40, Rock (4)

POPULAR Computing WEEKLY

FREE GAMES CASSETTES

35p 15-21 September 1983 Vol 2 No 37

This Week

Laser 200
David Aubrey Jones presents an in-depth review of the Hong Kong-built Laser 200 on page 16.

Video titles
Andrew Homer explains how to generate video titles on the BBC micro. See page 33.

Word processor
Dale McLoughlin presents a simple, machine code, word processor for the 48K Spectrum. See page 20.

New releases
All the latest software games including *Apocalypse* from Red Shift and *Perilous Post* from Impact Software. See page 57.

★STAR
Hill St Blues
on 48K Spectrum.
See page 10.
GAME★

News Desk

Sinclair's dual-processor

IT now seems likely that Sinclair's new 'professional' computer, scheduled for launch in early 1984, will be a dual-processor machine.

Also it should incorporate a monitor and twin-microdrives, all for around £400.

A twin-processor machine has a number of advantages. If the machine incorporates not only a 68000 chip but, as now seems likely, a Z80 also, then the machine will have a choice of operating modes. It would have the advantages of the 16/32 bit architecture of the 68000, while still being able to run the wealth of software currently available for the Spectrum.

Another advantage would be a multi-user capability, using perhaps Spectrums as stations on a network facility.

Commented Sinclair's managing director Nigel Searle: "You don't want to change all the variables at once. In order to be competitive you have to change, but you want to take

Continued on page 5

Design your own arcade games

QUICKSILVA is to launch the first of an entirely new type of program for the 48K Spectrum at the end of this month.

It is a kind of arcade game generator. "Somebody with no programming experience whatsoever should find it easy to make very convincing arcade games out of it," says its author, John Hollis.

The program is menu driven. The way *Games Designer*, as it is called, works is as follows: First, you set the format that the game will take — for example, a character that moves from left to right and fires at the bottom of the screen, or one that sits in the middle of the screen and can be moved around under joystick control firing in any direction, or whatever.

Next, you define as many sprites — moveable graphics shapes of size 12 × 12 pixels — as you want to appear in the game.

After that you specify the

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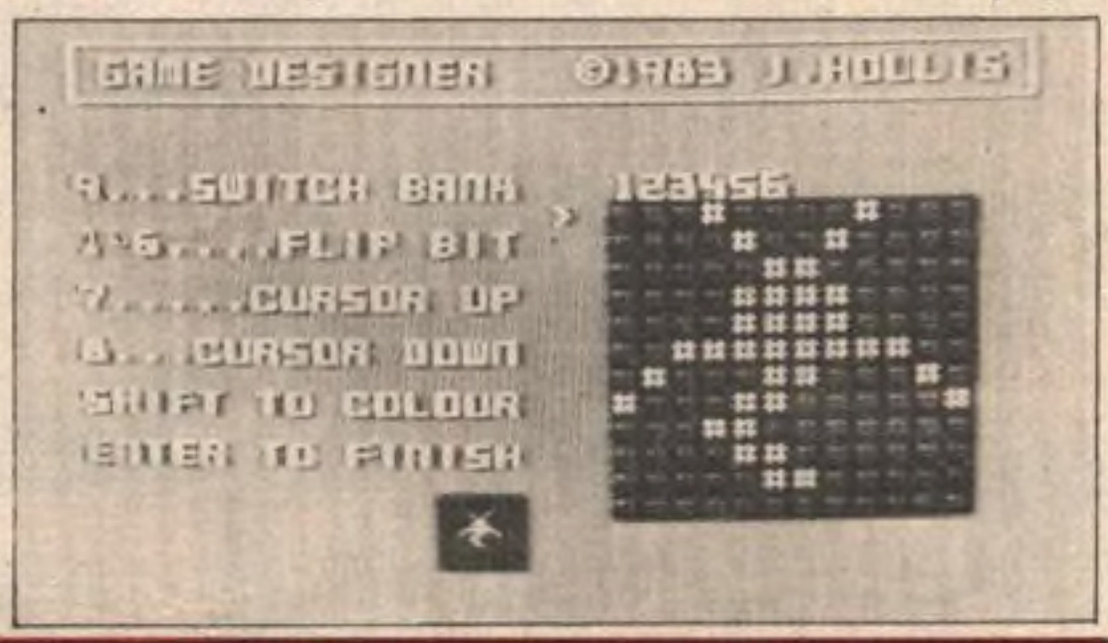

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How to submit articles

Articles which are submitted for publication should not be more than 3,000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted.

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.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your own program returned you must include a stamped, addressed envelope.

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 *Dr Who* game released by BBC Soft comes as a considerable disappointment, both to fans of the tv series and to home computer owners.

If ever there was a subject that cried out for special treatment, it is *Dr Who*. Devised by Terry Nation, the series has been enormously successful round the world since it was first screened back in the 1960s. It lends itself to a full-scale adventure, complete with Daleks and Cybermen, or at least to an innovative arcade game.

Instead, BBC Soft has produced a collection of four tired arcade games and cobbled them together to form the misleading title *Dr Who – The First Adventure*.

Not altogether surprisingly, the BBC was extremely quiet about the release of its *Dr Who* game. There was none of the fanfare of publicity that would have accompanied a more suitable offering.

There are any number of tv shows that could be linked to adventure or arcade games, particularly those shows with cult followings such as *Blake's Seven* and *The Prisoner*. Indeed, future shows may well be designed with the home computer market in mind.

However, if this marriage between tv and computer games is to be successful, there will have to be a vast improvement in quality over *Dr Who — The First Adventure*.

Next Thursday

A version of the popular board game where you must connect four discs together in any direction. Connect Four — next week's star game for the Commodore 64 by Les Allan.

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Sinclair

Continued from page 1

tried and tested methods with you.

"We have gained a large share of the consumer market through those methods and there is no reason why they cannot be applied to other fields."

For this reason he reckons that Sinclair would be unlikely to adopt a standard operating system for the new machine — such as Digital's VIP (see *Popular Computing Weekly*, September 8).

"I am very anxious not to appear negative about VIP and Personal CP/M — I think they are very impressive, but we will continue to go our own eccentric way."

The new Sinclair machine may well find itself in the same market as IBM's low-cost Peanut machine — soon to be launched. "Obviously slogging it out toe to toe with IBM is something one thinks about very closely," says Searle. "Even so, it is not necessarily true that we will do well by making ours an IBM compatible product.

"We have been fairly successful by being different and we will most likely do the same for any new market."

Sinclair managing director Nigel Searle

Games designer

Continued from page 1

levels of the game, and which sprites are to appear in which level. Each sprite also has a set path through which it moves which can be predetermined — you might set one to spiral down the screen, for example.

In this way, you can make up your own games in a very short space of time. It is also possible to flip sprites, so as to have different sprites with different directions of motion.

Games designer John Hollis

or perhaps a bird with wings that flap.

John says: "You don't have to program a zap game — you could even have a game with a lawnmower and moles.

"If I've got it right, people should be able to design games I haven't thought of."

Games Designer, for the 48K Spectrum, costs £14.95 and comes complete with an explanatory booklet and eight games ready-programmed on the system.

John had been thinking about the program for over a year before getting down to writing it in April. Even so, it was a huge software project and it took him over four months to complete it.

The program is the first to go out under the Software Studios banner, though it will be marketed by Quicksilva. Software Studios is a software laboratory formed jointly by John Hollis and Nick Lambert, Quicksilva's founders. Earlier this year, Rod Cousins took over the day-to-day running of Quicksilva as both John and Nick expressed a wish to get back to programming.

John is now working on the follow-up to his successful *Time Gate* title, while the first program from Nick's part of Software Studios should be out in the new year.

BBC misses out on Dr Who adventure

IT would appear that the BBC has missed an opportunity.

The new BBC Soft title for the BBC machine — *Dr Who, The First Adventure* — is not an adventure at all. Instead, it is a collection of four well-known arcade favourites. The four sections are: a two-dimensional maze, a *Frogger*, a *Galaxians*, and a computer version of the board game *The Black Box*.

Dr Who is the first computer program the BBC has spun-off from a tv series. A number of other software houses had already expressed interest in writing a *Dr Who* adventure, but were turned down by the BBC.

Said BBC Soft's Meyer Solomon: "A graphics adventure would have been a big project and entailed us going into assembly language programming.

"Really, *Dr Who, The First Adventure* is just a taster. The next *Dr Who* program will probably be a far more elaborate program — an adventure, possibly with some graphics and should be ready some time next summer."

Lambda burns its fingers

HONG KONG computer manufacturer, Lambda Electronics, has put its feet into hot water by launching its Lambda 8300 computer.

Sinclair Research is taking legal action against the company in Hong Kong, claiming that the machine is a copy of its ZX81 machine.

Although the 16K Lambda machine is completely different in appearance to the ZX81, its internal circuitry and the majority of its Rom is alleged to be identical.

Interestingly, the Lambda has a number of features that the ZX81 does not. It has a joystick port, a moving-key keyboard, a built-in loudspeaker and *Music* command, an automatic line number function and *Space Invader*-shaped pre-defined graphics keys.

A Sinclair spokesman said: "There have been a number of court appearances in Hong Kong and we are now attempting to get an injunction to halt sales of the Lambda."

The Lambda must be particularly worrying for Timex who will soon launch the TS1500 machine — basically a 16K ZX81 — in the US.

On display at Olympia show

NEXT week's Great Home Entertainment Spectacular exhibition will feature a number of new computer products.

Top of the list must be the new Elan computer, on display for the first time since it was announced last month.

Sinclair Research will show its Microdrive and Interface 1 publicly for the first time.

Mattel will display the computer add-on for its Intellivision games console and its Home Control System for the Aquarius computer. Milton Bradly will exhibit the vector graphics Vectrex games console.

Acorn's Electron will be on show, as will Atari's new 600XL and 800XL machines.

The Great Home Entertainment Spectacular will be held at Olympia, London, from September 17-25. Admission is £3 and £2 and the show will be open from 11.30 am to 9 pm each day except Monday September 19, when the show will open at 5 pm.

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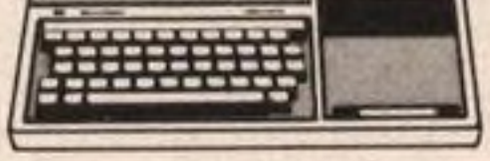

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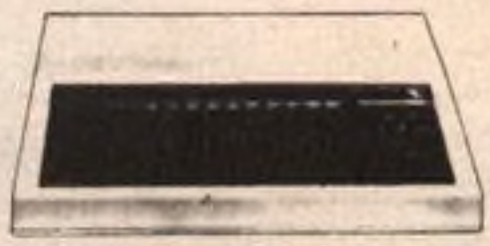

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Chinese move in on home market

CHINA is moving into the home computer market, with help from Sinclair Research.

Nigel Searle, Sinclair's managing director, visited Shanghai and Beijing (formerly Peking) last month. The purpose of his visit was to discuss the feasibility of setting up assembly lines for the ZX81 and Spectrum micros, under the aegis of the South China Computer Company and the China Electronics Import and Export Corporation.

A Sinclair spokesman said that, as a result of Nigel Searle's visit, "Sinclair has now shipped small quantities of ZX81 and Spectrum components for local assembly and

Prism's Bob Denton

sale in China, on a trial basis. It is hoped that, if this initial trial is successful, it will lead to larger quantities of Sinclair personal computers being sold in China over the next few years."

The Sinclair spokesman stressed, however, that discussions concerning the Chinese market were still at a preliminary stage.

The Chinese seem to be extremely keen on the project — a factory in Guangzhou has already been earmarked for the Sinclair scheme and the Beijing Software Academy is working on a program to produce Chinese characters on the Spectrum.

The Chinese are also keen on Micronet 800, Prism's telesoftware service. Richard Hease and Bob Denton of Prism both visited China last month, with a view to setting up a Micronet-type service.

In addition, Prism is to stage a micro trade exhibition in Beijing in November, according to market development manager Steven Wood.

Artic on the offensive

ARTIC Computing has launched its autumn offensive on the software market with the release of 21 new titles.

Ten of the programs are designed for the Spectrum and five each for the ZX81 and Vic20. The final program is *Asteroids* for the 48K Oric.

The Spectrum games include *Jigsaw*, *Road Racers* and *Snake*, the last of which is also available on the Vic20.

Artic, which now has a range of 62 titles, plans to release further programs in October for the BBC, Atari and Commodore 64 machines.

● Arnold Wheatons Software has appointed Artic its sole distributor for a range of Spectrum, BBC and Apple programs including *Angle Turner* and *Weather Station*.

Acorn seek quotation

ACORN is to seek a quotation on the Unlisted Securities Market.

Merchant bank advisors Lazards and stockbrokers, Cazenoves are handling the proposed share placement, believed to be about 10 per cent which could raise around £6m for the company. A plan at the beginning of the year to raise money through a private share placement has been dropped because of a £3m limit.

Acorn cannot go for a full stockmarket quotation because the company is still less than five years old.

The USM has been very buoyant in recent months with a large number of new technology companies joining. However, feeling in the City now is that the enthusiasm could go out of the market, particularly following the financial troubles of companies like Grundy, ITCS and Dragon.

Problems create problems

SINCLAIR is now manufacturing a Series 3 Spectrum which has cured one problem, only to create another.

The Series 3 machines are indistinguishable from any other Spectrums, except that they have a slightly modified ULA. The change to the ULA has been made to ensure that the machine is compatible with all makes of colour television.

After the Spectrum was launched last year, it became apparent that the computer did not work successfully with some types of tv — some of the Hitachi models, for example.

Unfortunately, while the new ULA solves this problem, its introduction has lead to another difficulty. The new ULA causes some existing software programs written on earlier versions of the Spectrum to crash. The problem concerns the *In* command and it seems that any existing software that calls this routine will not run on the new machines.

A spokesman for Sinclair commented: "The new chip was introduced to overcome the tv problem, and as a very unintentional side-effect the *In* command has been affected.

"We are only aware of one or two cases where it affects software. It looks as though it doesn't happen very often and none of our own software has been affected."

The ultimate

ULTIMATE Play the Game has announced two new titles for the 48K Spectrum.

They are: *Lunar Jet Man*, the follow-up to *Jet Pac*, and *Atic Atac*, a haunted house game where you can choose your own character.

Both will cost £5.50 and be available at the end of September.

Oric six-slot

A SIX slot mother-board will shortly be available for the Oric 1.

The board, from Kenema Associates, will come complete with ribbon connectors and be supplied with either two or six sockets on-board. Prices depend on the number of sockets, but should be between £35 and £45.

Cards to go with the mother-board include multiple parallel and serial cards and a speech synthesis module (the sort that builds up words from allophones). The speech card will sell for around £49.

The mother-board should go on sale in early October, to be followed by the first of the cards two weeks later.

Kenema Associates is an off-shoot of the Tangerine Users Group, and can be contacted at 1 Marlborough Drive, Worle, Avon.

Sinclair turnover doubles

SINCLAIR Research's pre-tax profits for the year to March 31, 1983, stood at £14.03m. This compares favourably with the previous year's £8.55m profits.

Turnover doubled from £27.17m to £54.53m, while earnings per share rose from 106p to 207p.

Chairman, Sir Clive Sinclair, called the figures "encouraging", but admitted the company had met some problems. "In particular the US market, which we serve through our technology and name licensing agreement with Timex, has been badly affected by a price war since Christmas which has driven the market leaders into heavy losses and resulted in a much lower sales volume in money terms than we expected.

Sir Clive Sinclair

"Fortunately, the UK market proved better than anticipated which partly compensated."

Sir Clive revealed that the company planned to introduce products in new market areas and noted: "We expect to be leaders in the flat screen television field where we are confident that we have the best technology."

● Prism Microproducts, Sinclair's UK distributor, announced that turnover in the first year of its operation totalled £10m. Pre-tax profits were a rather more modest £234,000.

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LETTERS

Open Forum entries

As a relatively new, but keen, reader of *Popular Computing Weekly*, I am interested in the possibility of submitting programs to Open Forum. However, I have, as yet, no printer for my Vic20, and am wondering whether entries for Open Forum have to be sent in the form of a computer print-out, or can be submitted in some other way.

A R Jenns
58 Endhill Road
Kingstanding
Birmingham B44 9RP

We get a number of queries on how to submit programs to *PCW*, so a brief resume of the procedure seems to be in order.

Firstly, please do include a print-out (remembering to put a fresh ribbon in the printer) of the program. It is also helpful to have a copy of the program on tape, but do not forget to keep a copy for yourself. Always state which computer the program is for (you would be surprised how many people forget to include this information), and how much memory it takes up. A brief description of the program and how it works is essential — it is not enough to say that the workings of a program are obvious or covered in Rem statements.

Finally, include your name and address on the tape and the print-out as well as the accompanying notes. Also, please include a SAE if you want the tape returned.

In praise of Piman

I think P Devereau (Letters, *PCW* 11-17 August) should be forcibly suppressed. How dare he insult Automata's wonderful advertising. Their back page is the first thing I turn to every week — in fact, it's the main reason I buy your magazine.

The Piman and his friends are never too busy to reply to your letters and when you meet them at exhibitions they are always having a party for their customers. I am never disappointed with their games, which are always delivered by return of post — the last one had a free pound note present in it.

Don't be such a misery, P Devereau, Automata are the only people who can make you laugh while you enjoy their programs. Like the Piman says in his free hit song "Give it a try man".

Karen Ross
109 Honeysuckle Road
Bassett
Southampton

We think the Piman deserves some praise too.

Home-brew program

After being interested in computing for some time, I acquired my first computer a couple of weeks ago — a Sinclair 16K Spectrum.

After non-stop programming for a week, I started to write my first home-brew program, "a dx propagation predictor". All amateur radio operators will know what I mean by "dx".

I have only completed one part of it and it is working successfully. I decided to delay the other parts and start on a radio ham log book program. I got all the main material written down and working and I was very pleased with myself, until it came to saving the information without saving the actual program all the time. Have you a solution to my problem.

As you may now have gathered, I'm trying to use my computer in conjunction with my other hobby, short-wave listening, and with any luck actually operating my own station. Also, have you any other correspondents with ZX Spectrum computers who are "Hams" or "SWLs" and, if so, do they know of any decent programs?

Paul Martin (16)
18 Wilkinson Close
Temple Hill
Dartford
Kent DA1 5JT

PS. I have just started to write my own program and I would like to know how to make the screen scroll laterally, so that it looks as if a plane is moving horizontally when really the scenery is moving.

I do not have any programs on tap to solve your problems, but our readers may be able to send in some solutions.

We hope to be doing some material on micros and radio in the near future.

Scrabble words

Regarding Steve Freedman's letter (Scrabble warning, *PCW* 1-7 September), I have written the following routine to print the basic forms (ie, no -ed, -s, -ing, etc) of all the words in the Scrabble dictionary.

```
100 LET l=2
150 LET f=0
200 LET a=40222
250 IF a>=40302 THEN LET l=3
251 IF a>=41302 THEN LET l=4
252 IF a>=45640 THEN LET l=5
253 IF a>=50959 THEN LET l=6
254 IF a>=53855 THEN LET l=7
255 IF a>=59555 THEN LET l=8
270 INPUT ;
300 IF PEEK a=0 THEN PRINT : LE
T a=a+1: GO TO 300
310 IF PEEK a>100 THEN GO TO 50
5
315 IF f=1 THEN LET a=a-1: LET
f=0
320 FOR b=a TO a+l-1
330 PRINT CHR$ PEEK b;
340 NEXT b
345 PRINT
350 LET a=a+l
360 GO TO 250
500 LET w=INT (PEEK a/100)
510 IF w=1 THEN LET x=PEEK a-10
1: LET x=x/4
520 IF w=2 THEN LET x=PEEK a-19
5: LET x=x/4
525 DIM a$(w)
530 FOR b=1 TO w
540 LET a$(b)=CHR$ PEEK (a+b)
550 NEXT b
600 FOR b=1 TO x
610 PRINT a$;
620 FOR c=1 TO (l-w)
630 PRINT CHR$ PEEK (a+w+c);
640 NEXT c
645 PRINT
650 LET a=a+(l-w)
660 NEXT b
665 LET a=a+1+w
670 GO TO 250
```

To use the routine:
Clear 24400
Load "C" Code (from Scrabble tape)
Clear 40000
then Run the accompanying program.

Paul Ockenden
61 Albourne Close
Brighton
East Sussex BN2 5FX

Unwanted chain letters

It appears that someone is using the names and addresses of contributors appearing in your Letters page to promote a chain letter scheme; and you may possibly share my view that you should do what you can to discourage such exploitation in the interests of your own reputation.

I am enclosing a letter I received today which I believe was prompted by the appearance of my own name and address in your issue of 1-7 September. First, there are the specific references to home computers; secondly, the envelope bears a post code I never bother to give when completing, say, coupons from computer mags.

Perhaps you may wish to consider whether it is a good idea to give full addresses — particularly when they often pin-point the location of valuable computer hardware.

John Ransley
East Sussex

We have received several complaints that someone is circulating a chain letter, using name and addresses taken from our Letters page. Anyone who receives such a letter should either send it to us or throw it away immediately.

Our policy on publishing full names and addresses has always been to show that the letters are genuine and that the writers are not afraid of being identified with the views they have expressed. At the same time, we have always witheld full addresses where requested to do so.

However, if people writing letters to *PCW* are bombarded with unsolicited material such as chain letters, we shall be forced to stop publishing any full addresses.

Hill St Blues

A new game for 48K Spectrum by A Follin and E Page

This program is rather unusual in that it is a fast-moving arcade-style game for two players in Basic.

One player takes the role of a New York cop, the other takes the role of an infamous villain whose idea of fun is knocking down old ladies in his Ford Mustang. Naturally, the cop has devoted his working life to putting an end to the villain's reign of terror.

The main program is a loop which involves key tests, updating car positions and checking for crashes, etc. This loop contains a machine code subroutine for scanning the keyboard which places the values read in locations 60001 to 60004. The main loop then uses these values for changing the cars' positions and directions. The other subroutines are called from this loop in the event of a crash.

Program notes

Lines	
40-60	Clear memory for m/c subroutines, call subroutines for initialising and printing instructions .
90-290	Main loop
120-147	Call m/c keyscan routine and update accordingly
150-250	Move cars and check for crash, etc
260-290	Check if pedestrian on screen. If not, and random number is greater than .7 then randomise new position
700-740	Suspend cop for ten goes and return to start position
800-890	End game, print score, prompt user for next game
9000-9150	Initialise. POKE in m/c routines and UDGs
9500-9760	Print titles, plays theme tune, print instructions, set up screen and game variables

After each game is finished, options are given to see the instructions again or not. If so, a jump is made to line 9590. This is in the middle of the instruction routine and cuts out the opening titles.

Machine Code Routines

50000-50015	Attribute change. Location 60000 contains the value of the screen attributes as on page 198 of the Spectrum manual
50020-50068	Keyscan routine. Checks all eight rows for left and right keys pressed and places resultant values in locations 60001-4
50070-50082	Check keys for setting up roadblock. If key pressed, BC register contains 1 on return else it contains 0
60000	Attributes
60001	Police car turns left
60002	Police car turns right
60003	Villain's car turns left
60004	Villain's car turns right ■

```
 0>REM © DEMON SOFTWARE 1983
 2 REM
10 REM *************************
20 REM **** HILL ST.BLUES ****
30 REM *************************
40 CLEAR 49999
50 GO SUB 9000: REM INITIALISE
60 GO SUB 9500: REM INSTR
70 REM
80 REM *************************
90 REM **** MAIN SECTION *****
100 REM *************************
 110 PRINT #1; FLASH 1; INK 7; P
APER 0;AT 0,11;"GET READY": FOR
I=5 TO 0 STEP -1: PRINT #1;AT 1,
15;I: BEEP .5,5-I: NEXT I: PRINT
 #1;AT 0,11;"          ";AT 1,15;
" "
 120 FOR I=60001 TO 60004: POKE
I,0: NEXT I: RANDOMIZE USR 50020
 130 LET PCD=PCD+(PEEK 60002)-(P
EEK 60001): LET RCD=RCD+(PEEK 60
004)-(PEEK 60003)
 131 IF USR 50070=0 THEN GO TO 1
40
 132 IF BLOCKS=0 THEN GO TO 140
 133 LET DROP=1: LET BLOCKS=BLOC
KS-1
 140 IF PCD=5 THEN LET PCD=1
 142 IF PCD=0 THEN LET PCD=4
 145 IF RCD=0 THEN LET RCD=4
 147 IF RCD=5 THEN LET RCD=1
 148 IF SUS>0 THEN LET SUS=SUS-1
: PRINT #1;AT 1,0;("
                    " AND SUS=0)
: FOR J=1 TO 15: NEXT J: GO TO 2
00
 150 LET X=PCX: LET Y=PCY: LET X
=X+(PCD=2)-(PCD=4): LET Y=Y+(PCD
=3)-(PCD=1)
 155 IF X=-1 OR X=32 OR Y=-1 OR
Y=23 THEN GO TO 700
 160 IF Y=RCY AND X=RCX THEN GO
TO 800
 170 IF ATTR (Y,X)=5 THEN LET BL
OCKS=BLOCKS+1: GO TO 190
 180 IF SCREEN$ (Y,X)<>" " THEN
GO TO 700
 190 PRINT INK 7;AT PCY,PCX;" ";
AT Y,X;CHR$ (143+PCD)
 195 IF DROP=1 THEN PRINT AT PCY
,PCX; INK 5;"m": LET DROP=0
 197 LET PCY=Y: LET PCX=X
 200 LET X=RCX: LET Y=RCY: LET X
=X+(RCD=2)-(RCD=4): LET Y=Y+(RCD
=3)-(RCD=1)
 205 IF X=-1 OR X=32 OR Y=-1 OR
Y=22 THEN GO TO 800
 210 IF Y=PCY AND X=PCX THEN GO
TO 800
 220 IF ATTR (Y,X)=5 THEN GO TO
800
 230 IF SCREEN$ (Y,X)<>" " THEN
GO TO 300
 240 IF Y=BY AND X=BX THEN LET Y
EARS=YEARS+1
 250 PRINT INK 2;AT RCY,RCX;" ";
AT Y,X;CHR$ (147+RCD): LET RCY=Y
: LET RCX=X: LET YEARS=YEARS+.1
 260 IF BIDD=1 THEN LET BC=BC-1:
 IF BC<=0 THEN LET BIDD=0
 270 IF BIDD=1 THEN GO TO 120
 275 IF RND<.7 THEN GO TO 120
 280 LET BIDD=1: LET BC=15: LET
BX=INT (RND*32+1)-1: LET BY=INT
(RND*22+1)-1: IF SCREEN$ (BY,BX)
<>" " THEN GO TO 280
 290 PRINT FLASH 1; INK 4;AT BY,
BX;"£": GO TO 120
 700 REM *************************
 710 REM ****** COP CRASH ******
 720 REM *************************
 730 IF ATTR (Y,X)<>6 THEN PRINT
 AT Y,X;" ": LET BIDD=0
 740 PRINT AT PCY,PCX;" ": LET P
CY=0: LET PCX=0: LET PCD=2: LET
SUS=10: PRINT AT 0,0; INK 7;"■":
 PRINT #1;AT 1,3; FLASH 1;" COP
SUSPENDED FOR 10 GOES ": GO TO 2
00
 800 REM *************************
 810 REM ***** ROBBER CRASH ****
 820 REM *************************
 830 PAPER 2: INK 7: BORDER 2: C
LS : PRINT AT 3,0;
"
```

NICKED

```
 850 PRINT AT 18,0;"YOU GOT SENT
ENCED TO ";INT YEARS;" YEARS"
 860 PRINT BRIGHT 1; FLASH 1;AT
21,0;"PRESS ANY KEY FOR ANOTHER
GAME": PAUSE 0
 870 INPUT "DO YOU WANT INSTRUCT
IONS (Y/N)"; LINE A$
 880 IF A$="Y" OR A$="y" THEN GO
 SUB 9590: GO TO 100
 890 GO SUB 9710: GO TO 100
9000 REM *************************
9010 REM ***** INITIALISE ******
9020 REM *************************
9030 PAPER 5: INK 1: BORDER 5: C
LS
9040 RESTORE 9050: FOR I=50000 T
O 50015: READ A: POKE I,A: NEXT
I: REM ATTRIBUTE CHANGE ROUTINE
9050 DATA 58,96,234,33,0,88,17,1
,88,1,0,3,119,237,176,201
9060 FOR I=50020 TO 50065: READ
A: POKE I,A: NEXT I: REM KEY TES
T ROUTINE
9070 DATA 62,240,219,254,203,71,
40,11,203,79,32,12,62,1,50,95,23
4,24,5,62,1,50,97,234
9080 DATA 62,15,219,254,203,79,4
0,11,203,71,32,12,62,1,50,100,23
4,24,5,62,1,50,99,234,201
9085 FOR I=50070 TO 50082: READ
A: POKE I,A: NEXT I
9087 DATA 1,0,0,62,240,219,254,2
03,87,192,14,1,201
9100 DIM A(15): DIM B(15): FOR I
=1 TO 15: READ A(I),B(I): NEXT I
: REM TUNE
9110 DATA 5,.5,4,.25,5,1.25,5,.5
,4,.25,5,1.25,5,.5,4,.25,5,.5,4,
.25,2,.25,4,.25,5,.5,4,.25,5,1.2
5
9120 FOR I=USR "A" TO USR "K"+7:
 READ A: POKE I,A: NEXT I
9130 DATA 124,124,68,124,108,124
,124,124,0,0,255,251,235,251,255
,0,124,124,124,124,108,124,68,124,12
4,0,255,223,215,223,255,0,0
9140 DATA 124,124,68,124,124,124
,124,124,0,0,255,251,251,251,255
,0,124,124,124,124,124,124,68,124,12
4,0,255,223,223,223,255,0,0
9150 DATA 255,129,129,129,129,12
9,129,255,0,0,126,66,165,165,0,0
,24,60,24,62,66,66,64,100
9160 RETURN
9500 REM *************************
9510 REM ***** INSTRUCTIONS ****
9520 REM *************************
9530 PRINT AT 3,0;"
```

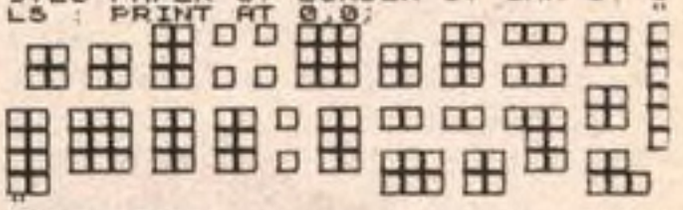
HILL ST.

```
;AT 10,0;"
```

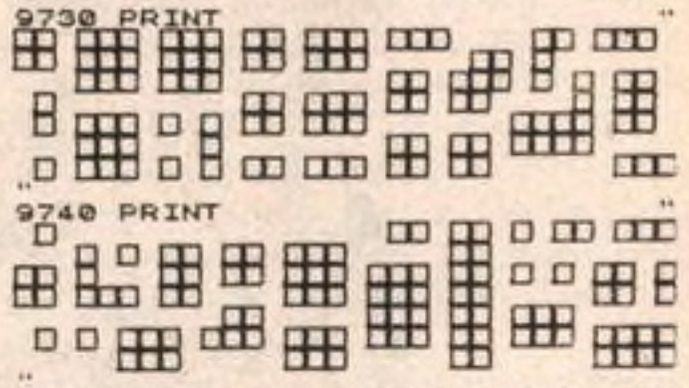
BLUES

```
9535 LET BEEP=-1: FOR I=30 TO 0
STEP -1: PRINT AT 8,I;"■ ": BEEP
 .2,BEEP: LET BEEP=-BEEP: NEXT I
: PRINT AT 8,0;" "
9537 FOR I=1 TO 20: NEXT I
9540 FOR I=1 TO 15: BEEP B(I),A(
I): NEXT I
9550 LET COLOR=40: PRINT AT 20,1
;"PRESS ANY KEY FOR INSTRUCTIONS
"
9560 IF INKEY$<>"" THEN GO TO 95
90
9570 POKE 60000,COLOR: RANDOMIZE
 USR 50000: LET COLOR=COLOR+1: I
F COLOR=48 THEN LET COLOR=40
9580 FOR I=COLOR TO COLOR-20 STE
P -10: BEEP .005,I: NEXT I: GO T
O 9560
9590 PAPER 0: BORDER 0: INK 6: C
LS
9600 LET A$="
    This is a game for 2 players;
one a cop and the other an evil
villain. The object of the game
for the villain is to get as big
a sentence as possible. To do
this, the villain must avoid
capture and knock down poor old
ladies. The object of the game
for the cop is, of course, to
stop the villain."
9610 LET A$=A$+"
                    "
The movement controls are:-
          COP                ROBBER
    Left      Right    Left      Right
      1          2       9          0
      q          w       o          p
      a          s       l        ENTER
CAPS SHIFT       z    SYM SFT     SPACE

In addition, the cop can press
any of the following keys to set
up a road block:-
c,e,d or x."
9620 LET A$=A$+"
          If the cop crashes or
 runsdown a pedestrian, he will
be   suspended for ten goes whil
e he appears in court. Meanwhile
, therobber is running free.....
          If the robber crashes
, he will be caught by foot patr
ols."
9630 POKE 23692,255: FOR I=1 TO
LEN A$: PRINT A$(I);: IF A$(I)<>
" " THEN BEEP .01,50
9640 NEXT I
9700 PRINT #1;AT 1,5; BRIGHT 1;
FLASH 1;"PRESS ANY KEY TO BEGIN"
: PAUSE 0
9710 FOR I=56 TO 0 STEP -8: POKE
 60000,I: RANDOMIZE USR 50000: F
OR J=I+10 TO I-10 STEP -2: BEEP
.01,J: NEXT J: NEXT I
9715 LET SUS=0: LET BIDD=0: LET
DROP=0: LET BLOCKS=5: LET BX=100
: LET BY=100: LET PCX=0: LET PCY
=0: LET PCD=2: LET RCY=19: LET R
CX=31: LET RCD=4: LET YEARS=1
9720 PAPER 0: BORDER 0: INK 6: C
LS : PRINT AT 0,0;"
```



```
"
9730 PRINT "
```



```
"
9740 PRINT "
```



```
"
9750 PRINT INK 7;AT 0,0;"■"; INK
 2;AT 19,31;"■"
9760 RETURN

GRAPHICS:-

A=▚  B=■  C=▙  D=▬  E=▛  F=▀

G=▟  H=▄  I=□  J=▌  K=▞

PLEASE NOTE THE FOLLOWING :-

230 IF Y=BY AND X=BX THEN LET YE
ARS=YEARS+1: GO TO 250

240 IF CODE SCREEN$ (Y,X)<>32 TH
EN GO TO 800

PLEASE ADD THE FOLLOWING TO THE
END OF LINE 260:-
: PRINT AT BY,BX;" "

CHANGE ALL RANDOMIZE USR TO
LET Z=USR

TO INCREASE THE FREQUENCY OF THE
PEDESTRIANS,DECREASE THE .7 IN
LINE 275.
```

YOU'RE

Forces of good and evil

***David Kelly** talks to Roy Carnell and Stuart Galloway of Carnell Software*

"As you see, we have a good view of the woods," grins Stuart, gesturing from the offices of Carnell Software towards the window and the timber yard next door.

Woods, forests, trolls, goblins and elves. Enchanted valleys, the forces of good and evil. All of these formed part of the world of Stuart Galloway and Roy Carnell long before they formed Carnell Software and wrote adventure programs.

Both grew up in Kirkcaldy, Scotland, and from an early age both were fascinated by any flights of the imagination they could lay their hands on. "Roy is a nutter on fantasy — quite an authority in fact, whereas I am more of a science-fiction fan," explains Stuart. They avidly collected shelf-upon-shelf of fantasy fanzines — *Famous Monsters of Film Land* and the like — and devoured all the 40s Hollywood B movies they could find. They even designed their own board games.

At 13 they made their first film in 8mm — *The Mummy's Revenge*, with Roy swathed in bandages.

From then on, both set out for a career in film production. Undaunted by a teacher who informed them that people from Scotland didn't get jobs in the movies, both managed to get into Birmingham Film School.

While at Birmingham they met a man called Wally Vevvers who had created most of the special effects on Kubrick's film *2001*. He offered them a job and, almost before they knew it, they were thrown in at the deep end working in the team creating the special optical trickery for *Superman 1*.

After that they worked on a number of films. Probably the closest to their hearts, and the one on which they worked most on their own, was Boorman's *Excalibur*, set in the mythical days of Merlin and the Arthurian legends.

Fantasy on film, but not exclusively. Any form of escapism fascinated Roy. Ever since the advent of the micro he had wanted one — he could see it had possibilities. Like so many, he was only able to afford one when the ZX81 came out — and that is really when Carnell Software started, back in November 1981.

"I started programming, but it took a while for the first adventure to come," says Roy. "I started to write *Volcanic Dungeon* experimenting with program routines and on bits of paper while I waited for my 16K Ram pack to turn up."

Roy had plenty of time to program because of the way the British film industry works — or rather, doesn't. People like Roy and Stuart at that time were only working about three or four months a year. So Carnell really sprang out of a need to find something to do to fill up the spaces. "I took the computer over to Stuart," explains Roy, "with the idea of selling programs by mail-order and he fell about with hysterics because I couldn't get the program I had written to load!"

"I suppose we are frustrated story writers," says Stuart. "And a computer game is just like being able to take a role in one of our stories."

"We had never played an adventure or seen one until we wrote *Volcanic Dungeon*," says Roy. "That's why it is quite unlike anything else.

"It is more of a game — with lots of treasures and monsters scattered around a dungeon." In the adventure you must rescue a princess who has been captured by the wicked Magra. "You have to discover what weapons to use against which monster — just like a game of cards, when you go in to fight the Magra you have to have a good hand of weapons," says Roy.

"It is an adventure you can play again and again — it is always different," explains Stuart. "We've even got one guy who has made a peg-board to plot the treasures and monsters for each game. Another chap wrote to us after playing it for three months without finding the princess.

"That is why we decided to hold the Volcanic Dungeon Championships earlier this year — the winner took 53 minutes.

"You have got to know your mythology — or to have seen a few Sinbad films. Most people when they start out get killed in the first couple of caverns until they get more experienced."

In April last year rumours were rife that Sinclair would announce a new computer. Stuart and Roy reckoned it would be a 32K colour machine with the same Basic as the ZX81 so they started writing a new game accordingly — which became *Black Crystal*.

Roy was back in Scotland because they were both unemployed again. Stuart went to Earls Court when the Spectrum was announced: "I fought tooth and nail for one of those leaflets to find out the details — and we were very lucky — it was just what we had hoped."

Work on *Black Crystal* pressed on. "If we are ever stuck for inspiration we take a walk to the pub instead of the car. We

Roy Carnell (left) and Stuart Galloway — preparing for Magra.

wanted a multi-program game with graphics with a central map with locations on it which acted as the entry points to other programs.

"The problem with most adventures is plot — they don't have one. From being in films and being long-frustrated story writers we realised that the most important thing was that the game should have a purpose. An adventure should be like a novel. It took many walks to the pub and our phone bills went through the roof — you always seem to get inspiration late at night — but we decided to create our own entire world of mythology."

All of Carnell's games centre around the Third Continent — a long time in the past when the land masses of Europe, Africa and America were one. At the moment they are concentrating on the European part — the Black Mountains, its foothills and The Enchanted Valley.

In *Black Crystal* you must find the seven Rings of Creation and use them to destroy the forces of evil. When correctly positioned around the source of evil — the Black Crystal — it can be destroyed.

By the time the Spectrum arrived, Roy had written most of *Black Crystal*. Then things began to get hectic. They both began work at Shepperton studios on a new film — yet to be released — called *The Keep*. At the same time money began to get tight. "Everybody goes on about how good it is — but that's rubbish," says Stuart. "You have good times and bad times just like any other industry — and last summer was very difficult. Following the Spectrum's launch there was a lot of uncertainty.

"Roy's account went badly into the red — that's one of the reasons *Black Crystal* was delayed until November.

"That is when we formed Carnell Software more formally.

"We are much older and wiser now," says Roy, "but for a while we couldn't cope. We were trying to do two jobs at once — Carnell and the film — and demand for *Black Crystal* was much greater than we imagined it would be."

"We were doing the packing ourselves," explained Stuart. "I had to go sick at one point to get a day off work to send out the first batch of 870 *Black Crystals*."

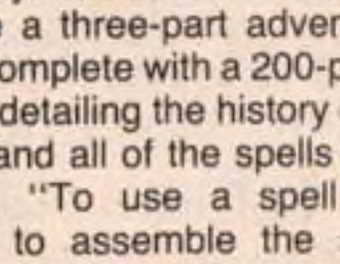
Christmas was sheer panic. They thought it would slow down and it didn't. At Christmas they held packing parties with friends coming down for a Chinese, some beer and some packing!

At the start of this year the pair made the break, quitting *The Keep* for full-time work on Carnell.

"We are treading very carefully, and for that we may have lost ground compared with some of our competitors. But I think we will be one of the survivors," says Stuart, "rather than one of the balloons that goes pop in a very spectacular way."

He reckons that to complete Carnell's plans for Christmas this year will cost the company over £120,000.

Most important of the new titles is the sequel to *Volcanic Dungeon* and *Black Crystal — The Wrath of Magra*, available in November, at first for the Spectrum. Again it is set in the mythical Third Continent. Chronologically, it takes place at the same time as the *Black Crystal* was destroyed and the great battle was fought when the armies of evil and the Tree of Life were destroyed.



That was at the end of the Third Age when the balance of the forces of good and evil was restored.

So, the Fourth Age begins, as does the plot of *The Wrath of Magra*. You play the role of the hero from *Volcanic Dungeon*. The Snow Giants take the body of Magra back to her castle in the Black Mountains where she is brought back to life by the powers of black magic. She is furious with you and recaptures the princess, imprisoning her in the castle. "You have to rescue her and kill Magra — and Magra is just hoping you'll try to fight her on her own ground," says Stuart.

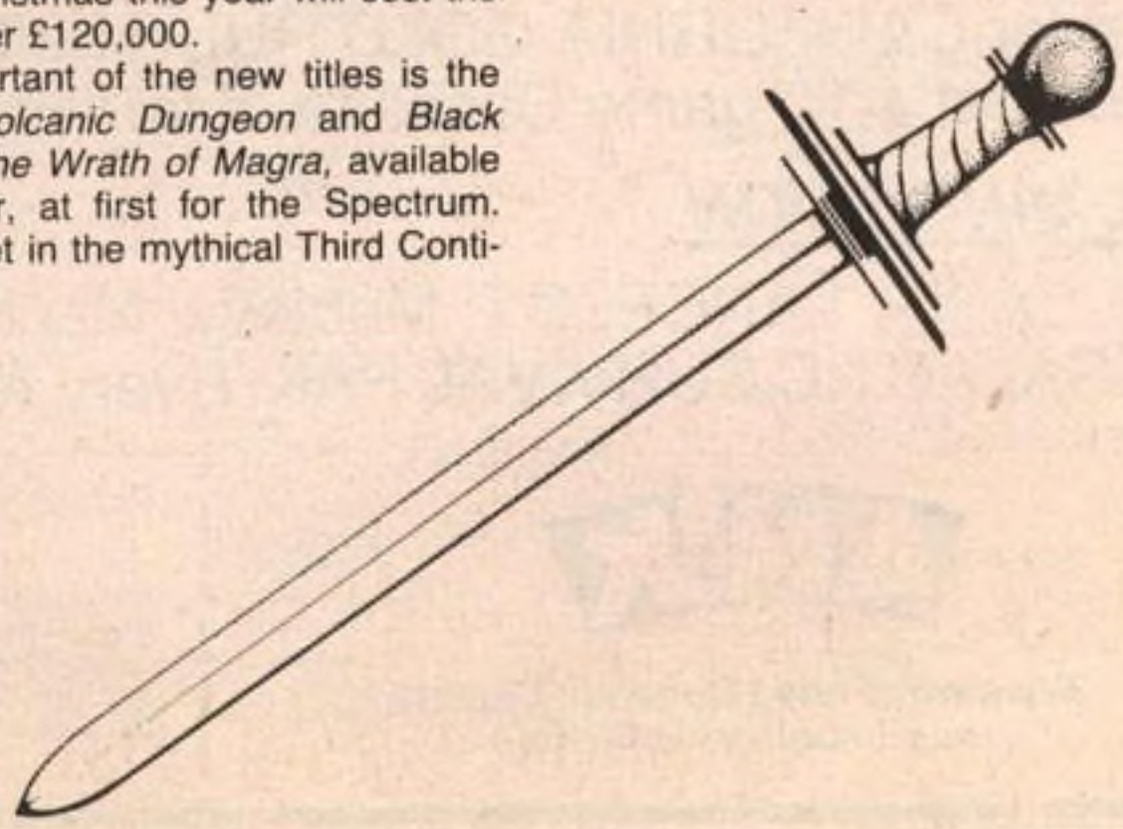
It will be a three-part adventure which will come complete with a 200-page paperback book detailing the history of the Third Continent and all of the spells needed for the game. "To use a spell it will be necessary to assemble the appropriate ingredients," explains Roy. "For example, to make a Saintly Staff you need to call up a dead saint — and you will need a lot of spiritual power to control it." Among the ingredients you might need is graveyard dust — and you would have to find that before making your Saintly Staff.

"We wanted to have an adventure where you can go to bed at night and take the book with you. What you will have is a real spellbook which you will have to learn to use — it is like you are a novice wizard thrown in at the deep end. You will have to go away and learn how to cope," says Roy.

"We don't see why you should get away with just pressing buttons."

During the three stages of *The Wrath of Magra* you must progress under the Black Mountains, up through the Mines and into Magra's castle.

And when you get there, you will have to be very well prepared, warns Roy. ■



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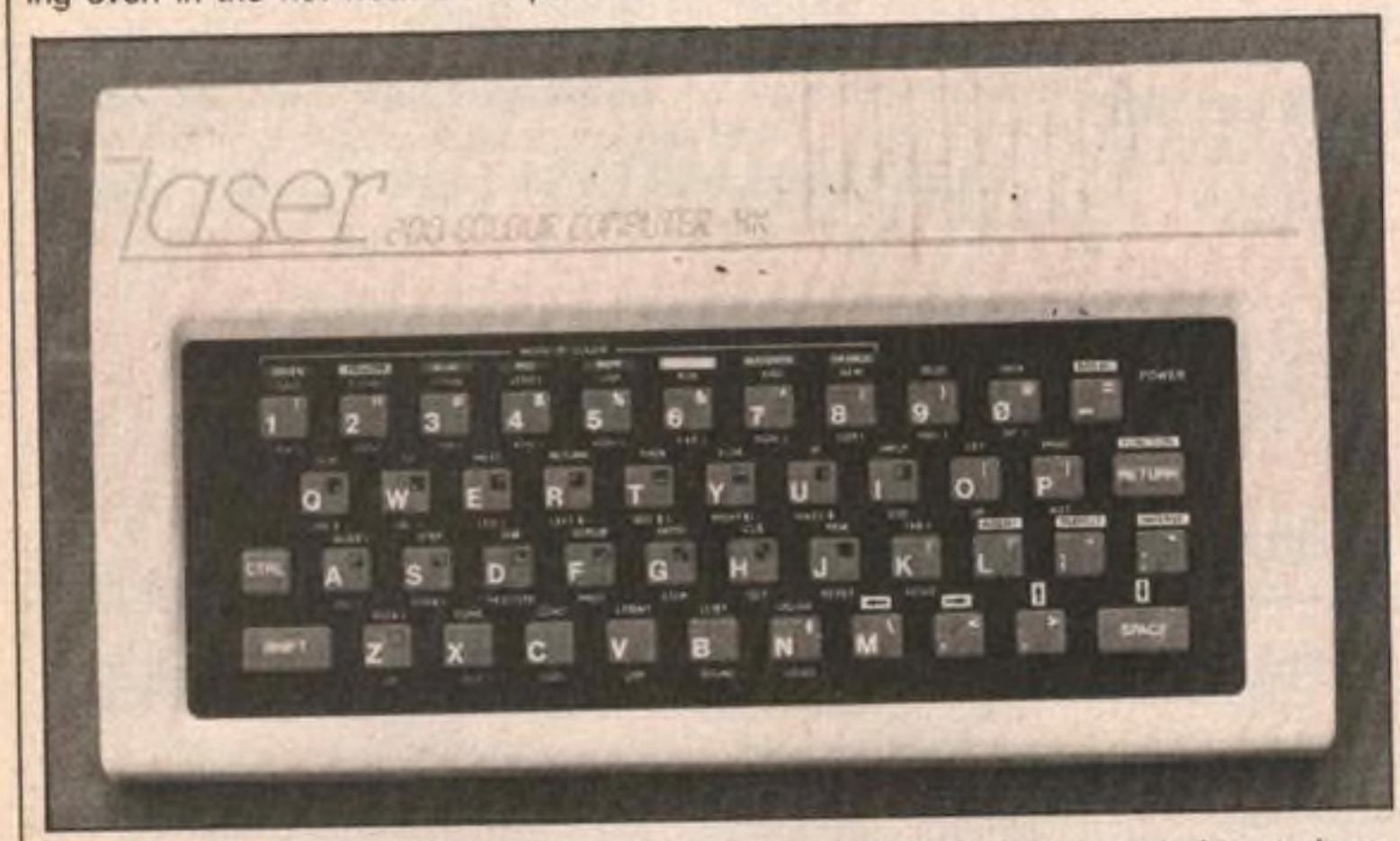
A taste of the Orient

***David Aubrey Jones** presents an in-depth review of the Laser 200*

When the Laser 200 was launched at the Earls Court computer show in London last month, it generated considerable interest. In spite of Sinclair's recent price cuts, the Laser reduced the price of a micro offering both colour and sound by a full £30. So just how well does it compare with its more expensive rivals? Is it rubbish from the Far East or is it a serious contender for your money?

Manufactured by the Hong Kong company Video Technology for £69.95, the Laser 200 computer comes complete with power supply, all leads, three manuals and a cassette containing eight interactive programs (games and more serious applications/Basic and machine code). The Laser has a tough, cream coloured, plastic case with separate rubber keys as per Spectrum. However, these are harder and have a more positive feel than those of their competitor. They auto-repeat and there is a useful 'click' sound when they are pressed, but I noticed an occasional tendency for them to bounce.

On the top right is a grille to help dissipate the heat generated inside the case — there was no sign of any overheating even in the hot weather. A power-on light glows in the top right-hand corner of the keyboard and there is a well-positioned on-off switch on the side (Sinclair take note). At the rear are connections for TV, monitor, cassette and power, together with two expansion ports. One of these is for extra Ram and the other for some peripherals such as joysticks (£19.95 pair) and printer (Centronics interface £19.95; four-colour printer £149.95).



Four K of Ram is built in, leaving less than 2K available for programs. However, due to the fact that keywords are stored in a tokenised form, some programs are possible within it.

When the Laser arrives in the shops, memory will be expandable to 20K for £29.95 with a plug-in unit. In spite of considerable use, there was no trace of the dreaded "Ram pack wobble". Later in the year, a 64K Ram pack (£59.95) will also be available.

At the heart of the Laser is a Z80A running at 3.58MHz, the same speed as that of the Spectrum. The Laser also supports double precision variables for increased accuracy in calculations, an unusual feature in a low-priced home micro, and integer variables. If integer variables are used in a program instead of real variables, a speed increase of some 20-30 percent can be obtained, which would be very useful for games programs.

When the Laser is first switched on, text is displayed in light green on a dark green background with a black border. This was clear and easy to read. The background colour can also be changed to dark orange, and inverse characters can be printed. The chip that handles the display is the same as that used in the Acorn Atom and Dragon computers. This allows nine colours on the screen at a time in text mode (32 columns × 16 lines) in the form of "Battenburg" graphics characters.

These are similar to those found on the Sinclair ZX81 or Spectrum, being made up effectively of 2 × 2 pixels. They are displayed in one of eight colours on a black background and allow a resolution of 64 × 32. The colours are green, yellow, blue, red, buff, cyan, magenta and orange.

A higher resolution mode (128 × 64) is also available. The resolution of this is not as high as that of the Spectrum, but the colour resolution is actually higher; each pixel or point can be set to a different colour (unlike the Spectrum there are no restrictions in the form of only two colours per character area in this mode).

Eight different colours can be used in high resolution, four at any one time. The two sets that one can choose between are green, yellow, blue and red, or buff, cyan, magenta and orange. The colours were steady and fairly sharp on all three colour televisions the Laser was tested with.

The Laser uses a form of Microsoft Basic, contained in a 16K Rom. All the standard commands and functions are available, including the facility of multi-statement lines. Strings are supported together with *Len, Str$, Val, Left$, Right$, Mid$, Asc, Chr$* and *Inkey$*. Arrays, both numeric and string, can be of any length and have up to three dimensions. There is also no restriction on the length of variable names, although only the first two characters are recognised.

An interesting and unusual feature of the Basic are some very powerful *Print* commands. As well as the usual *Print@* and *Print Tab*, *Print Using* allows the formating of output in a similar way to the language Cobol which is often used for business applications. For example:

PRINT USING "####";A where A = 2.36428 will produce▼2.36

There are seven field specifiers that *Using* will support to allow the printing of output to your exact requirements. Structured programmers will also be pleased with the inclusion of an *If . . . Then . . . Else* statement.

The high resolution graphics commands are less extensive than on some micros; there are no *Draw* or *Circle* commands. It is left to the software houses to fill this gap. *Set (x,y)* plots a dot at a specified location on the screen (where *x* is a value from 0 to 12, and *y* a value from 0 to 63) and *Reset (x,y)* blanks it out. *Point (x,y)* tests a point to see if it has been set — useful to see if your missile has hit a space invader!

The *Color* command changes the current ink and paper colours (note American spelling). It takes the form *Color F,B* where *F* is a number between 1 and 8, the foreground or ink colour you wish to use, and *B* is either 0 or 1, the background or paper colour you require. Some interesting effects can be obtained in the higher resolution mode by switching between background colours, since this also changes all four colours currently in use. It is somewhat dramatic to watch your picture made up of the colours green, yellow,

blue and red instantaneously change into buff, cyan, magenta and orange! In contrast, changing the paper colour in the low resolution mode has no effect on the ink colour.

Mention has already been made of sound. This is produced and controlled by the microprocessor in a similar way to that

of the Spectrum. Even speech is possible using machine code, by switching the port that controls the speaker directly, but from Basic you are limited to the *Sound* command. This is similar, but slightly less versatile, to *Beep* on the Spectrum. Two arguments following *Sound* control the pitch in semitones, and the length of the note.

```
SOUND pitch, length
```

where pitch is a number from 0 to 31, and length is a number from 1 to 9. The manual provides a table that details the notes on the musical scale and their equivalent pitch values. Thus:

```
For N=1 to 5
READ P,L: SOUND P,L
NEXT
DATA 29,4,31,4,27,4,15,4,22,6
```

will play a tune that will be well known to BBC computer owners (Close Encounters . . . !).

A fierce controversy has waged over the pros and cons of the single key entry of keywords. In this the Laser should please everybody. If you like it, it is there, and, if you don't, you can type all command words in full. In practice, I found this very useful. I ended up using a combination of the two methods — single key entry of the most commonly used words and letter entry of the others. This feature should prove very helpful to beginners.

Another strong feature of the Laser is editing, which is often difficult or lacking on the lower priced micros. Full on-screen editing is supported. After listing the section of the program you wish to alter, you shoot to the exact point using the cursor keys. Extra space can then be added in a line using *Insert*, words can be deleted using *Rubout*, and corrections can be made.

When the line has been altered to your requirements, you just press *Return* and it will be stored in its new form. One thing that did take a bit of getting used to, however, is the fact that *Rubout* works in the opposite direction to the delete key on most computers — it deletes characters to the right and not to the left. Annoying.

Loading and *Saving* to cassette tape takes place at 600 baud, twice the speed of the ZX81, but considerably slower than the top rate of many of the other newer micros. The cassette interface was fairly reliable, but difficulties were experienced with one out of five recorders tested. It proved very difficult to *Load* programs with this recorder when they had been *Saved* on one of the other recorders.

A useful loading sign appears at the bottom left of the screen giving information on the program found, etc, and a *Verify* command is included. Data files are also supported using *Print#* and *Input#* where the values of the specified variables or data are saved on to cassette tape.

A review of the Laser would be incomplete without some mention of the documentation that comes with the machine. Two small booklets are provided, and a manual on Basic. The first booklet, the 'user manual', provides brief details on setting up the Laser, while the other contains a collection of 21 *Basic Application Programs*. A nice idea, but most are uninspired with titles such as *Gallon and Litre, Word Guessing* and *Sorting Words*. The Basic manual assumes no computer knowledge and starts with 'What is a computer?'. A lot could have been done to make it more friendly and the manufacturers say they are making changes to it.

In conclusion, the Laser 200 offers reasonable value for money. It is suited to the first-time user who initially requires a basic machine that can be expanded at a later date. Its main deficiency is the fact that characters cannot be redefined, as on the Dragon. However, by using the higher resolution mode, this can largely be circumvented and quite reasonable character shapes can be drawn and used in machine code games, etc.

Ultimately, the success of a home micro depends to a large extent on the ready availability of good cheap cassette software. ■

LASER 200 FEATURES

CPU: Z80A running at 3.58 MHz
MEMORY: 16K Rom with Microsoft Basic Interpreter
4K Ram expandable to 64K
DISPLAY: Text — 32 × 16
Graphics Mode (0) — 64 × 32 (9 colours)
Graphics Mode (1) — 128 × 64 (8 colours; 4 at any one time)
Colours — black, green, yellow, blue, red, buff, cyan, magenta and orange
SOUND: Single channel from speaker
CASSETTE: 600 Baud with any ordinary cassette recorder
EDITING: Full on-screen editing
KEYBOARD: Moving rubber with auto repeat and audible 'click' on all keys. Optional single key entry.

BASIC COMMANDS

STATEMENTS

CLOAD	END	LPRINT	PRINT#
CLEAR	FOR . . TO . . STEP	MODE	READ
CLS	GOSUB	NEW	REM
COLOR	GOTO	NEXT	RESET
CONT	IF . . . THEN . . . ELSE	OUT	RESTORE
COPY	INPUT	POKE	RETURN
CRUN	INPUT#	PRINT	RUN
CSAVE	LET	PRINT@	SET
DATA	LIST	PRINT TAB	SOUND
DIM	LLIST	PRINT USING	STOP
			VERIFY

FUNCTIONS

ABS	INKEY$	NOT	SIN
AND	INP	OR	SQR
ASC	INT	PEEK	STR$
ATN	LEFT$	POINT	TAN
CHR$	LEN	RIGHT$	USR
COS	LOG	RND	VAL
EXP	MID$	SGN	

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Musical inspiration

***Peter Bartley** examines the musical abilities of the Vic20 in the fifth of a six-part series*

You've all heard random music on the Vic. Not very inspiring, is it? (Don't know what all this "Ludwig" business in the book is about . . .) Try Figure 1 for somewhat improved music.

Well, it's a start, anyway. The data read in lines 30, 40 and 60 produces a continuous bassline, over which are played random notes (line 50) defined in line 10. The notes are defined so that they sound OK whatever stage the bass is up to. This is a very powerful method of ensuring that the music is always tuneful (if a little bland). The only hard part about it is figuring out the bass — I've heard a couple of good rock 'n' roll lines and it should be easy to think up some others.

Probably the reason there is a very little tuneful Vic music about is that it takes so much time and effort to produce. Yet surprisingly musical effects are fairly easy to simulate. Figure 2 is a rather neat little "syndrums" program. Play them using keys 1-8, and try hitting the same key very quickly a few times.

Still on the subject of musical effects, Figure 3 is a demonstration "drumbeat" program — a little simple, but it gives the general idea.

Note that the sound registers are *Poked* off as soon as they are turned on (line 30). Any delay between this sounds the "drumbeat" as a note. One way to modify this program is to have the information concerning the drumbeats and delays in Data statements, which would mean they could more easily be changed (at will, in fact). Get weaving.

Finally, a word about envelope shaping. When a note is played from the Vic, it continues to play until you *Poke* the register with zero. On the other hand, a note from a piano decreases in volume (after peaking). Obviously to make the Vic sound like a piano, we must make the volume decay accordingly (define the volume envelope). Try:

```
10 POKE 36874,225:POKE 36875,243:POKE
   36876,225
20 FOR A = 1 TO 5 STEP.1:POKE 36878,A:NEXT
30 FOR A = 15 TO 0 STEP-.05:POKE 36878,A:NEXT
```

Musical tunes are useful in games to "introduce" the players or as "rewards" for high scores.

You may have noticed that in the first program the full three voices were used. Although they enhance the sound, producing three voice harmonies on the Vic is very, very difficult and boring. Each note and pause must be written into data statements. Yet the results can be stunning. As an example, try:

```
10 POKE 36878,15
20 READ A,B,C,D:IF A<>0 THEN POKE 36879,A
30 POKE 36876,A:POKE 36875,B:POKE 36874,C:
40 FOR E=1 TO D:NEXT:IF D=1 THEN END
50 GOTO 20
60 DATA 225, 215, 195, 720, 0, 215, 195, 0, 225,
   235, 195, 720, 0, 235, 195, 0, 225, 225, 195, 480
70 DATA 228, 228, 215, 240
80 DATA 231, 225, 225, 720, 0, 225, 225, 0, 231,
   225, 225, 480, 228, 228, 215, 240, 231, 225, 225,
   480
90 DATA 233, 211, 211, 240
100 DATA 235, 215, 231, 1450, 240, 240, 225, 720,
   235, 215, 231, 720, 231, 225, 225, 720, 225, 215,
   195, 720
110 DATA 235, 215, 231, 480, 232, 163, 163, 240,
   231, 207, 207, 480, 228, 215, 215, 240, 225, 225,
   225, 960
120 DATA 0, 0, 0, 1
```

Yes, it's that old chestnut . . . Well, what did you expect — Mozart? Hmmm, now there's a thought!

There are a couple of methods to allow music to be played directly from the keyboard of the Vic. Page 75 of the Vic20' users manual is one example, with the musical note values being stored in an array. The Vic1211A super expander cartridge allows you to do the same by putting the machine into "music mode". This also allows music to be played from within a *Print* statement. The powerful *Sound* command makes the production of harmonies a much more pleasant prospect. As well as this, the cartridge offers high-resolution graphics with commands like *Paint, Point, Draw, Circle* and *Color*, and an extra 3K of memory. Various *Read* commands for joysticks, lightpens and paddles are also available. ■

STOP PRESS: Think you couldn't get high-resolution graphics on your Vic without buying a cartridge? Wrong. Type in this program (carefully) then sit back and watch. Be warned, though, it takes a fairly long time.

```
10 POKE 36879,8:POKE 36867,24:POKE
   36866,16 OR 128: POKE 36865,46
20 POKE 36864,18:POKE 36869,240 OR
   13:POKE 56,33
30 FOR A=0 TO 255:POKE 7680+A,A:POKE
   38400+A,5:NEXT: FOR A=5120 TO
   7168:POKE A,0:NEXT
40 FOR H=5 TO 1 STEP-1:FOR A=0 TO 13
   STEP.03:B=COS(A)*25+64:
   C=SIN(A)*9*H+50
50 B%=B/8: C%=C/8: D=B% + C%*16 +
   7680:E = PEEK (D)
60 F = 5120 + E*8 + (C AND 7):POKE F,PEEK
   (F) OR (2↑(7 - (B AND 7)))
70 NEXT A,H:POKE 36878,15:POKE 36876,230:
```

Figure 1

```
10 C(0) = 207:C(1) = 215:C(2) = 231:C(3) =
   225:POKE 36878,15
20 FOR D = 1 TO 4
30 READ A:POKE 36874,A
40 READ B:POKE 36875,B
50 POKE 36876,C(INT(RND(1)*4))
60 READ C:FOR S = 1 TO C:NEXT
70 NEXT D:RESTORE:GOTO 20
80 DATA 195,207,250,207,0,120,209,0,
   300,207,195,120
```

Figure 2

```
10 POKE 36878,15:PRINT"[CLR]****
   SYNDRUMS (PMB)****"
20 FOR F = 1 TO 8:READ A(F):NEXT
30 DATA 201,212,223,235,239,240,
   245,250
40 GET A$:IF A$<>"" THEN V = 10:
   N = VAL(A$):P = A(N):GOTO 60
50 IF P>0 THEN V= 1
60 P = P - V
70 IF P< = 170 THEN P = 0: V = 0
80 POKE 36876,P
90 GOTO 40
```

Figure 3

```
10 POKE 36878,15
20 FOR A = 1 TO 500:NEXT
30 FOR A = 1 TO 3:POKE 36877,200:
   POKE 36874,200:POKE 36877,0:
   POKE 36874,0
40 FOR B = 1 TO 20:NEXT B,A
50 FOR A = 1 TO 500:NEXT
60 POKE 36877,240:POKE 36874,240:
   POKE 36877,0:POKE 36874,0:
   GOTO 20
```

The odd best-seller

***Dale McLoughlin** presents a simple word processor for the 48K Spectrum*

The Sinclair Spectrum does not readily lend itself to word processing applications, due really to the quality of its keyboard. However, it would still be useful to have a simple word processing program among one's software repertoire; it may help you to write the odd best-seller, or an article for your favourite computer magazine.

Here then is just such a program. It is written almost entirely in machine code, nearly 800 bytes in all, but do not be put off by the daunting task of entering all that hex — it will be well worth it when all is done. Of course, in less than 1K it is not possible to include all the user friendliness and versatility of a professional package, but the program is quite easy to use and much faster than anything written in Basic could ever be.

To enter the machine code, first type in program 1. When you run this, it will allow you to enter the hex in convenient blocks of any length, eg *0E* or *0E2A4B* etc. Program 1 *Pokes* the code into the top of memory, above Ramtop, which it moves for you, and overwriting the user defined graphics. You should *Save* the machine code immediately, to avoid any problems in case mistakes have been made. Use the command *Save "Wordproc" Code 64750,785.*

If you later find that there is an error (usually found by the system crashing), enter program 2 and run it to cross-check against the hex listing. When you find your mistake (or mistakes), make a note of the address and manually enter the correct data, remembering to convert the hex to decimal (appendix A of the Sinclair manual will help you do that). Since program 1 checks the total number of bytes entered, it should not be possible to leave something out without noticing. Note also that the first eight bytes are used to store variables and may be changed during the running of the *Wordproc* program.

Program 3 is the Basic part of the actual word processor. This should be entered, saved with *Save "Wordproc" Line 1* and then have the machine code bytes saved again immediately after it.

The machine code itself is divided into two main parts. There is an *Input* routine that uses the computer's own keyboard scanning program, which is called 50 times every second. The *Usr* routine simply looks to see which key was pressed last, if any, and then enters it into the appropriate position in the text. It recognises most of the single character symbols, ie *A-Z, 0-9* and all the symbols obtained by the caps or symbol shift keys. You cannot, however, get into extended or graphics modes, but this should not be any great disadvantage.

The other main machine code routine prints the text, or an appropriate part of it, on to the screen. The text is held in a single dimension array (*T$*) which must be the first variable in the variables area of memory, (hence the *Clear* statements in program 3). *T$* can be of any length, but in practice the maximum is about 40,000 characters. This corresponds to roughly 6,500 words of normal English, perhaps 20 pages of a paperback book.

The position of the cursor is shown in *T$* as a *Chr$0* and the end of text as *Chr$1.* These characters are not used in the Spectrum set so, if you *Print T$* as a Basic command after using the *Wordproc* program, they would show only as question marks. In fact, the whole of the array would look rather strange, because each line beginning throughout the text is shown as a character with 128 added to its usual code, thus a space becomes a graphics "*Q*".

On the display screen the cursor is shown by a flashing magenta square. The next character to be typed will appear in the position currently occupied by the cursor. The cursor can be moved within the text and new text can be added into any position. In any case, once more than 14 lines of text have been entered, the computer attempts to keep the cursor on line 15 of the screen, or thereabouts. When you have the program working, experiment with moving the cursor around and entering text: you will soon get the hang of it.

As I have already mentioned, all of the alpha-numerics and most of the other symbols can be accessed by the program. Unfortunately the capital shift lock does not work but this should not be a serious drawback. Other key functions are (all with caps shift except enter):

ENTER — moves cursor down to start a new line. When pressed in the middle of some text the next character pressed will move that line down to the next.

5 & 8 — cursor movement left and right, one space at a time throughout the whole text.

PROGRAM 1

```
10  DEF FN H$ (X) = CHR$ (48 + ( INT (X/16)) + (7 AND INT (X/16) > 9)) +
    CHR$ (48 + (X - INT (X/16) * 16 ) + (7 AND X - INT (X/16) * 16 > 9 ))
20  FOR X = 64750 TO 65532 STEP 5 : PRINT X ; "   " ;
30  FOR Y = X TO X + 4 : PRINT FN H$ ( PEEK Y ) ; " " ; : NEXT Y
40  PRINT ' ' : NEXT X : STOP
```

PROGRAM 2

```
10  DEF FN H (X$) = 16 * (( CODE X$ ( 1 )) - ( 48 AND X$ ( 1 ) < "A" ) -
    ( 55 AND X$ (1 ) > "9" )) + ( CODE X$ (2 )) - ( 48 AND X$ ( 2 ) < "A" ) -
    ( 55 AND X$ ( 2 ) > "9")
20  CLEAR 64749 : LET X = 64750
30  INPUT X$ : IF X$ = ""THEN GO TO 30
35  IF X - INT ( X / 5 ) * 5 = 0 THEN PRINT ' X ; "  ";
40  PRINT X$ ( TO 2 ) ; "  " ; : POKE X , FN H ( X$ ( TO 2 )) : LET X = X + 1
50  IF X > 65532 THEN PRINT " END OF DATA " : STOP
60  IF X$ = "" THEN GO TO 30
70  GO TO 35
```

PROGRAM 3

```
10  CLEAR 64749 : LOAD "" CODE
20  CLEAR : DIM T$ ( 40000 ) : RANDOMISE USR 64758
30  POKE 23560 , 255 : RANDOMISE USR 64895 : RANDOMISE USR 64787
40  PRINT AT 21 , 0 ; INK 1 ; " SAVE OR LOAD TEXT ? " : PAUSE 0
45  IF INKEY$ <> "" THEN GO TO 45
50  PAUSE 0 : IF INKEY$ = " S " OR INKEY$ = " s " THEN INPUT " FILE NAME ? " ;
    LINE X$ : SAVE X$ DATA T$ () : PRINT AT 21 , 0 ; INK 1 ; " TO VERIFY
    PRESS ANY KEY " : PAUSE 0 : VERIFY X$ DATA T$ ()
60  IF INKEY$ = " L " OR INKEY$ = " l " THEN CLEAR : LOAD "" DATA T$ () :
    RANDOMISE USR 65484 : GO TO 30
70  CLS : PRINT AT 21 , 0 ; INK 1 ; " CLEAR TEXT ARRAY ? " : PAUSE 0 : IF
    INKEY$ <> "N" AND INKEY$ <> "n" THEN GO TO 20
80  GO TO 30
```

6 & 7 — cursor up and down. The cursor is always left at the end of a line, if you want to move along a line use shifted 5 or 8 as above. If the line is full of characters (even if there are only spaces at the end) the cursor will appear at the start of the next line, but it will move sideways just the same with shifted 5 or 8.

0 — delete. Remember that it will delete the character immediately before the cursor. If the cursor is at the beginning of a line it will delete the last character of the line above and if it is at the second character of a line then that line may become part of the one above.

1 — breaks out of the machine code, and returns to BASIC, enabling you to Save or Load text or stop the program if necessary. When text is saved it is only the array T$ which is saved. In this way you could have a tape of text files with the main Wordproc program appearing only once at the beginning. Incidentally, because of the way the program uses memory it is not possible to check the file name when loading, so be sure to have the tape in the right place first of all.

2 — enables you to make a copy of the screen to the printer. It does this by calling a routine in the ROM at address 3756 which carries out the COPY command. If you wish to print out a whole file you will have to juggle the text around and successively copy the screens. Unfortunately the Sinclair printer is not suitable for serious word processing applications.

Incidentally, the *Break* key is disabled, except after pressing caps shifted one, and the usual repeat function still works. There is also a short click, to let you know that a key has been pressed.

When you are adding characters into the middle of some existing text, you will notice that the computer responds much more slowly. This is because everything else in *T$* must be moved up to make room for the new data and it is also necessary to completely reprint the whole screen after each key depression. It is all performed very fast, but the time difference is still noticeable. The same applies to delete.

The machine code stores a few bytes of information necessary for its operation in various places. The most noteworthy of these is in locations *23728/9*, which are unused bytes in the system variables area of memory. These contain the address of the cursor in memory (actually somewhere within *T$*), so *Print Peek (Peek 23728 + 256 * Peek 23729)* should always give *0*. When *T$* is *Loaded* from an existing file, a routine is called which finds the new location of the cursor and the other data which the program requires. The routine at *64758* is used when the program is first run, to set up those variables in the first place.

Finally, note that you can use any colours of *Ink* and *Paper* just by setting them with universal commands before running the program (or they could be added as, say, line 5). Only the cursor cannot be changed easily — I'm afraid you are stuck with the flashing magenta square. ■

Continued on page 23

WORDPROC HEX LISTING

Address	Hex				
64750	00	00	00	00	00
64755	00	00	00	2A	4B
64760	5C	01	06	00	09
64765	22	B0	5C	22	F4
64770	FC	22	F0	FC	36
64775	00	23	36	01	21
64780	81	5C	36	80	C3
64785	7F	FD	3A	08	5C
64790	3C	28	FA	3D	FE
64795	07	C8	CD	08	FE
64800	CD	86	FF	CD	A0
64805	FF	3A	81	5C	FE
64810	80	CC	7F	FD	18
64815	E3	FE	80	D0	D6
64820	20	F5	78	E6	18
64825	F6	40	67	78	E6
64830	07	0F	0F	0F	81
64835	6F	EB	F1	3C	3D
64840	28	17	ED	4B	36
64845	5C	04	26	00	6F
64850	29	29	29	09	06
64855	07	14	23	7E	12
64860	14	23	10	FA	C9
64865	06	07	14	EB	36
64870	00	24	10	FB	C9
64875	26	00	68	29	29
64880	29	29	29	11	00
64885	58	19	06	00	09
64890	77	22	F2	FC	C9
64895	3A	8D	5C	2A	F2
64900	FC	77	01	00	00
64905	2A	F4	FC	7E	FE
64910	01	28	61	FE	00
64915	20	23	3A	81	5C
64920	FE	00	28	0C	3E
64925	00	B9	28	07	0E
64930	00	04	3E	16	B8
64935	C8	3E	BB	E5	C5
64940	ED	43	EE	FC	CD
64945	6B	FD	C1	E1	23
64950	18	D4	FE	80	38
64955	1F	D6	80	08	3E
64960	00	B9	28	16	3E
64965	20	B9	28	0A	E5
64970	C5	CD	30	FD	C1
64975	E1	0C	18	F1	0E
64980	00	04	3E	16	B8
64985	C8	08	E5	C5	CD
64990	30	FD	C1	E1	23
64995	0C	3E	20	B9	20
65000	A3	0E	00	04	3E
65005	16	B8	20	9B	C9
65010	3E	20	B9	28	08
65015	C5	CD	30	FD	C1
65020	0C	18	F3	0E	00
65025	04	3E	16	B8	20
65030	EB	C9	21	08	5C
65035	7E	FE	FF	C8	36
65040	FF	F5	21	32	00
65045	11	00	00	CD	B5
65050	03	F1	FE	20	30
65055	06	CD	A8	FE	C3
65060	7F	FD	21	81	5C
65065	86	36	00	2A	4B
65070	5C	23	23	23	23
65075	5E	23	56	19	ED
65080	4B	B0	5C	03	A7
65085	ED	42	C8	FE	80
65090	38	04	ED	43	F0
65095	FC	ED	43	B0	5C
65100	08	0A	FE	01	20
65105	35	08	60	69	2B
65110	77	23	36	00	23
65115	36	01	ED	4B	EE
65120	FC	C5	FE	80	38
65125	02	D6	80	CD	30
65130	FD	2A	F2	FC	3A
65135	8D	5C	77	23	36
65140	BB	22	F2	FC	C1
65145	0C	3E	20	B9	20
65150	03	0E	00	04	ED
65155	43	EE	FC	C9	08
65160	2A	4B	5C	23	23
65165	23	23	5E	23	56
65170	19	36	01	2B	E5
65175	0B	A7	ED	42	44
65180	4D	E1	54	5D	2B
65185	ED	B8	12	CD	7F
65190	FD	C9	FE	0D	20
65195	19	21	81	5C	7E

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```
65200  FE  80  20  0E  3E
65205  20  32  08  5C  CD
65210  08  FE  CD  7F  FD
65215  21  81  5C  36  80
65220  C9  21  81  5C  36
65225  00  FE  0C  CA  51
65230  FF  FE  08  20  1A
65235  2A  4B  5C  01  06
65240  00  09  ED  4B  B0
65245  5C  A7  ED  42  C8
65250  60  69  2B  7E  36
65255  00  02  22  B0  5C
65260  C9  FE  09  20  10
65265  2A  B0  5C  23  7E
65270  FE  01  C8  22  B0
65275  5C  36  00  2B  77
65280  C9  FE  0A  20  20
65285  2A  B0  5C  54  5D
65290  23  7E  12  FE  01
65295  28  0D  54  5D  23
65300  7E  12  FE  01  28
65305  04  FE  80  38  F3
65310  2B  36  00  22  B0
65315  5C  C9  FE  0B  20
65320  22  2A  4B  5C  01
65325  06  00  09  44  4D
65330  2A  B0  5C  54  5D
65335  E5  A7  ED  42  E1
65340  28  07  2B  7E  12
65345  FE  80  38  F0  36
65350  00  22  B0  5C  C9
65355  FE  06  CA  AC  0E
65360  C9  2A  4B  5C  01
65365  06  00  09  ED  4B
65370  B0  5C  A7  ED  42
65375  C8  2A  4B  5C  23
65380  23  23  23  5E  23
65385  56  0B  ED  43  B0
65390  5C  03  19  A7  ED
65395  42  E5  60  69  C1
65400  54  5D  1B  ED  B0
65405  CD  6B  0D  3E  00
65410  32  81  5C  C9  2A
65415  B0  5C  ED  4B  F0
65420  FC  A7  ED  42  01
65425  1F  00  A7  ED  42
65430  C0  22  F0  FC  21
65435  81  5C  36  80  C9
65440  2A  F4  FC  E5  2A
65445  4B  5C  01  06  00
65450  09  EB  06  0F  3E
65455  80  2A  B0  5C  23
65460  2B  E5  A7  ED  52
65465  E1  28  05  BE  30
65470  F5  10  F3  22  F4
65475  FC  D1  A7  ED  52
65480  C2  7F  FD  C9  2A
65485  4B  5C  23  23  23
65490  23  4E  23  46  23
65495  3E  00  ED  B1  2B
65500  22  B0  5C  CD  A0
65505  FF  2A  B0  5C  ED
65510  4B  F4  FC  A7  ED
65515  42  28  09  3E  80
65520  2A  B0  5C  2B  BE
65525  30  FC  22  F0  FC
65530  C3  7F  FD
```


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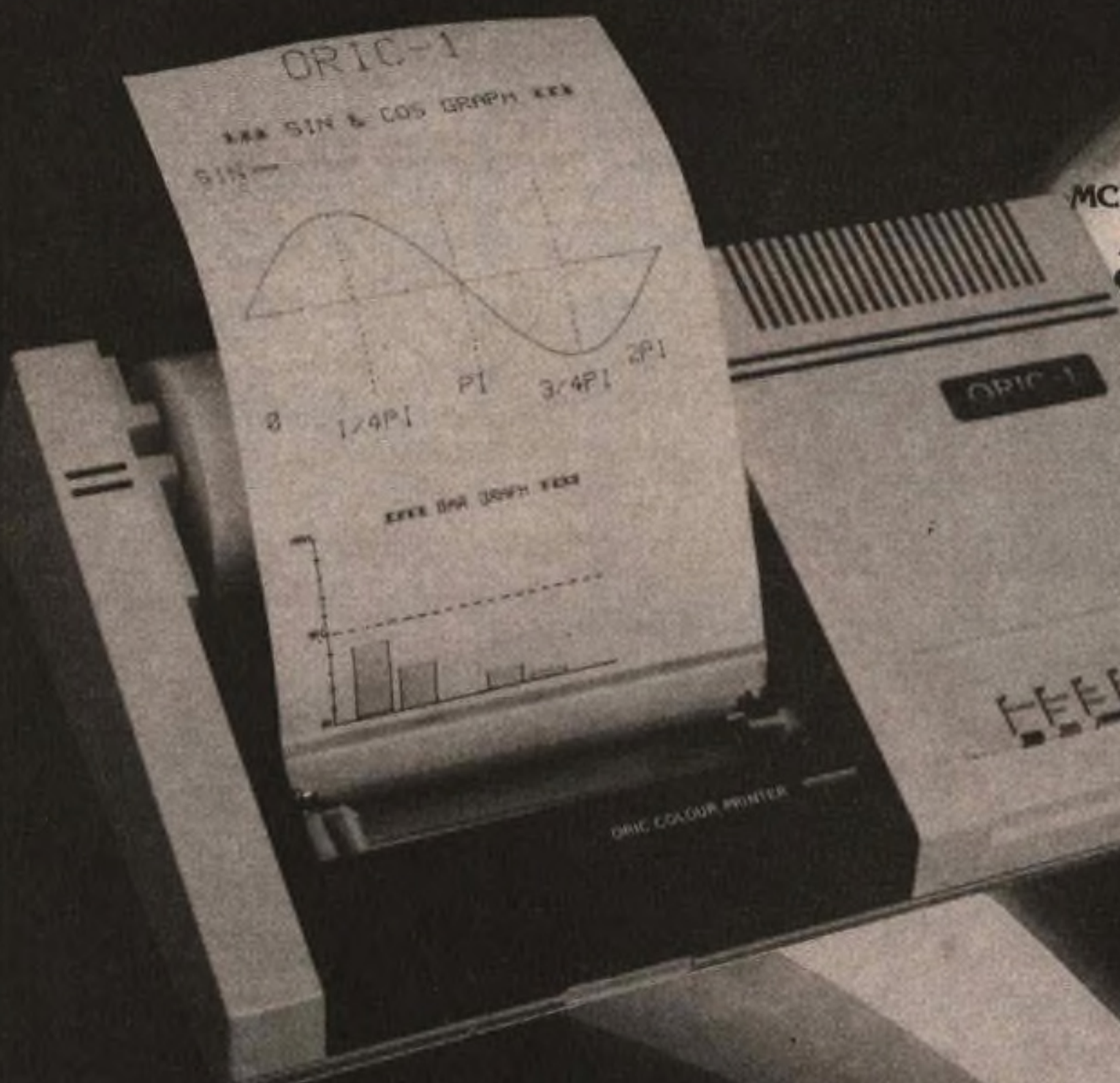

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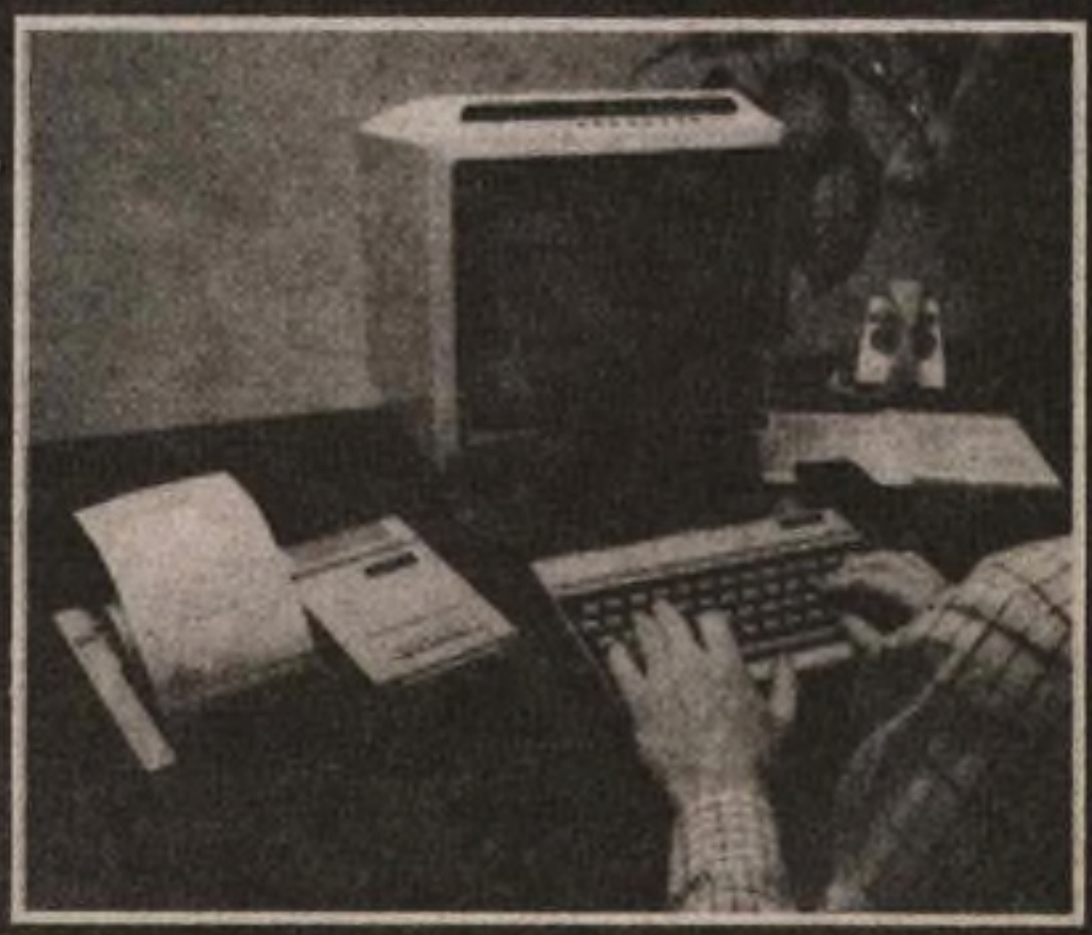

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Blow-up

***Les Allan** explains how to blow up the 64-character set to eight times normal size*

This short program enables the character set to be displayed at normal and eight times normal size. Also, the Rom location and decimal number associated with each pixel row is shown.

The program works by identifying the location in the Rom character set of a character typed in at the keyboard. The eight bytes holding the character shape are read from the character set and the bit pattern translated into eight rows of eight full character positions on the screen. A reverse space character is used to represent a pixel set; a normal space for a pixel not set.

The screen thus displays the exact arrangement of pixels as used in the formation of the normal size character. The screen also displays the memory location of each of the eight bytes used for the character and the values stored in those locations. All the character set is available, including all upper and lower case alpha-numerics and graphics, plus all reverse video forms. The mode in which the program is currently working is selected by the use of the four function keys:

F1 — Upper case selected
F3 — Lower case selected
F5 — Normal video on
F7 — Reverse video on

Invalid entries from the keyboard, eg, 'return', 'inst/del', etc, are error trapped.

The Rem statements contained in the program listing should enable the workings to be understood — if not, here is a brief functional listing:

2	Clears screen to black with black border
4	Memory pointers
6-40	Graphics for title page
42	2½ sec delay
44	Clear screen and change colour
48-62	Set up screen
64-78	Check for keyboard entry
80	Turn off keyscan interrupt/switch in character
82	Read character set into Ram
84	Switch in I/O/restart keyscan interrupt
86-98	Print character/address/value
100-110	Upper case sub-routine
200-210	Lower case sub-routine
300-310	Normal video sub-routine
400-410	Reverse video sub-routine
500-510	Erase character/address/value
600-610	Error trapping routine

Variables

I	Character shape pointer
J	Character pixel pointer
T	Delay loop counter
CH	Poke code of K$
CR	Reverse character offset
CS	Character start location
CT	Character video screen location
CO	Character colour screen location
MX	Reference in VAL calculation
VL	Value in each address for character shape
K$	Keyboard entry
KK$	Keyboard memory

Note

The rate of character printing may be increased by rearranging line 94 thus:

```
94 NEXT:PRINTLEFT$(A$,7 + I).....
    ....PEEK(12288 + I):NEXT
```

■

```
1 REM **** CLEAR SCREEN/COLOUR BLACK ****
2 PRINT"■■":POKE53280,0:POKE53281,0
4 POKE52,48:POKE56,48:CLR
5 REM **** CTRL 8 ****
6 PRINTTAB(17)"■■"TAB(28)"■"
7 REM **** CTRL 2 ****
8 PRINTTAB(16)"■■"TAB(27)"■■"
9 REM **** CTRL 4 ****
10 PRINTTAB(15)"■■"TAB(26)"■■■"
11 REM **** CTRL 5 ****
12 PRINTTAB(14)"■■"TAB(25)"■■■■"
13 REM **** CTRL 6 ****
14 PRINTTAB(13)"■■"TAB(24)"■■■■■"
15 REM **** CTRL 2 ****
16 PRINTTAB(12)"■■■■"TAB(23)"■■■■■■"
17 REM **** LOGO 1 ****
18 PRINTTAB(11)"■■■■■■"TAB(22)"■■■■■■■"
19 REM **** LOGO 3 ****
20 PRINTTAB(10)"■■■■■■■■"TAB(21)"■■■■■■■■■"
21 REM **** LOGO 6 ****
22 PRINTTAB(10)"■■■■■■■■"TAB(28)"■"
23 REM **** LOGO 5 ****
24 PRINTTAB(10)"■■■■■■■■"TAB(28)"■"
25 REM **** LOGO 7 ****
26 PRINTTAB(11)"■■■■■■"TAB(28)"■"
27 REM **** LOGO 8 ****
28 PRINTTAB(12)"■■■■"TAB(28)"■"
29 REM **** BLOW UP/LOGO 1 ****
30 PRINT"■■■■■■■■■
```

```
54 FORX=0TO7:PRINTTAB(6)"■ "TAB(15)" ":NEXT
56 PRINTTAB(6)"■                "
58 GOSUB100:GOSUB300
60 PRINTLEFT$(A$,18)TAB(9)"■ ■■■
```

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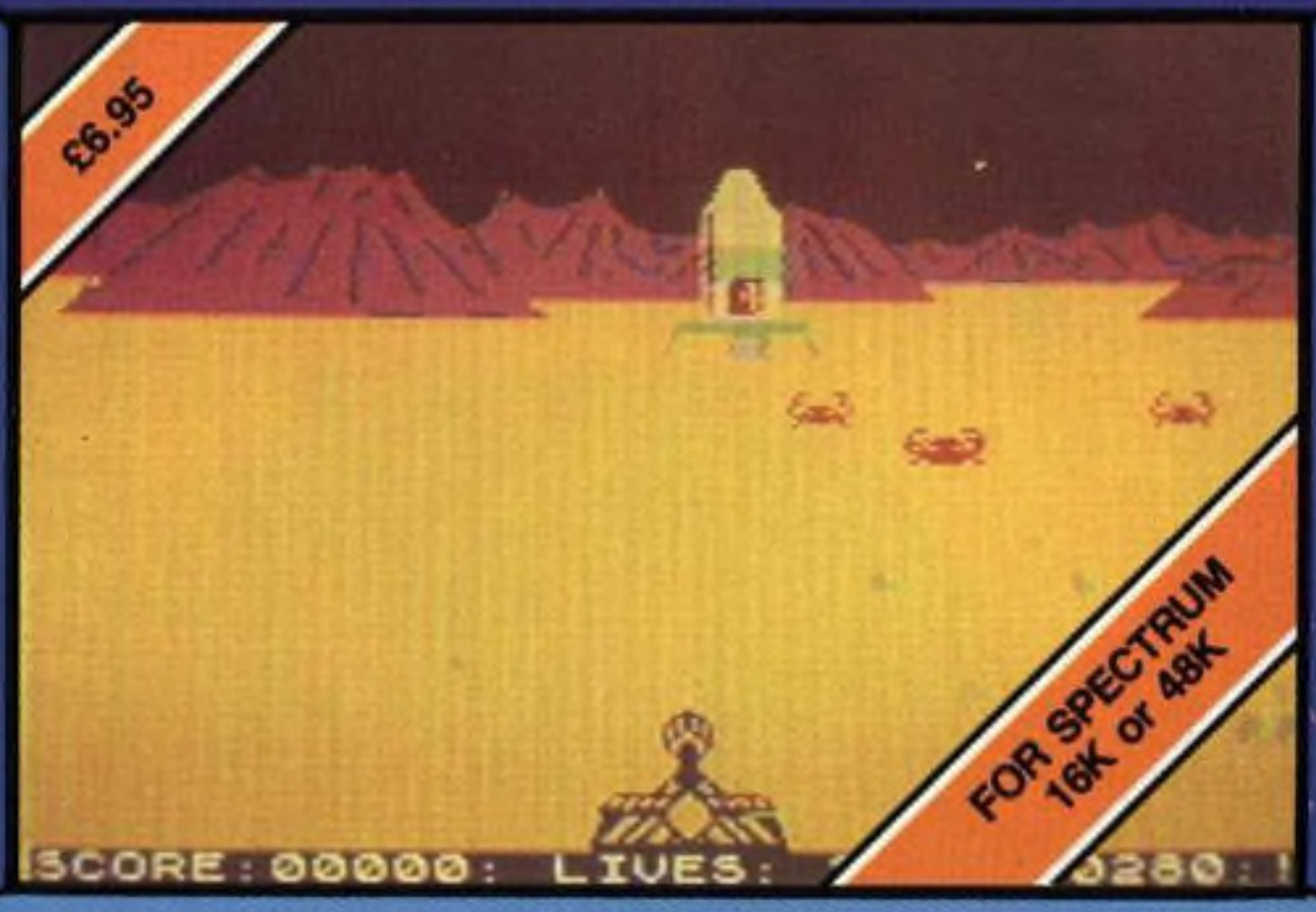

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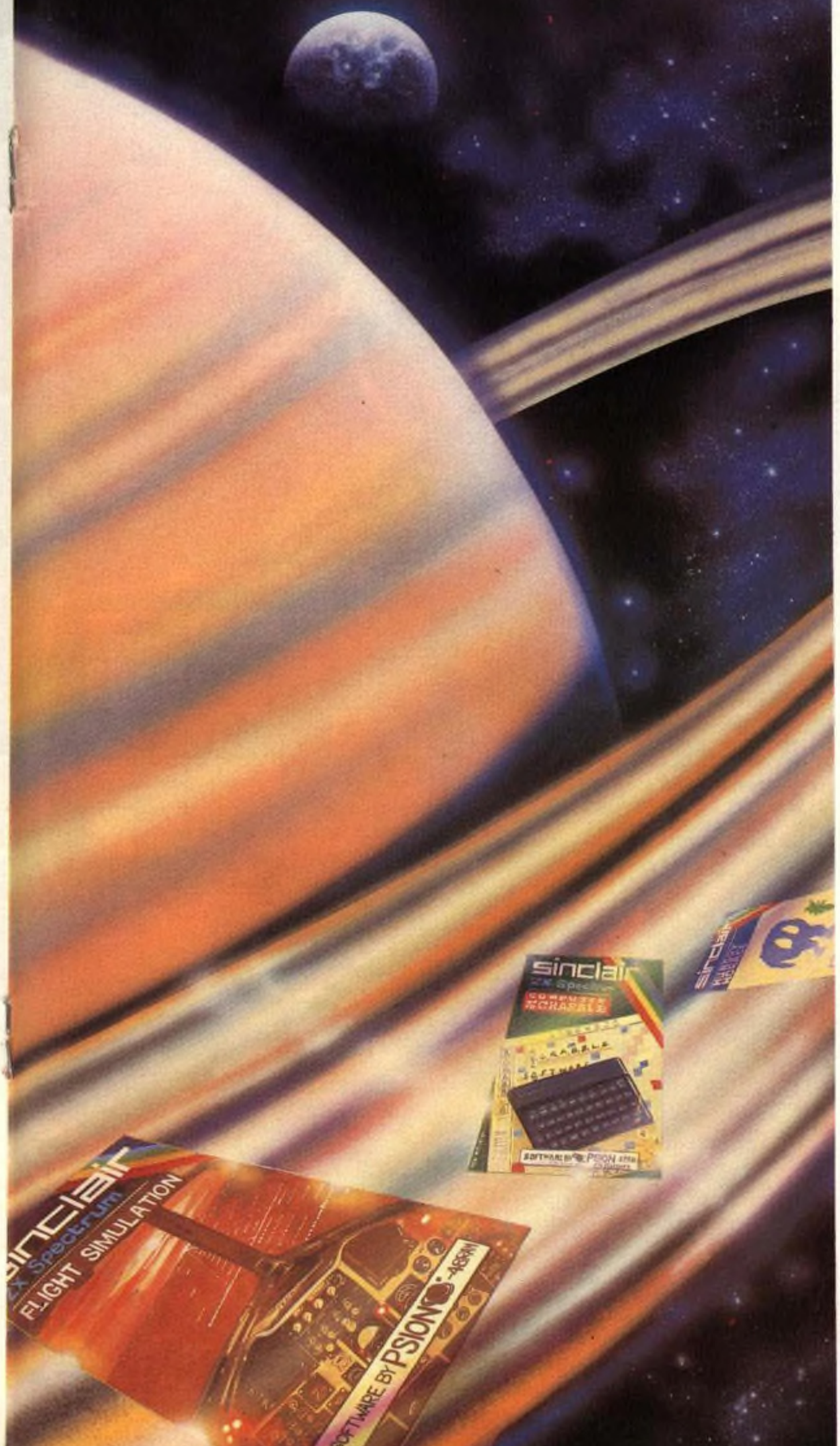

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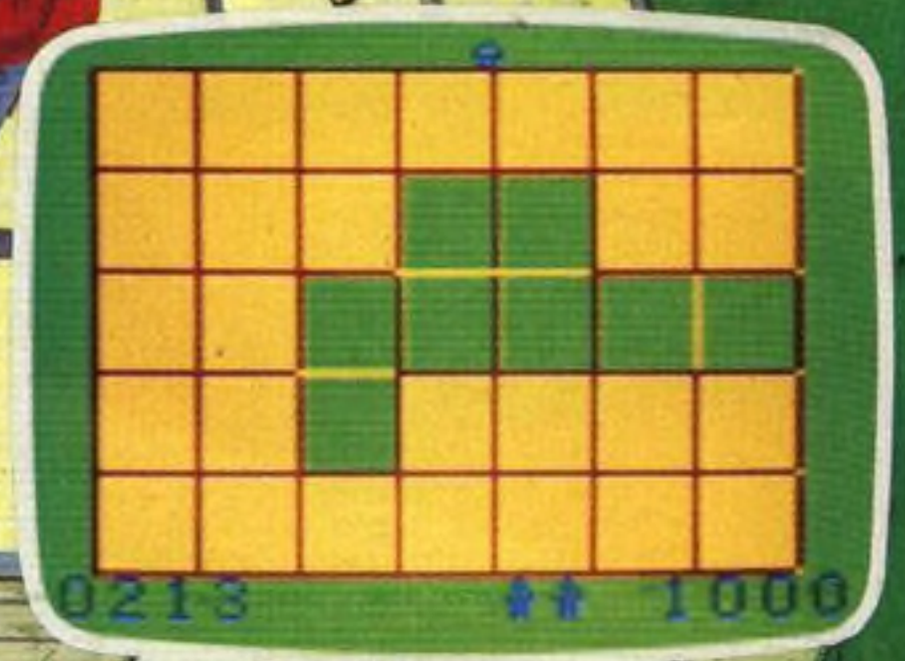

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Letters of credit

***Andrew Homer** explains how to generate simple video titles using a micro*

The production of suitable titles and credits for video recordings, produced with simple camera systems, can cause something of a problem. The excellent results produced by modern video cameras and recorders are often spoilt by the lack of effective titles and credits.

At Dudley College of Technology we have, in the past, made use of dry transfer lettering sheets which are, unfortunately, both time consuming and expensive. However, it is possible to produce effective titles directly on to video tape, quickly and inexpensively, without the use of a video camera.

Effective titles have been produced at Dudley by using a BBC microcomputer (model A or B) as a character generator and coupling it directly into a VHS video recorder. Any computer with UHF or Video output sockets could be used for this purpose, although the BBC machines offer large size characters in Mode 5 and a video output socket. A typical program to produce simple video titles on a BBC machine is shown in Example 1.

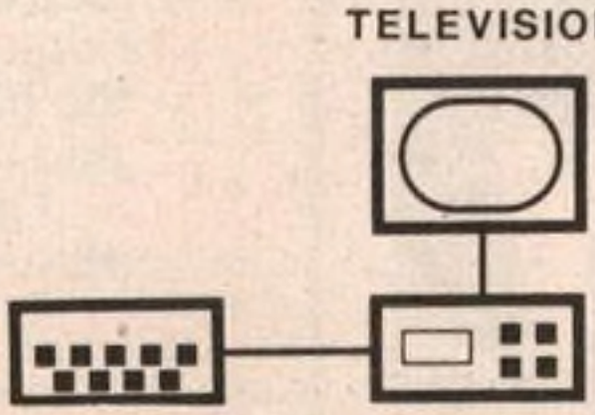
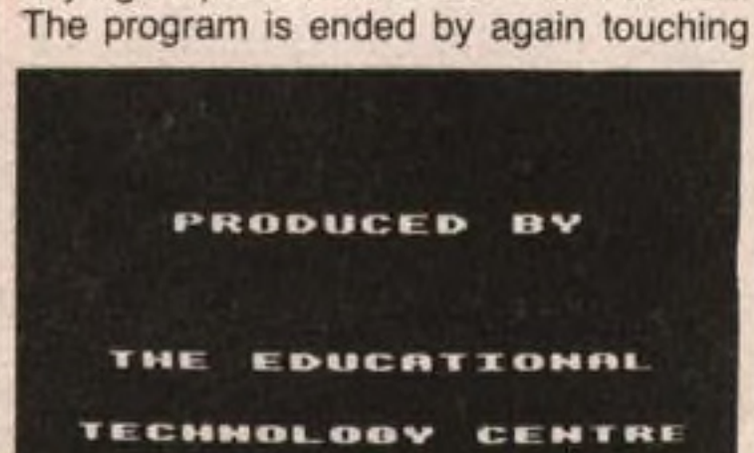


Figure 1

Example 1
Program notes

Line	
10	Selects the MODE. Selecting a MODE also clears the screen
20	Removes the flashing cursor from the display in any MODE. Without this line the cursor would be present throughout the recording
30	Waits for a character key to be pressed before carrying on to the next statement
40	Prints the title on the screen. Spaces between words can be increased if necessary to balance the text. Horizontal position is determined by the number in brackets after the TAB statement. The number represents character spaces across the screen. Vertical position is determined by the apostrophe marks after the PRINT statement. Each apostrophe moves the title one line down the screen. TAB (X,Y) could be used in place of the apostrophe as shown in Example 2
50	As line 30
60	Clears the screen
70	As line 30
80	Ends the program

When the program is Run, a completely blank screen appears. Touching a character key brings up the first title. Touching the key again produces another blank screen. The program is ended by again touching the key. Although very simple, a series of effective titles can be generated frame by frame as shown in Example 2. A squared grid, printed on paper, corresponding to the screen display, is useful if a number of frames are to be produced. Best results are usually obtained by having a blank screen at the beginning and end of the sequence.



In order to record the titles on to video tape, the computer must be coupled directly into the video recorder. The BBC machines, in common with many other systems, have both UHF and video output sockets. For best results, the video output socket on the computer should be connected to the video input socket on the video recorder with a suitable lead.

Unfortunately, the video output connection on the BBC machine, unless modified, gives a black and white picture. However, for simple titles, consisting of white letters on a black background, the improved picture quality obtainable through this connection makes its use well worthwhile.

If the UHF socket is to be used, it should be connected to the aerial input socket on the video recorder with the lead supplied with the computer. This connection will require a spare channel on the video recorder to be tuned in to the output signal from the computer.

Whichever connection is used, a UHF television receiver must be connected and tuned to the output from the video recorder in the normal way. If connected properly, the computer's visual display should appear on the television screen. The equipment should be connected as shown in Figure 1.

Titles stored in the computer as print statements can then be recorded on to video tape as required. Cassette or disc storage can, of course, be employed if the titles are likely to be needed again. Computer generated titles should not be recorded on to the front of existing programmes as severe disturbances can occur when the picture changes from titles to program content. In order to avoid such disturbances the following sequence should be employed:

(1) Record the opening titles (computer)
(2) Record the program content (video camera or second recorder)
(3) Record the closing credits (computer)

If a video recorder with insert editing facility is available, computer generated titles can be inserted at any point in an existing program. Music can be used with the title and credit sequences by connecting a cassette recorder to the audio input socket of the video recorder.

Although the production of very simple titles and credits has been described here, there is obviously plenty of scope for more ambitious graphics, such as larger size letters, if required. The titles and credits produced by this simple method have proved to be extremely effective when used with our own two-camera video system. ■

Example 1

```
10 MODE 5
20 VDU 23;8202;0;0;0;
30 X=GET
40 PRINT''''''TAB(3);"TITLES PROGRAM"
50 X=GET
60 CLS
70 X=GET
80 END
```

Example 2

```
10 MODE 5
20 VDU 23;8202;0;0;0;
30 X=GET
40 PRINT TAB(4,9);"DEMONSTRATION"
50 PRINT TAB(3,12);"TITLES  PROGRAM"
60 PRINT TAB(6,19);"A.J.HOMER"
70 X=GET
80 CLS
90 PRINT TAB(7,13);"THE END"
100 X=GET
110 CLS
120 X=GET
130 END
```

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Angling for a line

***Ian Barker** presents a simple 3D graphics program for the Dragon 32*

The Dragon's *Draw* command is easy to use, but it is also very limited. This program is based on the Draw command — it allows you to draw lines to *Pmode 4* at any angle (to vertical) and of any length.

Constructing irregular shapes requires the calculation of the cartesian co-ordinates of each line's end points. This program calculates these *x,y* co-ordinates for a given set of polar co-ordinates (*R*, *A1* and *A2*). *R* is the length of the line and *A1* its angle (in degrees) to the vertical (*X*) axis. 3D drawings can be achieved by entering positive or negative angles for *A2*.

Instructions and the *x*, *y*, *z* axes are presented at the beginning of the program — the axes and associated polar co-ordinates (*R*, *A1* and *A2*) are also shown in Figure 1.

The program is controlled by the user with the variable *C*. Initially, the starting point of the drawing will have to be entered *x1* and *y1*. This can be done by entering *C=1* and then *x1* and *y1* (*x1=0–255* and *y1=0–192*). The length of line and its angle(s) are then entered. A quick view of the hi-res screen is given while printing out the values of *x1*, *y1*, *x2* and *y2*, where (*x1*, *y1*) and (*x2*, *y2*) are the ends of the line.

The program then asks for the next line's *C* value — if *C=0* then the next line continues from the end of the first line. If *C=2* is entered, the drawing is shown until the spacebar is pressed to return to the program. *C=1* is used to move the drawing position of point (*x1*, *y1*) of the next line in a similar manner to the *Draw* command's blank move.

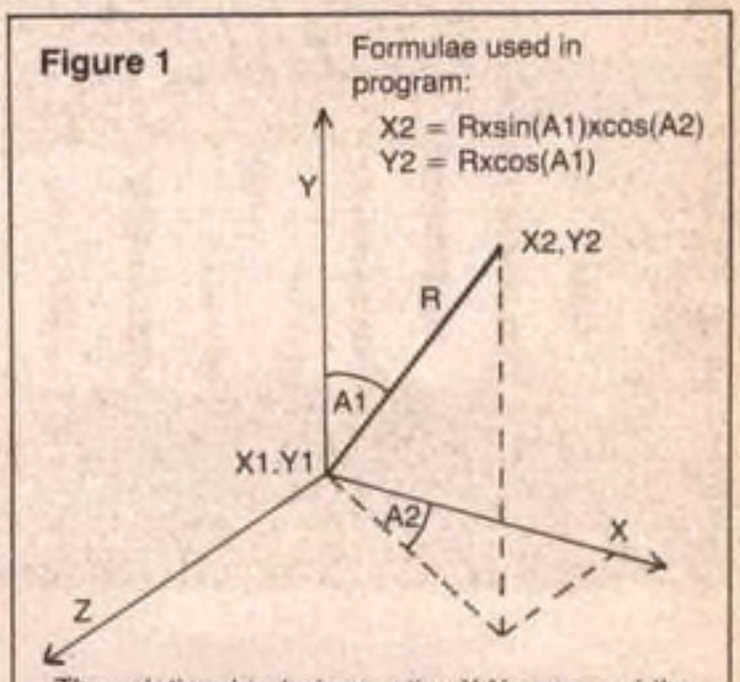
The accompanying table gives some values for the variables *C*, *R*, *A1*, *A2*, *x1* and *y1*, used to draw a regular hexagon. It may be noted that this figure is impossible to draw using the *Draw* command. ■

LINE NU	C	R	A1	A2	X1	Y1
1	1	70	0	0	125	96
2	0	70	60	0	—	—
3	0	70	120	0	—	—
4	0	70	180	0	—	—
5	0	70	240	0	—	—
6	0	70	300	0	—	—

Notes

Enter each line (1-6) before proceeding to the next one.
X1 and *Y1* are entered for line 1 only. These are entered when *c* is 1.
R is length of line in pixels.
A1 and *A2* are the angles of the line to the vertical and horizontal axes, respectively (*Y* and *X* axes).
Return can be used whenever 0 is the value entered, thus speeding up entry of the parameters considerably.
The hexagon can be made to appear to turn out of the plane of the screen by entering positive or negative values for *A2* whilst keeping *R* and *A1* the same.

Figure 1



The relationship between the X,Y axes and the Polar co-ordinates R,A1,A2.

```
10 REM* 3-D GRAPHICS*
20 REM*BY I.K.BARKER
30 REM MAY,1983
40 CLS:PRINT"A UTILITY P
ROGRAM BY I.K.BARKER"
50 PRINT"                MA
Y,83"
60 PRINT
70 LINEINPUT"ARE INSTRUC
TIONS REQUIRED(Y/N)?";A$
80 IF A$<>"Y"ANDA$<>"N"
THEN70
90 IFA$="Y"THEN GOSUB 49
0
100 PCLS
110 REM*DRAWING ROUTINE*
120 PMODE4,1
130 PRINT
140 PRINT"C=0   TO CONTI
NUE DRAWING FROM
POINT"X2","Y2
150 PRINT"C=1   TO DRAW
LINE FROM A NEW
POINT(X1,Y1)"
160 PRINT"C=2   TO VIEW
SCREEN                  (P
RESS SPACEBAR TO CONTINU
E)"
170 PRINT"      INPUT VA
LUE OF C FOR
LINE"S+1:INPUTC
180 IFC<00RC>3 THEN120
190 ON C GOTO 210,440
200 X1=X2:Y1=Y2:GOTO220
210 INPUT" INPUT NEXT PO
INT ,X1,Y1,",X1,Y1
220 INPUT"INPUT POLAR CO
-ORDS. ,R,A1,&A2";R,A1,A2
230 A1=180-A1
240 A1=A1*ATN(1.0)/45
250 A2=A2*ATN(1.0)/45
260 X2=R*SIN(A1)*COS(A2)
+X1
270 Y2=R*COS(A1)+Y1
280 D=X2-FIX(X2):D1=Y2-F
IX(Y2)
290 IFD>= .445THENX2=FIX(
X2)+1ELSEX2=FIX(X2)
300 IFD1>= .445THENY2=FIX
(Y2)+1ELSEY2=FIX(Y2)
310 IFX1<00RX1>256 THEN4
70
320 IFX2<00RX2>256THEN47
0
330 IFY1<00RY1>192THEN47
0
340 IFY2<00RY2>192THEN47
0
350 LINE(X1,Y1)-(X2,Y2),
PSET
360 IFS=0THENPRINT#-2,"L
INE  (X1,Y1)-(X2,Y2)"
370 PRINT"      LINE(X1,
Y1)-(X2,Y2)"
380 S=S+1:PRINT"NU"S"("X
1","Y1")-("X2","Y2")"
390 PRINT
400 PRINT#-2,S""X1;Y1"-"
X2;Y2
410 SCREEN1,0
420 FORQ=1TO1500:NEXT
430 GOTO110
440 SCREEN1,0
450 IF INKEY$=" "THEN110
460 GOTO450
470 PRINT"OUT OF RANGE "
,,"X1="X1,"X2="X2,"Y1"Y1
,"Y2="Y2:PRINT
480 X2=X1:Y2=Y1:PRINT"RE
-ENTER":GOTO110
490 REM**INSTRUCTIONS FO
R MAIN PROGRAM**
500 CLS:PRINT@32,"INSTRU
CTIONS";
510 PRINT@64,"press spac
ebar TO VIEW THE AXES AN
D POLAR COORDINATES R,A1
,& A2,ALSO press spaceba
r TO RETURN TOTEXT  pres
s d TO START DRAWING "
520 PRINT@227,"C=0,1,OR
2 CONTROLS THE MAIN
  PROGRAM"
530 PRINT@291,"R=LENGTH
OF LINE IN PIXELS"
540 PRINT@355,"A1=ANGLE
OF LINE IN DEGREES
  FROM VERTICAL AXIS"
550 PRINT@451,"A2=ANGLE
OF LINE IN DEGREES
  FROM HORIZONTAL AXIS"
560 IF INKEY$=" " THEN59
0
570 IF INKEY$="D"THEN RE
TURN
580 GOTO 560
590 REM**THE AXES DRAWN*
*
600 PMODE3,1:PCLS:SCREEN
1,0
610 DRAW"S6"
620 DRAW"BM100,96;C4NU70
NR100NG55"
630 DRAW"C2E45C3D91NH44E
46BM100,74;R2D2R2D2R2D3R
1BM121,96;D2L2D2L2D2L2D2
L2"
640 DRAW"BM90,20C4U5NH3E
3"
650 DRAW"BM240,90NE6BM+6
,+0;H6"
660 DRAW"BM18,162NR6UE6U
L6"
670 DRAW"C2BM135,47U8R4F
D2GDL3F4"
680 DRAW"BM107,70U4NR3U3
R4D7BM+4,+0U7"
690 DRAW"BM124,114;U4NR3
U3R4D7BM+3,+0;NR4E4UH2LD
GD"
700 DRAW"BM176,30;E4BM+0
,+4;H4F4BM+5,+0;L3E3H2GD
"
710 DRAW"BM+6,+4;G2E2"
720 DRAW"BM+4,-1;U3NH2E2
"
730 DRAW"BM+7,+5;L3E3H2G
D"
740 DRAW"BM55,100;E4;BM+
0,+4;NH4;BM+4,+0;NU4;BR4
;NG3BR4;U2NH2E2;BM+3,+4;
U4"
750 IF INKEY$=" " THEN
500
760 GOTO 750
```

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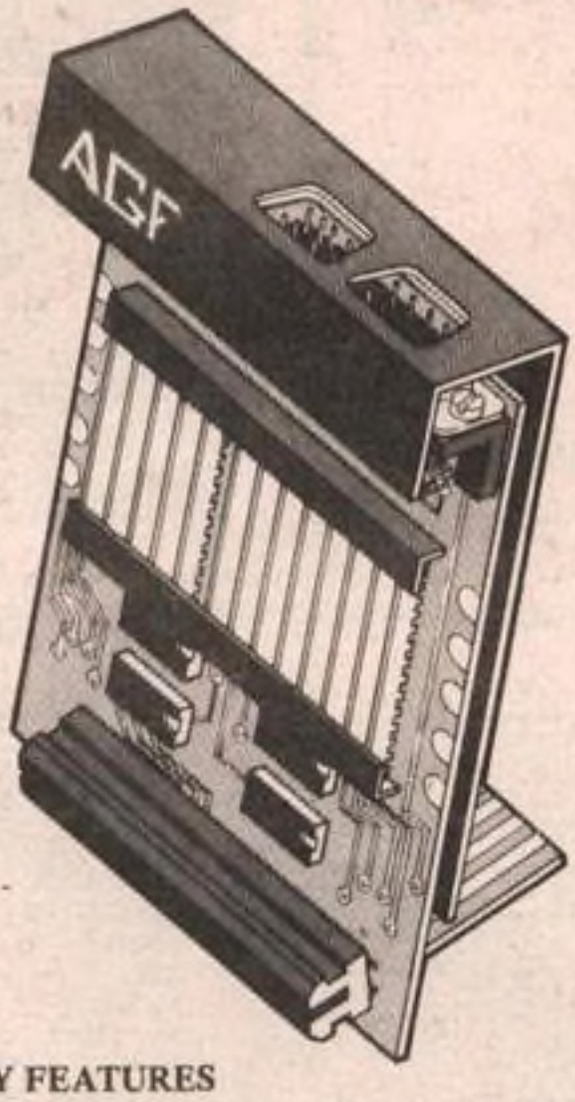

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Balloons

on Spectrum

This is an amusing game for either machine. The game starts with a small introduction, a balloon rising up to a dart and bursting.

The introduction also shows you the control keys, and tells you that by pressing two keys at once you can move diagonally. This is done by using the function *In* to control movement. The *Border* and *Paper* colours are *Poke*d in, rather than entered from *Basic*, to avoid any risk of interfering with *In* (lines 40-50).

The object of the game is to steer a dart so that it bursts the balloon which appears in random positions on the screen, and to do so in the shortest time possible. To make things harder, every so often the balloon shifts to a new position. At the end of the game the Spectrum will give you a report on how well you played. Do not be offended if it is rude to you at first: you will soon get better.

If you find the game too hard you can change line 720 to read:

720 IF a/30 <> INT(a/30) THEN GO TO 390

My high score is 100.

Variables

high = high score
p = vertical co-ordinate for dart
p1 = horizontal co-ordinate for dart
p2 = vertical co-ordinate to delete dart
p3 = horizontal co-ordinate to delete dart
a$ = dart
lives = time/25
a = time counted
b = vertical co-ordinate for balloon
c = horizontal co-ordinate for balloon
r$ = report

Graphics

Line 210 — graphic E
Line 220 — graphic A
Line 250 — graphic C,E,D,B
Line 480 — graphic I
Line 490 — graphic H
Line 500 — graphic G
Line 510 — graphic F

```
  10 REM Balloon © R.Smith
  20
  30 LET high=0
  40 POKE 23624,48
  50 POKE 23693,48
  60 INK 2: CLS
  70
  80 REM user graphics
  90
 100 DATA 60,110,94,126,126,60,8
,6
 110 DATA 0,128,76,255,76,128,0,
0,0,1,50,255,50,1,0,0
 120 DATA 8,8,28,28,8,8,28,42,42
,28,8,8,28,28,8,8
 130 DATA 128,64,56,56,59,4,10,8
,16,80,32,220,28,28,2,1
 140 DATA 1,2,28,28,220,32,80,16
,8,10,4,59,56,56,64,128
 150 RESTORE 60: FOR n=0 TO 71
 160 READ c: POKE USR "a"+n,c
 170 NEXT n
 180
 190 REM intro
 200
 210 PRINT AT 0,7; INK 2; PAPER
6; FLASH 1;"BURST THE BALLOON":
PRINT INK 1;AT 2,15;"†"
 220 FOR n=21 TO 3 STEP -1: PRIN
T AT n,15; INK 4;"●": BEEP .1,20
-(n*.1): PRINT AT n,15;" ": NEXT
 n: BEEP .1,-30: PAUSE 11
 230 INK 4: PRINT AT n+1,14;"\|/
";AT n+2,14;"- -";AT n+3,14;"/|\
"
 240 INK 2: PAUSE 11: CLS
 250 PRINT AT 0,8;"C O N T R O L
 S";AT 2,10;"« † ‡ »";AT 3,10
;"1  2  3  4";AT 21,8;"Any key t
o play"
 260 PRINT AT 5,0;"To move diago
nally press 2 keys": PAUSE 0
 270
 280 REM game start
 290
 300 CLS
 310 LET lives=5
 320 LET a$="†"
 330 LET score=0
 340 LET a=0
 350 LET p=5: LET p1=5
 360 LET p2=p: LET p3=p1
 370 LET b=INT (RND*20)+1
 380 LET c=INT (RND*30)+1
 390 IF POINT (0,10)=0 THEN INK
0: DRAW 255,0: DRAW 0,175: DRAW
-255,0: DRAW 0,-175: INK 2
 400 IF lives=1 THEN GO TO 770
 410 PRINT AT b,c; INK 4;"●"
 420 IF score>high THEN LET high
=score
 430
 440 REM move dart
 450
 460 LET p=p+(IN 63486=253 AND p
<20)-(IN 63486=251 AND p>1)
 470 LET p1=p1+(IN 63486=247 AND
 p1<30)-(IN 63486=254 AND p1>1)
 480 IF IN 63486=252 THEN IF p<2
0 THEN IF p1>1 THEN LET p=p+1: L
ET p1=p1-1: LET a$="«"
 490 IF IN 63486=243 THEN IF p>1
 THEN IF p1<30 THEN LET p=p-1: L
ET p1=p1+1: LET a$="»"
 500 IF IN 63486=245 THEN IF p<2
0 THEN IF p1<30 THEN LET p=p+1:
LET p1=p1+1: LET a$="‡"
 510 IF IN 63486=250 THEN IF p>1
 THEN IF p1>1 THEN LET p=p-1: LE
T p1=p1-1: LET a$="†"
 520 IF INKEY$="1" THEN LET a$="
«"
 530 IF INKEY$="4" THEN LET a$="
»"
 540 IF INKEY$="2" THEN LET a$="
†"
 550 IF INKEY$="3" THEN LET a$="
‡"
 560 PRINT AT p,p1; INK 1;a$
 570 IF p2<>p OR p3<>p1 THEN PRI
NT AT p2,p3;" "
 580
 590 REM burst balloon
 600
 610 IF p=b AND p1=c THEN LET sc
ore=score+10: BEEP .1,-30: PRINT
 AT b-1,c-1; INK 4;"\|/";AT b,c-
1;"- -";AT b+1,c-1;"/|\": CLS :
GO TO 370
 620 IF p<>b OR p1<>c THEN
 630
 640 REM scoring
 650
 660 PRINT AT 21,23;"HIGH=";high
;AT 21,0;"TIME=";a;AT 21,12;"1UP
=";score;AT 0,7;"BURST THE BALLO
N"
 670 LET a=a+1
 680 IF p<>p2 OR p1<>p3 THEN PRI
NT AT p,p1;" "
 690
 700 REM timer
 710
 720 IF a/25<>INT (a/25) THEN GO
 TO 390
 730 LET lives=lives-1: CLS : GO
 TO 370
 750 REM dead
 760
 770 IF lives=1 THEN LET r$="":
LET r$=("Terrible! " AND score<5
0)+("Well done! " AND score>=50)
+("Brilliant! " AND score>=70)+(
"Amazing!" AND score>=100)
 780 IF lives=1 THEN PRINT AT 10
,INT (31-LEN r$)/2;r$;AT 21,0;"T
IME=100";AT 21,12;"1UP=";score;A
T 21,23;"HIGH=";high;AT 11,7;"A=
another, S=stop": IF r$="" THEN
LET r$="Very good.": GO TO 780
 790 IF lives=1 THEN IF INKEY$="
s" THEN POKE 23693,56: POKE 2362
4,56: CLS : STOP
 800 IF INKEY$="a" THEN GO TO 40
 810 IF lives=1 THEN GO TO 790
```

Balloons
by R Smith

NEW

Cruising on Broadway

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Program notes

0	subroutine to set variables and screen
1-13	m/c data for ladders
18-26	random missile
27-32	sound effects of missile
36-70	moves man
125-240	checks missile and prints cross
220-360	moves homing bomb
2000	routine to end
2100-2500	set variables and screen
3000-3060	checks man's position, if below half of screen then homing bomb goes down ladders, if above then homing bomb goes up ladders
3100-3121	bonus man
3210-3240	blowing up procedure
3350-3380	no men left, blowing up procedure, scrolls screen
4000-4098	set up screen

```
 0 GOSUB2100
 1 N=820
 2 READD:IFD=-1THENGOTO18
 3 POKEN,D:N=N+1:GOTO2
 4 DATA169,107,162,0,157,70,30,157,92,30,157,114,30,157,136,30,157,158,30,162,15
4
 5 DATA157,15,30,157,37,30,157,59,30,157,81,30,157,103,30,157,96,30,157,118,30
 6 DATA157,140,30,157,162,30,157,184,30,157,189,30,157,211,30,157,233,30,157,255
30
 7 DATA162,255,157,176,30,169,64,162,0,157,71,30,157,93,30,157,115,30,157,137,30
 8 DATA157,159,30,157,170,30,157,192,30,157,214,30,157,236,30,162,176,157,82,30
 9 DATA157,75,30,157,97,30,157,119,30,157,141,30,157,163,30,157,168,30,157,190,3
0
 10 DATA157,212,30,157,234,30,162,255,157,177,30,162,0,169,115,157,72,30,157,94,
30
 11 DATA157,116,30,157,138,30,157,160,30,157,171,30,157,193,30,157,215,30,157,23
7,30
 12 DATA162,176,157,83,30,157,76,30,157,98,30,157,120,30,157,142,30,157,164,30,1
57,169,30
 13 DATA157,191,30,157,213,30,157,235,30,162,255,96,-1
 18 POKES5,32:POKES1,15:S=250:V=15:A=INT(RND(1)*6):IFAU=1THENA=6
 19 IFAU=2THENA=2:IFA=2THENQ=7810:AU=0
 20 IFA=3THENQ=7898:SS=7801
 21 IFA=4THENQ=7986:SS=7889
 22 IFA=5THENQ=8074
 23 IFA=6THENQ=7766:P=100:AU=0:SS=7713
 25 IFPEEK(Q-1)<>102THENPOKEQ,P:POKEQ-1,31:Q=Q-1:GOTO27
 26 POKEQ,P:POKEQ+19,31:P=32:GOTO18
 27 POKE36877,S:POKE8113,115
 30 IFPEEK(Q)=PEEK(Z)THENGOSUB3210
 32 SYS820:POKEZ,65:POKEA1,81:POKESS,43
 36 BU=PEEK(197):LL=PEEK(Z-1):MR=PEEK(Z+1)
 40 IFBU=26ANDLL<>102ANDPEEK(Z-2)<>113ANDPEEK(Z-2)<>32THENPOKEZ,100:POKEZ-1,65:Z
=Z-1
 42 IFPEEK(Z)=PEEK(A1)THENGOSUB3210
 45 IFZ<8076THENGOTO50
 47 IFPEEK(Z-5)=PEEK(DP)THENPOKEDP-22,32:POKEDP,76:GOTO50
 48 IFPEEK(Z-3)=PEEK(DP)THENPOKEDP,100:POKEDP-22,101:GOTO50
 49 IFPEEK(Z+1)=PEEK(DP)THENPOKEDP-22,32:POKEDP,76
 50 IFBU=34ANDMR<>102ANDPEEK(Z+2)<>113ANDPEEK(Z+2)<>32THENPOKEZ,100:POKEZ+1,65:Z
=Z+1
 52 IFPEEK(Z)=PEEK(A1)THENGOSUB3210
 55 IFBU=32ANDPEEK(Z-44)ANDPEEK(Z-22)=32THENPOKEZ,100:POKEZ-22,65:Z=Z-22
 57 IFPEEK(Z-22)=43THENGOSUB3100
 60 IFBU=17ANDPEEK(Z-22)=64THENPOKEZ,64:POKEZ-22,65:Z=Z-22
 65 IFZ<7850THENAU=2
 66 IFZ<7820THENAU=1
 70 IFBU=33ANDPEEK(Z+22)=64THENPOKEZ,64:POKEZ+22,65:Z=Z+22
 125 IFPEEK(Q-1)<>102THENPOKEQ,P:POKEQ-1,31:Q=Q-1:GOTO220
 130 POKEQ,P:POKEQ+19,31:P=32:GOTO18
```

```
220 POKESS,91:POKES1,S-1:POKES2,V:V=V-1:POKEA1,100:POKEA1+D1,81:A1=A1+D1
260 IFPEEK(A1+22)=64ORPEEK(A1+22)=65THENGOSUB3057
280 IFPEEK(A1+D1)=102THEND1=-D1
300 IFPEEK(A1-22)=32ANDD1=-22THENKL=0:GOSUB3000
310 IFPEEK(A1+22)=113ANDD1=22THENGOSUB3000
315 IFKL=1THENGOTO340
320 IFPEEK(A1-21)=115THENGOSUB3050
340 IFPEEK(A1)=PEEK(DP)THENPOKEA1,100:A1=7766:D1=-1
350 IFPEEK(Z)=PEEK(A1)THENGOSUB3210
360 IFME=0THENGOTO2000
370 IFPEEK(Z)=PEEK(Q)THENGOSUB3210
380 IFPEEK(Z+22)=100THENPOKEZ,32:POKEZ+22,65:Z=Z+22
390 IFPEEK(A1-2)=PEEK(Z)THEND1=-1
400 IFPEEK(A1+2)=PEEK(Z)THEND1=1
1990 POKESS,86:GOTO25
2000 GOTO3350
2100 GOSUB4000:PRINT"■":A1=7756:D1=-1:S1=36877:S2=36878:ME=3:ML=8144:S3=36876:S
S=7713
2101 DO=76:DP=8101:POKE8077,99:FORI=8142TO8185:POKEI,102:NEXTI
2110 POKE8078,77:POKEML,193:POKEML-1,193
2120 M=7680:Z=8099:Q=8074:POKE7810,31:POKE7898,31:POKE7986,31:P=32
2130 POKE8074,31:FORI=1TO6:FORK=MTOM+21:POKEK,113:POKEK-22,100:NEXT:M=M+88:NEXT
I
2140 FORI=7680TO8164STEP22:POKEI,102:POKEI+21,102:NEXTI:S=200
2500 RETURN
3000 IFZ<A1THEND1=-1
3028 IFZ>A1THEND1=1
3029 IFZ<A1-20THEND1=1
3030 RETURN
3050 IFZ<A1-20THEND1=-22:KL=1:RETURN
3055 RETURN
3057 IFZ>A1+20THEND1=22:RETURN
3060 RETURN
3100 POKEZ,32:Z=8099:POKES1,0:FORD=1TO11:L=220:J=20:FORI=1TO8:POKES3,L-J:J=J-3
3120 FORK=1TO1:NEXTK:NEXT:NEXTD
3121 ME=ME+1:ML=ML+1:POKEML,193:POKES3,0:RETURN
3210 POKEZ,65:J=20:POKES1,0:POKES3,0:FORK=1TO20:C=250
3220 FORI=1TOJ:POKES1,C-2:C=C-2
3230 NEXTI:C=C-10:J=J-1:NEXTK:POKES2,0
3231 POKEZ,32:ME=ME-1:POKEML,102:ML=ML-1:IFME=0THENSYS820:GOTO3350
3233 Z=8099:IFPEEK(A1-2)<>32ANDPEEK(A1-2)<>113THEND1=-1
3240 RETURN
3350 POKES2,15:POKES1,0:M=15:POKES3,M:PRINT"■WANT ANOTHER GO (Y/N)?■":GOSUB3364
:POKES3,0
3352 FORI=1TO23:FORK=1TO10:NEXTK:SYS59765:FORP=1TO10:NEXTP:NEXT
3354 RUN
3355 POKE198,0:WAIT198,1
3360 IFPEEK(197)=28THENEND
3361 RETURN
3362 GOTO3355
3364 POKES3,0:FORI=250TO210STEP-1:POKE36876,I:FORK=1TO60:NEXTK,I:POKES2,M:M=M-1
3365 IFM<=20THENPOKE36878,0:POKE36876,0:RETURN
3367 GOTO3364
3368 POKES3,0:POKES2,0:CLR:RUN
3370 POKES3,0:POKES2,0
3380 GOTO3360
4000 PRINT"■■":POKE36879,9:PRINT"      ■ALIEN ATTACK"
4097 POKE198,0:WAIT198,1
4098 RETURN
```

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Character

on BBC Micro

This is a utility program for the BBC Model A or B. It enables easy programming of the user defined character set by positioning a cursor using the four cursor control keys and then pressing the space bar to set or reset the selected pixel.

The program when run prompts for the character number. This must be in the range 224 to 255. The character's present shape is then displayed full-size in mode 1 graphics. As each pixel is altered on the main grid the actual character is also changed.

The pixels shown on the drawing grid are normally reset or coloured red, when set they change to yellow. When you are satisfied with the shape you require, press return to enter the character into the user character set.

The whole user set is shown from character 224 to 255 and is updated each time a new character is entered.

Below the character set display is the current character VDU line code, showing in decimal the value of each row of pixels (these also change as each pixel is set/reset).

After you have entered a character into the graphics set by pressing return, you will again be prompted for the next number to be programmed. The drawing grid will remain as for the last character, so if the next shape to be set up is drastically different from the last it may be quicker to press "c" to clear the drawing grid and start afresh.

Leave the program by pressing escape which sets mode 7 screen and restores the cursor keys to normal.

```
 10 REM CHARACTER DEFINER
 20 REM written by Robert Buttery
 30 REM 4 June 1983
 40 REM
 50 REM
 60  ON ERROR GOTO 1020
 70 MODE1
 80 @%=4
 90 DIM A(8,8),count(8)
100  PROCinit
110 PROCgetchar
120 *FX4,1
130 PROCsetchar
140 VDU31,1,1
150 REPEAT
160   BIT=GET
170   IF BIT=139 AND Y>1 THEN Y=Y-1
180   IF BIT=138 AND Y<8 THEN Y=Y+1
190   IF BIT=136 AND X>1 THEN X=X-1
200   IF BIT=137 AND X<8 THEN X=X+1
210   IF BIT=32 THEN PROCchangebit
220   IF BIT=13 THEN PROCsetchar:PROCgetchar
230   IF BIT=67 THEN PROCclear
240   VDU31,X,Y
250   UNTIL FALSE
260
270
280 DEF PROCchangebit
290 IFA(X,Y)=2 THEN A(X,Y)=1 ELSE A(X,Y)=2
300 PROCgetvalue
310 ENDPROC
320
330
340 DEFPROCgetvalue
350 count(Y)=0
360 FORI%=1TO8
370   COLOURA(I%,Y)
380   IFA(I%,Y)=2 THEN count(Y)=count(Y)+2^(8-I%)
390   PRINTTAB(I%,Y)"*"
400   NEXTI%
410 PROCsetchar
420 ENDPROC
430
440
450 DEF PROCgetchar
460 PROCdisplayset
470 PRINTTAB(32,4)"        "
480 COLOUR3: PRINTTAB(15,4)"Enter CHR$ number ";
490 INPUT num
500 IF num <224 OR num >255 THEN 470
510 PRINTTAB(15,4)"CHR$ ";num;" = ";CHR$num;"
520 VDU31,X,Y
530 COLOUR1
540 ENDPROC
570 DEF PROCsetchar
580  VDU23,num,count(1),count(2),count(3),count(4),count(5),count(6),count(
7),count(8)
590 COLOUR3
```

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```
600 PRINTTAB(26,4)CHR$num
610 PRINTTAB(0,22)num;" = ";:FORI=1TO8:PRINTcount(I);:NEXT
620 MOVE0,350:DRAW0,250
630  ENDPROC
640
650
660 DEF PROCdisplayset
670 COLOUR3
680 VDU31,0,12:FORI%=224 TO 255 STEP 8
690   PRINTI%;"  ";
700   FORJ%=0 TO 6:PRINTCHR$(I%+J%);"   ";:NEXTJ%:PRINTCHR$(I%+J%);" ";I%+7
710   PRINT
720   NEXTI%
730 COLOUR2
740 PRINTTAB(1,29)"SPACE=Set/Reset    RETURN=Store char.    'C'=Clear char.
 ESCAPE=Quit"
750 COLOUR3:GCOL0,2
760 MOVE0,400:DRAW1279,400
770 DRAW1279,660
780 DRAW0,660
790 DRAW0,400
800 MOVE0,350:DRAW0,250
810 DRAW1279,250:DRAW1279,350:DRAW0,350
820 ENDPROC
830
840  DEF PROCinit
850 COLOUR1
860 FORY= 1TO8
870   count(Y)=0
880   FORX=1 TO 8
890     A(X,Y)=1:PRINTTAB(X,Y)"*"
900     NEXTX:NEXTY
910 X=1:Y=1
920 VDU31,1,1
930 ENDPROC
940
950
960 DEFPROCclear
970  PROCinit
980 PROCsetchar
990 ENDPROC
1000
1010
1020 MODE7:*FX4
1030  END
```

Character
by R Butley

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...e treasure (no mean feat in itself), has to ...en leave the castle (in which, of course, ...e adventure is set), and get to the ...eighbouring forest, where he or she can ...eposit the goodies and get the points. ...haron would like to know how to get out ...th the treasure.

Richard Ashley tells me that there is the ...ld sinkhole down which you may jump. ...t, while this manoeuvre will indeed take ...u to the forest, there is a small snag — ...u may also drop some of the treasure.

One or two intrepid labyrinth-wanderers ...ave written to say that they find the "Please come, you're our only hope . . . There is an address on the other side of the paper, and pausing only to crack the second oldest joke in Chandler take-offs (a man passed me. "You got a light, Mac?", I asked. "No, but I got a dark brown overcoat!", he replied), Dan Diamond hurries to the obligingly eerie graveyard, and Franklin's Tomb.

"Taking my Courage in one hand, and leaving the Whitbread behind (yup, that's the oldest one), I strolled up to the door. Suddenly the ground gave way beneath me, and I found myself falling, falling . . ."

warning for the occasion: *Never anger dragon, he might fume!*

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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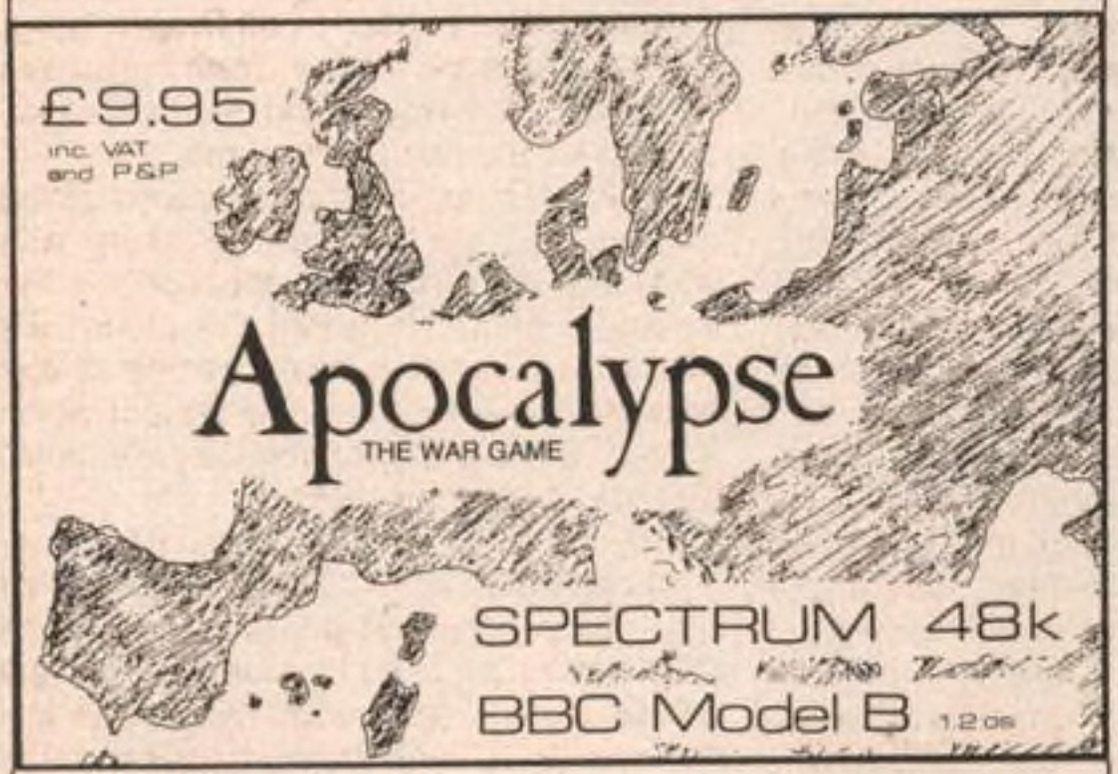

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Double diamond

Deep in the darkest Home Counties, the Taylor family, for some time now, have been Dragon-punching, in an attempt to solve *Madness and the Minotaur.*

This adventure, from Dragon Data, has been one of the perennial braintwisters for the machine and has prompted many letters to this column, with pleas for help. The main problem used to be the Great Mushroom Hunt, but now most people seem to be able to find it. Michael Vesey, however, wonders what to do with it, once it has been found. You won't learn any spells without it, Michael — be patient.

Mark, Amanda and Dad Taylor, though, have found many objects (like food, water, bottle, dagger and golden flute), although they don't seem to have been able to get at the leather shield by jumping for it.

Apart from satyrs, sprites and troglodytes, they have also met the Oracle, who has imparted several cryptic clues to the Taylors.

I would make a note of all the clues, famille Taylor, the information is bound to come in handy when you meet the creatures. Incidentally, you should resist the temptation to eat the food (is it mushroom soup?) at an early stage!

Frank Goldberg of Ealing also enjoys *M&M*, but complains about the lack of a *Save* routine. It's a pity that this particular adventure, which seems to be an intricate and lengthy quest, cannot be halted in mid-game and returned to at another time.

Sharon Austin, of Margate, while calling *M&M* "certainly the best in my collection (of programs)", is having great difficulty in restraining herself from smashing the computer. The trouble stems, largely, from the fact that the adventurer, having collected the treasure (no mean feat in itself), has to then leave the castle (in which, of course, the adventure is set), and get to the neighbouring forest, where he or she can deposit the goodies and get the points. Sharon would like to know how to get out with the treasure.

Richard Ashley tells me that there is the odd sinkhole down which you may jump. But, while this manoeuvre will indeed take you to the forest, there is a small snag — you may also drop some of the treasure.

One or two intrepid labyrinth-wanderers have written to say that they find the random elements of *M&M* rather unsettling. Far from being random, however, the elements that change throughout the game depend on the player's actions at various points.

As an example, if the player deposits an object at a certain location, that object is randomly relocated, unless the player has previously deposited an object at another location. This kind of intricate manoeuvring can, of course, be frustrating until the key to the puzzle is found, but is immensely rewarding once cracked.

Madness and the Minotaur is described by Dragon Data as a "fascinating real-time adult strategy game", in which you can pass the time "doing battle with ferocious beasts". It's one of several adventures from this company, some of the other titles being *Quest*, *Black Sanctum*, *Calixto Island*, *Dragon Mountain* and *El Diablero.*

Now, if you are playing *Ring of Darkness* at the moment, you might find these tips of Tony Fowler's useful in your wanderings. You could gain some useful information in the pub, says Tony — but how to get people talking in a pub? Second, when the monster is in the distance, you may find it useful to have a noisy weapon. Finally, be very careful when attacking other characters — some are unbeatable.

Ring of Darkness is from Wintersoft — but they, and Dragon Data, are not the only software house producing adventures for the Dragon (Dragon Data are merely the glossiest). Salamander Software have just released a rather nice one called *Franklin's Tomb.* It's the first, they say, of a projected series, all using "a different approach to other adventures, in that the graphics are supplied in a separate manual".

The separate manual is certainly a lavish affair, being a 20-page casefile, "fully illustrated", as Salamander say. Well, 13 of the pages are fully illustrated with pretty pictures of the major locations.

But let Salamander's very own private dick set the scene: "My name is Diamond. Dan Diamond (known as Double Diamond, no doubt — TB). I'm a cop; at least, I used to be. My beat is the city, a seething kaleidoscope of human emotion and solid steel. It was a muggy Monday morning, the sort of day that just lies there like a dead fish, staring at you. Suddenly, the door opened and she walked in. You could cut paper with the creases in her uniform . . ."

That's enough, you get the picture.

The broad has delivered a letter, saying: "Please come, you're our only hope . . ." There is an address on the other side of the paper, and pausing only to crack the second oldest joke in Chandler take-offs (a man passed me. "You got a light, Mac?", I asked. "No, but I got a dark brown overcoat!", he replied), Dan Diamond hurries to the obligingly eerie graveyard, and Franklin's Tomb.

"Taking my Courage in one hand, and leaving the Whitbread behind (yup, that's the oldest one), I strolled up to the door. Suddenly the ground gave way beneath me, and I found myself falling, falling . . ."

And this is where you come in! To the accompaniment of the *Pink Panther* theme (don't ask me why), the title page gives the player another look at the letter (zero points to Salamander, here, for lack of imagination in designing the title page, a deficiency I've noticed in all Dragon programs — prove me wrong). Then the screen clears, to make way for the display that will stay up for the rest of the game.

On the left, are brief descriptions of the location you are currently at, along with what you can see. On the right is the inventory panel, in which the player will see a list of what is being carried at any time. A three-line box at the bottom of the screen is reserved for the player's input, and the computer's replies.

The input should take the usual form, ie, verb and noun, as in "*Take Lamp*" and so on — though, as this program is "Dragon Data approved", and as *Madness and the Minotaur* does not always follow this format, it may be worth trying other combinations of words.

Franklin's Tomb is written in Basic, but is reasonably fast in execution. It seems a little illogical in layout — from the starting location, I went first of all to the east. Later, I tried going west, and found exactly the same things happening to me. Well, maybe it's a mirror adventure.

FT, unlike *M&M* has a *Save* feature (as well as red herrings and blue kippers). It doesn't have a *Score* routine, however — in reply to your request for your score so far, the program just says: "this isn't a football match". Some of the traditional magic words are recognised, so try anything that comes to mind.

All in all, good value, I think, and a game which should keep the old grey cells ticking over for a day or two. As I hinted before, *Franklin's Tomb* is the first in a series of related adventures, and some of the clues in the present program should be transportable to others in the series. Salamander are working on a version for the Oric which should be ready soon.

Robin Hamilton writes from Loughborough to ask if there are any versions of the original mainframe adventure for the Dragon 32. I haven't noticed any, Robin, but if any software manufacturers have been sufficiently interested to have ploughed through the column this far, maybe they would let me know of any plans they have in that direction.

To round off our Dragon column, I hope that Henry Lee will allow me to adapt his warning for the occasion: *Never anger a dragon, he might fume!* ■

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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PEEK & POKE

NOISE FLOOR

Henry Cavey of Lime Crescent, Bishops Stortford, Essex, writes:

Q Like other people, I have had trouble with my ZX81 *Load/Save*. My father asked someone at work, who knows about these things, what might be wrong. And he said that the tape's noise floor might be low, or that the azimuth might not be at its best. My father did not really understand and neither did I. I know that azimuth is to do with the recording head in my tape recorder, but what is a floor of noise? Can you explain?

A Jargon strikes again! A frustrating and common disease, jargon can often cause more confusion than it saves. Still, a noise floor is a level of noise. It is not a phrase I have met before in computing, I think he simply means that the sound on the tape is not loud enough. It is generally taken that the output level of sound needs to be able to get up to 4.5v for successful *Load/Save* — 3v, for example, would be insufficient as the noise floor would be too slow.

Azimuth is more commonly quoted when referring to this problem. It does, as you say, refer to the tape head. Specifically, the angle of the tape head to the tape. This, up to a point, can be adjusted on some tapes to give a more tinny sound. This is better for *Load/Save* on a ZX81.

FUNCTION KEYS

Paul Rogers of Grange Crescent, Tenterden, Kent, writes:

Q I would like to know something about the Vic20 function keys. How do I use them and can I use them all the time to do things like *Poke* or *Print*?

A I think, from your question, you would like to be able to use your function keys as soon as you switch on. This, I am afraid, you cannot do. As soon as the computer is turned off, any program is of course lost, whether it uses the function keys or not.

To use the function keys, you have to check the keyboard to see if a function key has been pressed. The most common way of doing this is to use the *Get* statement, where you check the value of the depressed key. You can do this because all the keys have a code, which you can compare with that of the function key to see if it was pressed. The odd numbered function keys have codes from 133 to 136, and the evens from 137 to 140. Try these three lines:

```
10 GET FK$: IF FK$ = ""THEN GOTO 10
20 IF FK$ <> CHR$(133) THEN GOTO 10
30 PRINT "YOU PRESSED FUNCTION KEY 1"
```

We can extend this to read more of the keys. Keep line 10 and enter the following:

```
20 IF FK$ < CHR$ (135) OR FK$ > CHR$ (138) GOTO 10
30 IF FK$ = CHR$ (135) THEN A = 5: GOTO 100
40 IF FK$ = CHR$ (136) THEN A = 7: GOTO 100
50 IF FK$ = CHR$ (137) THEN A = 2: GOTO 100
60 IF FK$ = CHR$ (138) THEN A = 4: GOTO 100
100 PRINT "YOU PRESSED FUNCTION KEY", A
```

In this example, I have kept the four keys I used in a single routine. It is quite possible to use the *If/Then* format to take you to a whole suite of subroutines. Indeed, one way of thinking about the function keys is to see them as a one-key entry into a sub-routine.

There is another way of reading the keys and this is to *Peek* addresses 197 or 203. These read the key pressed and return a specific value. Thus *F1* and *F2* would return the same value. Every key can be used in this way, but when dealing with the function keys specifically, the values are as follows:

F1/F2	39
F3/F4	47
F5/F6	55
F7/F8	63
No Key	64

As for using the function keys to replace commands, I do not know of a way of doing this, other than by rewriting the keyboard scan so that it returns a different value for the keys you want to reallocate.

SOFTWARE WRITER

Mehermosh Master of the Computer Training Centre, London, writes:

Q I am a newcomer, not so much to computing, but to the UK. I have read your magazine and liked its content. I have a 48K Spectrum and have written many programs for it, both games and business (some good, some not so good). I would like to sell them to magazines and software houses. Could you tell me some useful addresses where I can sell these programs and how long an answer would take.

A At a conservative estimate, there are about 100 companies who would probably show interest in Spectrum software. There is no way I can name them all, but you could try companies like Silversoft, Quicksilva, Artic, or Imagine. For more serious types of program, Campbell, Hilderbay and Calpac.

As for magazines, the software generally comes in fits and starts. So there is a build up from March to Easter, that drops away during the summer, to pick up again later. You should look for an answer in about three and five weeks, but remember that it may take several months before the program is actually published.

Here are some guidelines:

(1) Always send a copy of the program on a good quality cassette tape.
(2) Always try and include a clear printout.
(3) Very important — always ensure that every item you send has your name and address on it, as well as the title of the program.
(4) If you want your material back, then also enclose an appropriate SAE.

Now to update a couple of previous answers. K H Bourke Burrows of Bibi Magnetics has written to add some extra information to the answer I gave to David Brown in the June 30 issue of *PCW*.

The International Electro-Technical Commission has not yet finalised a specification for computer grade cassettes, but the ECMA have decided on an international standard, ECMA-34. Tape must be as even as possible and unblemished, it must also be sufficient to retain the signals recorded on it faithfully. Cases should have thick pillars to hold the corner rollers, this helps cut torque, which of course causes wow and flutter. The other thing to look for is a strong large pressure pad to ensure even contact right across the playing head.

It boils down to the fact that just because a tape is C-10 this does not automatically make it of computer quality, though the smaller the tape size, the less the torque.

I have also had a letter from Miss Pam Fereday of Hove in Sussex, who writes to tell me of several computer and related indexes. The ones she mentions are:

Computer and Control Abstracts: A world-wide index that includes most of the monthly journals, such as: *Personal Computer World*, *Your Computer*, *Microcomputer Printout*, and so on.

Electrical and Electronics Abstracts: A sister publication to *CCA* dealing in electronics. Both publications contain indexes and abstracts.

Current Technology Index: Deals with mainly British journals in the field of technology generally. Eg: *New Scientist*, *Electronics Weekly*, etc. However, it does not include the popular computing magazines and it is only an index, no abstracts are provided.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, 12-13 Little Newport Street, London WC2R 3LD.

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ATARI 400 16K, program recorder, Basic cartridge, manual and Energy Czar cassette, £140. Call 01-734 3748 evenings.
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VIC20 + cassette recorder, games tape, cartridge, books, £140 ono; Epson MX80FT printer, £300 ono; disk drive, teak case, power, £270 ono. C. Lawson, 3 Roseburn Gardens, Edinburgh (tel: 031,337 1656, day or evening).
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TRS 80, Model 3, 48K + internal monitor and disc drives (2 x 40 track), about 20 discs + much software, sell for £975 ono, cost price (November 1982) £1,600+. Tel: 01-572 2917.
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VIC20 + CN2 cassette deck + 16K Ram + seven cartridge type games + joystick, £150. Tel: Harlow 417618 (after 6 pm).
CASSETTE DECK for Vic20 plus £250 software — for £80 — call 01-455 2651.
VIC20 plus C2N plus Vic printer, 8K and 16K Ram pack, books including Vic Revealed and Reference Guide. Software including Spiders of Mars, Meteorite, various other games plus super expander and programmers aid, O level packages plus magazines and joystick worth £830. Will sell for £500 ono. Tel: 01-848 4000.
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VIC20 + C2N cassette deck + 12 cartridges + 30 original cassettes + joystick, £330 (may split). Tel: 031 661 7477.
VIC20 SOFTWARE to sell or swap, Vic20 manual, Vic joystick, cassette unit with lead for BBC (brand new), £18, *Personal Computer News* issues 1 to 25, only £10. Tel: 01-460 3171 any time.

Wanted

WANTED. Kempston or Quickshot joystick for Spectrum. Lowest price up to £13. Tel: Brookwood 81117.
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WANTED. BBC Model A or B in good condition. Tel: Canterbury (0227) 58529.
WANTED. Second-hand Atari, disk-drive. Tel: 0990 21160.
WANTED. Sinclair Spectrum 16K or 48K. Must be in working condition. All offers considered. Tel: 01-574 4122.
WANTED. Basic ZX80 or ZX81. Tel: Southend 335916.
WANTED. An old type 410 Atari tape recorder. Tel: 907 1582.
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ZX81 + 16K, Kayde keyboard, books + magazines, software, excellent condition. Could not buy the same new for £125. Quick sale, £65 ono. Tel: Andover (0264) 4628.
PRINTER, EPSON MX70, as new, £200, also TRS80 LII 16K with cassette and VDU. Offers. Phone D. Fitzgerald (0635) 49044.
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SPECTRUM 64 PRINT, amazing software that gives 64 characters per line instead of 32, prints anything from your Basic program, cassette, 48K or 16K, £2.90. K. Ahmed, 28 Magpie Hall Lane, Bromley, Kent.
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TELETEXT ON YOUR SPECTRUM: Create your own 900-page Teletext system with "ZXtext". Full colour graphics, flashing, 24-hour clock with alarm, free sample system — it's all here! Cassette £4.95. Iain Stewart, 17 Torry Drive, Alva FK12 5NQ.
AUTO KOPY COPIES any type of Spectrum tape (16/48K), even programs full 16K or 48K long, the best available, machine code, simple to use, full guarantee, £3. B. Tidd, 160 Howlands, Welwyn Garden City, Herts.
SOFTSAVE for the Vic20 is a 100 per cent machine code utility program which allows you to back-up most software onto a new tape. Cassette with instructions, £4.95 from Softsave, 248 Evelyn Street, London, SE8 5BZ.
SEEN MY CAT? Post free Spectrum software from the two writers; independent assessment. FREE offers and more in my catalogue. SOFTWARE (P), 20 Gordon Avenue, Bognor Regis, Sussex (02403) 822561.
DIET AND WEIGHT CONTROL for 48K Spectrum, revolutionary, simple and effective, £4. Dr E. Frangoulis, 54 Holland Road, London W14.
SPECTRUM BASIC PROGRAMS made 100 per cent breakproof, £6. Send program on tape to A. H. Ibrahim, 54 Beresford Road, Longsight, Manchester M13 0QT.
ATARI VIDEO GAME with 5 cartridges, £70 ono. Tel: 328 2075 (Private sale).
1800 US DOLLAR SONY CRF1, communication receiver, latest and best, will swap for best computer most preferables offered or money. Tel: 0269-850578 (David).

ADVENTURE HELPLINE

Micro *Vic20*
Adventure *The Count*
Problem *(1) Open the Coffin. (2) Stop Dracula robbing you of your tent stake. (3) What use is the oven?*
Name *M. Valentine*
Address *101A Underdale Road, Shrewsbury, Shropshire*

Micro *Spectrum 48K*
Adventure *The Hobbit*
Problem *Where is the bow and how do you kill the monstrous dragon flying after you?*
Name *Robert Tench*
Address *32 Anglian Way, Market Rasen, Lincs*

Micro *BBC Model B*
Adventure *Philosopher's Quest*
Problem *I cannot get out of the ME passages after finding the portrait of Escher*
Name *Andrew Hunt*
Address *39 Roedich Drive, Taverham, Norwich NR8 6RA*

Micro *Vic20*
Adventure *Pirate's Cove (Commodore)*
Problem *I need to know how to open the treasure chest which is found on Pirate's Island*
Name *D. Hughes*
Address *13 Pitfield Gadens, Baguley, Wythenshawe, Manchester M23 8EA*

Micro *ZX Spectrum 48K*
Adventure *The Hobbit*
Problem *Upon reaching the elvish clearing I become stuck. I have with me Thorin, a sword, rope, large key, map and a ring*
Name *Nicolas Pinnell*
Address *Penrhos, Green Lane, Churt, Farnham, Surrey*

Micro *BBC B*
Adventure *Castle of Riddles*
Problem *The happy little bears and the horrible blood sucking creature seem impassable and waving the rod in the dark passages merely produces coloured smoke. Where do I go from there?*
Name *P. J. Ambrose*
Address *91 Dene Way, Newbury RG13 2JN*

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NEW RELEASES

CURSES

Snoopy fans will be more than familiar with the Red Baron — the German World War I flying ace.

Terminal Software now gives you the chance to emulate the Red Baron's legendary feats in *Super Dogfight* — a two-player game for the Commodore 64. Based on the original arcade game, *Super Dogfight* is written in machine code and offers sprite graphics, colour and sound, and full screen wrap-around for uninterrupted play.

Curse you, Red Baron.

Program *Super Dogfight*
Price *£9.95*
Micro *Commodore 64*
Supplier *Terminal Software*
28 Church Lane
Prestwich
Manchester M25 5AJ

BLACK HOLE

The Newbrain is one of those machines that has what media people call a low profile. Although intended for fairly serious home users (and lacking colour), a number of software houses brought out games packages for the machine, before news of Grundy's collapse was announced last month (*PCW* 23-31 August).

Grundy Business Systems produced software for both camps; ie, games and utilities, Most of the games are in packs of two which, providing that both are of good quality, is a nice idea.

Quadrax/Space Battle gives you a sort of complicated noughts and crosses with a shoot-'em-up space game. *Quadrax* requires you to beat the computer to a straight line of a chosen number on a grid — *Space Battle* is a two-player game, each trying to destroy 10 of the other's ships without flying into a Black Hole.

Program *Quadrax/Space Battle*
Price *£9.95*
Micro *Newbrain*
Supplier *Grundy Business Systems*
Cambridge Science Park
Milton Road
Cambridge CB4 4BH

EDITOR

For those who need to store information and perform simple processing operations, without going to the expense of a fully-fledged word-processor like *Tasword*, there is *Pagepro*.

Pagepro allows you to set up pages of information and, to a limited extent, edit it. Other facilities include copying to a printer and *Load/Save* of all information.

Program *Pagepro System*
Price *£5.95*
Micro *Spectrum 48K*
Supplier *SD Micro Systems*
PO Box 24
Hitchin
Herts SG4 0AE

SOUPED-UP

Ants may not strike you as particularly fearsome creatures, but those found in Macronics' *Ant Attack* are different from the common or garden kind.

Basically, *Ant Attack* is a kind of souped-up caterpillar — souped-up because of the various other animals that turn up to help the ants in their attack.

A feature on this game that could easily become a must on other games is voice control. Assuming you have the correct kind of cassette player, you can operate the fire control simply by speaking into a microphone!

Presumably, this idea could be extended to all the controls, provided the Spectrum could be relied upon to distinguish between the sounds, and providing actually saying the word doesn't take too long for the kind of fast action response arcade games require.

Program *Ant Attack*
Price *£4.95*
Micro *Spectrum*
Supplier *Macronics Systems*
26 Spiers Close
Knowle
Solihull
West Midlands B93 9ES

SLEIGH RIDE

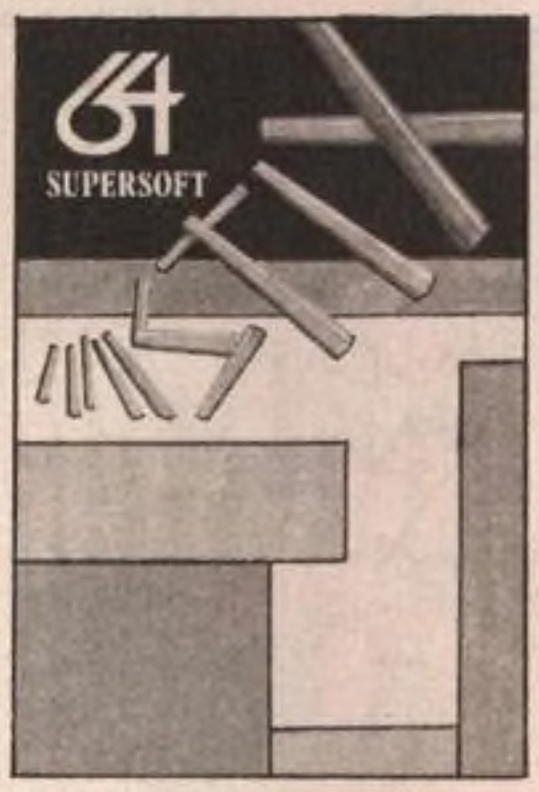
Geordie software company Byteware is now producing games and educational programs for most of the popular micros.

Bob Sleigh & Bio for the TI99/4A has two programs on one cassette. In *Bob Sleigh* you must guide your sleigh down a twisting track. There are four track widths and four speeds available.

Bio produces your biorhythm charts for any 30-day period.

Program *Bob Sleigh & Bio*
Price *£4.50*
Micro *TI99/4A*
Supplier *Byteware Ltd*
Unit 25
Handyside Arcade
Newcastle upon Tyne
NE1 4PZ

COSMIC



Stix, based on the arcade game *Qiz*, does not involve space invaders, mutant camels or laser cannons.

Instead, *Stix* consists of a bundle of energy that 'roams the universe, destroying all in its-path'. But, a freak cosmic storm has trapped the *Stix* in hyperspace, giving you the chance of controlling it by enclosing it with force fields.

The game can be played with joysticks, or direct from the keyboard.

Program *Stix*
Price *£9.20*
Micro *Commodore 64*
Supplier *Supersoft*
Winchester House
Canning Road
Wealdstone
Harrow
Middlesex HA3 7SJ

PARCHMENTS

Invincible Island from Richard Shepherd Software is one of the company's first games not actually written by Richard Shepherd.

Peter Cooke, author of *Invincible Island*, has constructed an interesting split-screen graphic and text adventure for the 48K Spectrum. Ancestral home of the mysterious Xaro tribe, the island of the title contains 'unimaginable treasures'. But, before you can find the treasure, you must first discover the seven parchments of Xaro.

I must admit to being a little disconcerted to find that I usually did no better than 'you have scored a pathetic 0'. But, there is a useful Help facility, though unusually it cannot be used during a game.

All in all, a very creditable addition to the Richard Shepherd stable. But, I must admit I am waiting to see if the next release is Invisible Island by Dudley Moore.

Program *Invincible Island*
Price *£6.50*
Micro *Spectrum 48K*
Supplier *Richard Shepherd Software*
Elm House
23-25 Elmshott Lane
Cippenham
Slough
Berkshire

NEW RELEASES

WORLD RULER

Wargamers are a dedicated breed, always ready to spend hours pondering over the precise meaning of some new tactical advance by their fellow players — and using rule books more complicated than the most erudite ZX80 programming manual.

Computers are a useful tool for wargamers, since a typical game requires writing down all sorts of information, keeping track of things like supplies, power levels, etc.

One of the leaders in the area of putting wargames on computers is Red Shift.

State of the art for this kind of game may very well be *Apocalypse* which, not eschewing big themes, allows you to become a world leader and rule the world — using nuclear force if necessary.

The game comes with four maps depicting various parts of the world you may wish to dominate and an elaborate instruction booklet. Since the game is likely to last at least four hours, there is a *Save* option.

Program *Apocalypse*
Price *£9.95*
Micro *Spectrum 48K*
Supplier *Red Shift*
12c Manor Road
Stoke Newington
London N16

GOLD MINE

Latest offering from Welsh software house Abacus is *Super Digger*.

The plot is simple — you are working down a gold mine when suddenly you find yourself surrounded by hungry man-eating monsters. Armed with a pick-axe, you must dig traps to catch the monsters, or bash them over the head. But, be warned, sometimes the monsters will leave proximity mines which explode when you walk over them.

Those of you with delicate sensibilities should also know that the monsters are lacking in table manners — after chomping on your bones, they are apt to burp.

Program *Super Digger*
Price *£5.95*
Micro *Spectrum 16K*
Supplier *Abacus*
716 Llangyfelach Road
Treboeth
Swansea SA5 9EL

POSTMAN

Perilous Post sounds like a kind of *Frogger*. As the postman you must deliver a parcel to a house flashing red at the top of the screen.

Your simple task is fraught with danger, as first you cross railway lines then negotiate the river using boats and finally avoid the traffic wardens.

You have a time limit for the delivery of each parcel (if only it were true) and are awarded a new van for every 10,000 points.

Program *Perilous Post*
Price *£6.50*
Micro *Vic20*
Supplier *Impact Software*
70 Redford Avenue
Edinburgh EH13 0BW

COPTER RESCUE

Byteware is offering a range of games for several machines including the TI994/A and the Commodore 64.

It is interesting to note that Texas games seem to be far less often written in machine code than is the norm for other machines — perhaps because of the difficulty of getting hold of technical information from Texas?

Writing in Basic another problem crops up, because there is a difference between Texas Basic and Texas Extended Basic such that the best games require the latter. For those people who have the Extension module, Byteware has a couple of programs that utilise its extra facilities.

Copter Captive first requires you to collect keys and escape from a room whilst avoiding your captors. If you can escape, you must use your helicopter to rescue your troopers — this is achieved by colliding with them.

Program *Copter Captive*
Price *£7.95*
Micro *Texas TI99/4A (Extended Basic)*
Supplier *Byteware Unit 25 Handyside Arcade Newcastle-upon-Tyne NE1 4PZ*

3D MOVIE

Silly Software seem to want to be a sort of Automata for the Dragon.

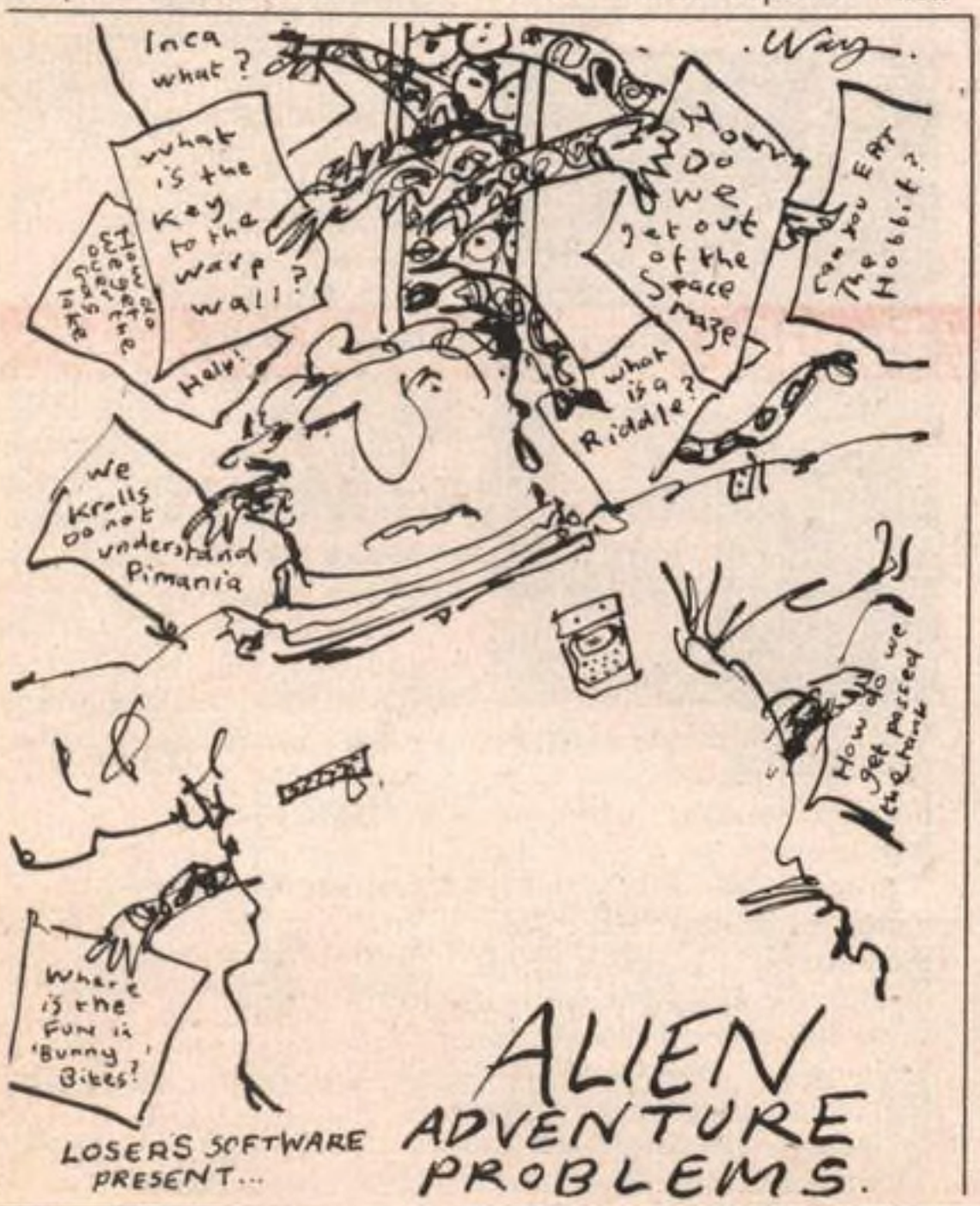
Its first release is entitled *Movie Producer* and it has 3D graphics — on the cover of the cassette! Included with the actual program are a pair of red and green glasses that enable you to see the cover in 3D.

It appears to be a sort of adventure game. As ever, the objective is to accumulate money and power, but here you achieve it by making a film.

The game begins in Wardour Street, where you must first try to sell your script. Having sold it, you must then make your movie, each day costing you 500 dollars.

The game features graphics and music as well as (to be taken with a modicum of sodium carbonate, I think) a claimed 25 billion levels of play.

Program *Movie Producer*
Price *£7.95*
Micro *Dragon 32*
Supplier *Silly Software*
61 Tornhill
North Weald
Epping
Essex



Grammar gripe

Grammar, n. A system of pitfalls thoughtfully prepared for the feet of the self-made man, along the path by which he advances to distinction.

The Devil's Dictonary by Ambrose Bierce

When it comes to writing I am very particular about the words I use.

I don't like the use of contractions such as "can't" because they're clumsy and possibly reveal a lack of command of English, and we're only too aware that that leads to inclarity of thought. The ending of sentences by a preposition is also something I can't put up with.

Another rule to follow is never to use exclamation marks! And NEVER to capitalise. And never start a sentence with a conjunction. But that's only sensible, isn't it!

A pet hate, and its all around us in it's misuse, is the confusion between "it's" (which is short for "it is", and thus its wrong to use it anyway), and "its" (which means "belonging to it", that is it's definition).

Always a verb in a sentence.

Examples of misuse are everywhere, and it can sometimes be important. Some word-processing packages now offer help with spelling, and one in use with the US Army also helps with simple grammar. The simple grammar is needed to help write manuals that the semi-illerates amongst the draft might possibly understand.

Having an army which contains people who are not able to distinguish between buttons marked "Do not press, explosive" and "Coffee, white with sugar" must be worrying.

How can you obey orders if you cannot read them, never mind understand them?

In *Communications Management* (August 1983), in a feature about telecommunications satellites, I read: "It is now 21 years since the world's first experimental commercial communications satellite, Telstar I, provided direct exchange of television broadcasting across the Atlantic, some five years after, the USSR put Sputnik I into orbit."

I have no quarrel with the feature, indeed it was interesting. But consider the short quotation, and see what a computer might do. A computer would do nothing — the sentence is grammatically correct and clear in meaning.

The meaning is not, however, that intended by the author (or so I hope).

As the sentence reads, Sputnik was launched five years after Telstar ". . . some five years after, the USSR put Sputnik I into orbit".

I know, and you know, that Telstar came five years after Sputnik, and that was what was meant by the author. Somewhere between the author having his idea to talk of Sputnik and the words appearing in the magazine, an extra comma intruded.

How did we know what the author was meaning, even though it did not so appear? Experience, and knowledge of the worlds, a personal database of inconsidered trifles.

Any computerised system would be useless when faced with such a problem — for a start the computer would not realise there was a problem.

A computerised system to correct spellings and/or grammar is a simple expert system — working on probabilities and fuzzy logic — but the world of words is so vast that a computer cannot truly cope. Many would maintain that our language is really our society in a different form (eg, George Orwell in *1984*).

An expert system works with a set of rules, a set of conventions. Usually I — for example — follow the conventions of what is normally termed "grammar". Sometimes, for effect, I transgress those conventions. How is an expert system to know which transgressions are intended, and which are not? It is a convention that some conventions will be observed and others will be transgressed.

There are two forms of reading, or understanding: "efferent"; where the object is to acquire information as quickly as possible, and "aesthetic", where the whole point is the experience of the reading or understanding itself.

Expert systems might be better at coping with efferent texts (eg, manuals) than with aesthetic texts (eg, novels, or — worse still — my outpourings . . .). ■

Boris Allan

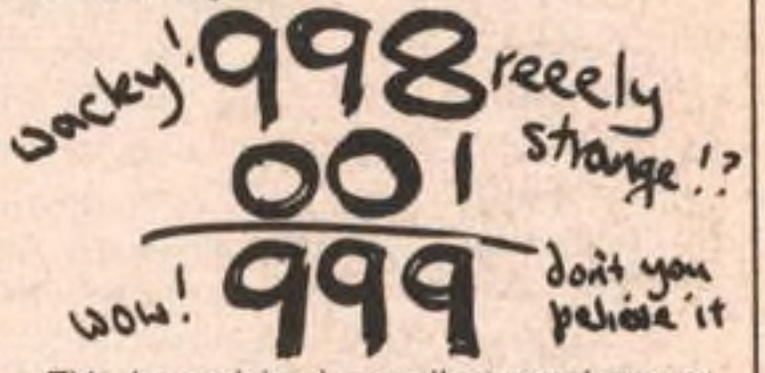
Puzzle

A rare breed

Puzzle No 73

Walter was one of that rare breed of wacky mathematicians!

He would never do things the conventional way if it could be avoided. When once asked to work out the square root of 998001 he simply divided the six-digit number in half and added the halves together.



This, he explained, gave the correct answer.

How many other six-digit numbers can have their square roots evaluated in this wacky way?

Solution to Puzzle No 68

Answer: 10, 4 and 9, and 5, 6, and Queen were the cards dealt.

Let us call the first three cards *A*, *B* and *C*, and the second three *D*, *E* and *F*. Also, *A* will denote the highest card.

So,

$$A + B + C = D + E + F$$

and

$$A * B * C = D * E * F$$

As all values are in the range 1 to 13 and all are different, the following program tests all possible permutations of cards.

```
10 FOR A = 6 TO 13 20 FOR B = 1 TO A - 1 30 FOR
C = 1 TO A - 1 40 IF B = C THEN GOTO 140 50 FOR
D = 1 TO A - 1 60 IF B = D OR C = D THEN GOTO
130 70 FOR E = 1 TO A - 1 80 IF B = E OR C = E
OR D = E THEN GOTO 120 90 LET F = A + D + C -
(D + E) 100 IF F = A OR F = B OR F = C OR F = D
OR F = E OR F < 1 THEN GOTO 140 110 IF A * B * C
= D * E * F THEN PRINT A;" ";B;" ";C;" ";D;" ";E 120
NEXT E 130 NEXT D 140 NEXT C 150 NEXT B 160
NEXT A
```

From the possible sets of values printed, there are two sets with a five present: (10, 4, 9)/(5, 6, Q) and (5, 4, Q)/(3, 8, 10). So you will still have to use a little bit of telepathy to see inside the demonstrator's mind.

Winner of Puzzle No 68

The winner is: N Wheeler, Cavendish Road, Sutton, Surrey, who receives £10.

Top 10 Top 10 Top 10 Top 10

Spectrum

1	(1)	Jet Pac	(Ultimate)
2	(—)	Scrabble	(Psion)*
3	(2)	Flight Simulation	(Psion)*
4	(3)	Horace and the Spiders	(Psion/Melbourne House)
5	(8)	Transylvanian Tower	(Richard Shepard)*
6	(7)	Horace Goes Skiing	(Psion/Melbourne House)
7	(4)	Football Manager	(Addictive Games)*
8	(6)	The Hobbit	(Melbourne House)*
9	(10)	Automania	(Imagine)
10	(—)	Pssst	(Ultimate)

*Requires 48K

(Figures compiled by W H Smith and Sons, London)

Atari

1	(2)	Diamonds	(English Software)
2	(1)	Miner 2049er	(Big Five)*
3	(—)	Hellcat Ace	(Microprose)
4	(3)	Curse of Crowley Manor	(Adventure International)
5	(—)	Fire Fleet	(English Software)*
6	(8)	Orc Attack	(Thorn EMI)*
7	(—)	Air Strike	(English Software)†
8	(9)	Choplifter	(Broderbund)*
9	(7)	The Blade of Blackpoole	(Sirius)‡
10	(5)	Zaxxon	(Datasoft)

‡42K Disc. *Cartridge. †32K Cassette

(Figures compiled by Calisto Computers, Birmingham 021-632 6458)

Dragon

1	(1)	The King	(Microdeal)
2	(2)	Frogger	(Microdeal)
3	(3)	Talking Android Attack	(Microdeal)
4	(6)	Night Flight	(Salamander)
5	(5)	Shuttle	(Microdeal)
6	(4)	Space War	(Microdeal)
7	(—)	Morocco Grand Prix	(Microdeal)
8	(10)	Ring of Darkness	(Wintersoft)
9	(—)	Katerpillar Attack	(Microdeal)
10	(7)	Planet Invasion	(Microdeal)

(Figures compiled by Boots & Co, London)

BBC

1	(1)	Felix in the Factory	(Program Power)
2	(—)	Super Invaders	(Acornsoft)
3	(2)	Danger UXB	(Program Power)
4	(3)	3D Bomb Alley	(Software Invasion)
5	(9)	Great Britain Limited	(Simon W Hessel)
6	(5)	Starship Command	(Acornsoft)
7	(—)	Centipede	(Superior Software)
8	(—)	Feasibility Experiment	(Digital Fantasia)
9	(—)	Demon Decorator	(Program Power)
10	(7)	Alien Swirl	(Program Power)

*All model B

(Figures compiled by Micro Management, Ipswich 0473 59181)

Vic20

1	(1)	Arcadia	(Imagine)
2	(2)	Skyhawk	(Quicksilva)
3	(4)	Wacky Waiters	(Imagine)*
4	(3)	Cosmic Crunch	(Commodore)*
5	(6)	Gridrunner	(Llamasoft)
6	(8)	Panic	(BugByte)
7	(9)	Sargon II Chess	(Commodore)*
8	(7)	Cosmiads	(BugByte)
9	(5)	Catcha Snatcha	(Imagine)
10	(10)	Frantic	(Imagine)

*Cartridge.

(Figures compiled by Boots & Co, London)

Books

1	(1)	Complete Spectrum Rom Disassembly, *Logan and O'Hara*	(Melbourne House)
2	(3)	Commodore 64 Machine-code Master, *Lawrence and England*	(Sunshine)
3	(4)	Assembly Language Programming for the BBC Micro, *Birnbaum*	(Macmillan)
4	(2)	Structured Programming With BBC Basic, *Atherton*	(Horwood)
5	(8)	Complete Forth, *Winfield*	(Sigma)
6	(—)	BBC Micro Book, Basic, Sound and Graphics, *McGregor and Watt*	(Addisson-Wesley)
7	(—)	Programming the 6809, *Zaks*	(Sybex)
8	(6)	Spectrum Hardware Manual, *Dickens*	(Melbourne House)
9	(7)	Z80 Assembly Language Programming, *Leventhal*	(Osbourne)
10	(—)	Anatomy of the Dragon, *James*	(Sigma)

(Figures compiled by Watford Technical Books, Watford 0923 23324)

(Last week's position in brackets)

ZX81*

1	(9)	Chess	(Psion)
2	(1)	Space Raiders	(Psion)
3	(2)	Espionage Island	(Artic)
4	(3)	Flight Simulation	(Psion)
5	(4)	Fantasy Games	(Psion)
6	(7)	Football Manager	(Addictive Games)
7	(6)	Defender	(Quicksilva)
8	(5)	1K Games	(Artic)†
9	(—)	Asteroids	(Quicksilva)
10	(—)	QS Invaders	(Quicksilva)

*All 16K except where shown. †Runs in 1K.

(Figures compiled by Boots & Co, London)

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PIMAN EXPANDS

To celebrate the PIMAN's return to normal service, after your heartwarming response to his prickly pleas for original software to market, we at AUTOMATA are buying the little cult some new premises! In our mission to spread joy and happiness across the planet, we are moving into a dinky retail software outlet, (Dorothy's Woolshop, honest..), down here in Pi-eyed Portsmouth. Our friendly little shop, zany whacky offices, 17 tons of rubble, garden full of a red setter and exotic weeds, not to mention Lurch The Office Parrot (I told you not to mention Lurch The Office Parrot) are at the NEW ADDRESS printed above this week's Krummy Kartoon Strip. So will our customer please write it down next time they allow you a sharp object in that wierd hospital. We'll be selling exciting specially selected ~~crappx~~ excellent software cassettes and our staff are highly trained in ~~bullshitting~~ assisting customers. You know, we're going to have to stop writing this garbage on the back cover of Popular COMPUting Weakly, and adVErTISE A FEW of our wonderful programs. He-hum, maybe next week. I mean who writes this stuff anyway.....it certainly ain't me. By the way, did I ever tell you about the time the Piman met this Israeli nun, and they went to a .....CRIPES! IT'S THE MEN IN THE WHITE COATS AGAIN.... gerroffmeeeee

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