TAPE POS
ITION";AT 10,2;"H CALL - SPECIAL
 INSTRUCTIONS",AT 11,2;"I TO MA
KE FURTHER ENTRIES",AT 12,2;"■ T
O LIST IN.....",AT 13,2;"■ NUMB
ER ORDER",AT 14,2;"K ALPHABETICA
L ORDER",AT 15,2;"L TO SAVE PROG
RAM"
 630 GOTO (60 AND INKEY$="A")+(1
050 AND INKEY$="B")+(660 AND INK
EY$="C")+(660 AND INKEY$="D")+(6
60 AND INKEY$="E")+(660 AND INKE
Y$="F")+(660 AND INKEY$="G")+(66
0 AND INKEY$="H")+(140 AND INKEY
$="I")+(1810 AND INKEY$="J")+(12
30 AND INKEY$="K")+(1770 AND INK
EY$="L")
 770 GOTO (780 AND 0$="C")+(820
AND 0$="D")+(860 AND 0$="E")+(91
0 AND 0$="F")+(950 AND 0$="G")+(
849 AND 0$="H")
 849 LET Z$=Z$(3)
 850 GOSUB 1860
 851 GOTO (852 AND 0$="S")+(856
AND 0$="P")
 852 FOR B=1 TO A
 853 IF Z$=A$(B)(24) THEN PRINT
A$(B)
 854 NEXT B
 855 GOTO 1700
 856 FOR B=1 TO A
 857 IF Z$=A$(B)(24) THEN LPRINT
 A$(B)
 858 NEXT B
 859 IF 0$="P" THEN GOTO 530
 860 IF Z$=A$(B)(23) THEN PRINT
A$(B)
 894 IF Z$=A$(B)(23) THEN LPRINT
 A$(B)
 910 GOSUB 1860
 920 LET X=0
 925 FOR B=1 TO A
 930 IF Z$=A$(B)(25 TO 27) THEN
PRINT A$(B)
 932 IF Z$=A$(B)(25 TO 27) THEN
LET X=X+1
 937 IF X>=1 THEN GOTO 1700
 938 PRINT "NO ENTRY UNDER THAT
NUMBER"
 944 IF Z$=A$(B)(25 TO 27) THEN
LPRINT A$(B)
 950 LET X=0
 951 FOR B=1 TO A
 952 IF Z$=A$(B)(29 TO 31) THEN
PRINT A$(B)
 953 IF Z$=A$(B)(29 TO 31) THEN
LET X=X+1
 955 NEXT B
 956 IF X>=1 THEN GOTO 1700
 957 PRINT "NO ENTRY UNDER THAT
NUMBER"
 958 GOTO 1700
1010 PRINT "SORRY,17 LETTERS ONL
Y.TRY AGAIN"
1090 PRINT "INSTRUCTIONS",,"----
---------",,,"ENTER TITLES AS RE
QUESTED.",,"ENTER PROGRAM CATEGOR
Y AS:-",,"""P"" = PROGRAMMING.",,"
""U"" = UTILITY.",,"""G"" = GAME
S.",,,,"ENTER TAPE NUMBER AND PO
SITION",,"ON TAPE AS MAXIMUM OF T
HREE",,"DIGITS EACH.",,,,"USE ONE
 CHARACTER ONLY FOR",,"SPECIAL IN
STRUCTIONS CODE.",,,,"TO LEAVE EN
TRY LIST,ENTER""END"".",,"TO LEAV
E TITLE EMPTY",,"ENTER TWO SPACE
S.",,,,"ENTER ""M"" (OR GOTO 530)
 TO",,"RETURN TO MENU."
1300 LET D$(I)=A$(I)(1 TO 3)+A$(
I)(19 TO 21)
```

Program List A

```
NUMERICAL

DEC LOADER.............    1  P*
HEX LOADER.............    2  P*
LONDON BRIDGE..........    3  G$
ABOVE RAMTOP...........    4  P
MEMORY TEST............    5  U$
EYEBALL................    6  G
COMPILER...............    7  P*
LABEL MAKER............    8  U
CHOMPER................    9  G
PATIENCE...............   10  G*
HOUSEHOLD EXPENSES.....   11  U£
BUSINESS EXPENSES......   12  U£
CAR EXPENSES...........   13  U£
GRAND PRIX.............   14  G
MORTGAGE...............   15  U£
COVERSIONS.............   16  U

ALPHABETICAL

ABOVE RAMTOP...........    4  P
BUSINESS EXPENSES......   12  U£
CAR EXPENSES...........   13  U£
CHOMPER................    9  G
COMPILER...............    7  P*
COVERSIONS.............   16  U
DEC LOADER.............    1  P*
EYEBALL................    6  G
GRAND PRIX.............   14  G
HEX LOADER.............    2  P*
HOUSEHOLD EXPENSES.....   11  U£
LABEL MAKER............    8  U
LONDON BRIDGE..........    3  G$
MEMORY TEST............    5  U$
MORTGAGE...............   15  U£
PATIENCE...............   10  G*

GAMES

LONDON BRIDGE..........    3  G$
EYEBALL................    6  G
CHOMPER................    9  G
PATIENCE...............   10  G*
GRAND PRIX.............   14  G

UTILITY

MEMORY TEST............    5  U$
LABEL MAKER............    8  U
HOUSEHOLD EXPENSES.....   11  U£
BUSINESS EXPENSES......   12  U£
CAR EXPENSES...........   13  U£
MORTGAGE...............   15  U£
COVERSIONS.............   16  U

PROGRAMMING

DEC LOADER.............    1  P*
HEX LOADER.............    2  P*
ABOVE RAMTOP...........    4  P
COMPILER...............    7  P*

 PROGRAM LIST   MENU

A TO SET UP FILE
B THIS CLEARS PREVIOUS ENTRIES
C INSTRUCTIONS
D CALL - PROGRAM NUMBER
E CALL - PROGRAM NAME
F CALL - PROGRAM CATEGORY
G CALL - SPECIAL INSTRUCTIONS
H TO MAKE FURTHER ENTRIES
I TO LIST IN.....
J NUMBER ORDER
K ALPHABETICAL ORDER
L TO SAVE PROGRAM

■ SELECT A LETTER ■
```

Program List B

```
NUMERICAL

DEC LOADER.....    1  P*   1/   1
HEX LOADER.....    2  P*   1/  35
LONDON BRIDGE..    3  G$   1/122
ABOVE RAMTOP...    4  P    1/275
MEMORY TEST....    5  U$   1/322
EYEBALL........    6  G    2/  21
COMPILER.......    7  P*   2/  89
LABEL MAKER....    8  U    2/105
CHOMPER........    9  G    2/432
PATIENCE.......   10  G*   3/  14
HOUSEHOLD EXPENSES 11 U£   3/  55
BUSINESS EXPENSES 12  U£   3/144
CAR EXPENSES...   13  U£   4/  11
GRAND PRIX.....   14  G    4/102
MORTGAGE.......   15  U£   4/233
CONVERSION.....   16  U    5/  10

TAPE NUMBER

CAR EXPENSES...   13  U£   4/  11
GRAND PRIX.....   14  G    4/102
MORTGAGE.......   15  U£   4/233

 PROGRAM LIST   MENU

A TO SET UP FILE
B THIS CLEARS PREVIOUS ENTRIES
C INSTRUCTIONS
D CALL - PROGRAM NUMBER
E CALL - PROGRAM NAME
F CALL - PROGRAM CATEGORY
G CALL - TAPE NUMBER
H CALL - TAPE POSITION
I CALL - SPECIAL INSTRUCTIONS
J TO MAKE FURTHER ENTRIES
K TO LIST IN.....
L NUMBER ORDER
M ALPHABETICAL ORDER
N TO SAVE PROGRAM

■ SELECT A LETTER ■
```

Addressed and labelled

***John Bradshaw** presents a word-processing program for editing and printing letters and articles*

I have found this program very useful for entering, editing and printing letters, notes for lectures, orders of church worship and sermon outlines. At the time when *WP* was written my only printer was the ZX: hence the number 32 (ie, the number of characters per line permitted by the printer) will be found in the program. I imagine that if 32 were replaced by 65 or 80, the program could be used by the better printer.

Text is inserted in the form of Data blocks at the end of the program. Since each block is accessible (by Listing) and cannot be affected by alterations to other blocks, editing and manipulation of the blocks is simple and safe! Hence, it is possible to delete, alter, expand and move blocks freely.

However, the price to be paid for entering text as Data is that the Spectrum will accept only about 450 characters per Data entry. So a paragraph on the ZX printer is limited to about 15 lines. On the other hand it is possible to do some things that are not possible even on some expensive machine-code, disk-based systems. For example, if the names and addresses to which a circular letter is to be sent are kept on tape as little blocks of data (ie, as 'mini-programs' within a reserved set of line numbers), each destination can be *Merged* with (*WP* + the letter), and the program will then print out a correctly addressed letter.

Moreover, since, as will be seen later, any data items can be selected for printing on their own, having inserted the address on the letter, an 'address label' can then be printed for the envelope before proceeding to the next destinee.

The normal mode for entering text is one that uses 'word-wrap' and right-justification. This is the default mode — ie, unless the user gives other instructions, *WP* will print proportionately-spaced, justified block of text. A data entry which consists of # followed by a space will be printed without proportional spacing. An entry which begins with @ followed by a space is printed at *Tab* @, and an entry beginning with *c* followed by a space will be centred.

The main sections of the program are prefaced by REM statements, to which the following notes refer:

Advice When Run is *Entered* advice is given on the screen on how to enter text at Line 2000 ff. This is followed by examples.

Main Menu The user chooses the TAB value, single or double spacing, and whether to *View* or *Print*. Additionally, the user may select up to 26 blocks of data to be printed in any order. The user can also instruct the computer to number the blocks on the screen or on the print-out.

Proportional Spacing Paragraphs are scanned line-by-line. The ends of words are tagged and spaces are inserted after them, progressively, until a line of 32 'characters' is formed. This line is then printed. A limiting device ensures that two or three words are not unduly expanded to fill the line. The Subroutine (Lines 1230 to 1410) is slow, so that lines with proportional spacing are printed at about one per second. Clearly this is where machine-code would help. On the other hand, the fact that the whole program is in Basic enables the user to adapt it according to his or her need.

Menu When the text has been viewed or printed, the variables are saved and the user can make alterations; eg, from single to double-line spacing, etc.

I shall be happy to answer questions about *WP* or to provide copies of it on tape at £2 including postage: any proceeds will go to charity. Write to me at 2 Netherwood Close, Solihull, W. Midlands.

I usually *Merge WP* with my program *Relist* which renumbers the text (ie, the Data blocks) in tens and/or my program *Delete* which deletes *WP* itself, leaving only the text to be *Saved*. I shall be glad to know how to improve *WP*, especially by using machine code for Lines 1320 to 1410. I forgot to say that one edits in exactly the same way as when writing programs. ■

```
  10 REM WPT
  20 REM 36/500
  30 POKE 23609,50
  35 REM **ADVICE FOR USER**
  40 PRINT "ENTER TEXT AS DATA A
T LINES 2000, 2010 ... LIKE THIS
:"
  50 PRINT ,,"(N.B. Where single
 quotes are   shown below, they
represent double quotes, that is
 P with SYMBOL-SHIFT)."
  60 PRINT ,,"2000 DATA '# To J
Smith'"
  70 PRINT ,,"When  the  progra
 is run this  will appear as:
                To J Smith"
  80 PRINT ,,"Similarly, 2010 DA
TA '@ From A Brown' appears as
  From A Brown
                i.e., it is set
in by the TAB number chosen befo
re."
  85 PRINT ,,"2020 DATA  c HEADI
NG"
  88 PRINT ,,"This will be centr
ed, like this:
                        HEADING
"
  90 PRINT ,,"2030 DATA  'unmarx
ed   text   isproportionately  s
paced  so  thatboth  margins  are
 justified, asin this present pa
ragraph."
 100 PRINT ,,"WHEN TEXT HAS BEEN
 ENTERED,ALTER THE REM STATEMENT
 IN LINE 20 TO RECORD THE NUMBER
 OF DATA ENTRIES & SOME NUMBER G
REATER THAN THE NUMBER OF CHARACT
ERS IN THE LONGEST PARAGRAPH."
 110 INPUT ,,"PROCEED (y/n) ? ";
q$
 115 REM **MAIN MENU**
 120 IF q$="y" THEN CLS : PAUSE
50
 130 INPUT "TABULATION:Number of
 spaces ";b
 140 INPUT "SELECT y/n      ";s$
 150 INPUT "SINGLE OR DOUBLE SPA
CING s/d";w$
 160 INPUT "NUMBER DATA OR NOT (
y/n) ";nn
 170 INPUT "NUMBER OF DATA ITEMS
";x
 180 INPUT "LENGTH, (): length of
 longest DATA ENTRY) ";y
 190 INPUT "VIEW (v) OR COPY (c)
 ";j$
 200 CLS : IF s$="n" THEN GO TO
470
 205 REM **SELECTS TEXT FOR VIEW
     OR PRINT**
 210 INPUT "ENTER DATA ITEMS SEL
ECTED. Then ENTER 0. ";aa: IF aa
=0 THEN GO TO 470
 220 INPUT ab: IF ab=0 THEN GO T
O 470
 230 INPUT ac: IF ac=0 THEN GO T
O 470
 240 INPUT ad: IF ad=0 THEN GO T
O 470
 250 INPUT ae: IF ae=0 THEN GO T
```

```
0 470
 250 INPUT af: IF af=0 THEN GO T
0 470
 270 INPUT ag: IF ag=0 THEN GO T
0 470
 280 INPUT ah: IF ah=0 THEN GO T
0 470
 290 INPUT ai: IF ai=0 THEN GO T
0 470
 300 INPUT aj: IF aj=0 THEN GO T
0 470
 310 INPUT ak: IF ak=0 THEN GO T
0 470
 320 INPUT al: IF al=0 THEN GO T
0 470
 330 INPUT am: IF am=0 THEN GO T
0 470
 340 INPUT an: IF an=0 THEN GO T
0 470
 350 INPUT ao: IF ao=0 THEN GO T
0 470
 360 INPUT ap: IF ap=0 THEN GO T
0 470
 370 INPUT aq: IF aq=0 THEN GO T
0 470
 380 INPUT ar: IF ar=0 THEN GO T
0 470
 390 INPUT as: IF as=0 THEN GO T
0 470
 400 INPUT at: IF at=0 THEN GO T
0 470
 410 INPUT au: IF au=0 THEN GO T
0 470
 420 INPUT av: IF av=0 THEN GO T
0 470
 430 INPUT aw: IF aw=0 THEN GO T
0 470
 440 INPUT ax: IF ax=0 THEN GO T
0 470
 450 INPUT ay: IF ay=0 THEN GO T
0 470
 460 INPUT az: IF az=0 THEN GO T
0 470
 470 REM **READING TEXT**
 475 DIM v$(x,y)
 480 FOR n=1 TO x
 490 READ v$(n)
 500 IF s$="y" THEN NEXT n
 510 IF s$="n" THEN GO TO 790
 515 REM **PRINTING SINGLE LINES
           OR ADDRESSES**
 520 LET n=aa: GO SUB 780
 530 LET n=ab: GO SUB 780
 540 LET n=ac: GO SUB 780
 550 LET n=ad: GO SUB 780
 560 LET n=ae: GO SUB 780
 570 LET n=af: GO SUB 780
 580 LET n=ag: GO SUB 780
 590 LET n=ah: GO SUB 780
 600 LET n=ai: GO SUB 780
 610 LET n=aj: GO SUB 780
 620 LET n=ak: GO SUB 780
 630 LET n=al: GO SUB 780
 640 LET n=am: GO SUB 780
 650 LET n=an: GO SUB 780
 660 LET n=ao: GO SUB 780
 670 LET n=ap: GO SUB 780
 680 LET n=aq: GO SUB 780
 690 LET n=ar: GO SUB 780
 700 LET n=as: GO SUB 780
 710 LET n=at: GO SUB 780
 720 LET n=au: GO SUB 780
 730 LET n=av: GO SUB 780
 740 LET n=aw: GO SUB 780
 750 LET n=ax: GO SUB 780
 760 LET n=ay: GO SUB 780
 770 LET n=az: GO SUB 780
 780 IF n=0 THEN GO TO 1570
 790 IF j$="v" AND v$(n,1)="@" A
ND nn=0 THEN PRINT TAB h;v$(n,3
TO 34-h): GO TO 1540
 800 IF j$="v" AND v$(n,1)="@" A
ND nn=1 THEN PRINT TAB h;v$(n,3
TO 34-h): PRINT n: GO TO 1540
 810 IF j$="c" AND v$(n,1)="@" A
ND nn=0 THEN LPRINT "";TAB h;v$(
n,3 TO 34-h): GO TO 1540
 820 IF j$="c" AND v$(n,1)="@" A
ND nn=1 THEN LPRINT TAB h;v$(n,3
TO 34-h): LPRINT n: GO TO 1540
 830 IF j$="v" AND v$(n,1)="#" A
ND nn=0 THEN PRINT TAB 0;v$(n,3
TO 32): GO TO 1540
 840 IF j$="v" AND v$(n,1)="#" A
ND nn=1 THEN PRINT TAB 0;v$(n,3
TO 32): PRINT n: GO TO 1540
 850 IF j$="c" AND v$(n,1)="#" A
ND nn=0 THEN LPRINT "";TAB 0;v$(
n,3 TO 32): GO TO 1540
 860 IF j$="c" AND v$(n,1)="#" A
ND nn=1 THEN LPRINT TAB 0;v$(n,3
TO 32): LPRINT n: GO TO 1540
 865 REM **FINDS ENDS OF WORDS**
 870 LET L=0
 880 LET v$(n,1 TO y)=v$(n,L+1 T
O y)
 890 DIM q(10)
 900 LET k=0: LET z=0: LET m=1:
LET p=1: LET q=1
 910 LET t=32
 920 FOR p=1 TO t
 930 IF v$(n,p)=CHR$ 32 THEN LET
 q(m)=p-1: LET m=m+1
 940 IF m=8 THEN GO TO 960
 950 NEXT p
 960 LET L=0: LET a$="": LET b$=
"": LET c$="": LET d$="": LET e$
="": LET f$="": LET g$="": LET h
$="": LET i$=""
 970 IF v$(n,1)<>"" THEN LET a$=
v$(n, TO q(1))
 980 LET m=1
 990 IF q(m)=0 THEN LET z=m: GO
TO 1150
1000 IF q(m)<>0 THEN LET b$=v$(n
,(q(m)+2) TO q(m+1))
1010 LET m=2: IF q(m)=0 THEN LET
 z=m: GO TO 1150
1020 IF q(m)<>0 THEN LET c$=v$(n
,(q(m)+2) TO q(m+1))
1030 LET m=3: IF q(m)=0 THEN LET
 z=m: GO TO 1150
1040 IF q(m)<>0 THEN LET d$=v$(n
,(q(m)+2) TO q(m+1))
1050 LET m=4: IF q(m)=0 THEN LET
 z=m: GO TO 1150
1060 IF q(m)<>0 THEN LET e$=v$(n
,(q(m)+2) TO q(m+1))
1070 LET m=5: IF q(m)=0 THEN LET
 z=m: GO TO 1150
1080 IF q(m)<>0 THEN LET f$=v$(n
,(q(m)+2) TO q(m+1))
1090 LET m=6: IF q(m)=0 THEN LET
 z=m: GO TO 1150
1100 IF q(m)<>0 THEN LET g$=v$(n
,(q(m)+2) TO q(m+1))
1110 LET m=7: IF q(m)=0 THEN LET
 z=m: GO TO 1150
1120 IF q(m)<>0 THEN LET h$=v$(n
,(q(m)+2) TO q(m+1))
1130 LET m=8: IF q(m)=0 THEN LET
 z=m: GO TO 1150
1140 IF q(m)<>0 THEN LET i$=v$(n
,(q(m)+2) TO q(m+1))
1150 LET z$=a$+b$+c$+d$+e$+f$+g$
+h$+i$
1160 LET L=LEN z$+z-1
1165 REM **LIMITS PROPORTIONAL
           SPACING**
1170 IF a$<>"c" AND b$="" AND c$
="" AND d$="" AND e$="" AND f$=""
 AND g$="" AND i$="" THEN GO TO
 1420
1180 IF a$<>"c" AND c$="" AND d$
="" AND e$="" AND f$="" AND g$=""
 AND i$="" THEN LET a$=a$+" ":
 GO TO 1420
1190 IF z=4 AND L<25 THEN LET e$
="  "
1200 LET u$=CHR$ 32
1210 LET k=LEN (a$+b$+c$+d$+e$+f
$+g$+h$+i$)
1220 IF k=32 THEN GO TO 1420
1221 REM **CENTERING**
1222 IF j$="v" AND a$="c" AND nn
=0 THEN PRINT TAB 16-INT (k/2);b
$+CHR$ 32+c$+CHR$ 32+d$+CHR$ 32+
e$+CHR$ 32+f$+CHR$ 32+g$+CHR$ 32
+h$+CHR$ 32+CHR$ 32+i$: GO TO 15
40
1224 IF j$="v" AND a$="c" AND nn
=1 THEN PRINT TAB 16-INT (k/2);b
$+CHR$ 32+c$+CHR$ 32+d$+CHR$ 32+
e$+CHR$ 32+f$+CHR$ 32+g$+CHR$ 32
+h$+CHR$ 32+CHR$ 32+i$: PRINT n:
 GO TO 1540
1226 IF j$="c" AND a$="c" AND nn
=0 THEN LPRINT TAB 16-INT (k/2);
b$+CHR$ 32+c$+CHR$ 32+d$+CHR$ 32
+e$+CHR$ 32+f$+CHR$ 32+g$+CHR$ 3
2+h$+CHR$ 32+CHR$ 32+i$: GO TO 1
540
1228 IF j$="c" AND a$="c" AND nn
=1 THEN LPRINT TAB 16-INT (k/2);
b$+CHR$ 32+c$+CHR$ 32+d$+CHR$ 32
+e$+CHR$ 32+f$+CHR$ 32+g$+CHR$ 3
2+h$+CHR$ 32+CHR$ 32+i$: LPRINT
n: GO TO 1540
```

Continued on page 25

BE THE WAR LORD

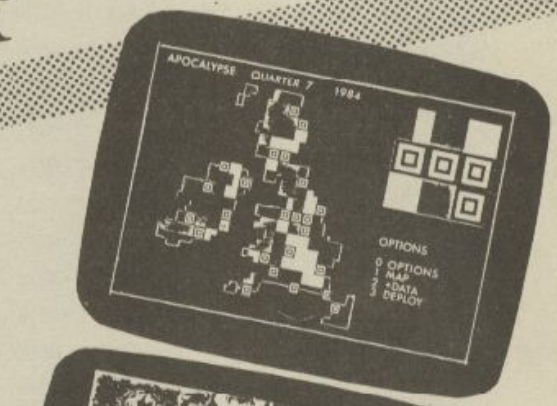
RUN CITIES, COUNTRIES, CONTINENTS– BUT, BE WARNED!

Someone is about to press the button for Apocalypse

A GAME OF STRATEGY

"REDSHIFT HAS MADE THE WORLD OF WAR GAMES ORIENTATED COMPUTER GAMES ITS OWN"
P.C.W. – 24/30 NOV 83 ISSUE

The leading game (APOCALYPSE) has four different maps, on any one of which you may fight your war (see section A.). An additional tape which contains a further six maps may also be added to expand your atlas (see section B.). Alternatively, you can be NERO in the FALL OF ROME or Napoleon's right-hand man in NAPOLEON'S CAMPAIGN in 1813 (see section C.). Can you survive the War of 1984 or could you lead your marines from island to island in the PACIFIC war? (see section D.).



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GAMES WORKSHOP

Apocalypse is produced under licence from The Games Workshop Ltd.

```
1229 REM **PROPORTIONAL
          SPACING**
1230 IF k<32 AND a$<>"" AND q(2)
<>0 THEN LET a$=a$+u$: LET k=k+1
1240 IF k=32 THEN GO TO 1420
1250 IF k<32 AND q(3)<>0 THEN LE
T b$=b$+u$: LET k=k+1
1260 IF k=32 THEN GO TO 1420
1270 IF k<32 AND q(4)<>0 THEN LE
T c$=c$+u$: LET k=k+1
1280 IF k=32 THEN GO TO 1420
1290 IF k<32 AND q(5)<>0 THEN LE
T d$=d$+u$: LET k=k+1
1300 IF k=32 THEN GO TO 1420
1310 IF k<32 AND q(6)<>0 THEN LE
T e$=e$+u$: LET k=k+1
1320 IF k=32 THEN GO TO 1420
1330 IF k<32 AND q(7)<>0 THEN LE
T f$=f$+u$: LET k=k+1
1340 IF k=32 THEN GO TO 1420
1350 IF k<32 AND q(8)<>0 THEN LE
T g$=g$+u$: LET k=k+1
1360 IF k=32 THEN GO TO 1420
1370 IF k<32 AND q(9)<>0 THEN LE
T h$=h$+u$: LET k=k+1
1380 IF k=32 THEN GO TO 1420
1390 IF k<32 AND q(8)<>0 THEN LE
T i$=i$+u$: LET k=k+1
1400 IF k=32 THEN GO TO 1420
1410 IF k<>0 AND k<32 THEN GO TO
 1200
1415 REM **PRINTING PARAGRAPHS**
1420 IF j$="v" THEN PRINT a$+b$+
c$+d$+e$+f$+g$+h$+i$
1430 IF j$="c" THEN LPRINT a$+b$
+c$+d$+e$+f$+g$+h$+i$
1435 REM **DOUBLE SPACING**
1440 IF j$="v" AND w$="d" THEN P
RINT ""
1450 IF j$="c" AND w$="d" THEN L
PRINT ""
1460 IF k<>0 THEN GO TO 880
1465 REM **SPACES BETWEEN
          PARAGRAPHS**
1470 IF j$="v" AND w$="s" THEN P
RINT ""
1480 IF j$="v" AND w$="d" THEN P
RINT ""
1490 IF j$="c" AND w$="s" THEN L
PRINT ""
1500 IF j$="c" AND w$="d" THEN L
PRINT ""
1505 REM **NUMBERING**
1510 IF j$="v" AND nn=1 THEN PRI
NT n
1520 IF j$="c" AND nn=1 THEN LPR
INT n
1530 IF k<>0 THEN GO TO 880
1540 IF s$="n" THEN NEXT n
1550 IF s$="y" THEN RETURN
1560 RESTORE 490
1565 REM **MENU: NEXT STEPS**
1570 PRINT ""
1580 PRINT TAB 0;"VIEW/COPY";TAB
 24;"GOTO 190"
1590 PRINT TAB 0;"LENGTH";TAB 24
;"GOTO 180"
1600 PRINT TAB 0;"DATA";TAB 24;"
GOTO 170"
1610 PRINT TAB 0;"NUMBER";TAB 24
;"GOTO 160"
1620 PRINT TAB 0;"SINGLE/DOUBLE
SPACING";TAB 24;"GOTO 150"
1630 PRINT TAB 0;"SELECT DATA IT
EMS";TAB 24;"GOTO 140"
1640 PRINT TAB 0;"TABULATION";TA
B 24;"GOTO 130"
1645 REM **VIEW AND/OR ADD TO
          LAST DATA ITEM**
1650 INPUT "VIEW LAST DATA ENTRY
 (y/n) ";i$
1660 IF i$="y" THEN PRINT ""
1670 IF i$="y" THEN LIST 1980+10
*n
2000 DATA "@ 2 Netherwood Close"
2010 DATA "# to Joe Bloggs"
2020 DATA "I want to write this
note to test the re-numbered WP
program."
2030 DATA "c CENTRE HEADING"
2040 DATA "c ************"
2050 DATA "# END"
```


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Master your ZX Microdrive

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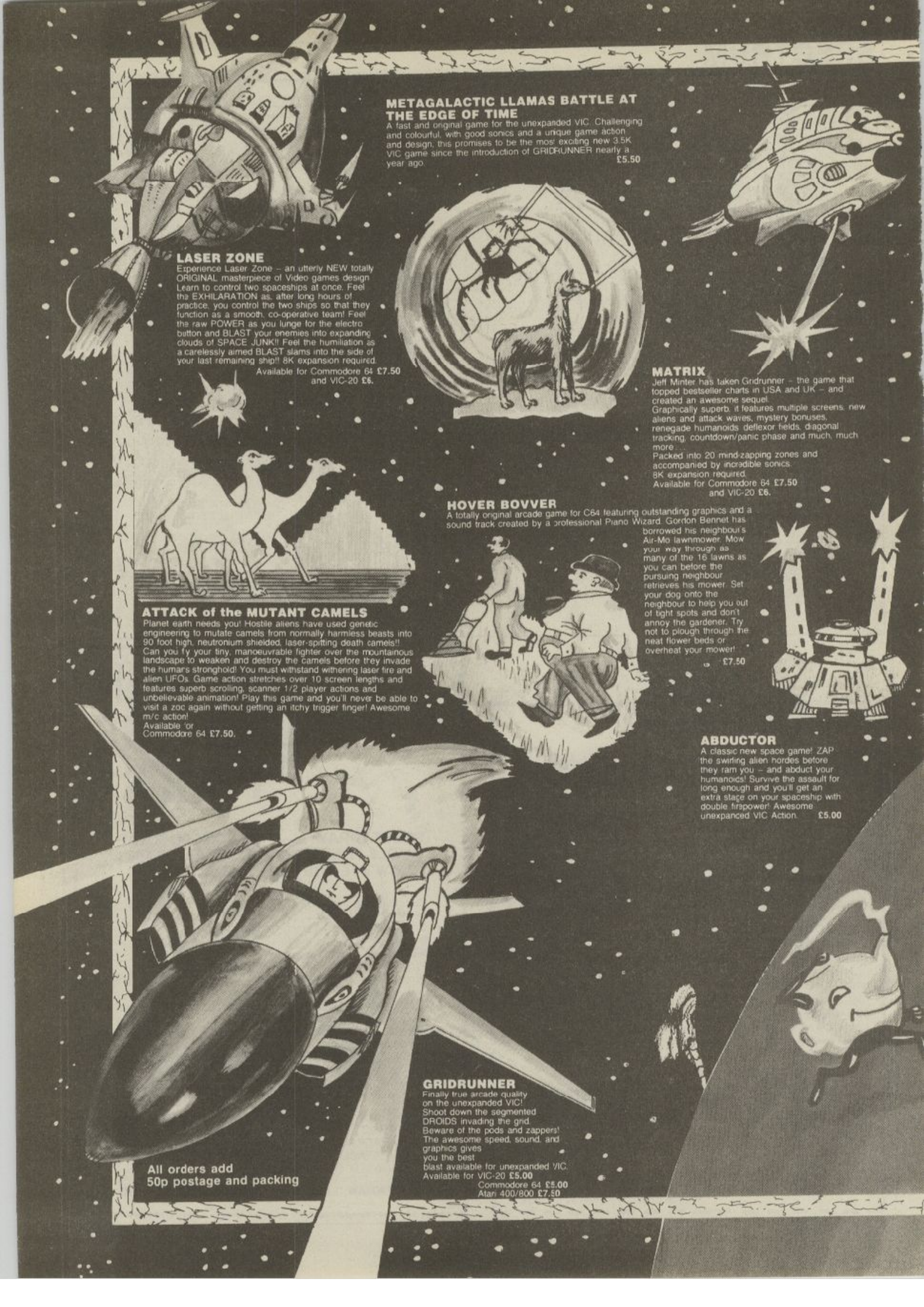

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Jeff Minter has taken Gridrunner – the game that topped bestseller charts in USA and UK – and created an awesome sequel.

Graphically superb, it features multiple screens, new aliens and attack waves, mystery bonuses, renegade humanoids, deflexor fields, diagonal tracking, countdown/panic phase and much, much more...

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A totally original arcade game for C64 featuring outstanding graphics and a sound track created by a professional Piano Wizard. Gordon Bennet has borrowed his neighbour's Air-Mo lawnmower. Mow your way through as many of the 16 lawns as you can before the pursuing neighbour retrieves his mower. Set your dog onto the neighbour to help you out of tight spots and don't annoy the gardener. Try not to plough through the neat flower beds or overheat your mower!

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ATTACK of the MUTANT CAMELS

Planet earth needs you! Hostile aliens have used genetic engineering to mutate camels from normally harmless beasts into 90 foot high, neutronium shielded, laser-spitting death camels!! Can you fly your tiny, manoeuvrable fighter over the mountainous landscape to weaken and destroy the camels before they invade the human's stronghold! You must withstand withering laser fire and alien UFOs. Game action stretches over 10 screen lengths and features superb scrolling, scanner 1/2 player actions and unbelievable animation! Play this game and you'll never be able to visit a zoo again without getting an itchy trigger finger! Awesome m/c action!

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OF THE MUTANT CAMELS

At last the long awaited sequel to Attack of the Mutant Camels is available. You are controlling a ninety foot high, neutronium shielded, lazer spitting death camel; leading a rebellion against your evil Zzyaxian overlords. The game features beautiful smooth scrolling graphics and no less than 42 different attack waves, more than any game in video history. The challenge of play will last for months as you battle to see what's on the next wave. **£7.50**

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Curved slope

***Milosc Versipellis** presents an envelope shaping program for the Commodore 64*

This program for the Commodore 64 allows the user to explore the SID chip's envelope shaping capability. It is written *top-down* style to isolate sub-routines for use in other programs. The many lines with just a colon are to add readability, they are not necessary to the working of the program.

Four variables define the shape of the program by setting the *slope* of a curve. The numbers are coded logarithmically, so that a slope of two is twice a slope of one. This is necessary since human senses measure all input logarithmically. Since it is the slope that is being set in coded form, a zero will still produce a slope.

As a clue to your experiments, the coded numbers 0 to 15 can be thought of as the length of time a particular phase lasts, so that you can hear the envelope effects. Perhaps you would like to try the following — they are given in order — Attack, Decay, Sustain, Release:

10, 10, 10, 0 HARPlike sound
10, 15, 0, 0 HARPSICHORDlike sound
15, 0, 10, 15 A Great AMEN
12, 2, 13, 9 A lesser Amen
12, 7, 7, 10 Typical envelope natural
8, 4, 2, 1 BANJOlike sound ■

```
0 :
1 REM####################################
2 :
3 REM      THE ROYAL MAIL
4 :
5 REM  ENVELOPE SHAPING  EXPERIMENT
6 :
7 REM    BY MILOSC VERSIPELLIS
8 :
9 REM####################################
10 :
20 GOSUB 9000 :REM INITIALISE
30 GOSUB 8000 :REM GET NYBBLES
40 GOSUB 7000 :REM PLAY NOTE WITH ADSR
50 GOTO20
90 :
4000 :
4001 REM       CHECK NYBBLE LIMITS
4002 :
4100 A=INT(A)
4110 FL=0
4120 IF A < 0 OR A > 15 THEN FL=1:PRINT
4990 RETURN
6000 :
6001 REM END - SHUT OFF VOLUME AND NOTES
6002 :
6010 :
6020 FORI=0TO24
6030 :POKES1+I,0
6040 NEXT
6990 RETURN
7000 :
7001 REM        PLAY NOTE
7002 :
7003 REM VOLUME AND ATTACK/DECAY
7007 :
7010 GOSUB6000    :REM SWITCH OFF SOUND
7020 POKES1+24,15:REM INITIALISE SOUND
7030 POKES1+5,ATT OR(DEC*16)
7040 POKES2+5,ATT OR(DEC*16)
7050 POKES3+5,ATT OR(DEC*16)
7051 :
7060 REM SUSTAIN/RELEASE
7061 :
7070 POKES1+6,SUS OR(REL*16)
7080 POKES2+6,SUS OR(REL*16)
7090 POKES3+6,SUS OR(REL*16)
7091 :
7100 REM SET FIXED CHORD
7101 :
7110 POKES1+1,17
7120 POKES1,37
7130 POKES2+1,21
7140 POKES2,154
7150 POKES3+1,25
7160 POKES3,177
7161 :
7170 REM SET TRIANGULAR WAVEFORM
7171 :
7180 POKES1+4,17
7190 POKES2+4,17
7200 POKES3+4,17
7201 :
7990 RETURN
8000 :
8001 REM GET NYBBLE VALUES
8002 :
8050 PRINT HEADER$
8100 PRINT"        SELECT ENVELOPE "
8110 PRINT
8120 :
8200 INPUT"ATTACK  NUMBER (0 - 15) ";A
8210 GOSUB4000
8220 IF FLTHEN8200
8230 ATT=A
8240 PRINT
8260 :
8300 INPUT"DECAY  NUMBER  (0 - 15) ";A
8310 GOSUB4000
8320 IF FLTHEN8300
8330 DEC=A
8340 PRINT
8360 :
8400 INPUT"SUSTAIN NUMBER (0 - 15) ";A
8410 GOSUB4000
8420 IF FLTHEN8400
8430 SUS=A
8440 PRINT
8460 :
8500 INPUT"RELEASE NUMBER (0 - 15) ";A
8510 GOSUB4000
8520 IF FLTHEN8500
8530 DEC=A
8540 PRINT
8560 :
8990 RETURN
9000 :
9001 REM STARTING VARIABLES SET UP
9002 :
9010 S1=54272
9020 S2=S1+7
9030 S3=S2+7
9031 :
9040 REM DEFAULT VALUES
9041 :
9050 ATT=0
9060 DEC=0
9070 SUS=0
9090 REL=0
9100 HEADER$="++++++++ENVELOPE SHAPING  EXPERIMENT+++++"
9990 RETURN
10100 REM S1,S2,S3 ARE THE ADDRESSES OF
10110 REM THE  VOICE  REGISTERS  ON THE
10120 REM COMMODORE   64    SID  CHIP .
10200 :
10210 REM ATT DEC SUS REL ARE SHORT FOR
10220 REM ATTACK , DECAY, SUSTAIN  AND
10230 REM RELEASE WHICH  ARE  THE  MAIN
10240 REM COMPONENTS  OF  ENVELOPES .
10300 :
10310 REM THE NYBBLES MUST  BE  CHECKED
10320 REM TO ENSURE  THEY  ARE  BETWEEN
10330 REM THE VALUES ZERO  AND  FIFTEEN
10340 REM BECAUSE THEY  CONTROL  VOLUME
10350 REM WHICH HAS A MAXIMUM  VALUE OF
10360 REM FIFTEEN.  NOTE THE USE OF THE
10370 REM FL  OR  FLAG  VARIABLE HERE .
11000 ####################################
11001 :
11002 :
11003 REM FOR THE COMMODORE 64  COMPUTER
11004 :
11005 ####################################
```

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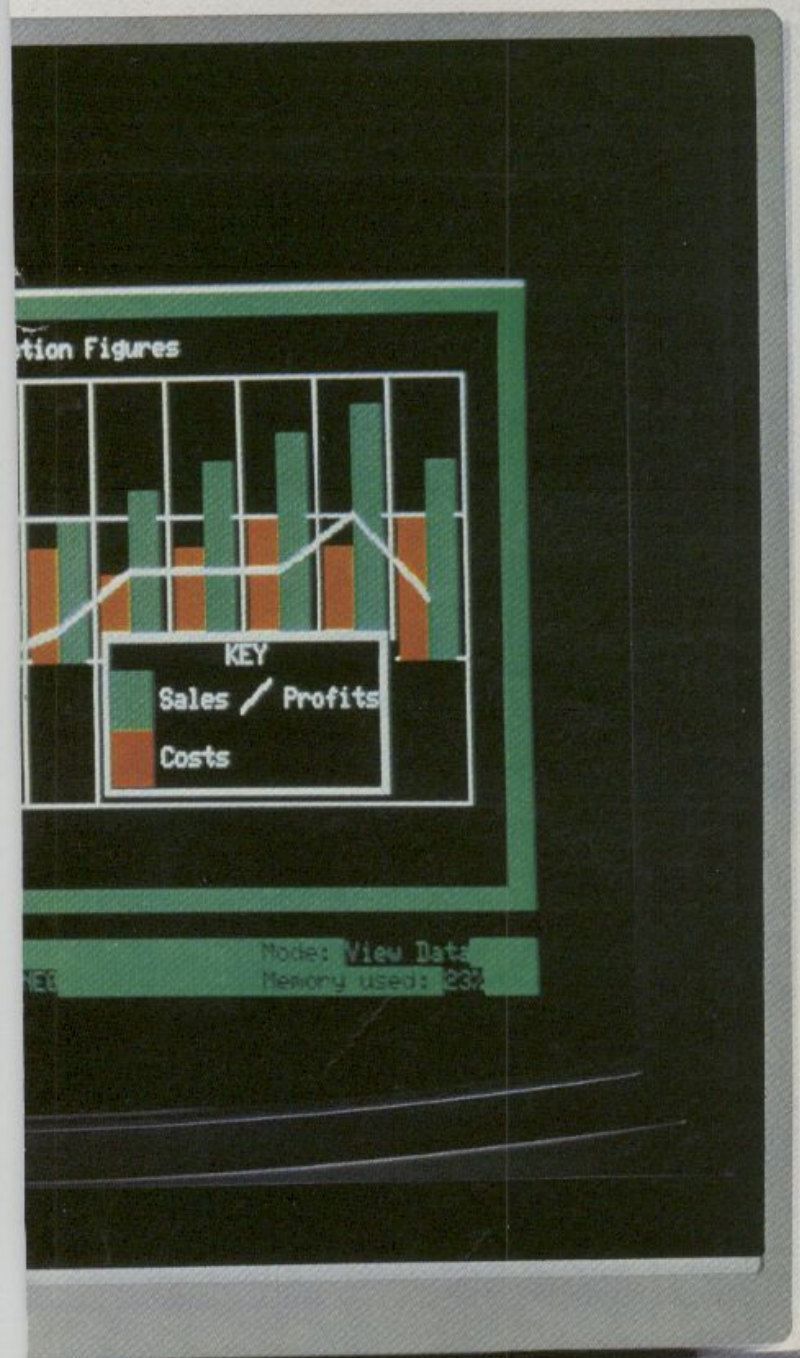


The Sinclair QL is a new computer.

Not just a new Sinclair computer, but a totally new sort of computer – nothing like it exists anywhere.

It's not just a bit better than this, or a bit cheaper than that – it's a computer that's very hard to compare with anything. Just check the features below – and if you don't agree, take up the challenge at the end of the advertisement.

If you do agree, there's only one course of action you can take... get yourself a Sinclair QL at the earliest possible moment.

The Sinclair QL has 128K RAM. Big deal?

Several micros offer 128K RAM, or more, as standard. The 'What Micro?' table for December 1983 lists over 50 of them – but 40 of the 50 micros listed cost over £2,500!

The Sinclair QL offers you 128K RAM for under £400, and an option to expand to 640K. That's a lot of bytes to the pound!

The Sinclair QL has a 32-bit processor. Who else?

Under £2,700, nobody. Even the new generation of business computers, such as the IBM PC, are only now beginning to use 16-bit processors.

At prices like this, the Motorola 68000 family – widely regarded as the most powerful microprocessors available – will remain a luxury.

Yet with the Sinclair QL, the 32-bit Motorcla 68008 is available for less than £400.

You can also be sure that the QL will not become outdated. 32-bit architecture is future-proof.

32-bit processor architecture, 128K RAM, and QDOS combine to give the QL the performance of a mini-computer for the price of a micro.

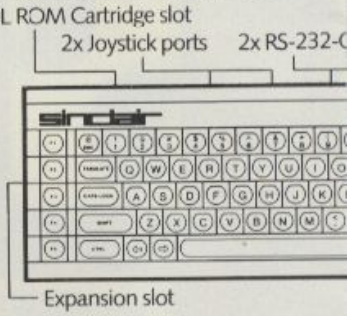
Exclusive: new QDOS operating system

No competition! QDOS sets a new standard n operating systems for the 68000 family of processors, and may well become the industry standard.

QDOS is a single-user, multi-tasking, time-sliced system using Sinclair's new SuperBASIC as a command language.

One of its most significant features is its very powerful multi-tasking capability – the ability to run several programs individually and simultaneously. It can also display the results simultaneously in different portions of the screen. These are features not normally available on computers costing less than £7,000.

Eleven input/output ports



New professional keyboard

The QL keyboard is designed for fast input of data and programs.

It is a full-size QWERTY keyboard, with 65 keys, including a space bar; left-and right-hand shift keys; five function keys; and four separate cursor-control keys – key action is positive and precise

A membrane beneath the keyboard protects the machine from dust (and coffee!), and for users who find an angled keyboard more comfortable, the computer can be raised slightly at the back by small detachable feet.

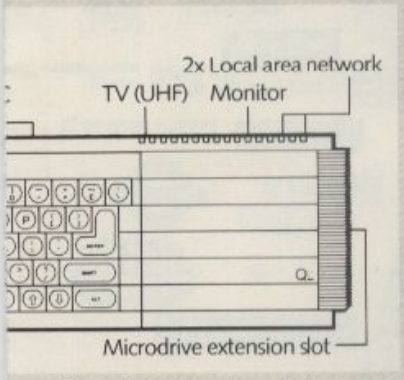
£399

ecause there's no comparison!

Advanced new friendly language – Sinclair SuperBASIC

The new Sinclair SuperBASIC combines the familiarity of BASIC with a number of major developments which allow the QL's full power to be exploited.

Unlike conventional BASIC, its procedure facility allows code to be written in clearly-defined blocks; extendability allows new procedures to be added which will work in exactly the same way as the command procedures built into the ROM; and its constant execution speed means that SuperBASIC does not get slower as programs get larger.



Two 100K microdrives built in

The Microdrives for the Sinclair QL are identical in principle to the popular and proven ZX Microdrives, but give increased capacity (at least 100K bytes each) and a faster data-transfer rate. Typical access speed is 3.5 seconds, and loading is at up to 15K bytes per second. The Sinclair QL has two built-in Microdrives. If required, a further six units can be connected.

Four blank cartridges are supplied with the machine.

Included – superb professional software

The suite of four programs is written by Psion specially for the QL and incorporates many major developments. All programs use full colour, and data is transportable from one to another. (For example, figures can be transferred from spreadsheet to graphics for an instant visual presentation.)

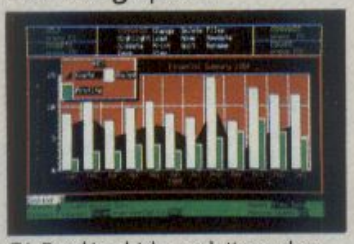
Word-processing

Certain to set a new standard of excellence, QL Quill uses the power of the QL to show on the screen exactly what you key in, and to print out exactly what you see on the screen.

A beginner can be using QL Quill for word-processing within minutes.

QL Quill brings you all the facilities of a very advanced word-processing package.

Business graphics



QL Easel is a high-resolution colour program so easy to use you probably won't refer to the manual! It handles anything from lines, shaded curves or histograms to overlapping or stacked bars or pie charts. QL Easel does not require you to format your display before entering data; it handles design and scaling automatically or under your control. Text can be added and altered as simply as data.

Spreadsheet

QL Abacus makes simultaneous calculations and 'what if' model-construction easier than they've ever been. Sample applications are provided, including budget-planning and cash-flow analysis. QL Abacus allows you to refer to rows, columns and cells by names, not just letters and numbers. Function keys can be assigned to change a variable and carry out a complete 'what if' calculation with a single key-stroke.

Database management

QL Archive is a very powerful filing system which sets new standards, using a language even simpler than BASIC. It combines ease of use for simple applications – such as card indices – with huge power as a multi-file data processor.

An easy-to-use labelling facility means that you don't have to ask for your file by its full name – a few letters are enough.

New – the Sinclair QLUB

The QLUB is the QL Users Bureau. Membership is open to all QL owners. For an annual subscription of £35, QLUB members receive one free update to each of the four programs supplied with the QL, and six bi-monthly newsletters. Sinclair has also made exclusive arrangements for QLUB members to obtain software assistance on QL Quill, Abacus, Archive or Easel by writing to Psion.

The Sinclair QL challenge

If you're seriously considering any other computer, post the coupon for a blow-by-blow comparison. We'll take a *published* comparison chart for the machine you're considering (not one we've created ourselves) and give you the Sinclair QL figures, detail by detail.

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Access to files

***Brian Cadge** looks at direct access on disc drives in the first of a two-part series*

Now that the Dragon disc drives are finally available in quantity, more and more users who have paid out nearly £300 for this metal box will be asking themselves "Is it just a fast cassette recorder?" Although one of the main advantages of a disc drive is its speed, the other major benefit is not so immediately obvious — the capability for sophisticated file handling.

Cassette tapes have the disadvantage of being serial access only — that is, record 2 can only be read after record 1 and so on. But a disc drive is capable of 'random access', that is, reading any record you wish at 'random'. The file handling commands added with the DDS cartridge are easy to use and lend themselves to direct access filing, although there is no provision for true random access from Basic as on some other drives.

The program presented here illustrates the use of direct access files and should be of use to any disc drive owners who want to keep names and addresses or catalogue their programs, etc. To try and make it as easy to follow as possible, the program is designed as a series of modules — easily spotted by the Rem lines. Line 60 defines the important function which will simulate direct access files. The Dragon disc drives allow a file to be created as it is written to, but this is only suitable for serial data. For our purposes, the disc space must already have been reserved for the file in advance — similar to a *Dim* statement — and this is done by the first module. Notice in line 310 that by the use of the *Free* function it is possible to avoid a possible error by checking that the disc space exists before attempting to *Create* the file in line 330.

To read an entry from the file, the user-defined function is used, with the argument being the record number that we wish to read. The length of the record, *L*, must also be stated as well as the name of the file, *F$*, see line 510. This program also allows you to enter a 'search string', the program then searches through the whole file and prints any possible match that it finds — the *Instr* function is very useful here.

Not only can we read from any record directly, we can also, of course, write to any record and this is done by the module starting at line 800. The same format is used for the *Fwrite* command in line 880 as is used for the *Flread* command.

Another very useful feature of the DOS Basic is error trapping. The program is fully error trapped. Any errors not found by the individual modules are handled by the error routine starting at line 1010 — the *Error Goto* command in line 70 points to this. The most common errors, for example caused by the user not inserting a disc properly, are explained in full. Others have their code number and line number displayed. After an error has occurred, control is passed back to the main menu.

By not having any data in Ram, except when required, the files can be as big as disc space will allow, up to 165K. This program is only an example of file handling on the Dragon, it is written in such a way as to be easily expanded. I leave it up to you to customise it and add your own modules as you like; for example, a printer dump of the files contents.

Next week, we take a more technical look at Dragon's disc drives, including a memory map for the DOS and some DOS Rom routines of interest to the machine code programmer. ■

```
10 'GENERAL PURPOSE FILE PROGRAM
20 'REQUIRES DRAGONDOS 1.0
30 '
40 CLEAR500
50 FLAG=0
60 DEF FNR(R)=(R-1)*L+20
70 ERROR GOTO 1010
80 CLS
90 PRINT"OPTIONS AVAILABLE ARE:"
100 PRINT
110 PRINT" 1: CREATE A NEW FILE"
120 PRINT" 2: EXAMINE ENTRIES IN FILE"
130 PRINT" 3: DELETE ENTRIES FROM FILE"
140 PRINT" 4: ADD AN ENTRY TO FILE"
150 PRINT" 5: CHANGE CURRENT FILE IN USE"
160 PRINT
170 IF FLAG=0 THEN PRINT"NO FILENAME -
    SELECT 1 OR 5." ELSE PRINT"FILE IN
    USE IS "F$
180 PRINT
190 BEEP:PRINT@453,"ENTER OPTION NUMBER";
200 INPUT OP$:OP=VAL(OP$):IF OP<1 OR OP
    >5 OR OP>INT(OP) THEN 190
210 IF FLAG=0 AND (OP<>1 AND OP<>5) THEN
    190
220 ON OP GOTO 230,400,670,800,920
230 '*****************
240 'CREATE A NEW FILE
250 '*****************
260 CLS:PRINT"CREATE A NEW FILE.":PRINT
270 INPUT "NUMBER OF RECORDS";N
280 IF N<1 THEN 270
290 INPUT "LENGTH OF EACH RECORD";L
300 IF L<1 THEN 290
310 IF (FREE1)+1024<(20+L*N) THEN BEEP:
    PRINT:PRINT"NOT ENOUGH DISK SPACE!"
    :WAIT5
000:GOTO70
320 LINE INPUT "FILENAME:";F$
330 CREATE F$,20+L*N
340 N=0
350 FWRITE F$,FROM 0,N
360 FWRITE F$,FROM 10,L
370 BEEP:PRINT:PRINT"FILE "F$" CREATED"
    :FLAG=255
380 PRINT"DISK SPACE USED ="LOF(F$+".
    DAT")
390 WAIT 5000:GOTO70
400 '*****************
410 'EXAMINE AN ENTRY
420 '*****************
430 CLS
440 INPUT "EXAMINE ALL ENTRIES (Y/N)";A$
450 IF A$="Y" THEN 620
460 CLS
470 PRINT "ENTER RECORD NUMBER OR SEARCH
    STRING:"
480 LINE INPUT S$
490 R=VAL(S$)
500 IF R=0 THEN 570
510 FLREAD F$,FROM FNR(R),FOR L,A$
520 CLS
530 PRINT"RECORD NUMBER"R
540 PRINT
550 PRINTA$
560 PRINT:PRINT"PRESS ANY KEY":EXEC41194
    :GOTO70
570 FOR I=1 TO N
580 FLREAD F$,FROM FNR(I),FOR L,A$
590 IF INSTR(1,A$,S$)<>0 THEN PRINT"
    RECORD NUMBER"I:PRINTA$:PRINT:BEEP
```

```
600 NEXTI
610 GOTO560
620 CLS
630 FORI=1 TO N
640 FLREAD F$,FROM FNR(I),FOR L,A$:PRINT
    I,A$
650 NEXTI
660 GOTO560
670 '************************
680 'DELETE AN ENTRY FROM FILE
690 '************************
700 CLS
710 BEEP:INPUT "RECORD NUMBER TO BE
    DELETED",R
730 FLREAD F$,FROM FNR(R),FOR L,A$
740 PRINT:PRINT"DELETE:":PRINTA$
750 INPUT"DELETE (Y/N)",Z$
760 IF Z$<>"Y" THEN BEEP:PRINT"ABANDONED
    ":WAIT5000:GOTO70
770 FWRITE F$,FROM FNR(R),FOR L," "
780 IF R=N THEN N=N-1:FWRITE F$,FROM 0,N
790 GOTO70
800 '*****************
810 'ADD ENTRY TO FILE
820 '*****************
830 CLS
840 INPUT "RECORD NUMBER",R
850 IF R<1 THEN 840
860 PRINT:PRINT"ENTER TEXT:"
870 PRINT:LINE INPUT A$
880 FWRITE F$,FROM FNR(R),FOR L,A$
890 IF R>N THEN N=R:FWRITE F$,FROM0,N
900 INPUT "ADD ANOTHER (Y/N)",A$
910 IF A$="Y" THEN 800 ELSE 70
920 '*******************
930 'CHANGE CURRENT FILE
940 '*******************
950 CLS
960 LINE INPUT "FILENAME)",F$
970 FREAD F$,FROM0,N
980 FREAD F$,FROM10,L
990 FLAG=255
1000 GOTO70
1010 '**********************
1020 'ERROR TRAPPING ROUTINE
1030 '**********************
1040 SOUND1,1
1050 IF ERR>=128 THEN PRINT"DISK ERROR"
     ELSE PRINT"ERROR IN BASIC"
1060 PRINT"ERROR"ERR,"AT LINE",ERL
1070 PRINT
1080 IF ERR=128 THEN PRINT"DISK NOT
     READY, PLEASE ENSURE   THAT DISK
      IS IN PLACE AND THE   HATCH IS
      CLOSED."
1090 IF ERR=160 THEN PRINT"YOU HAVE TRIED
     TO ACCESS A FILE THAT DOES NOT EXIST.
1100 IF ERR=154 THEN PRINT"YOU HAVE TRIED
     TO ACCESS A DATA RECORD THAT DOES
     NOT EXIST."
1110 IF ERR=162 THEN PRINT"THERE ARE TOO
     MANY FILES OPEN":CLOSE
1120 WAIT 5000:GOTO70
```


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Keyed up

***Michael Durrant** explains how to get 40 function keys on the BBC with 1.2 Rom*

This program enables you to set up the function keys on the BBC B such that you can get not the usual 10 but 40 different functions.

This facility is made possible by the new 1.2 *Rom* (and so will not work on machines with the old *Rom*) and using function keys in conjunction with different keys. The combinations are as follows:

1) Function keys on their own
2) Function keys with *Shift*
3) Function keys with *Control*
4) Function keys with *Control* and *Shift*

The important thing to note is that the additional 30 character definitions will survive not only a *Break* but also a hard — reset (*Ctrl — Break*). This means that once this program has been run and the characters defined, another program can be entered (in *Mode* 4 say) and the keys can be used to insert the definitions as one character, instead of the *Print Chr$ (224);* etc, with the *Vdu* definitions at the beginning. ■

```
 10 MODE7
 20 PROCOFF
 30 PRINTTAB(5,5);CHR$(141);CHR$
    (130);CHR$(157);CHR$(132);"
    FUNCTION KEYS SET U ";CHR$(156)
 40 PRINTTAB(5,6);CHR$(141);CHR$
    (130);CHR$(157);CHR$(132);
    "FUNCTION KEYS SET U ";CHR$(156)
 50 VDU28,0,24,39,8
 60 PRINT'TAB(3);" NORMAL FN:"
 80 PRINTTAB(4);"0. .UNUSED'
 90 PRINTTAB(4);"1. .UNUSED'
100 PRINTTAB(4);"2. .LIST["
110 PRINTTAB(4);"3. .RUN["
120 PRINTTAB(4);"4. .*FX12,4[
    *FX11,35["
130 PRINTTAB(4);"5. .PRINTTAB("
140 PRINTTAB(4);"6. .=INKEY("
150 PRINTTAB(4);"7. .*KEY"
160 PRINTTAB(4);"8. .UNUSED"
170 PRINTTAB(4);"9. .UNUSED"
180 PRINTTAB(4);"10 .OLD[ LIST"
190 *KEY2"LIST!M"
200 *KEY3"RUN!M"
210 *KEY4"*FX12,4!M*FX11,35!M"
220 *KEY5"PRINTTAB("
230 *KEY6"=INKEY("
240 *KEY7"*KEY"
250 *KEY10"OLD!MLIST"
260 PRINTTAB(5,14);CHR$(130);"PRESS
    ANY KEY FOR NEXT PAGE"
270 PRINTTAB(5,15);CHR$(148);STRING
    $(27,"`")
280 A$=GET$
290 CLS
300 PRINT'TAB(3);" SHIFT FN:"
310 PRINTTAB(3);CHR$(145);"````````
320PRINTTAB(4);"0. .NO EFFECT"
330PRINTTAB(4);"1. .RED   ";CHR$
   (134);"   THESE KEYS ARE USED"
340PRINTTAB(4);"2. .GREEN ";CHR$
   134;"   IN MODE SEVEN"
350PRINTTAB(4);"3. .YELLOW";CHR$
   134;"   AND WHEN PRESSED"
360PRINTTAB(4);"4. .BLUE  ";CHR$
   134;"   WITH A SHIFT KEY"
370PRINTTAB(4);"5. .MAGENTA";CHR$
   134;"  GIVE COLOURS"
380PRINTTAB(4);"6. .CYAN";CHR$
   (134);"(USEFUL IN"
390PRINTTAB(4);"7. .WHITE ";CHR$
   134;"   IN PRINT STATEMENTS)"
400PRINTTAB(4);"8. .FLASH"
410PRINTTAB(4);"9. .STEADY"'
420 PRINTTAB(5,14);CHR$(130);"PRESS
    ANY KEY FOR NEXT PAGE"
430 PRINTTAB(5,15);CHR$(148);STRING
    $(27,"`")
440 A$=GET$
450 MODE1
460 PROCOFF
470 COLOUR1:PRINT''''''TAB(3);"
    CNTRL FN:"
480 COLOUR2:PRINTTAB(3);"**********
490 COLOUR3
500 *FX227,224
510VDU23,224,129,66,36,24,24,36,
    66,129
520VDU23,225,255,255,255,255,255,
    255,255,255
530VDU23,226,0,60,126,126,126,126,
    60,0
540VDU23,227,255,129,129,129,129,
    129,129,255
550VDU23,228,0,0,60,36,36,60,0,0
560VDU23,229,126,195,219,215,215,
    219,195,126
570VDU23,230,170,85,170,85,170,85,
    170,85
580VDU23,231,85,170,85,170,85,170,
    85,170
590VDU23,232,0,0,0,24,24,0,0,0
600VDU23,233,24,24,24,24,24,24,24,
    24
610 PRINT
620 PRINTTAB(9);"0. ";CHR$(224)'
630PRINTTAB(9);"1. ";CHR$(225)'
640PRINTTAB(9);"2. ";CHR$(226)'
650PRINTTAB(9);"3. ";CHR$(227)'
660PRINTTAB(9);"4. ";:COLOUR1:PRINT
   FOR MODES 0 TO 6";:COLOUR3:PRINT
670PRINTTAB(9);"5. ";CHR$(229)'
680PRINTTAB(9);"6. ";CHR$(230)'
690PRINTTAB(9);"7. ";CHR$(231)'
700PRINTTAB(9);"8. ";CHR$(232)'
710PRINTTAB(9);"9. ";CHR$(233)'
720 COLOUR2
```

```
730 COLOUR2:PRINTTAB(8)"PRESS ANY
    KEY FOR NEXT PAGE"
740 COLOUR1:PRINTTAB(7);STRING$
    (29,"*")
750 A$=GET$
760 CLS
770COLOUR2:PRINT''''TAB(3);" SHIFT
    & CNTRL FN:"
780COLOUR1:PRINTTAB(3);"**********
    *********"
790 COLOUR2
800 *FX228,234
810VDU23,234,255,255,255,255,0,0,0,0
820VDU23,235,0,0,0,0,255,255,255,255
830VDU23,236,240,240,240,240,240,
    240,240,240
840VDU23,237,15,15,15,15,15,15,15,15
850 VDU23,238,240,240,240,240,0,0
    ,0,0
860 VDU23,239,15,15,15,15,0,0,0,0,
    15,15,15,15
870VDU23,240,0,0,0,0,240,240,240,
    240
880VDU23,241,0,0,0,0,15,15,15,15
890VDU23,242,1,3,7,15,31,63,127,254
900VDU23,243,128,192,224,240,248,
    252,254,255
910 FORN=0TO9
920 PRINTTAB(4);N;".";:COLOUR2:
    PRINTCHR$(129);:COLOUR1:PRINT
    CHR$(234+N);:COLOUR2:PRINTCHR$
    (129)':COLOUR2:NEXT
930 PRINTTAB(17,10);"THE RED
    CHARACTERS"
940 PRINTTAB(17,11);"ARE THE
    CHARACERS"
950 PRINTTAB(17,12);"DEFINED AND
    THE"
960 PRINTTAB(17,13);"YELLOW BLOCKS"
970 PRINTTAB(17,14);"EMPHASIZE
    THEIR"
980 PRINTTAB(17,15);"POSITION ON A"
990 PRINTTAB(17,16);"CHARACTER CELL
1000 COLOUR1:PRINTTAB(18,19);" FOR
     MODES 0 TO 6"
1010 PRINT''''''''
1020 COLOUR2:PRINTTAB(8)"PRESS ANY
     KEY TO FINISH"
1030 COLOUR1:PRINTTAB(6);STRING$
     (27,"*")
1040 A$=GET$
1050 COLOUR3
1060 END
1070 DEFPROCOFF
1080 VDU23,1,1;0;0;0;
1090 ENDPROC
```

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Maze 'n' Chase

on Spectrum

Maze 'n' Chase is an addictive maze chase-type program with a difference. You are the small man beginning at the bottom of the screen. You must move around the maze, eating the dots and scoring points (use cursor control keys to move, arrows show direction of movement). However, you must avoid the small invader that inhabits the maze, who moves towards you with deadly intent. Every spade you run into enables you to dig one hole in the maze (press key 0 to dig). Only the invader can fall down the holes you dig, and when he does you must race to the scene and fill in the hole (press key P to fill); this must be done before the invader has time to climb out.

Whenever an invader is buried, you will have several seconds before a new and identical invader appears. There are four spades in each maze. When you have cleared the maze of dots and spades, you will move on to a new and different maze. You have four lives. You score one point for each dot eaten, 10 points each spade picked up and 30 points for each invader buried.

Program notes

The program uses the *Attr* and *Screen$* function extensively throughout to detect what is where in the maze. The main purpose of lines 104-240 is to control the movement of the invader. The invader will keep within the maze walls and will actually chase you. If the invader gets near you he will accelerate. User-defined graphics are used and are set up in lines 1000-1020. The maze is constructed in lines 5-50.

PROGRAM OF THE WEEK

```
    1 REM A-MAZE-'N' CHASE
          by J.Southgate.
    2 GO SUB 1000
    3 LET h=0: LET li=4: LET sc=0
: LET y=0: LET p=0: LET o=1
    5 FOR i=1 TO 19 STEP 2: BEEP
.01,60-i*2: PRINT AT i,0; INK 0;
".....
": NEXT i
   10 FOR n=2 TO 19 STEP 2: PRINT
 AT n,0; INK 6;"
"
   20 PRINT AT n,RND*28+1;" ": IF
 RND>.2 THEN GO TO 20
   30 NEXT n
   35 PRINT AT 1,2; INK 4;"I";AT
5,28; INK 4;"I";AT 15,2; INK 4;"
I";AT 19,28; INK 4;"I"
   40 FOR n=0 TO 20: PRINT AT n,0
; INK 6;"";AT n,30; INK 6;"":
NEXT n
   50 FOR n=0 TO 30: PRINT AT 0,n
; INK 6;"";AT 20,n; INK 6;"":
NEXT n
   60 LET w=0: LET y=0: LET o=1:
LET l=19: LET c=12: LET a=2: LET
 b=5
   65 PRINT AT l,c; INK 1;"A": IF
 INKEY$="" THEN GO TO 65
   70 PRINT AT 21,2;"SCORE=";sc;A
T 21,14;"LIVES=";li;AT 21,25;"I=
";p: NEXT n
   71 PRINT AT l,c;" "
   72 IF INKEY$="0" THEN GO SUB 5
00
   75 LET e$=INKEY$: IF e$>"4" AN
D e$<"9" THEN LET m$=e$
   80 LET l=l+((m$="6") AND ATTR
(l+1,c)<>62)-(m$="7" AND ATTR (l
-1,c)<>62)
   90 LET c=c+((m$="8") AND ATTR
(l,c+1)<>62)-(m$="5" AND ATTR (l
,c-1)<>62)
   92 IF ATTR (l,c)=60 THEN LET s
c=sc+10: LET p=p+1: LET w=w+1: B
EEP .5,20: IF w>=287 THEN LET sc
=sc+50: FOR n=0 TO 20: PRINT AT
n,0;"
";: BEEP .1,n*2: NEXT n: GO
TO 5
   95 IF SCREEN$ (l,c)="." THEN L
ET sc=sc+1: LET w=w+1: BEEP .001
,30: IF w>=287 THEN LET sc=sc+50
: FOR n=0 TO 20: PRINT AT n,0;"
                              ":
 BEEP .1,n*2: NEXT n: GO TO 5
  100 PRINT AT l,c; INK 1;"A"
  102 IF y=1 AND l=a AND (c=b-1 O
R c=b+1) AND INKEY$="p" THEN BEE
P .01,20: PRINT AT a+1,b; INK 6;
"": BEEP .5,20: BEEP .5,-20: LE
T sc=sc+30: LET a=1: LET b=5
  104 IF h=1 THEN PRINT AT a,b;".
": LET h=0: GO TO 106
  106 PRINT AT a,b;" "
  108 IF y=1 THEN BEEP .01,-20: L
ET x=x+1: IF x=30 THEN LET y=0:
PRINT AT a+1,b; INK 6;""
  109 IF y=1 THEN GO TO 70
  110 IF a=l THEN GO TO 200
  120 LET a=a+(a<l AND (ATTR (a+1
,b)<>62))-(a>l AND (ATTR (a-1,b)
<>62))
  125 IF o=1 AND ATTR (a,b+1)<>62
 THEN LET b=b+1
  128 IF o=-1 AND ATTR (a,b-1)<>6
2 THEN LET b=b-1
  129 IF ATTR (a,b+o)=62 THEN LET
 o=o*-1
  130 IF ATTR (a,b+o)=60 THEN LET
 o=o*-1
  135 IF SCREEN$ (a,b)="." THEN L
ET h=1
  140 PRINT AT a,b; INK 2;"Q": GO
 TO 70
  210 IF b>c THEN LET b=b-1
  220 IF b<c THEN LET b=b+1
  225 IF ATTR (a,b)=57 THEN FOR i
=65 TO 90: PRINT AT a,b;CHR$ i:
BEEP .01,i-40: NEXT i: PRINT AT
a,b;"B": BEEP .5,-30: PRINT AT a
,b;" ": LET li=li-1: LET l=19: L
ET c=5: LET a=1: LET b=5: IF li=
0 THEN GO TO 700
  228 IF ATTR (a+1,b)=59 THEN GO
SUB 600
  229 IF SCREEN$ (a,b)="." THEN L
ET h=1
  230 PRINT AT a,b; INK 2;"Q"
  240 GO TO 70
  500 IF p=0 OR ATTR (l+1,c)<>62
OR m$="6" THEN RETURN
  510 PRINT AT l+1,c; INK 3;"":
BEEP .1,-30: BEEP .1,-20: BEEP .
1,-10: LET p=p-1: RETURN
  600 LET y=1: LET x=1: BEEP .01,
20: PRINT AT a+1,b;"": OVER 1;C
HR$ 8;"Q": BEEP .2,-10: BEEP .01
,20: GO TO 70
  700 PRINT AT 8,10; INK 2; INK 2
; PAPER 6;"GAME OVER": BEEP 1,30
: INPUT ; INK 7; PAPER 0;"PRESS
 ENTER TO PLAY AGAIN";y$: RUN
1000 FOR u=144 TO 146: FOR n=0 T
O 7
1010 READ r: POKE USR CHR$ u+n,r
: NEXT n: NEXT u
1020 DATA 24,36,66,165,66,36,90,
129,60,36,24,126,153,36,36,102,1
26,16,16,16,16,124,124,56
1030 RETURN
```

Maze 'n' Chase
by James Southgate

Music

on BBC

This machine code routine makes keying in programs more pleasant, giving you a beep of varying pitch each time you press a key.

The *Osrdch* vector is altered to point to this routine. At the end of the routine a jump is made to &DFA5, which is the normal contents of the vector at &210.

The pitch of the note is determined by multiplying the ASCII code of the letter you press by three. An *Osword* routine is used to make the sound.

Instructions on how to change the various parameters of the sound are given in the program. Lines 310-340 determine whether the code is less than 32; ie, a control code. If it is a control code then a sound is not emitted. Lines 460-500 are responsible for making the sound.

```
 90 *KEY10 OLD|M?&210=0:?&211=&0D|M
100 ?&210=0:?&211=&0D:?&70=2:?&71=0
    :?&72=&F6:?&73=&FF:?&74=0:?&75=0
    :?&76=4:?&7 7=0
110
120 REM ***** TO CHANGE THE
    AMPLITUDE OF THE SOUND USE
    '?&72=amplitude' *****
140 REM ***** TO SWITCH SOUND OFF
    USE HARD BREAK OR ?&210=&A5:
    ?&211=&DF ****
160 REM ***** TO CHANGE SOUND
    CHANNEL USE '?&70=channel *****
180 REM ***** TO CHANGE THE
    DURATION OF THE SOUND USE ?&76=
    duration. (TWENTIETHS OF A
    SECOND) *****
220 FOR PASS=0 TO 3 STEP 3
230 P%=&D00
240 [OPT PASS
250 STA &80
260 PHA
270 TYA
280 PHA
290 TXA
300 PHA
310 LDA &80
320 SEC
330 SBC #31
340 BCS GTEQUAL
350 PLA
360 TAX
370 PLA
380 TAY
390 PLA
400 JMP &DFA5
410 .GTEQUAL
420 STA &81
430 ASL A
440 CLC
450 ADC &81
460 STA &74
470 LDA #7
480 LDX #&70
490 LDY #0
500 JSR &FFF1
510 PLA
520 TAX
530 PLA
540 TAY
550 PLA
560 JMP &DFA5
570 ]
580 NEXT
```

Music
by Robert Turner

Wordgame

on Dragon 32

The program produces a trackword-type game, with a set time-limit.

Program notes

10	Initialise arrays etc
20-50	Select or reject instructions
60-90	Select own word
100-120	Select word from array
130-170	Scramble word
180-250	Prepare board
260-330	Run/re-run game
340-360	Prepared words
380-490	Print instructions
500-	Accept user's word

```
10 DIMW$(30),U$(9),S$(9):B$=STRING$(7,128)
20 CLS:PRINT"DO YOU WANT INSTRUCTIONS (Y/N)"
30 A$=INKEY$
40 IF A$="" THEN S=RND(30):GOTO 30
50 IF A$="Y" THEN GOSUB 380
60 CLS
70 PRINT"USE MY NINE-LETTER WORD (Y/N)"
80 A$=INKEY$:IF A$="" THEN 80
90 IF A$="N" THEN GOSUB500:GOTO130
100 FOR N=1 TO 30:READW$(N):NEXT
110 X$=W$(S)
120 FOR N=1 TO9:U$(N)=MID$(X$,N,1):NEXT
130 FOR N= 1 TO 9:S$(N)="":NEXT
140 FOR N=1 TO 9
150 S=RND(9)
160 IF S$(S)="" THEN S$(S)=U$(N) ELSE 150
170 NEXT N
180 CLS6
190 FOR X=170 TO 362 STEP 32
```

```
200 PRINT@X,B$;
210 NEXT X
220 PRINT@203,S$(1);:PRINT@205,S$(2);:PRINT@207,S$(3);
230 PRINT@267,S$(4);:PRINT@269,S$(5);:PRINT@271,S$(6);
240 PRINT@331,S$(7);:PRINT@333,S$(8);:PRINT@335,S$(9);
250 PRINT@416,"";
260 TIMER=0
270 IF TIMER/50 <120 THEN270
280 SOUND 150,10
290 PRINT@416,"YOUR TIME IS UP     ";CHR$(223);
300 PRINT@448,"ANOTHER GAME (Y/N)?";
310 A$=INKEY$:IF A$="" THEN310
320 IF A$<>"Y" THEN END
330 RESTORE:GOTO20
340 DATA AUBERGINE,ACCORDION,MELODRAMA,ARTICHOKE,TRIBUTARY,BACKWATER,
    APPETISER,CHIPOLATA,LOLLIPOPS,BLACKJACK
350 DATA PRIVATEER,NORWEGIAN,SOVEREIGN,AFTERWARD,SEPTEMBER,PIECEMEAL,
    YESTERDAY,ANCHOVIES,BRIMSTONE,TARANTULA
360 DATA BUTTERCUP,DANDELION,SACRAMENT,EPISCOPAL,CATHEDRAL,MANGANESE,
    INOCULATE,EPIDERMIS,HEARTBURN,ADRENALIN
370 END
380 CLS
390 PRINT"THE IDEA OF THE GAME IS TO"
400 PRINT"FORM WORDS BY COMBINING ADJACENTLETTERS. ";
410 PRINT"LETTERS CAN BE ADJACENT";
420 PRINT"HORIZONTALLY,VERTICALLY, "
430 PRINT"OR DIAGONALLY."
440 PRINT"EACH LETTER CAN BE USED ONLY"
450 PRINT"ONCE IN EACH WORD"
460 PRINT:PRINT:PRINT
470 PRINT"PRESS ANY KEY TO CONTINUE"
480 A$=INKEY$:IF A$="" THEN 480
490 RETURN
500 PRINT"WHAT'S YOUR WORD";
510 INPUTWO$
520 IF LEN(WO$)<>9 THENPRINT:PRINT"NINE LETTERS PLEASE!":FOR T= 1 TO
    1000:NEXT T:GOTO500
530 FOR N= 1 TO 9:U$(N)=MID$(WO$,N,1):NEXT N
540 RETURN
```

Wordgame
by D Lee

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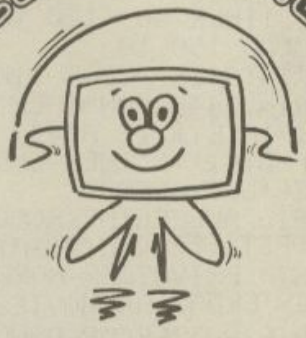

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SPRITES FOR THE DRAGON

Merlin's Sprite Magic offers a whole host of new features for the Dragon

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Animation is easily implemented with DRWG function which swaps the drawings being used for sprites and they needn't even be the same size.

Some of the commands are exceptionally powerful . . . MOVEn moves a single sprite, MOVEn,n moves a block of sprites, MOVEM moves all the sprites. All the MOVE commands observe the individual direction, screen-edge, joystick and keyboard instructions for the various sprites. The REPORT function reports how many have crashed. The HIT function reports crashed sprite numbers.

Sprites are non-destructive i.e. they do not leave a "trail". They're fast and they're efficient and they're easy to use.

The Dragon now has its very own BEEP command. This one, however, offers a range of 16 pre-programmed gunshots, explosions, sirens, laser sounds and the like. You can also program your own . . . BEEP (six parameters) lets you generate the kind of noises you have heard on other high quality software.

Keyboard handling has had some attention too . . . optional auto-repeat, INKEY function returns ASCII code, KEY function does the same, but waits for a keypress. CLEAR key clears hi-res screen and homes the print cursor.

We have also included a couple of routines to provide text on the hi-res screen . . . in all 5 PMODES with enhanced cursor controls providing relative as well as absolute positioning, PAGE command, HOLD command (to fix headers or graphics), COLOUR command changes text foreground and background colours etc. The hi-res screen is used just like the Basic text screen, including editing. You can also re-define the character set using the friendly new command CHR(n)=eight row values.

Sprite Magic requires absolutely no knowledge of machine code. The comprehensive manual describes the new Basic commands in full, with lots of examples. As well as the documented demonstration program, the cassette includes Character and Sound Generators, Mate in two (yes you can!), Shooting Gallery and Breakout. Price £17.25 all inclusive.

Access

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BARCLAYCARD VISA

Letter Puzzle

on Vic20

This program draws a five by five grid with the letters a to x. You then move the letters and try to get them into order. The instructions tell you the order in detail. You move the letters with the keys:

W = Up
A = Left
D = Right
X = Down

— or use a joystick. The puzzle is like *Magic Squares* which are small plastic squares in which you move bits around to make words or pictures. The Rem statements are self-explanatory and so you should be able to follow how the program works easily.

```
10 POKE 36879,8
12 POKE 36878,15
13 POKE 36864,12
20 REM
22 REM **** INISIALISE ****
25 REM.
27 DIM P(30),C(30),T(24)
30 FOR I=1 TO 25
35 READ P(I):NEXT
50 REM **** DATA FOR POSITIONS ****
55 REM
60 DATA 7774,7777,7780,7783,7786
62 DATA 7840,7843,7846,7849,7852
64 DATA 7906,7909,7912,7915,7918
66 DATA 7972,7975,7978,7981,7984
68 DATA 8038,8041,8044,8047,8050
70 REM ** PUT CHARS IN RANDOM **
71 C(25)=32
72 FOR I=1 TO 24
75 X=INT(RND(1)*24)+1
77 IF T(X)<>0 THEN 75
80 C(I)=X:T(X)=1:NEXT I
100 REM
102 REM **** INSTRUCTIONS ****
105 REM
110 PRINT"    LETTER PUZZLE"
115 PRINT"    ═══════════"
120 PRINT"  MOVE THE LETTERS AND  PUT THEM INTO ORDER"
125 PRINT"  USE THE KEYS:-"
130 PRINT"        W"
132 PRINT"        |"
134 PRINT"      A-S-D"
136 PRINT"        |"
138 PRINT"        X"
140 PRINT"  OR USE THE JOYSTICK"
150 PRINT"     PRESS ANY KEY     "
155 GETA$:IFA$=""THEN155
160 PRINT"    LETTER PUZZLE"
162 PRINT"    ═══════════"
170 GOSUB 500:REM * GRID *
175 FOR I=1 TO 24
180 POKE P(I),I:NEXT
185 PRINT"  GET THE LETTER INTO   THIS ORDER."
190 PRINT"     PRESS ANY KEY     "
195 GETA$:IFA$=""THEN195
200 REM
202 REM **** SET UP PUZZLE ****
205 REM
210 PRINT"      LETTER PUZZLE"
215 PRINT"      ═══════════"
220 GOSUB 500:REM * GRID *
230 FOR I=1 TO 25
235 POKE P(I),C(I)
237 POKE P(I)+30720,4
240 NEXT I
250 TI$="000000"
260 P=25:TR=0
300 REM
303 REM **** PLAY ****
305 REM
307 POKE 36864,8
312 REM ** JOY STICK **
313 M=0
314 J=PEEK(37137)
316 IF J=110 THEN M=-1
318 IF J=122 THEN M=-5
320 IF J=118 THEN M=5
322 POKE 37154,127
324 IF PEEK(37152)=119 THEN M=1
330 POKE 37154,255
332 REM ** KEYBOARD **
333 REM-LARGE PETE-
334 J=PEEK(197)
336 IF J=09 THEN M=-5
338 IF J=17 THEN M=-1
340 IF J=18 THEN M=1
342 IF J=26 THEN M=5
352 IF M=0 THEN 380
355 P1=P+M
357 IF P1<26 AND P1>0 THEN 360
358 POKE36875,230
359 FORR=1TO400:NEXT:POKE36875,0:GOTO 390
360 IF M=1 AND P/5=INT(P/5)THEN 365
361 IF M=-1 AND P/5-.2=INT(P/5)THEN 365
362 IF M=-1 AND P=21 THEN 365
363 GOTO 370
365 POKE 36875,220
366 FORR=1TO400:NEXT
367 POKE 36875,0:GOTO380
370 POKE P(P),PEEK(P(P1))
372 POKE P(P),PEEK(P(P1))
375 POKE P(P1),32
376 POKE 36876,200
377 FORR=1TO200:NEXT
378 POKE36876,0
379 P=P1:TR=TR+1
380 REM
382 REM **** CHECK FOR WIN ****
383 REM
384 FOR I=1 TO 24
385 IF PEEK(P(I))<>ITHEN 390
387 NEXT:GOTO 700
390 PRINT"                    TIME:";TI$
395 PRINT"  MOVES:";TR
400 GOTO 300
500 REM
502 REM **** DRAW GRID ****
505 REM
510 PRINT"          ┌─┬─┬─┬─┬─┐"
520 FOR I=1 TO 4
530 PRINT"     │ │ │ │ │ │"
535 PRINT"     │ │ │ │ │ │"
540 PRINT"     ├─┼─┼─┼─┼─┤"
545 NEXT I
550 PRINT"     │ │ │ │ │ │"
555 PRINT"     └─┴─┴─┴─┴─┘"
560 RETURN
700 REM
702 REM **** WIN ****
703 REM
705 PRINT"      WELL DONE YOU MADE IT!"
710 FOR I=1 TO 10
720 POKE 36875,0:POKE36876,128
730 FORR=1TO300:NEXT
740 POKE 36876,0:POKE36875,128
750 FORR=1TO300:NEXT
760 NEXT I
765 POKE 36875,0
770 PRINT"  ANOTHER GO(Y OR N)"
780 GETA$:IFA$=""THEN780
790 IFA$="Y"THEN RUN
800 PRINT"J":POKE36879,27
810 POKE 36864,12
```

Letter Puzzle
by A Blackham

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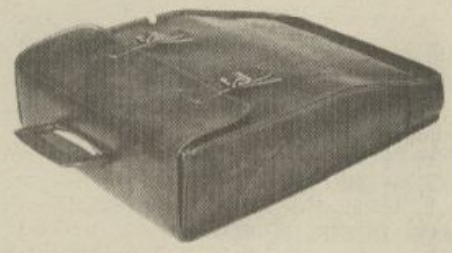

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Input

on Spectrum

The purpose of this piece is to provide an alternative to using the *Input* statement when entering numerical data into Spectrum. The *Input* statement has three major faults: first, the value entered is removed from the screen once the *Enter* key has been hit. The second is that using *Input* stops you from using the bottom two lines of the screen for display purposes. Third, and most importantly, *Input* is not 'user friendly' for numeric data. If we hit a non-numeric key by accident (and we all do this from time to time), then the program will crash with an error code 2.

Program 1, which uses *Inkey$* instead of *Input*, has been written as a subroutine which can be used with other programs. An input prompt is printed (line 3010) and the auto repeat is cancelled (line 3020). The subroutine now waits for a key to be hit and the result is stored in location B$. Lines 3050 to 3100 test the *Code* of the last key hit to ascertain whether or not that key is valid for numeric data.

Program 2 is an illustration of a main program using this subroutine, the data that we enter being stored in an array X. As the subroutine stores the numeric data as a string, we must use the *Val* function if we wish to use X as our array.

Also it is convenient to initiate an auto-scroll (lines 60 and 160) in case we wish to store more than 20 numbers. The Print statement following the *Gosubs* are necessary because the subroutine does not force the computer to move to the next line. Program 3 illustrates how the subroutine can be used when entering pairs of numbers — in a regression program, for example. I have found this subroutine to be especially useful when I have written programs where the output is in the form of a table, but one entry per line of the table is an input.

Program 1

```
3000 LET A$="": LET D=0
3010 PRINT FLASH 1;">"; FLASH 0;
CHR$ 8;
3020 IF INKEY$<>"" THEN GO TO 30
20
3030 IF INKEY$="" THEN GO TO 303
0
3040 LET B$=INKEY$: LET Z=CODE B
$
3050 REM CHECK FOR VALID ENTRY
3060 IF Z>47 AND Z<58 THEN GO TO
 3130
3070 IF Z=13 AND A$<>"" THEN GO
TO 3230
3080 IF Z=46 AND D=0 THEN GO TO
3120
3090 IF Z=12 THEN GO TO 3170
3100 GO TO 3020
3110 REM ENTRY ACCEPTED
3120 LET D=1
3130 LET A$=A$+B$
3140 PRINT B$;
3150 BEEP .1,15
3160 GO TO 3010
3170 REM DELETE LAST ENTRY
3180 IF A$="" THEN GO TO 3020
3190 IF A$(LEN A$)="." THEN LET
D=0
3200 LET A$=A$(1 TO LEN A$-1)
3210 PRINT " ";CHR$ 8;CHR$ 8;
3220 GO TO 3010
3230 REM ENTER PRESSED
3240 IF A$="." THEN GO TO 3020
3250 PRINT " "; : BEEP .1,10
3260 RETURN
```

Program 2

```
  10 DATA "1st","2nd","3rd"
  20 PRINT "HOW MANY ENTRIES? ";
  30 GO SUB 3000: LET N=VAL A$
  40 PRINT
  50 DIM X(N)
  60 PRINT
  70 POKE 23692,255
  80 FOR I=1 TO 3
  90 READ A$
 100 PRINT A$;" NUMBER = ";
 110 GO SUB 3000: LET X(I)=VAL A
$
 120 PRINT
 130 NEXT I
 140 FOR I=4 TO N
 150 PRINT I;"th NUMBER = ";
 160 GO SUB 3000: LET X(I)=VAL A
$
 170 PRINT
 180 NEXT I
 190 STOP
```

Program 3

```
  10 PRINT "HOW MANY PAIRS? ";
  20 GO SUB 3000: LET N=VAL A$
  30 DIM X(N): DIM Y(N)
  40 PRINT : PRINT
  50 PRINT TAB 5;"X VALUE";TAB 2
0;"Y VALUE"
  60 POKE 23692,255
  70 FOR I=1 TO N
  80 PRINT TAB 8;
  90 GO SUB 3000: LET X(I)=VAL A
$
 100 PRINT TAB 23;
 110 GO SUB 3000: LET Y(I)=VAL A
$
 120 PRINT
 130 NEXT I
 140 STOP
```

Input
by Ronald Jones

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Beginners only

What would you recommend as a good Adventure for a beginner to start on? This is a question that I am often asked and, to be truthful, I cannot answer it!

There are, nowadays, several categories of Adventure — we can distinguish text Adventures, text with graphics, and graphics-only Adventures. We can further reduce any Adventure to one of two types if we concentrate on playing techniques.

Programs like *The Hobbit* or *Valhalla*, and most of the D&D-type combat Adventures, actually change with each playing, and the solution to the game at one playing need not necessarily be the solution at the next playing. Having silly Thorin wandering about, wittering on about Gold, or Mary bashing you over the head when you let loose a perfectly reasonable bit of strong language may prove a bit confusing to the beginner, who has enough to worry about (although I recently had a letter from an Adventurer of eight years old who completed *The Hobbit* in just a week or so!).

So, although the unpredictable elements in this kind of Adventure may appeal to some players, in general, the beginner will find that text Adventurers are easier to play, with graphic Adventures being tackled later.

From America, Scott Adams and his company, Adventure International, have one of the most well-known catalogues of Adventures. These are available for all the American computers — Atari, Vic20, CBM 64, Apple — and have the added bonus of a Difficulty Rating system. Thus, *Pirate Adventure* is the easiest and would be a good place for the absolute beginner to start. The others range through Medium Difficulty to Advanced Adventurers Only Need Apply!

Probably the hardest is *Savage Island Part 2*, and I wouldn't recommend this one to a complete novice. Anyway, they're all pretty good value, and if you have an Atari or Apple, you can get to see a SAGA (Scott Adams Graphic Adventure) — they are rather expensive, and apart from the pretty pictures, are exactly the same as the text version.

The Scott Adams Adventures are now available for the Spectrum. Adventure International has finally woken up to the fact that there are a million Sinclair owners, a large percentage of whom are just dying to get their hands on a Scott Adams Adventure — and none of them will be disappointed!

Of the other American text Adventures easily available over here, I must single out for mention the Infocom series. *Zork I, II* and *III* are the most famous, but the others, like *Suspended*, in which the player controls six robots which are his eyes, ears, and other senses, and *Witness* and *Deadline*, which contain complete dossiers of Police files, are equally as good. They're all very expensive — but they are state-of-the-art.

All this is pretty advanced stuff, however, and I only mention them as an example of what goodies you can look forward to!

Back on solid ground, and in the UK, we have many companies putting out Adventures which would make a good starting point for our budding Adventurer.

For the ZX81 and Spectrum, a good range of Adventures is available from Artic. There are four of them, with a fifth in preparation. With the exception, I believe, of the latter, they are all text (complete with the occasional odd spelling!). The scenarios and plots are excellent and invoke a good sense of atmosphere. But be warned — although they are a good introduction, they are not easy, and occasionally need rather lateral thinking (but that's what Adventuring is all about!).

Having been around for a number of years, they have obviously stood the test of time — three years is an eternity in the home computing market!

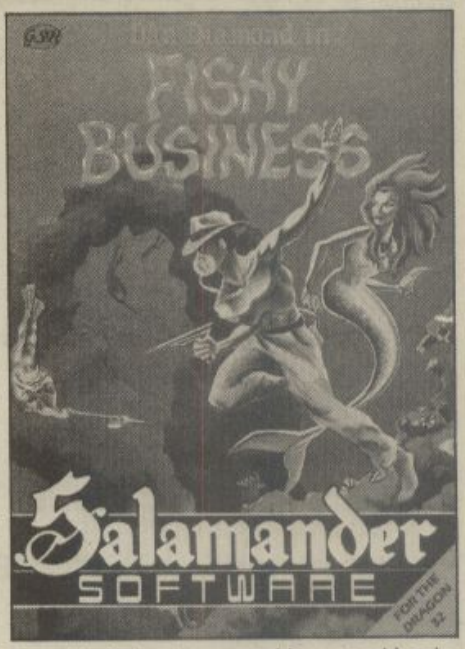
A large range of computers is catered for by Channel 8 Adventures. In the distant past, they were writing for the Nascom and Tandy TRS80, but in the last few months, the company has written versions of its 12 Adventures (and this number may increase by two or three in the next few weeks) for a much larger range of machines, which includes the BBC, Spectrum, Commodore and Atari computers.

The Adventures are text supported by nicely-drawn graphics, and the pictures, pretty though they are, can be toggled on or off as the player wishes. In fact, they have to be cleared from the screen if the player wishes to see what is at the current location.

They are all written by Brian Howarth, who obviously takes Scott Adams as a model, and his programs are a good training ground for the beginner.

Other worthwhile additions to the Spectrum owner's library are the Phipps Associates Adventures. Written by Mike Farley, they are, again, text Adventures, supported by graphics. Unfortunately, these are very slowly drawn, and the whole process can be very boring when repeated again and again. However, the Adventures themselve cannot be faulted, and *Knight's Quest* has become something of a classic Spectrum Adventure.

For the beginner, *Greedy Gulch* contains many of the common problems to be found in Adventures, and is a good beginner's program.



The Spectrum, of course, is the machine with probably the biggest support from third-party software authors, and among their products are many good Adventures.

For the Dragon, Salamander has the Dan Diamond Trilogy. A pastiche of the Mike Hammer sort of detective novel, they follow the fortunes of the Private Eye from a graveyard in California in *Franklin's Tomb* to deep space in *Lost In Space*, to a watery alien world in *Fishy Business*. These Adventures are text only, although the beautifully produced accompanying manuals contain pictures of many of the locations, with clues embedded in them.

Pettigrew's Diary, from Shards Software, is a graphic Adventure, but suitable for beginners and certain to keep anyone hooked for many hours while travelling through the London Underground system among other locations.

Acornsoft, in their initial release of software for the BBC, included a couple of Adventures. *Castle Of Riddles* and *Philosopher's Quest* have been with us for a couple of years and still baffle people with dancing bears and rainbow-coloured rods. Third-party software is now coming through for the BBC machines.

For the Oric, you will find some good Adventures among the Tansoft catalogue — *Zodiac Adventure* being one of the better programs for beginners.

This list has been necessarily brief — in future weeks, I'll look at some in more detail, and add to the list. ■

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So, if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to: Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

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DOES IT EXIST?

G Back of Bradbourne Road, St Johns, Sevenoaks, Kent, writes:

Q Do you know anything about the *Rom* cartridge slot on the BBC micro? I know that it costs £55 to install and you get a speech chip, but what about the cartridge for the slot? Do they exist? My dealer cannot help.

A In short, no! Now that the Electron has at last seen the light of day, the *Rom* cartridge slot remains the great mystery of Acorn Computing. As far as I know all you can get for the £55 is the speech chip with its 175 word vocabulary. Apart from that, to my knowledge, there are no cartridges available from Acorn or anyone else.

Perhaps one of the reasons for this is that Acorn have released no specifications for the cartridge, the handbook that comes when the cartridge is added, is, to say the least, sketchy. I doubt that cartridges will become available in the near future, especially as the Electron does not have the cartridge slot.

DISC TO CARTRIDGE

Dr Manfred Dechmann of Herrenbergstrasse 1, Zurich, writes:

Q How can I load programs on disc on to a cartridge or module. I need a few programs very often — five times a day — and so I want to save the loading time even from disc.

I have a C64 with 1541 disk station and Epsom RX80.

A If I understand your question correctly what you are asking is how to copy disc programs to cartridge. The answer, I'm afraid, is with great difficulty. Unlike copying from tape to disc where the problems can be solved by playing around with the software memory locations, etc, a cartridge is a program "burnt into" an Eprom and mounted on a circuit board.

In some magazines from America I have seen devices that enable you to burn in your own Eproms, but they are very expensive. I doubt though this would solve your problem. If you are using the disc information daily for something like word processing or records, an Epsom has two major problems; firstly it cannot usually have programs longer than 32 K, sometimes 16K — probably not enough for your purposes — and, secondly, you cannot change the data information as with a disc — adding and erasing addresses, for example.

I'm afraid the only real way you have of speeding up access times is to see if your disc system cannot be improved in some way, but I doubt any difference would be very substantial.

ZX PRINTER

G. T. Swain of Fairmead Crescent, Edgeware, Middlesex, writes:

Q I own a Sinclair ZX81 and I have a Spectrum on order. Can you recommend a printer that could be used with either machine. I already have a Sinclair printer, and to say the least it is not very good.

A Other than the Sinclair printer there are no printers that you can connect directly to your ZX81 or Spectrum (there is, though, a plain paper version of the Sinclair printer available that was originally designed for use with the Timex).

So any other printer you might choose will need to be interfaced. Almost all the available interfaces are Centronics, ie, they enable you to connect your Spectrum to Centronics printers — fortunately this is the vast majority. Suitable interfaces are made by Hilderbay, Kempston, Tasmann and Morex (among others) and with them you should find that virtually any cheap printer can be connected.

As to what you should buy, it really is up to you. How much money do you want to spend? Is it mainly for letters or listings? If you don't want to spend more than £200 and only need it for listings, then any dot matrix printer will do — an Epsom, for example. If it's for important letters, then you may need a Daisywheel costing more like £350.

I doubt that any other than Spectrum interfaces will work with the ZX81 — you will probably have to buy a special one for it, although you should be able to use the same printer.

OVERHEATED VIC

Matthew Smith of Elan Avenue, Stourport-on-Severn, writes:

Q Not wishing to pay £200-plus for a Commodore printer, I was considering buying a smaller one. The one I have noticed is the Amber which is £70, but I would like to know if a dearer one would pay off?

The other problem that I have is overheating. After an hour my Vic gets very hot, and after about three hours it reduces my programs to gibberish. This means that I have to turn off and start again. I find that the slits at the back do little to help the problem. Is there a small cheap fan available that I could use to reduce the heat?

A People are always asking questions about printers — quite rightly since they can cost more than the computer itself. There are all sorts of problems with buying printers, but they are particulalrly highlighted with Commodore machines.

The problem is this — Commodore programs make much use of control characters — particularly for cursor movement and colours, consequently listings are full of them. Since you were considering the Amber I would guess that your main requirement from a printer is to do program listings rather than word processing. The problem is that the Amber, and indeed all printers other than the Commodore ones, do not support the control characters. Thus, even assuming you manage to interface a printer to your Commodore so that it will print basic numbers and letters, it will still not print the control characters. I think you would be best advised to look for a second-hand Commodore printer — you should be able to find one for less than £200.

Your heat problem is very common and apart from taking care to save programs every couple of hours or so, there isn't much you can do. Commercial computers have inbuilt coolers, but it is hardly practical for you to open up your computer and put a fan in it.

LYNX USER GROUP

Ms G. Marsh of Kingston Road, Oxford, writes:

Q I have recently bought myself a 96K Lynx computer, and while I'm pleased with it, I also find that there is very little published for it. I suppose that's what happens if you get a computer that is not a big seller. What I would actually like to know, is there a Lynx User group?

A The Lynx as you rightly imply is overshadowed by the likes of the BBC at one end, and the Spectrum at the other. It is a pity because it is fundamentally a good computer. However, all is not lost as there is a Lynx User group, namely NILUG (National Independent Lynx User Group). The address you want is NILUG, 53 Kingswood Avenue, Sanderstead, South Croydon, Surrey CR2 9DQ.

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COMMODORE 4008 with Basic 4 Rams plus £100. Will swap for BBC B or Commodore 64 with £100. Tel: 01-733 9961.

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VIC20 Super Expander, little used, £27, Commodore joystick, £6, Vic Revealed, £6, Zap Polo Boom, £5, Programming the Vic20, £1. Getting Acquainted with the Vic20, £4. Tel: Northwich 782475 after 5 pm.

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COMMODORE VIC20, C2N plus 16K plus program reference guide, 3K super expander, mags and software. All boxed, excellent condition, offers. Romford 65874 after 4 pm.

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SPECTRUM 48K, with interface 1, microdrive printer and joystick, tapedeck and DKTronics keyboard, cost new £350, sell for £230 ono. Best offer secures. £550 of software, all original, £3 per tape or £250 the lot. Tel: Iver 654398 after 7 pm.

48K SPECTRUM, £200 software and books, sell for £200. Tel: 01-622 6241.

48K SPECTRUM, fuller master unit plus £150 software, tape recorder, worth over £370, sell for £230 or swap for CBM64 and C2N. Tel: Downland 56288 after 5 pm.

48K ZX SPECTRUM, cassette recorder, Kempston joystick, interface, over £100 software, Scrabble, Manic Minor, Quill, £250. Tel: 01-248 840 (Oxford).

SPECTRUM SOFTWARE ORIGINALS. Many to offer. Sale or swap. Wanted. Jet Set Willy Selec Pools Winner, what have you. Tel: 0789 763502 (Warwickshire) after 6 pm or weekends. Ask for Tony.

ZX81s for sale

16K ZX81. Boxed plus power supply plus £200 worth of software plus 15 cassettes and Ram pack, £80 ono. Tel: Basildon (0268) 25438.

£200 OF SOFTWARE (ZX81). Swap for Memotech keyboard or sell for £30. Wanted 48K Spectrum or 16K Spectrum (Mark II). Will pay extra for software. Tel: Southport. (0704) 26728.

WANTED. Any adventure programs for ZX81 16K. Phone: Gregory 0349 882026.

AQUARIUM computer to swap for any computer apart from ZX81. 01-472 4192 after 4 pm.

ZX81 16K RAM, £50 ono, games also. 0634 814089.

16K ZX81 fuller keyboard, joystick, programmable interface, tapes, books, magazines, worth £160, sell for £65 ono. Tel: Tony 06285 24201 after 5 pm.

FOR SALE. Microdrive order form to highest offer. Tel: 0259 60840 after 6 pm.

For sale

3K JUPITER ACE, leads, manuals, demo tape, price £40 for quick sale. Tel: 01-399 5831.

COMPUTER BIG TRACK for sale, excellent condition £20. Tel: 01-452 7545 only after 4 pm.

VECTREK VDU dumb computer terminal, ASCIA serial output, printer outputs, display 80 colour system, 24 series with built-in green phosphor screen, £100 ono. Tel: 0603-22750.

MICRODRIVE order form, f/s, £20. Tel: 0606 888299.

SOFTWARE for Sharp MZ80K at £4 per game. Lots of games. Tel: 01-455 6641 after 4.15 pm.

SELL INTELLIVISION GAMES, £7-£10 each, 16 games, including Micro Surgeon, made by Imagic. Tel: 01-958 8643 (Andy).

SHARP MZ80A, 48K Mbinary, monitor and built-in cassette deck, £100 worth of software, boxed with manual, 11 months old, £350. Tel: Tunbridge Wells 33549.

TV GAME PRINZTRONIC tournament VC 6000 and 12 cartridges including Space Invaders, Grand Prix etc, in original boxes, £120 ono. Tel: Canterbury (0227) 58529.

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INGERSOLL programmable television game, includes 2 cartridges containing total of 12 games also 2 centre sprung analogue joysticks should be ideal for computer use, only £25 ono. Tel: 0706-69727.

ZAXXON for Intellivision, unwanted Christmas gift only used once, cellophane still around box, cost new £30, sell for £26 ono. Tel: 0642 815881 after 5 pm. Ask for Mike.

TELETYPE. Data Dynamics ASR33 data terminal with keyboard, punch, reader and floor stand, 8 bit ASCII at 110 baud. Excellent condition, £85. Tel: Fleet (02514) 20946.

MICRODRIVE order form for sale, £20 ono. Tel: Eliot on Poynton 0625 87368.

MICRODRIVE order form for sale. Best offer secures. Tel: 01-938 1341 after 5 pm.

MICRODRIVE order form. Highest offer secures. Tel: 01-949 0225.

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GENIE 1 COMPUTER, with unit, books and games. Tel: Watford 38091.

TI MINI MEMORY MODULE, three weeks old, boxed, as new, £30. Tel: 0383 733439.

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OFFERS. Regent 200 terminal keyboard, numeric pad, VDU RS232 centronics. Also Gestetner electric duplicator, power supply, Spectrum software. Would exchange for computer or hardware. Tel: 061-432 4538 evenings.

NEW BRAINA. Hardly used, extra cassette lead plus Beginners Guide and game plus 12-inch green screen, anti-glare monitor. All boxed with leads worth £370+, only £310. Tel: Waltham Cross 37675 after 5 pm.

JUPITER ACE plus 32K. Excellent condition, still boxed, complete with manual, leads and cassette plus Adventure game, £100. Tel: 01-985 7414 after 6 pm.

I HAVE swapped my Vic for a 64, now I have hundreds of games for sale, all in original package, all £2 each. Tel: Ripon 5818.

LCD GRANDSTAND. Miwi Crazy Kong. Brand new, worth £15, sell £10. Tel: 021-430 2114

ORIC-1 48K. In original packing plus £70 of software. £150. Tel: Boston 60577.

SWAP GAMES DESIGNER, Chequered Flag, Penetrator and PacMan for ZX printer (good condition). Different software if required. Tel: Staines 57086 after 4.30 pm. (May sell software separately).

SPECIAL GAMES for 32K switchable Rampack. Also wanted, Commodore 64. Tel: 01-953 8643.

BBC "B" 1.2 Rom. Lots of programs and magazines, £300. Tel: 01-251 3769 after 6 pm.

SHARP MZ80K with software. Tel: 0244 47910 evenings.

BBC 32K O.S. 1.2 for sale. Perfect condition, £270. Tel: 0905 60660 weekends.

CRS80, books, manuals, level one games pack and books. Offers. ZX microdrive order form. Tel: 021-742 1446 after 6 pm.

BBC "B" plus two joysticks and £200 software and magazines, boxed, including all leads, all for £380. Tel: Glasgow 771 1793 after 7 pm.

EPSOM RX80 FP, two weeks old, £300, under guarantee. Tel: Glasgow 771 1793.

Wanted

WANTED. Valhalla or Hobbit for Spectrum. Will swap for Star Trek, Krazy Kong, Gulpman and Frogger. Tel: Peter 01-422 7583 evenings, before 8 pm.

MICRODRIVE ORDER FORM (X2) and software (3D Tunnel and others) to swap etc. Tel: Jon, 01-949 2053.

MICROKET PEN PAL WANTED. Using micronet mail box for exchanging of information of hardware, software and general Spectrum news. Send me a message on account. Tel: 01-387 5477.

ATARI CARTRIDGES to swap. Centipede, Krazy Shootout, Assembler Editor, Video Easle. Swap Casiotone MT65 keyboard for Series 3 Spectrum. Tel: Jeremy, 01-363 1578 after 6 pm or weekend.

SPECTRUM and CBM 64 computer software wanted for immediate cash. Offer must be makers originals with cassette, slips intact. Prefer large collections in London area. Details please telephone 01-520 0904.

WANTED. Original Sinclair Spectrum keyboard, will buy or swap for fuller Spectrum keyboard or software. Tel: Wakefield (0924) 863658.

SPECTRUM SOFTWARE SWAP. Over 70 titles including Hobbit, Scrabble, Machine coder, Collectors Pack. Send your list for mine. Immediate reply. Eddie Earley, 65 Anner Road, Dublin 8, Ireland.

WANTED. CBM 64 user to swap programs. Tel: Mick, 01-828 2333, extension 249 (day).

WANTED. Spectrum 48K. Preferably north-west England. Tel: 051-426 6024 after 6 pm.

A10 DISC DRIVE, £200; £1,500 of software, £100. Will separate. Tel: Hackwood 8446.

JUPITER ACE plus leads and manual for £50 ono. Tel: Basildon (0268) 555468.

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ZX MICRODRIVE order form. Best offer secures. Tel: (Iver) 654398 after 7 pm.

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GEM Monster Mine, Sultans Maze ..... each £5.95

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NEW RELEASES

SCALE DOWN

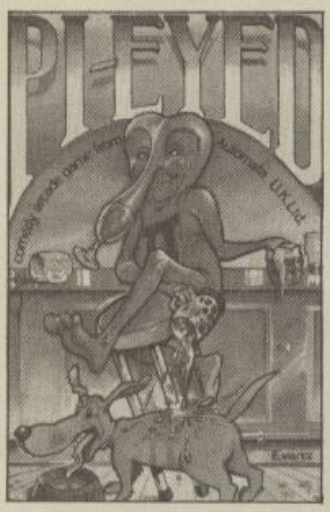
Although it's called *Logo-art*, this new program from Hobby Software has relatively little to do with the famous language used with Turtles and the like.

In fact *Logo-art* is an *Artists Designer*-type program, albeit one with a good many features.

For the Dragon 32, it allows you to draw in any *Pmode* and *Save* your creation to tape. Apart from the usual draw/erase line features there is a choice of scaling, ie, how far the line moves for each instruction, down to a single pixel point.

Program *Logo-art*
Price *£6.95*
Micro *Dragon 32*
Supplier *Hobby Software*
8 Elgar Avenue
Chapel House Estate
Newcastle upon Tyne
NE5 1HZ

OPENING TIME



Pi-Eyed is the latest in Automata's growing range of arcade games for the Spectrum. As ever it refrains from violence and concerns itself instead with the serious business of drinking — something dear to the PIman's heart (he must be a journalist).

The game is not likely to give Ultimate any sleepless nights, at least not technically, but it is good fun for all that.

Using the cursor keys you move the Piman along a road full of traffic (a bit like *Frogger* — PIgger perhaps?) to evade the traffic he can enter one of the buildings that flash past — surprisingly, most of these seem to be pubs.

Once in a pub the Piman must drink all the pints on the table — this makes him drunk and difficult to control, consequently he falls over everyone; this loses points.

Other locations simply produce funny (fairly) messages and the aim of the game is really to last as long as you can.

Program *Pi-Eyed*
Price *£6*
Micro *Spectrum 48K*
Supplier *Automata*
27 Highland Road
Portsmouth
Hants PO4 9DA

NOTATION

Vectors was one of those mathematical concepts that I never really mastered — maybe what I needed was *Vectors* by Salamander Software.

This package is a collection of 14 programs which cover most of the vector algebra required for 'A' level maths.

Subjects include Scalar multiplication, matrix notation, modulus, ratio theorum and many others.

The 14 programs develop logically on from one another and were written by a senior lecturer in mathematics.

The programs can be saved to disc should you have one and will work on both the BBC B and the Electron.

Program *Vectors*
Price *£24.95*
Micro *BBC B/Electron*
Supplier *Salamander*
17 Norfolk Road
Brighton
East Sussex
BN1 3AA

WIDE-EYED

Astronomy fans should get hours of wide-eyed entertainment from *The Cosmos* by Eclipse Software.

This program attempts to display the entire Cosmos on your 48K Spectrum from next door neighbours like the Virgo Cluster — a mere 2,000 light years away — to remote regions like the Hydra Cluster.

Program *The Cosmos*
Price *£5.95*
Micro *Spectrum 48K*
Supplier *Eclipse Software*
79 Ardrossan Gdns
Worcester Park
Surrey KT4 7AX

AROUND SPACE

The galaxy is yours to explore in *Megawarz* a 'magical planetary trip' which takes you from Pluto to Mars battling it out with various aliens whose degree of vulnerability to your firepower is illustrated by their colour which changes periodically.

Your ship comes equipped with shields which have to be replenished from time to time by capturing astronauts who, for some reason, are hurtling through space towards you.

Movement is either by joystick or the keyboard and you can select the difficulty level and adapt the game to make it more or less difficult.

The first round ends when you have destroyed aliens in every corner of the galaxy and arrived back at the earth and then — guess what? It all starts again, faster and meaner.

Program *Megawarz*
Price *£7.50*
Micro *Commodore 64*
Supplier *Paramount Software*
67 Bishopton Lane
Stockton -on-Tees
TS18 1PU

TIME LORDS

If unbelievably difficult text adventures appeal to you then you are bound to react with glee to the news that Level 9 has just issued its latest epic — *Lords of Time*.

Nine evil timelords are out to cause chaos throughout human history. Using a mysterious clock you must travel through nine different periods of time looking for the nine special objects which together will save eternity.

The adventure is being issued for seven different machines and is entirely in machine code. Responses are fast and, even more important, Level 9 have thought about a suitable response for when you haven't typed in the right thing, other than "I don't understand". Another winner.

Program *Lords of Time*
Price *£9.90*
Micro *Most (32K+)*
Supplier *Level 9 Computing*
229 Hughenden Road
High Wycombe
Bucks HP13 5PG

BLOCKED MAZE

Skull is a machine code maze game for the Spectrum 48K. The only objective of the game is to stay alive as long as possible and accumulate as many points as possible. This is achieved by finding various treasures that are scattered about the maze.

Problems take the form of nasty skulls that will defend the treasure. You may also find that your way through the maze is suddenly blocked by a portcullis that can only be raised by a special key.

The 3-D views through the maze are very well done — in a similar way to *Transylvanian Tower* by Richard Shepherd — and also like that game you can elect to view a map of what's located where, but you

need to have a good memory as it dissolves within a couple of seconds. Very enjoyable with lots of tactical play possible.

Program *Skull*
Price *£6.95*
Micro *Spectrum 48K*
Supplier *Games Machine*
Bessemer Drive
Stevenage
Herts SG1 2DX

SINGLE PIXEL

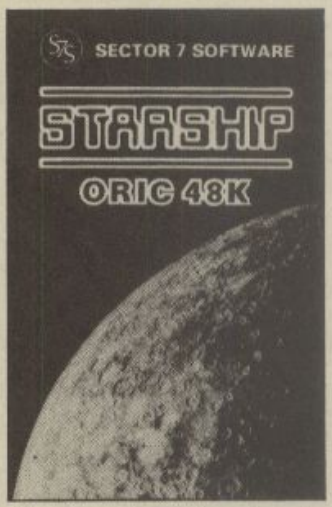
A very nice idea this; *Dataid* is a Dragon graphics program that comes not only with a manual but also a specially designed protractor and ruler.

The program itself is a fairly standard drawing program with fill and a choice of movement detail — from single pixel to 20 pixels. But the ruler and protractor look really useful in enabling accurate plotting on the high resolution screen.

The whole package is neatly put together and anything you create can be *Saved* for use in your programs. The price is reasonable too.

Program *Dataid*
Price *£10.95 (+£1.00)*
Micro *Dragon 32*
Supplier *Detail Utility Products*
32 Slepe Crescent
Brooklands Park
Branksome
Poole
Dorset BH12 4DN

EIGHT WAVES



More arcade action for the Oric 48K. *Starship* from Sector 7 Software would seem to have all the necessary requirements for the genre — eight waves of different aliens, machine code etc.

On this particular game you are required to defend earth (armed only with three gigantic battlecruisers) from a massed onslaught by the war fleet of the Cirellian Empire.

Apart from high score tables the game has an added feature not often seen on Oric games — it loads a pretty title screen for you to look at, whilst the Oric is taking its usual interminable time to load.

Program *Starship*
Price *£6.50*
Micro *Oric 1 48K*
Supplier *Sector 7 Software*
PO Box 8
Newton Abbot
Devon
TQ12 1UE

MORTGAGE

Vic Money Manager is one of Ivan Berg Software's growing range of utility packages for the Vic20 plus 8 or 16K.

The box contains two cassettes and a manual. The main program is *Money Manager* which is a fairly straightforward accounts program allowing you to keep records of bank statements, tax demands, etc, recording the main details with the relevant dates.

There are facilities to get a balance of your account and to credit regular income payments. You may also list standing orders and compare actual and estimated expenditures.

The second tape is *Money Calculator* which contains programs for mortgage and interest calculation.

Program *Vic Money Manager*
Price *£9.99*
Micro *Vic20 (8K/16K)*
Supplier *Commodore*
675 Ajax Avenue
Slough Trading Estate
Slough
Berks SL1 4BG

ENERGY LEVEL

Krago Castle is an adventure game with strategy overtones. Although a lot of the time you concern yourself with secret passages and locked doors, whilst wondering what effect drinking the mysterious potion is going to have, you also have to maintain your energy for frequent bouts of combat with nasty monsters.

Although there are a couple of nice title screens, most of the action is text only — mainly Basic with machine code subroutines — a quick play suggested there were quite a few clever ideas in the game.

Program *Krago Castle*
Price *£6.00*
Micro *Spectrum 48K*
Supplier *Assassin Software*
10 Ash Road
Leeds 6

GRAPHICS AID

Print 'n' Plotter originally produced a range of practical aids for Spectrum program development in the form of large sheets of lined paper which mimicked the layout of the pixels on the Spectrum screen.

It has now issued a program that looks just as useful. *Paintbox* is basically a very sophisticated designed program. The potentially very impressive results are illustrated in both the adds and the helpful manual that comes with it.

The advantage of *Paintbox* is that like other similar programs it allows you 'etch a sketch' like facilities but it also gives you up to 84 user defined graphics with each design — especially useful for interesting type faces. If you've been looking for a Spectrum graphics aid, this seems like one of the best.

Program *Paintbox*
Price *£7.50 (p+p 75p)*
Micro *Spectrum 48K*
Supplier *Print 'n' Plotter Products*
19 Borough High Street
London SE1 9SE

SUN TRAP

Here Comes the Sun is a graphics adventure from Alligata Software who have previously concentrated on BBC, Commodore and Dragon programs — this one is for the Spectrum.

The general plot sounds a little like Artic's *Ship of Doom* — you have to find your way to the retro rockets of a ship and activate them before you are dragged into the sun.

The program is supposed to be extremely difficult and will allow inputs other than *Take X* or *Drop Y* like *The Hobbit*.

Although hi-res, the graphics are fairly simple, but sound is used to good effect — one the hardened text adventurer will enjoy.

Program *Here Comes the Sun*
Price *£7.95*
Micro *Spectrum 48K*
Supplier *Alligata Software*
178 West Street
Sheffield S1 4ET

New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

Top 10

Atari

1	(1)	Zaxxon	(Datasoft)
2	(10)	Spy's Demise	(Penguin)
3	(5)	O'Riley's Mine	(Starcade)
4	(6)	Meltdown	(Cosmi)
5	(—)	Wingman	(Microprose)§
6	(—)	Zork III	(Infacom)
7	(—)	Slinky	(Cosmi)
8	(—)	Planet Fall	(Infacom)‡
9	(—)	Cavern of Kafka	(Cosmi)†
10	(4)	Enchanter	(Infocom)†

§48K Cassette. ‡32K Disc. †32K Cassette.
(Figures compiled by Calisto Computers, Birmingham 021-632 6458)

Spectrum

1	(—)	Chequered Flag	(Psion)*
2	(1)	Atic Atak	(Ultimate)*
3	(—)	Death Chase	(Micromega)*
4	(8)	Lunar Jetman	(Ultimate)*
5	(—)	Manic Miner	(Bug-Byte)*
6	(5)	3D Ant Attack	(Quicksilva)*
7	(—)	Flight Simulation	(Psion)*
8	(—)	Stonkers	(Imagine)*
9	(7)	The Alchemist	(Imagine)*
10	(4)	Kong	(Ocean)*

*Requires 48K.
(Figures compiled by W H Smith and Son, London)

BBC*

1	(—)	Killer Gorilla	(Program Power)
2	(2)	Disc Doctor	(Computer Concepts)
3	(1)	White Knight Mk 2	(BBC)
4	(—)	Laser Command	(Program Power)
5	(3)	Planetoid	(Acornsoft)
6	(—)	Acornsoft Chess	(Acornsoft)
7	(5)	Snapper	(Acornsoft)
8	(7)	Wordspell	(Griffin)
9	(6)	Sphinx Adventure	(Acornsoft)
10	(9)	Pheasability Experiment	(Digital Fantasia)

*All Model B.
(Figures compiled by Micro Management, Ipswich 0473 59181)

Top 10

ZX81

1	(—)	Asteroids	(Quicksilva)
2	(—)	Defender	(Quicksilva)
3	(—)	Invaders	(Quicksilva)
4	(—)	Scramble	(Quicksilva)
5	(—)	Centipede	(DK 'Tronics)
6	(—)	Invaders	(Bug-Byte)
7	(3)	Krazy Kong	(PSS)
8	(10)	ZX DB Disassembler	(Bug-Byte)
9	(7)	Hopper	(PSS)
10	(8)	Froth	(Sinclair)

Dragon 32

1	(—)	Eightball	(Microdeal)
2	(—)	Dragon Chess	(Oasis)
3	(—)	SAS	(Peaksoft)
4	(—)	Space Shuttle	(Microdeal)
5	(—)	Dent Assault	(Microdeal)
6	(—)	Cuthbert goes Digging	(Microdeal)
7	(4)	Ugh!	(Softek)
8	(—)	Dream Bug	(Kensig)
9	(—)	Intergalactic Force	(Microdeal)
10	(—)	Tiger Grand Prix	(Tiger)

(Figures compiled by Boots/Websters)

Commodore 64

1	(—)	International Football	(Commodore)
2	(—)	Hungry Horace	(Melbourne House)
3	(—)	Forbidden Forest	(Centresoft)
4	(—)	Space Shuttle	(Microdeal)
5	(—)	Cosmic Convoy	(Tasksoft)
6	(—)	Hobbit	(Melbourne House)
7	(9)	Frogger	(Interceptor Micros)
8	(—)	Escape MCP	(Rabbit)
9	(—)	Road Toad	(Audiogenic)
10	(—)	Pooyan	(Centresoft)

Vic20

1	(3)	Wizard and the Princess	(Melbourne House)
2	(—)	Snooker	(Visions)
3	(—)	Amok	(Audiogenic)
4	(—)	Computer Wars	(Thorn EMI)
5	(—)	Four Gates of Freedom	(Phoenix)
6	(1)	Arcadic	(Imagine)
7	(—)	Sargon II Chess	(Commodore)
8	(—)	Laser Zone	(Llamasoft)
9	(—)	Supervaders/Bomber Run	(KTel)
10	(—)	Escape MCP	(Rabbit)

(Figures compiled by Boots/Websters)

Books

1	(4)	Advanced User Guide for the BBC Micro, *Bray*	(Cambridge Micro Centre)
2	(5)	Commodore 64 Programmer's Reference Guide, *Commodore*	(Commodore)
3	(6)	Beyond Basic, *Freeman*	(BBC/NEC)
4	(3)	Graphics on the BBC Micro, *Cryer*	(Prentice-Hall)
5	(—)	BBC Micro Disk Companion, *Latham*	(Prentice-Hall)
6	(1)	30 Hour Basic, Spectrum edition, *Prigmore*	(BBC/NEC)
7	(7)	Advanced Graphics with your ZX Spectrum, *Angell and Jones*	(Macmillan)
8	(—)	Programming the M68000, *King*	(Addision-Wesley)
9	(—)	68000 Assembly Language Programming, *Kane and Leventhal*	(Osborne)
10	(9)	Mastering Machine-code on Your ZX Spectrum, *Baker*	(Interface)

(Figures compiled by Watford Technical Books, Watford 0923 23324 Prestel 28844)
(Last week's position in brackets)

Book Ends

POCKET SIZED

Assembly Language for the Z80 is the latest in Pitman's Pocket Guide Series — neatly designed instruction books that actually will fit in a pocket.

Although not machine specific — and so it would probably need to be supplemented by more specific information should you actually wish to get down to some serious programming — it is nevertheless one of the most useful books on this subject I have seen.

The wonderful world of registers, stacks, unconditional jumps and relative addressing are described and explained in a fair amount of detail and the book, if that's the right description, seems excellent value for money.

Book *Assembly Language for the Z80*
Price *£2.50*
Micro *General (Z80 based)*
Supplier *Pitman Publishing, 128 Long Acre, London WC2E 9AN*

DISC DRIVES

Whilst it is easy to see that general introductions to micros might sell well to all kinds of people, I am not sure there is an equivalent size of market for a general book on disc drives. Nevertheless *Disc Drives for Microcomputers* is just that.

This slim volume attempts to provide a general outline on how disc drives work and guidance on how to write programs that use them effectively. A number of programs are included in the book, although for many machines they will need some adaptation.

Book *Disc Drives for Microcomputers*
Price *£7.95*
Micro *General*
Supplier *Sinclair Brown, John Wiley & Sons, Baffins Lane, Chichester, Sussex*

This Week

Program	*Type*	*Micro*	*Price*	*Supplier*
3D Spell	Ed	Spectrum	**£5.95**	Camel
Astro Fighters	Arc	Vic20	**£6.95**	Sumlock
Bombastic	Arc	Atari	**£9.95**	English
Brick Wars	Arc	Spectrum	**£3.99**	Paul Coyle
Bull Run	Arc	Spectrum	**£5.95**	Phipps Associates
Chopper	Arc	Vic20	**£6.95**	Sumlock
Cuthbert in the Mines		Dragon 32	**£8.00**	Microdeal
Dambuster	Arc	BBC B	**£7.95**	Alligata
Datapack	Ut	Vic20	**£8.95**	Sumlock
Destroyer	Arc	Vic20	**£7.95**	Sumlock
Dinky Digger	Arc	Spectrum	**£6.95**	Postern
Eagle Flight	Arc	Commodore 64	**£7.95**	Alligator
Execution	Ed	Spectrum	**£2.50**	Loophole
Fallout	Arc	Ace	**£4.95**	Plasma
Fireball	Arc	Dragon 32	**£7.95**	Abacus
Frogger	Arc	Ace	**£4.95**	Plasma
Games Tape	Arc	Ace	**£4.95**	Plasma
German is Fun	Ed	Spectrum	**£5.95**	CDS
Graphics Rom	Ut	BBC B	**£28.00**	Computer Concepts
Grid Trap	Arc	Vic20	**£7.95**	Sumlock
Gun Fight	Arc	Vic20	**£6.95**	Sumlock
House of the Living Dead	S	Spectrum	**£5.95**	Phipps Associates
Invaders	Arc	Ace	**£4.95**	Plasma
Jumping Jack	Arc	Vic20	**£7.95**	Sumlock
Killer Knight	Arc	Spectrum	**£5.95**	Phipps Associates
Kriegspiel	S	Dragon 32	**£6.95**	Beyond
Loony Zoo	Arc	Spectrum	**£5.95**	Phipps Associates
Magic Meanies	Arc	Spectrum	**£5.95**	CDS
Manage	S	Spectrum	**£6.00**	CCS
Marathon	Arc	Commodore	**£9.95**	English
Maths Invaders	Ed	BBC Electron	**£6.95**	Stell
Mission 1	Ad	Spectrum	**£6.00**	CCS
Monkey Bizness	Arc	Spectrum	**£5.95**	Artic
Moonbuggy	Arc	Ace	**£4.95**	Plasma
Multiplan	Ut	Commodore 64	**£99.95**	Microsoft
Multitron	Arc	Vic20	**£7.95**	Sumlock
Oligopoly	S	Spectrum	**£6.00**	CCS
Pengwyn	Arc	Spectrum	**£6.95**	Postern
Pi-balled	Arc	Spectrum	**£6.00**	Automata
Puzzle Pack	S	Vic20	**£6.95**	Sumlock
Q Man	Arc	BBC	**£5.50**	MRM
Robohunt	Arc	Ace	**£4.95**	Plasma
Scorpion	Arc	Vic20	**£7.95**	Sumlock
Siren City	Arc	Commodore 64	**£7.00**	Interceptor
Skramble	Arc	CMB64/Vic20	**£7.95**	Anirog
Space Rescue	Arc	Vic20	**£6.95**	Sumlock
Star Trader	S	BBC B	**£7.95**	FBC Systems
Starship Escape	Arc	Vic20	**£9.95**	Sumlock
Stockmarket	S	Spectrum	**£6.00**	CCS
Tankbattle	Arc	Ace	**£4.95**	Plasma
Tarot	S	Atari	**£12.95**	English
Timebomb	Arc	Spectrum	**£5.95**	CDS
Token of Ghall	Ad	Commodore 64	**£7.00**	Interceptor
Triad	Arc	Vic20	**£7.95**	Sumlock
Vortex Raider	Arc	Commodore 64	**£7.00**	Interceptor
Xanagrams	S	Spectrum/BBC B	**£6.95**	Postern

Key: Ad — adventure/**Arc** — arcade/**Ed** — education/**S** — strategy-simulation/**Ut** — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to: This Week, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

Ziggurat

Plug-compatible

Two computers with 16-bit microprocessors, both costing around £400 are due on the market in a short while — the Sinclair QL and the Advance 86a.

The two machines follow differing design philosophies, and the two approaches are very familiar to those whose experience extends to the world of main-frame computers. They are the "plough your own furrow" and the "plug-compatible" schools of thought.

For many years main-frame manufacturers have either decided to make their products compatible with IBM (plug-compatible products such as Amdahl), or deciced to make their own way with products so distinctly excellent that they will be purchased in preference to IBM (eg, Honeywell or ICL).

With IBM becoming dominant in the upper reaches of the micro business market with its PC and now PCjr, the trend with low cost "professional" machines is set to follow the same path as the main-frames. Any manufacturer has to think very carefully about IBM before launching a new micro.

By choosing Motorola for the 16-bit chip, incorporating microdrives on-board, designing its own Basic and operating system, Sinclair Research seems to have chosen to be a Honeywell rather than an Amdahl.

Sinclair Research has been very successful in the past in producing highly novel, idiosyncratic products — trail-blazers in fact. It has been said that if Sinclair did not exist, then somebody would have had to invent him. What was meant was that Sinclair added a sense of the magical to personal computing: though he had a good team, his personality was the driving force behind it.

In moving into a new sector of the market, and one which is already well supplied with machines, Sinclair Research is not in the same position of advantage it was with their small computers. A product has to be very good to sell to the serious user. However, at about £400 many "non-serious" users bought the BBC model B, and possibly that is the market for the QL, the upmarket personal user.

We know very little about the Advance, but we do know that it is a plug-compatible computer (ie, compatible with the IBM PC). The designers of the Advance took a design decision at the start to be plug-compatible with the IBM PC. In a similar way, in the world of mainframes, Amdahl and Hitachi design computers and peripherals so that IBM software and add-ons work without modification.

The way in which Amdahl and Hitachi sell their plug-compatible products is to make them cheaper, and faster, and anything else to give them an edge over IBM. Plug-compatible manufacturers are not trying to drive IBM out of business, because if IBM folded so probably would the plug-compatible manufacturers. IBM "look alikes" are only viable if IBM is still the dominant computer manufacturer, because who wants to be a look-alike to a manufacturer whose products do not sell well?

The Advance is IBM PC compatible, is faster, and — according to somebody who has used a pre-production version — is a nice machine to use. The Advance uses the Intel 8086 chip (the IBM PC uses the 8088), and so is an advance (no humour intended) on the IBM in terms of technology.

With the QL and the Advance we have two very cheap 16-bit machines with two opposing views of the market and it should be very interesting to see how they fare.

Why is the IBM PC so popular (though it costs far more than, say, the Sirius)? The reason is simple. You can trust the IBM, they will not fold overnight, and when they enhance their machines they always ensure that old software will run on the new machines.

How many other personal computer manufacturers can say that? ■

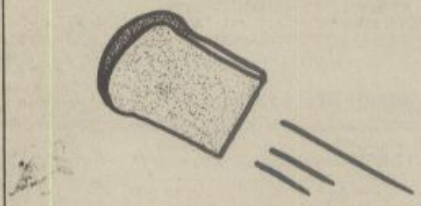
Boris Allan

Puzzle

Sale bargains

Puzzle No 92

Sue Sails went to the sales to buy a new electric toaster, and came back with many wondrous things — but not, I ought to add, the toaster!



It turned out that she had bought 25 items and had spent exactly £25 on the four types of goods listed.

Bath towels	two for £1
Tablecloths	£1 each
Saucepans	two for £5
Sets of cutlery	£5 each

How many of each hac she bought?

Solution to Puzzle No 87

If the addition sum is examined, it is seen that if we assign values to the letters 'N' and 'S' we can immediately find out the value of 'A'. Once this is known, the value of 'T' can likewise be determined. This enables us to reconstruct the complete sum and check if any of the possible results match up.

```
10 FOR N = 0 TO 9 20 FOR S = 0 TO 9 30 IF N = S
THEN GOTO 160 40 LET X$ = STR$ (N + 2 * S) 50
LET A + VAL (X$(LEN X$)) 60 IF A = S OR A = N
THEN GOTO 160 70 LET X$ = STR$((N * 10 + N) +
(N * 10 + S) + (N * 10 + S)) 80 IF LEN X$<2 THEN
LET X$ = "0" + X$ 90 LET T = VAL (X$(LEN X$ -
1)) 100 IF T = A OR T = N OR T = S THEN GOTO
160 110 LET ANN = A * 100 + N * 10 + N 120 LET
TANS + T * 1000 + A * 100 + N * 10 + S 130 LET
STANS = S * 10000 + TANS 140 LET SANTA = S *
10000 + A * 1000 + N * 100 + T * 10 + A 150 IF ANN
+ TANS + STANS + SANTA THEN PRINT S;A;N;T;A
160 NEXT S 170 NEXT N
```

From this the only solution is: S = 4, A = 5, N = 7 and T = 2, giving 577 + 2574 + 42574 = 45725.

Winner of Puzzle No 87

The winner is: G Loveridge, Usk Road, Pontypool, Gwent, who receives £10.

... but seriously, **AUTOMATA**

PIMANIA – the cult adventure that's for real
16K ZX81 £5 ☐ BBC 32K £10 ☐ Dragon 32 £10 ☐ Spectrum 48K £10 ☐

GROUCHO – the Pimania sequel, Concord-QE2-USA prize
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PI-EYED – the comedy cartoon arcade game, starring the Pi-Man. Free protest disco record. Spectrum 48K £6 ☐

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Starring the Pi-Man. Free offensive Reggae music. Spectrum 48K £6 ☐

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An oriental masterpeice for Dragon 32 plus Spectrum 48K £5 ☐

GO TO JAIL – Play the game
find out what all the fuss is about, cookie. Spectrum 48K £6 ☐

THE PIMAN'S GREATEST HITS – amazing stereo L.P. cassette £3 ☐

SPECIAL OFFER: free copy of YAKZEE with every GROUCHO, using this coupon (ends 1-3-84) ☐

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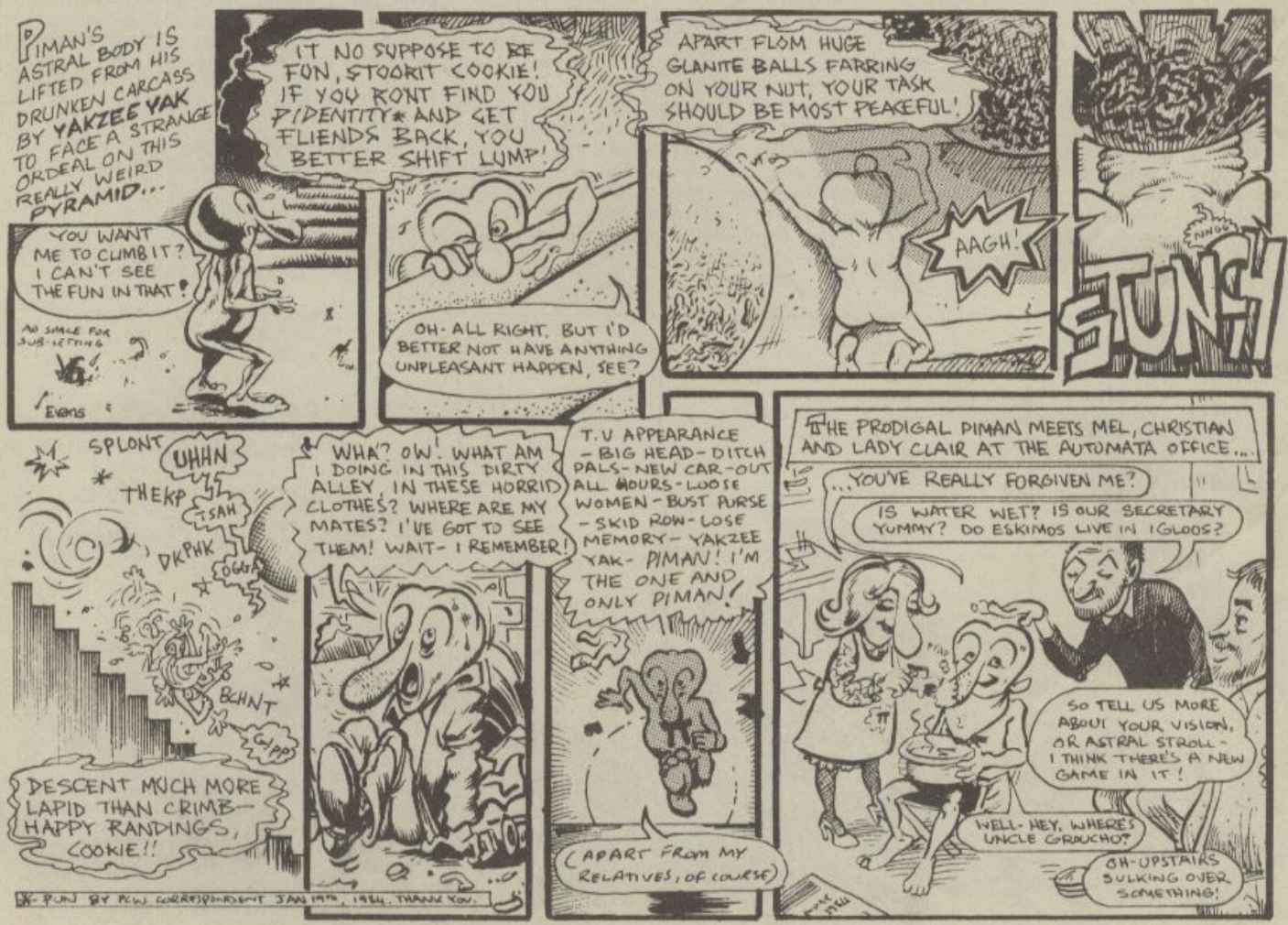
27 Highland Road, Portsmouth, Hants. PO4 9DA

Well folks .... far be it from us to actually ADVERTISE anything on our glorious BACK PAGE, but in order to celebrate the PIMAN's return to the bosom of his happy family, (and to appease the AUTHORS of his new program)... we want to encourage you to purchase and enjoy..

PI-Balled our latest ENTERTAINMENT! It costs six quid and it runs on the 48K Spectrum. The graphics are SUPERB. The FREE MUSIC on the flipside is wonderfully offensive, (and the authors want their measly ROYALTIES!)

HI THERE YOU GUYS. THIS IS **UNCLE GROUCHO** *speaking. Just a reminder that my computer entertainment where DREAMS COME TRUE contains the identity of a world-famous Hollywood Star. The GENIUS who finds it gets to meet the STAR in the USA, travelling CONCORD & QE2, and staying in the Waldorf New York, with £500 to blow. See the SPECIAL OFFER in this week's ORDER COUPON.*

SEE US AT THE 10th ZX MICROFAIR
Saturday 4th February
Alexandra Palace

Wocha! Stagg-Beetle 'ere, 'im who wrote PI-EYED, the funniest arcade game on the market (only £6) and I want me ROYALTIES too! See yer at the MICROFAIR fer lots of fun, bargains and PI-EYED PIMEN..HIC..