

POPULAR Computing WEEKLY

35p 9 December 1982 Vol 1 No 34

This Week

Atari software
Tony Bridge looks at some of the Christmas offerings for the Atari 400/800 micro. See page 12.

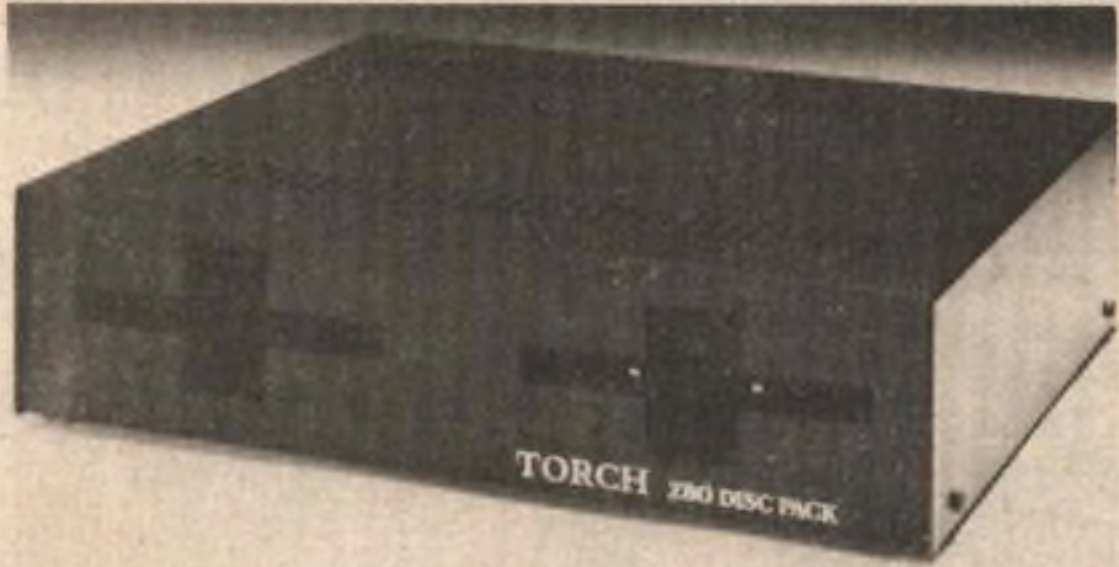
Vic20 tape index
John Ingham's index routine enables you to sort through a number of programs on one tape. See page 23.

Dragon art
Four random art generation programs from Dave Windle take you into the realms of Dali and Picasso on page 25.

Ivan Berg
David Kelly profiles Ivan Berg, the software mastermind who is bringing programs from the stars. See page 11.

Lunar Lander
Have you ever wondered what it would be like to be an astronaut? Find out in Gordon Cooper's new game for the 16K Spectrum and 1K ZX81 on page 8.

News Desk



Torch Z80 disc pack.

Torch prices drop in line with costs

TORCH Computers has slashed the prices of its product range by up to 30 per cent. The price of the Torch computer system drops from £4019 to £2795 and the price of the Torch Z80 disc pack falls from £1144 to £895. Director Martin Vlieland-Boddy explained "I'm just getting more competitive!" Part of the reason for the price drops is reduced manufactur-

ing costs. Torch recently took over the factory and some staff of the now defunct Arfon Computers in Caernarfon. This has meant that Torch can now itself undertake some of the manufacture, rather than subcontracting the work out. At £895, the Torch twin-disc 800K drives, operating system and Z80 card is the cheapest way of running CP/M software on the BBC micro, with which it is compatible.

Northern fair

OVER 5000 people turned up to the first day of the Northern Computer Fair in Manchester on November 25-27. Little new hardware or software of any note was launched and the established names in the market such as Atari, Sinclair and Commodore stayed away from the exhibition, sceptical of promised crowds of up to 20,000.

The new companies such as Dragon Data and Lynx built impressive displays and reaped the rewards of attending the first major computer exhibition outside London. Quicksilva's spectacular new 4D Timegate program was undoubtedly the star attraction.

Picturesque, Bug-Byte, A&F Software, Artic and Macronics displayed their existing range of products, with special Christmas discounts for customers at the fair. The Northern Computer Fair is part of an attempt by IPC, the international publishing conglomerate, to shake the Personal Computer World Show's dominance of the exhibition market.

Classified

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For unexpanded Vic20

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"A real action shot of the game"

SEA INVASION

Unexpanded Vic20

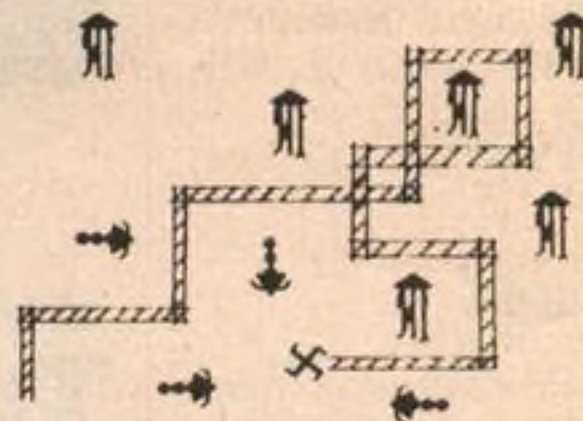
Fight off the attacking sea creatures for as long as you can. Shoot the whale for a surprise score, watch out for the crabs, starfish and octopuses.



SHARK ATTACK

For unexpanded Vic20

You are in shark-infested waters after being thrown overboard from a pirate ship. Your only protection being an atomic net which you trail behind you, trying to cover all the visible ocean and ensnare the sharks at the same time. Beware of stopping or covering your tracks for too long, if you do, then the sharks will escape and come after you. Watch out for the ever increasing deadly octopi (sometimes the sharks will eat part or all of one!)



"A real action shot of the game"

MOONS OF JUPITER

For expanded Vic20, 3K, 8K or 16K

You are the Commander of a fleet of destroyers looking on from the safety of a mother ship, you send in one destroyer at a time to blast a passage through the MOONS OF JUPITER. Your destroyers have to dodge, and blast the UFOs... Watch out for the Gologs they can smash your destroyers, but you cannot harm them.

A MACHINE CODE ARCADE QUALITY GAME

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Four games to stretch your brain

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ROBOT PANIC

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copyright to copy programs out of other maga-
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be tempted.

All submissions should be typed and a double
space should be left between each line. Please
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Programs should, whenever possible, be
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you want to have your 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

There have been cries in certain quar-
ters to restrict the import of foreign
micros. Representations have already
been made to the government to this
effect.

Protectionism is an issue that has
implications spreading far beyond the
world of micros. Differing groups have
tried to ban the import of foreign cars,
steel and even football players.

The protectionist argument is that
we must preserve our domestic indus-
tries from unfair competition. Coun-
tries which dump their goods on Bri-
tain at ridiculously low prices must be
stopped. If France can force Japan to
sell its video recorders through one
tiny customs post, effectively reducing
the flow of imports to a trickle, so can
we.

But, the obverse of this coin is that if
we ban other people's goods they will
ban ours. Thus you may limit imports,
but you will also restrict exports.

Whatever the merits of the protec-
tionist argument, it is not one that
applies to the home micro industry.
This is one of the few fields where
Britain actually leads the rest of the
world. Far from worrying about im-
ports, we should be out selling our
micros to the Americans, the
Japanese and everyone else.

Next Thursday

In our special Christmas issue, Stephen
Adams looks at the pros and cons of
QSave — a combined hard and software
device which can dramatically speed
up loading and saving on the ZX81. He
also reviews the LMX Prom program-
mer for the ZX81.

Also next week, Asghar Ahmed tests
your knowledge of anatomy with a
skeleton program for the Vic20.

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Linsac's ZX Companion series has received excellent press reviews:

"Far and away the best" — *Your Computer*

Thoughtfully written, detailed and illustrated with meaningful programs ... outstandingly useful" — *EZUG*

'The Spectrum Games Companion' is the latest addition to the series and is aimed at the games player and programmer alike. Twenty-one games designed specifically for the ZX Spectrum are included, with clear instructions on entry and play. Each program is explained fully with complete details on how it is designed and written. Introductory chapters show how to set up and use the Spectrum and how to create your own games. Later sections cover number games, word games, board games, simulation games, dice games, card games and grid games. If you want to enjoy your ZX Spectrum and learn its secrets at the same time then this is the book for you!



Bob Maunder is co-author of 'The ZX80 Companion' and author of 'The ZX81 Companion'. He is a Senior Lecturer in Computer Science at Teesside Polytechnic, holds an MSc degree in Computer Science, and is a Member of the British Computer Society.

The Spectrum Games Companion is available from good book shops, or send £5.95 to:

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Postage is free within the U.K. — add £1 for Europe or £2.50 outside Europe.

Curb on foreign micro imports

MICROCOMPUTER manufacturers plan to lobby Prime Minister Margaret Thatcher for more support for their industry.

The recently formed British Microcomputer Manufacturers Group (BMMG) has written to the Prime Minister indicating that help is urgently needed to ensure a future for micro manufacture in the UK. The BMMG is asking for legislation to control the flood of imported Japanese and American microcomputers and a firm buy-British commitment in Government purchases.

The increasing number of foreign imported micros is seen by the BMMG as a major threat. Commodore's Vic20 machine is now the world's top-selling micro and Hitachi, Casio, Sanyo, Sharp and Sord all have new products planned for launch.

The decision to seek Government support for their cause comes after the disclosure that, of the 25 approved suppliers for public contracts, only five are British. The Central Computer and Telecommunications Agency, the body responsible for choosing the approved companies, is at the moment drawing up a revised list. The BMMG's action is

intended to influence this selection.

The group has 20 members — but neither Acorn Computers, Computers, Dragon Data, Grundy nor Jupiter Cantab are included.

Ironically, the only major home computer manufacturer among the BMMG's membership — Sinclair Research — is openly critical of its action.

"We are selling well in the UK despite overseas competition and since well over half of our manufacture is for export it would certainly not be in our interests to see the introduction of import quotas on micros," said a Sinclair spokesman.

"In essence, the Government has a buy-British commitment already — just look at the machines included in the Government's Micros in Schools Schemes," he added.

Reaction from some non-member manufacturers has also not been favourable. Martin Vlieland-Boddy of Torch Computers, commenting on the proposal for import restrictions, said: "It is disgusting. If you cannot compete in an open market then it is a reflection on your company — and not on the government."



IT Andromeda Zita-P.

IT launch new portable micro

IT COMPUTER Services Ltd of Staines has launched a series of portable micros to rival the Osborne 1.

The Andromeda Zita-P, bottom of the range at £995, includes a 10 inch display, full Qwerty keyboard and 125K disc drive. The package comes in an aluminium carrying case, which is hinged to provide

access to cables and interfaces.

This compares with the Osborne 1 which costs £1,250 and includes two 5¼ inch floppy disc drives and an RS232C interface.

At the other end of the scale, the Andromeda Zita-P 4.3 costs £2,095 but includes three integral drives, each with 1Mbyte capacity.



ZX Speech Synthesizer.

Speaking of Sinclair . . .

THE Chatterbox is a new speech synthesizer compatible with the ZX81 and ZX Spectrum microcomputers.

Built by William Stuart Systems, the unit has a virtually

unlimited vocabulary. It uses the technique of phoneme synthesis where each word is broken down into a comparatively small number of sounds — vowels, diphthongs and consonants.

Any word can then be formed from these components. The module can hold a word typically in about six bytes — in 10K about 1,600 words can be stored.

The Chatterbox costs £49 plus VAT and is available from William Stuart Systems, Dower House, Herongate, Brentwood, Essex.



Trapped inside a video game.

Disney competition for schools

OVER £15,000 in prizes is being offered to schools in a competition organised jointly by Disney and Acorn Computers.

The competition involves writing an idea for an adventure game, based on the new video-game movie from Disney — *Tron*.

The competition is open to both primary and secondary schools. Primary school entries must describe a plot of a game in 100 sentences of 10 words or less.

There is no limit on the length of secondary school submissions, but both written and visual representation should be included. No knowledge of programming is required — all that is wanted is a good idea and a vivid imagination.

The winner will receive as a first prize an Acorn BBC model B microcomputer with discs and teletext adapter.

Details of the competition can be obtained from Acorn Computers.

Dragon move attacked by MP

A LABOUR MP has hit out against Dragon Data's intention to move away from unemployment-torn Swansea.

Alan Williams, Labour MP for Swansea West, has criticised the decision in a letter to Welsh Secretary Nicholas Edwards. "It is no good Thatcher and Tebbit telling the unem-

ployed to get on their bikes if you are putting our jobs on the backs of lorries," he said.

Dragon Data plans to move to premises provided by the Welsh Development Agency at Kenfig Industrial Estate in South Glamorgan. The company hopes to switch locations in mid-December.

Dragon to get disc drive

LONDON-based Compusense has developed a 5¼" disc drive for the Dragon 32 microcomputer.

Single or twin double density drives should be available from mid-January. Complete with serial port (RS232C) and Flex operating system, the disc

drives start at £450, excluding VAT.

Compusense has also developed a machine code monitor for the Dragon which allows you to write assembly language programs. It costs £18.40 including VAT and postage.

Straight from the shoulder

As a first time reader of your weekly and a member of the Spectrum waiting list, I was alarmed by the anti-Sinclair tone of your November 4 issue. In your columns I read that the Spectrum was rejected by educationalists, spurned by readers and damned in your editorial.

Surely the Spectrum cannot be all that bad? Is there anyone who can convince me that I am not wasting time and money in the Spectrum queue, and that I should spend more for the same now, or spend less for less now? Or have I been hoodwinked by the Sinclair publicity machine? Or am I being misled by the anti-Sinclair band wagon? The Spectrum seems to polarise people into strong pro-and-anti camps over all manner of issues, very few of which seem to have any bearing on whether it is or is not a good micro-computer.

J Blake
61 Queens Road
Tunbridge Wells
Kent

The Spectrum is not all that bad, quite the reverse. The Spectrum is a very good machine. To quote from our editorial of November 4 "Pound for pound the Spectrum still offers one of the best deals in the microcomputer market".

The problems associated with the Spectrum in the main concern its lack of availability and poor quality control. Rectify these problems and the Spectrum is still a very attractive proposition.

As for the rejection of the Spectrum by most local education authorities, I feel this reflects more on the failings of the Department of Industry's "Micros in Primaries" scheme than on the Spectrum.

... and here's another

After reading the comments in recent copies of your magazine concerning the deliveries of the Spectrum computer and the attitudes of Sinclair Research Ltd, I should like to record my own experience of this company.

A great deal of deliberation

between my sons and myself resulted in an order being placed for a 16K Spectrum last September, knowing that the delivery was likely to be extended. A phone call to Sinclair during the first week in October, after receiving their standard letter of confirmation of order, produced an extremely polite response and a delivery date of the first week in November.

The unit duly arrived on Saturday, November 6. It has worked perfectly since being switched on. The sound is adequate and the colour excellent. The quality of the display on the tv screen is far better than the Vic20 and Dragon on show in the local stores.

As far as I am concerned, the company has kept me informed of their difficulties and have answered my telephone calls with an immediate and polite response. After all, what other company gives you piped music while the telephone operator is busy, and has met the delivery date given to me.

The only letters I have seen printed, to date, are those of an adverse nature and I hope that this letter will help to restore the balance.

M S Tapp
3 Brookside
Cornford Lane
Pembury
Kent

We are only too pleased to publish your letter. Sinclair has undoubtedly come in for a lot of criticism lately and we are glad to be able to show that there is another side to the story. If Sinclair had treated all his customers in the same way, much of this criticism would never have arisen.

Everything in a name

I would just like to make it clear that I, the author of *Scribble* for Spectrum (published November 4), am Terence R Wiley of 1 Watson Gardens, Howdon, Wallsend, Tyne and Wear, and not *Anonymous*.

T R Wiley
1 Watson Gardens
Howdon
Wallsend
Tyne and Wear

Mum's the word.

Bugged In on Spectrum

Since reading about bugs in the Spectrum in *Popular Computing Weekly*, I have come up with one:

- (1) Switch on Spectrum and press *Enter*.
- (2) Change the flashing K cursor to a E cursor.
- (3) Press 6 (yellow) and you will notice that the cursor flashes black and yellow.
- (4) Press *Delete* (caps shift and 0) and you will notice that the cursor changes back to normal, but is positioned in the middle of the bottom line.

Now try this with other colours and it does not work (nb 9 stands for white and 7 does not change the cursor). Is this just my Spectrum not working, or is it a real Spectrum bug and in that case am I not a clever little brat?

David Edwards
118 Middle Crockerford
Vange
Basildon
Essex

Award goes to Automata

From reading your latest issue, I see other prospective Spectrum owners are fed up with waiting for delivery. My gripe is at the software industry. As you may well know, Microl has been advertising extensively in all the computer press. I ordered one copy of *The Database* on September 6, 1982, with the promise of the dreaded 28 day delivery. Although how it can take any mere mortal more than two weeks to clear a cheque and wrap up a cassette I do not know.

After waiting four weeks, five weeks, six weeks, I received a mass printed letter saying that the program was being re-written and would not be available until mid-December. However, Microl said I would be able to have a refund if I could not wait. Two weeks ago I sent a recorded letter asking for my refund. I am still waiting . . .

Further to waiting three months for my Spectrum, I have found it a very good machine for my uses. However, a few weeks ago I received

the software catalogue for Sinclair's own products marked *Ex-stock available now*. Four weeks have passed and I have received a card from Sinclair saying my order is being processed. This means that another three-weeks' syndrome is moving on.

But all is not lost. The N M award goes to Automata who market *Pimania*. The software arrived in under 48 hours of posting my order!!!

PS: Lets have some more business programs.

N Murray
39b St Thomas Street
Weymouth
Dorset DT4 8EH

Correct entering a must

Spectrum Disassembler. I believe that the problem your correspondent "Keith Robertson" has experienced with this excellent program is entirely to do with the lower case letters u, v, w, x and y. These *must* be entered as shown in the listing, since the program uses these lower case letters in argument editing as explained in the text. My version works!

Robin Lucas
84 Woodman Road
Brentwood
Essex

Dragon user's pleasure

I would like to thank you for starting a regular page for Dragon 32 users.

I have just successfully completed my first program which was *Flying Saucers*. I do hope we have plenty more as I am going to place a regular order at my newsagents for your magazine.

Matthew Blackwell
79 Dominion Drive
Collier Row
Romford
Essex

Rest assured. The Dragon page will be a regular feature in our future issues.

If you have an opinion you want to express, or have spotted an error that needs correcting, write to: Letters, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2.

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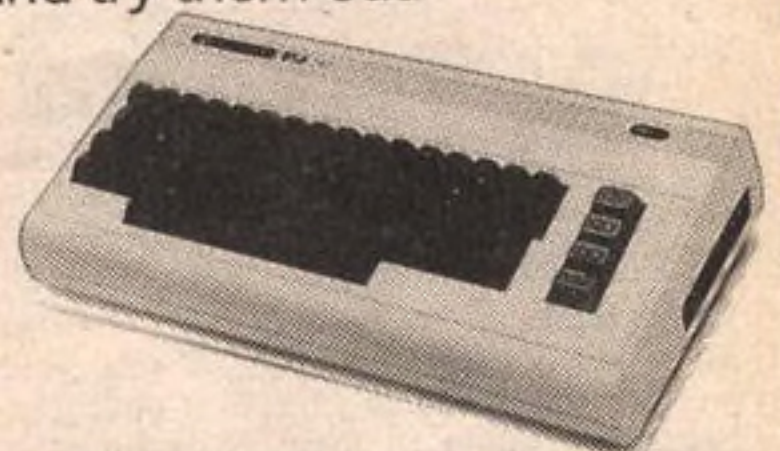
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Lunar Lander

A new game for 16K Spectrum
and 1K ZX81 by Gordon Cooper

This program runs on a 16K Spectrum. It uses the colour and high resolution plotting facility of the Spectrum to show the spaceship landing on a rugged lunar surface. To land safely will require all your skill. You must angle and fire your rocket to counteract gravity, the downwards fall and sideways drift. For experienced pilots there is an option to have a solar wind, making landing even harder.

To help you land, there is a constantly updated plot of your angle and position on the screen. You also have digital instruments showing your height, speed, drift and remaining fuel. You control the craft by rolling left or right, and deciding the amount of rocket thrust.

To start the game, load the program and issue the Run command. There is an option to display instructions on the screen. Once past these you will find a solar wind blowing. To begin with, use your plasma bomb to stop this. As you become more experienced, you can omit the bomb and have a sidewind to counteract as well.

At this point, the radar scanner will start, with sound and colour effects. Once working, it will display the craft at the top left of the screen, above a rugged surface. Enter *l* or *r* to roll left or right, and *h* to hold your angle once you are happy with it. Now enter the number of gallons of fuel you wish to burn this cycle. Start with a number between five and 10. Carry on in this way until you have landed.

Happy landings. If you are not perfect your craft will topple over, or disintegrate while a funeral march plays. A perfect landing needs a speed of less than 4, and a drift of less than 2. You will find it slightly easier to land on level high ground.

To speed the execution of commonly used routines, three subroutines are placed at the beginning of the listing. To pass over these, Line 2 passes control straight to Line 80. Between Lines 80 and 110 is the code to display the instructions.

Lines 110 to 120 determine whether you want a wind to harrass your landing. Lines 122 to 130 start up the radar, with colour and sound effects. Control then passes to the subroutine at Line 13 to plot the moon surface.

The plotting subroutine plots vertical lines of alternate pixels from the bottom of the screen to the randomly varying moon surface held as $v(x)$. This is done by both Lines 20 and 26. The two lines start plotting one pixel apart, at $z=0$ or 1. This prevents the appearance of horizontal lines over the moon's surface.

Once the surface is plotted, which takes quite a time, control passes to Line 200, where the variables are set up with initial values. Line 235 adjusts the amount of fuel to compensate for the wind and drift. These values are then printed by the subroutine at Line 4. This is at the beginning of the program to speed its execution. It is called 10 times in each fuel burn cycle.

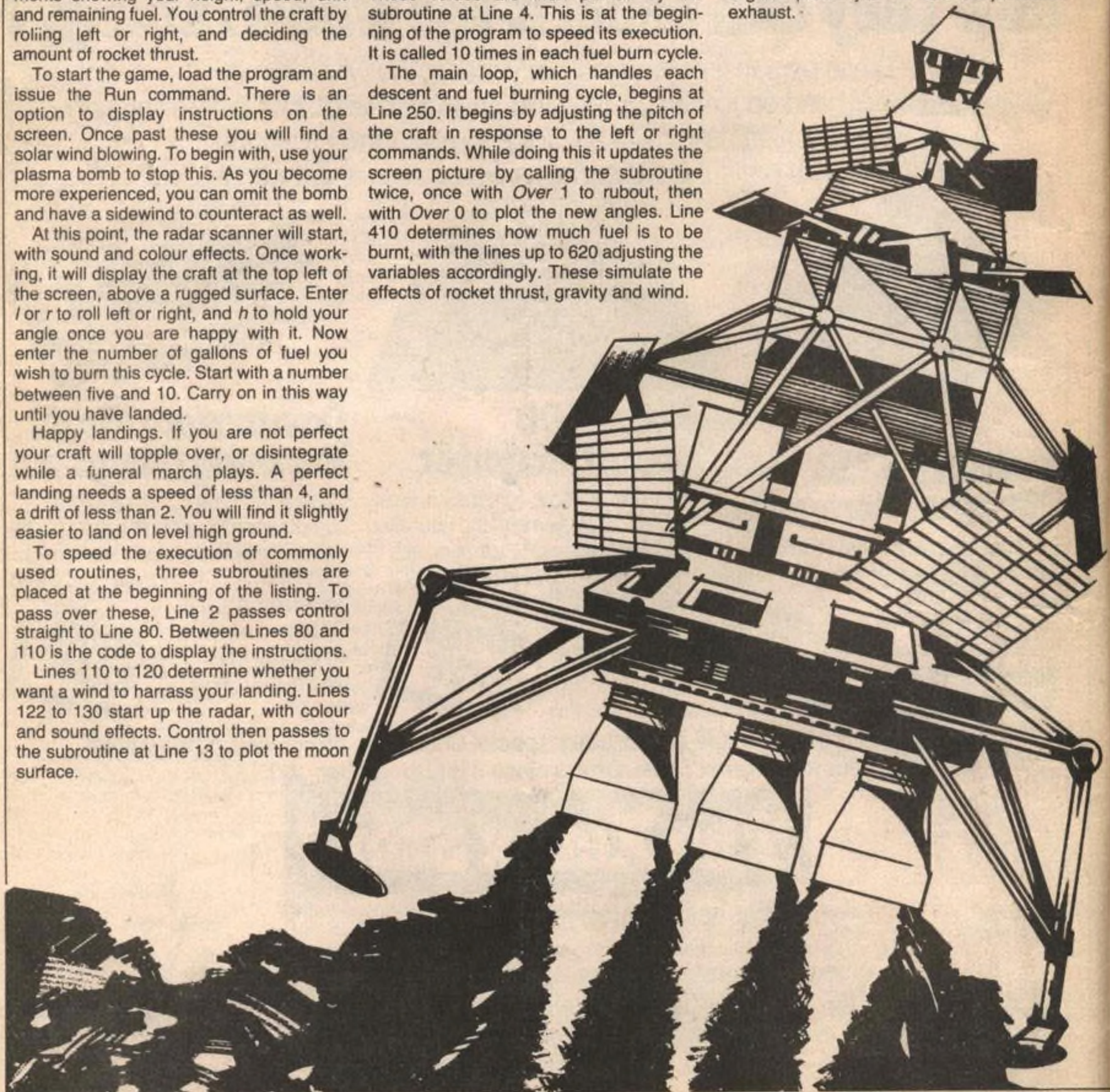
The main loop, which handles each descent and fuel burning cycle, begins at Line 250. It begins by adjusting the pitch of the craft in response to the left or right commands. While doing this it updates the screen picture by calling the subroutine twice, once with *Over 1* to rubout, then with *Over 0* to plot the new angles. Line 410 determines how much fuel is to be burnt, with the lines up to 620 adjusting the variables accordingly. These simulate the effects of rocket thrust, gravity and wind.

Lines 650 to 870 handle the landing. Dependant on speed, you get three victory roll sounds, the craft topples over, or disintegrates. If it breaks up, a funeral march starts at Line 5000, and a cross is placed at the grave by Lines 1050 to 1084.

ZX81 lander

This program is designed to run on a standard 1K ZX81 in *Slow* mode. It produces a moving graphic image of a lunar module descending to the moon surface. The altitude, speed and remaining fuel are also displayed on the capsule's digital instruments.

To start off try entering 5, which will leave the speed the same while using 5 of your precious gallons of fuel. To slow down further enter a larger number, but watch your fuel. If you burn more than 9 in a given period you will see the jet/rocket exhaust.



```

Height Speed Drift Fuel
0 0.0 2.3 0

```



```

2 GO TO 80
3 REM This prints instruments
4 OVER 0: PRINT AT 2,0,"
5 INK 0: PRINT AT 2,3,INT (h)
6 PRINT AT 2,11,INT (v)/10
7 PRINT AT 2,19,INT (d)/10
8 PRINT AT 2,26,INT ((f+5)/10)
11 RETURN
12 REM This plots moon surface
13 FOR x=0 TO 255: LET y=y+(RN
14 D*(6)-3)
15 IF y<0 THEN LET y=1
16 LET v(x+1)=y
17 FOR z=0 TO y STEP 2
18 PLOT x,z
19 NEXT z
20 LET x=x+1: LET v(x+1)=y: BE
21 EP
22 FOR z=1 TO y STEP 2
23 PLOT x,z: NEXT z
24 RETURN
25 REM This plots lunar module
26 INK 7
27 IF a>0 THEN LET a=0
28 IF a<-8 THEN LET a=-8
29 LET b=8-ABS a
30 LET y=h/40+v(x+1)
31 IF y>168 THEN GO TO 79
32 IF ABS a<3 THEN PLOT x-1,y:
33 DRAW a,b-1
34 IF ABS a<6 AND ABS a>2 THEN
35 PLOT x-1,y+(a/4): DRAW a,b
36 IF ABS a>5 THEN PLOT x,y-1:
37 DRAW a-1,b
38 PLOT x,y: DRAW a,b
39 IF ABS a<3 THEN PLOT x+1,y:
40 DRAW a,b-1
41 IF ABS a<6 AND ABS a>2 THEN
42 PLOT x+1,y-(a/4): DRAW a,b
43 IF ABS a>5 THEN PLOT x,y+1:
44 DRAW a-1,b
45 RETURN
46 DIM v(255)
47 REM Setup & instructions
48 INK 7: PAPER 0: BORDER 0: C
49 LS
50 PRINT AT 7,0,"You are in de
51 epest space"
52 PRINT AT 9,0,"Do you need i
53 nstructions on how"
54 PRINT AT 10,0,"to land your lunar m
55 odule?(y/n)"
56 INPUT a$
57 IF a$<>"y" AND a$<>"Y" THEN
58 GO TO 110
59 PAPER 7: INK 0: BORDER 7: C
60 LS
61 PRINT AT 3,0,"You must land
62 your lunar module gently on the
63 moon. You have 4 instruments w
64 hich show-"
65 PRINT AT 8,3,"Height above
66 lunar surface"
67 PRINT AT 10,3,"Speed of ver
68 tical descent"
69 PRINT AT 12,3,"Drift from l
70 eft to right"
71 PRINT AT 14,3,"Fuel remaini
72 ng"
73 PRINT AT 16,0,"There is a s
74 pace wind blowing from left to
75 right which will slowly incre
76 ase your drift. You can use a p
77 lasma bomb if you wish to stop
78 the wind"
79 INPUT "Press enter to conti
80 nue",a$
81 CLS
82 PRINT "Your craft is the wh
83 ite module at the top left of t
84 he radar screen. You can rol
85 l it left or right. When happy w
86 ith its angle press n or just ente
87 r and you will then be asked h
88 ow much fuel to burn this cycle."
89 PRINT AT 8,0,"If your craft
90 is straight up and down burning
91 5 will leave your speed as it i
92 s"
93 PRINT AT 12,0,"Hint- It is
94 easier to land on high ground"
95 PRINT AT 15,0,"If your fine
96 t speed is less than 4 and d
97 rift less than 2 you have won. If
98 drift less than 4 you survive
99 but topple over"

```

```

105 INPUT "Good luck, press ent
er to go",a$
110 PAPER 5: INK 0: CLS
111 LET w=INT (10*RN)+2
112 PRINT AT 3,0,"There is a ";
113 w,"mph space"
114 PRINT "wind blowing from le
ft to right": PRINT: PRINT "Do
you want to use your plasma bom
b to stop it?(y/n)"
115 INPUT r$
116 IF r$<>"y" AND r$<>"Y" THEN
117 GO TO 122
118 PAPER 2: INK 7: CLS: FLASH
119 PRINT AT 11,13,"BLAST"
120 FOR z=1 TO 7
121 BORDER 7-z
122 BEEP .3,(-4+z)+10
123 IF z>2 THEN FLASH 0: PRINT
124 AT 16,2,"There is no longer any
wind!"
125 LET w=0: NEXT z
126 BORDER 0: PAPER 0: INK 7: C
127 LS
128 FOR z=-20 TO 30 STEP 2
129 FLASH 0: PRINT AT 7,0,"I wi
130 ll switch on the radar scan"
131 PRINT AT 9,0,"Please be pat
132 ient, it's very old"
133 BEEP .1,z
134 PAPER INT ((z+30)/10): IF I
135 NT (z/10)=z/10 THEN CLS
136 NEXT z
137 OVER 0: BRIGHT 0: INK 0: PA
138 PER 6: BORDER 0: CLS: LET y=30
139 GO SUB 13
140 PRINT "Height Speed Dr
141 if Fuel"
142 REM Set up initial values
143 LET h=(155-v(11))+40
144 LET v=750
145 LET a=0
146 LET d=500/(RN+10)+1
147 LET f=1250+INT d+INT w*9
148 LET x=10
149 GO SUB 4
150 REM Main loop enters here
151 OVER 0: GO SUB 30
152 INPUT "Roll R=Right L=Left,
153 H=Hold",r$
154 INK 0: OVER 1: GO SUB 30
155 IF r$=" " OR r$="h" OR r$="H
156 " THEN GO TO 400
157 IF r$="r" OR r$="R" THEN LE
158 T a=a+1
159 IF r$="l" OR r$="L" THEN LE
160 T a=a-1
161 GO TO 300
162 REM Plot module,
163 OVER 0: GO SUB 30
164 REM Calculate new posn.
165 INK 0
166 IF f>0 THEN INPUT "Burn how
167 much captain?",r$
168 IF r$>10 THEN LET r=f/10
169 REM Calc vert component
170 FOR z=0 TO 9
171 REM Sub out plot
172 OVER 1: GO SUB 30
173 LET y=y-v/400-(40-r+b)/640
174 LET v=v+5-r+b/8
175 LET x=x+d/80
176 IF x<0 THEN LET x=0
177 IF x>247 THEN LET x=247
178 IF x=9 OR x=247 THEN INK 0:
179 PRINT AT 4,0,"You are about to
180 drop off screen": BEEP .4,35
181 LET f=f-r
182 IF f<=5 THEN LET f=0: IF f=
183 0 THEN LET r=0
184 LET h=40+(y-v(x+1))
185 IF h<0 THEN LET h=0
186 LET d=d+(r+a)*8+w*2
187 REM Show new readings
188 GO SUB 4
189 REM Plot new craft posn.
190 OVER 0: GO SUB 30
191 IF r<20 AND r>0 THEN BEEP
192 .1,r+9
193 IF h<5 THEN GO TO 650
194 NEXT z
195 IF f=0 THEN LET z=z-1
196 IF f=0 THEN GO TO 440
197 GO TO 250
198 REM Landed
199 IF v>40 THEN GO TO 1000
200 PAPER 2: INK 7: FLASH 0
201 FOR z=0 TO 6
202 PRINT AT 4+z,0,"
203 NEXT z
204 PRINT AT 5,10,"WELL DONE"
205 IF d<40 THEN PRINT AT 7,6,"
206 You landed safely"
207 IF d>20 AND d<40 THEN PRINT
208 AT 9,6,"But TOPPLED OVER"
209 IF d<-20 AND d>-40 THEN PRI
210 NT AT 9,6,"But TOPPLED OVER"
211 REM This flashes colour &
212 plays victory roll
213 FOR z=1 TO 3
214 IF d>20 THEN LET z=3
215 FOR j=0 TO 7
216 BORDER j
217 BEEP .1,(j+3)+(z+2)
218 NEXT j
219 NEXT z
220 IF d<=20 AND d>=-20 THEN GO
221 TO 8000
222 IF d>40 OR d<-40 THEN GO TO
223 1000
224 FOR z=1 TO 8
225 OVER 1: GO SUB 30
226 IF a<0 THEN LET a=0

```

```

810 LET a=a+1
820 IF a>7 THEN LET a=7
830 OVER 0: GO SUB 30
840 BORDER (7-a)
850 BEEP 1,(-2+z)
860 NEXT z
870 GO TO 8000
1000 REM Crash
1005 OVER 1: GO SUB 30
1010 FOR z=1 TO 199
1020 LET r=RN+2
1030 LET d=x+(12+r)-2)/4
1040 IF d<0 THEN LET d=0
1050 IF d>255 THEN LET d=255
1060 LET h=y+z/(4+(1+r))
1070 IF h<0 THEN LET h=0
1080 IF h>140 THEN LET h=140
1090 OVER 0: INK 2: PLOT d,h
1100 NEXT z
1110 INK 0: PLOT x,y: DRAW 0,12
1120 PLOT x-1,y: DRAW 0,12
1130 PLOT x+1,y: DRAW 0,12
1140 PLOT x-4,y+7: DRAW 0,0
1150 PLOT x-4,y+8: DRAW 0,0
1160 PLOT x-4,y+9: DRAW 0,0
1170 PRINT AT 5,9,"WHAT A CRASH!"
4000 REM Funeral march follows
5000 BEEP .8,0: BEEP .6,2: BEEP
.4,3: BEEP .4,2: BEEP .6,0
5010 BEEP .6,0: BEEP .8,2: BEEP
.4,3: BEEP .4,2: BEEP .8,0
5020 BEEP .8,3: BEEP .5,5: BEEP
1.6,7
5030 BEEP .8,3: BEEP .8,5: BEEP
1.6,7
5040 BEEP .6,7: BEEP .2,8: BEEP
.4,5: BEEP .4,3: BEEP .4,2: BEEP
.6,0
5050 BEEP .8,0: BEEP .8,-5: BEEP
1.6,0
5060 BEEP .8,0: BEEP .8,-5: BEEP
1.6,0
8010 INPUT "Another go? (y/n)",a$
8030 IF a$="n" OR a$="N" THEN ST
OP
8040 GO TO 110
9000 REM Moonlander © G.Cooper
1982
Variables:-
v Vertical speed
w Wind speed
h Height above surface
d Drift, + to right
f Fuel
r Fuel burnt this cycle
a angle from vertical
b angle 90 degrees-a
x X axis plot 0 to 255
y plot height
v(x) surface height at (x-1)
z temp variable

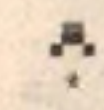
```

ZX81 Lander

```

ALT SPEED FUEL
214 65 95

```



```

1 LET H=5000
2 LET U=750
3 LET F=125
4 LET R=0
5 LET Z=19.7-H/250
6 CLS
7 PRINT TAB 5,"ALT SPEED FUEL
8 PRINT AT 21,0,"
9 PRINT AT 2,2,"
10 PRINT "
11 IF Z>19.5 THEN PRINT AT 21,
12 0,"
13 IF R>=10 AND Z<=10 THEN PRI
14 NT "
15 PRINT AT 2,5,INT (H/10)
16 PRINT AT 2,11,U/10
17 PRINT AT 2,16,F
18 IF F>0 THEN INPUT R
19 IF R>F THEN LET R=F
20 FOR T=1 TO 10
21 LET H=H-U/10-(5-R)/2
22 IF H<=9 THEN GOTO 65
23 LET U=U+5-R
24 NEXT T
25 LET F=F-R
26 GOTO 5
27 IF U<=80 THEN PRINT "CRASH"
28 IF U<=40 THEN PRINT "GOOD"
29 IF U<=41 AND U<=79 THEN PRI
30 NT "VERY BUMPY"
31 PRINT U/10,"MPH"
32 PAUSE 500
33 RUN

```

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TRADE & EXPORT ENQUIRIES WELCOME

Software from the stars

David Kelly talks to Ivan Berg about his burgeoning software business.

After ten years in the audio publishing business Ivan Berg has built up an enviable catalogue of the spoken word on cassette:

Albert Einstein, Suzannah York, Paul Eddington and Reginald Bosanquet.

Within 12 months Ivan has applied the same expertise to the software publishing business, with dramatic success. Software publishing now takes up nine tenths of his resources. In short, he knows his personalities.

It all began when Ivan bought a Vic20 microcomputer for his son last Christmas. "I discovered that programming was not the closed book I thought it was," he says. "I thought about us doing some software — after all we have the publishing, audio and cassette know-how and all that was missing was the computer expertise. My brother has been working with mainframes for 15 years and, when I explained my ideas to him, that's when it all started.

"We approached Commodore with a view to producing software in association with them and they were very receptive. Their system was chosen because of its dedicated cassette. We would need to load up to 40K of data for each program, in 8 or 16K blocks, so reliable loading was vital."

Less than four months after their first program went on sale, Ivan and his brother find themselves with a flourishing software catalogue of mainly educational programs designed for both the 8K and 16K Vic20 microcomputers. Their software personalities now include Robert Carrier, Professor Eysenck, Robert Robinson and Patrick Moore.

Part of the company's success in what was an alien industry must be due to its approach — an approach radically different from that customarily taken by software houses.

Ivan takes the traditional computer program production method and turns it inside-out. Under his control, the company treats software like a book — starting with an idea, commissioning an author to write the 'story' of the program and reducing the programmer's role to one of translator, bringing the author's plan to the screen.

First comes the idea. Says Ivan: "I can come up with hundreds of ideas, the problem is choosing the best. A successful project must combine several features — it must have some practical use and be interesting, it must entertain more than one person and, most importantly, it must already have proved to have been popular



Ivan Berg, ideas man.

in another medium, tv, film, radio, magazine or book.

"As far as possible the buying public must recognise the name, title or personality involved. When we first started we looked for books that already existed which would lend themselves to conversion into computer programs. We identified these very quickly — Know Your Own IQ, Know Your Child's IQ, and Know Your Own Personality.

"Because of the reputation we have built up in audio publishing, agents and personalities were aware of us. For the Know Your Own Personality program we had to deal with Penguin Books and all our educational software is produced in association with Hodder and Stoughton Educational. The same thing happened with the BBC. Mastermind seemed to have good possibilities — having a central figure the programme was ideal for conversion to a computer."

Each idea is considered by Ivan and his brother to decide if it can be made to work as a computer program. At this stage Commodore are also involved to endorse the idea in principle.

It is only after the basic plan for the program has been accepted that an approach is made to an author. The person selected will be the author who is best able to write the 'story' of the program — what the user will actually see — and he need not have any knowledge of computer programming.

"At the moment we only have two programmers working for us," explains Ivan. "But, by mid-December we will have at least 10 more on contract and we are in the process of appointing a full-time in-house editor." The programmers must work as closely as possible to the author's original script, and the work must be completed within a strict time schedule — usually within four or six weeks. Then the program is checked for editorial inaccuracies — spelling mistakes and the like — and is de-bugged.

"When this is complete, we take the

program over to Commodore and they also check it for bugs. So far we have had no problems — they have accepted every program we have given them.

"We now have 14 programs on sale, with another 12 in various stages of production. The problem is producing them fast enough. All our programs released through Commodore in August and November are on their second reprint. What has staggered us more than anything has been the runaway success of our GCE 'O' level revision programs.

"Commodore US are licensing all our software and we will be changing our educational material to fit in with the American high-school syllabuses.

"I am sure that the Vic20 will continue as long as there is a demand for it. Commodore has now recovered all its tooling costs from its manufacture and there is room for a further price reduction after Christmas — perhaps down pretty close to the £100 mark!

"We are also working on versions of all our programs for the Commodore 64. And we will also be doing a range of 'professional' software packages for it — a Menu Planner for the catering trade, an Interior Designer which designs rooms on-screen and shows the different elevations, and a Professional Money Manager Program. These will be disc-based.



Ivan Berg, linked to a winner.

"We also have a Mind and Body diet and fitness program, an Astronomy program which will display the seasonal star fields, and we shall be looking at law and medicine programs. All these will be available in some form on the Vic20 as well.

"For the future we are looking at electronic banking and at the possibilities of the video-disc/computer combination.

"Unfortunately we cannot be all things to all men. We either expand rapidly and quadruple our production problems or stick with the one company — Commodore.

"I hope we have linked ourselves to a winner! It would have been preferable to have been able to join up with an all-British company, but there wasn't one when we first started. And there still isn't one with a dedicated cassette deck, which we think is vital." ■

Advent of Owari

Tony Bridge looks forward to Christmas on his Atari.

Christmas 1982 looks like being a very interesting one for the computer consumer. Hard- and software are more plentiful than ever before, and bargains abound. ("Dear Santa, I would like a toy train, a space gun, and a computer...")

The Atari series of computers has a dedicated band of followers, and little wonder, for these machines have a superior graphics capability. There is a very large pool of software for the Atari, and Thorn/EMI has just released, in time for Christmas, some 20 new programs.



A software selection from Thorn/EMI.

These new programs consist largely of games, as most personal software does. All the programs are superbly packaged, as one might expect from a company with connections in the record industry. Sturdy, high-density plastic boxes, reminiscent of videocassettes, protect the cartridge or cassette within. And the instructions come in superbly-designed booklets.

These packages are an object lesson, to other manufacturers, in eye-catching appeal. One day in the not-too-distant future, software will be sold, like books or records, in racks, and all programs will have to be as well-packaged as this present batch.

You will not find any space games in the present collection, nor any adventures (the zappers and axe-getters are, of course, well-catered for by other manufacturers, as we shall see later). No, most of the programs here are "thinking" games.

Let's start by looking at a couple of games usually played in the quiet of the local pub, with a pint and a packet of crisps the only playing aids. *Cribbage* and *Dominoes* are contained on one tape. *Cribbage* (author: J Smith) is played against the computer, which also takes care of the scoring. The scoring is done on a board, with "pegs", just as in real life. *Dominoes* (author: J Smith again), too, is played against the computer, which proves a fairly strong opponent in both programs.

The next cassette contains two games that take you right out of the pub. The first, *Owari* (author: A Howard), is the ancient African game of strategy, in which seeds

or stones are moved around two rows of cups. Two players can play, or one against the computer, and the idea is to capture your opponent's seeds. Sounds simple, but you'll need your wits about you! The other game on this tape is *Bull and Cow* (author: A Howard), which is just a *Mastermind* game, using little bulls and cows instead of black and white pegs.

Compute 4 (author: K Buckner) and *Reversi* (author: A French), are Thorn/EMI's contribution to the endless list of *Connect-4* and *Othello* variants. Good graphics, but no surprises.

Several programs for younger users are present in this new release — and (thank goodness!) they're not all "educational". The tape we received, however, contained two programs which both purport to be educational games. The first, *Fizzbuzz* (author: A French), is a kind of Snap-by-numbers, whilst *Train* (author: as *Fizzbuzz*) has a little train winding its way through the hills, dragging a series of number-coaches behind it. You are expected to choose correctly the next number in the series from those above the scene. At higher levels the problems can become tough even for older players (all right, I admit to being stumped more than once!). A cunning user, however, merely needs to run through each option until the right answer is hit upon by luck. No explanation is given as to how the correct solution should be reached. Therefore, a mere diversion, and not a useful educational tool.

Moving on to reaction games, we find



From Nigeria, an ancient game of strategy.



Tony Bridge: contentment.

Snooker and Billiards. Very good graphics in both programs, but a rather awkward two-operation shooting method. First the aim is to set up (and this in itself can be rather hit-and-miss, excuse the pun, with the conventional joystick), then the strength of the shot is estimated. Occasionally, one becomes so overjoyed at finally getting the aim right, that the "fire" button is pressed before the strength-meter is properly set, and the ball trickles forward a mere couple of inches, or goes cannoning around the table. However, good sound and graphics make for a good simulation.

The final game program in this batch of releases is *Kickback* (author: A French, again), which comes in cartridge form. Based, I would say, on *Breakout*, the graphics nevertheless remind me of American football, with an oval-shaped ball being kicked around from man to man. The idea is to get the ball from your man at the bottom of the screen, through all the defenders, into the opposing goal. Despite excellent graphics, and a satisfying flash-and-clang as the ball rebounds from a player, the game very soon becomes boring.

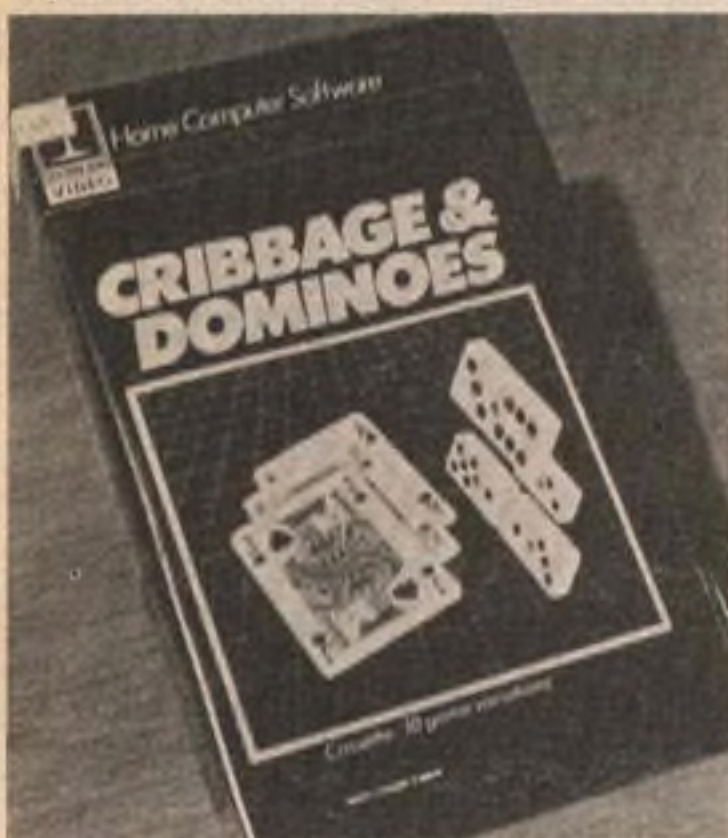
Two more cartridges wind up Thorn/EMI's Christmas release. *Jumbo Jet Pilot* (author: H Samara) is, as the name suggests, a Flight Simulator program: as a real fan of these, I approached this cartridge with anticipation.

As one has come to expect from an Atari program, the graphics are outstanding. After selecting your skill level (Capt Bill Smith of BA can start at 5, the rest of us, at 1), you can look at your instrument panel, which consists of an array of dials and information. A very comprehensive instruction book will help you decipher these, however, and then you can take off.

Your mission is to navigate your Jumbo to the landing strip at the other side of the map. The simulator is broadly realistic in its flight characteristics (can you loop the loop in a Jumbo?), but ultimately, I'm afraid, boredom sets in — a couple of hours is needed to get even halfway across the map, and straight and level flight at this sort of time-scale is fairly unexciting. As a tyro, I could be doing something wrong, of course!

Submarine Commander (author: D Lock) is my personal favourite from this present release. The player is put in charge of a submarine patrolling the Mediterranean in search of enemy ships to destroy (from the saloon bar to a Jumbo to a submarine — anything can happen with an Atari!).

At the start, the instrument panel is displayed. Fully as complex as the Jumbo's, things are nevertheless made clear in the instruction book. A map of the area may also be called up, which shows the sub's position and that of all the shipping. Once on an attack course, a periscope view may be selected. Of course, you are not allowed merely to skulk around shooting off torpedoes at the enemy willy-nilly —



Jacking it in.

they will be firing back with gusto (also with large calibre shells, and depth-charges).

When you are lucky enough to get a hit with your torpedo, you will see, through your periscope, the unfortunate vessel still floating at you as it sinks beneath the waves

... The score given at the end of the game is dependent upon tonnage sunk, number of torpedoes used, time taken and so on. The graphics in this program are outstanding, even in such exalted company.

From Synapse Software (wish I'd thought of that name) comes *Shamus* (author: William Matage), a combination of arcade and adventure. Your little Shamus has to negotiate twisting corridors in search of The Key. He is not alone — Spiral Drones and Snappers, to mention only two of the 'orrible beasties, come after your man in gangs, and which of course must be shot down.

Scattered around the corridors are various treasures like Extra Lives, Keys and Mystery Question Marks, which can be picked up or left. Once all the beasties have been disposed of, however, the dreaded Shadow immediately comes out of hiding and rushes towards you. And he will kill your man unless you get him off to the next screen fairly sharpish!

Scott Adams' Adventure International is the company responsible for *Preppie* (author: Russ Wetmore). This is the game in which frog-lovers everywhere finally get their revenge. You control a little preppie who, for some reason, has been sent to retrieve golf balls from the middle of hazards such as you will never see at your local municipal course. The road and river that have to be crossed are, naturally, filled with various speeding objects ready to squash, drown, or eat you if you mis-step.

In the lower levels, manic little men are intent upon rolling the road, and these can squash you very graphically, to the accompaniment of a Funeral March. Later levels present you with speeding golf carts, bulldozers, snapping alligators, and, the Froggy Revenge, a giant frog which will jump on you, given half the chance. The music (guaranteed to drive you crazy



Tony Bridge, trawling the depths.

within about half a minute), sounds and incredible graphics of this program make it entirely addictive.

Finally, after all the preceding intellectual stimulation, a good old, no-nonsense, Arcade Game: *Caverns of Mars*, from Atari Program Exchange (APX). This turns out to be a vertical version of Scrambler, and apparently has been a firm favourite of Atarists for some months. At each of the four skill levels, your ship has to negotiate ever more airlocks, and zap more little nasties (boy, are they difficult to shoot!), until the re-energising base can be reached. A time limit is then set, in which you have to renegotiate all the airlocks and escape.

Summary

These final three games highlight, at the same time, the similarities and the differences between Thorn/EMI's new collection, and those of the smaller software producers.

The main similarity is excellent graphics. In fact, it would be hard to program poor graphics on an Atari, and it is this feature, above all others, which persuades people to part with larger sums of money than for other computers (the gap between the graphics of the Atari and those of its lower-priced competitors is, however, narrowing all the time).

The outstanding difference between the Thorn/EMI catalogue, and the others reviewed here, is *addictiveness*. Not one of T/E's games, including the excellent *Submarine Commander*, has this quality, while the three last games all have it in spades (I am going to defeat this game — just one more go).

At the prices charged universally for Atari software, games *must* stand up to being played time and again. Unfortunately, the value marks for *all* the programs suffer from the high cost involved. I cannot believe that it is necessary to charge an average of £20 for what are mostly very pedestrian programs. *Jumbo Jet Pilot*, at £30, is outrageously over-priced — a similar program from Psion/Sinclair for the Spectrum is just about as good, and costs a mere £8. "A smaller market," I hear you say? Well, yes, but until Atari bring down the price of their hardware, the market will remain smaller. ■

Firm	Program	Cassette or Cartridge	Cost	Value (1-10)
Thorn/EMI	<i>Cribbage & Dominoes</i>	Cassette	£14.95*	7
	<i>Snooker & Billiards</i>	Cassette	£19.95*	6
	<i>Pool</i>	Cassette	£19.99*	6
	<i>Kickback</i>	Cartridge	£29.99*	4
	<i>Submarine Commander</i>	Cartridge	£24.50*	7
	<i>Jumbo Jet Pilot</i>	Cartridge	£29.95*	3
	<i>Figure Fun</i>	Cassette	£14.99*	6
	<i>Compute 4 & Reversi</i>	Cassette	£14.99*	4
	<i>Owari & Bull and Cow</i>	Cassette	£14.99*	4
Atari (APX)	<i>Caverns of Mars</i>	Cassette	£24.50	8
Adventure Int	<i>Preppie</i>	Cassette	£20.00	9
Synapse Software	<i>Shamus</i>	Cassette	£21.80	9

*Prices can vary depending on the retailer.

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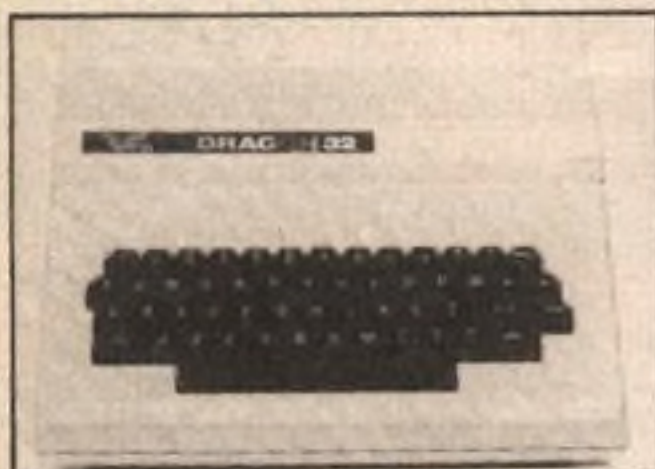
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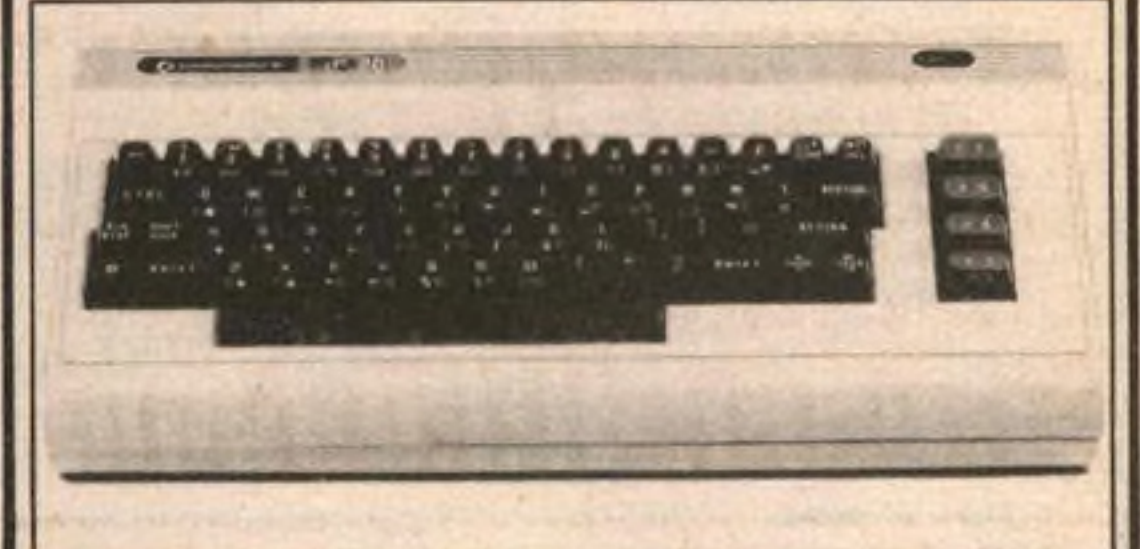
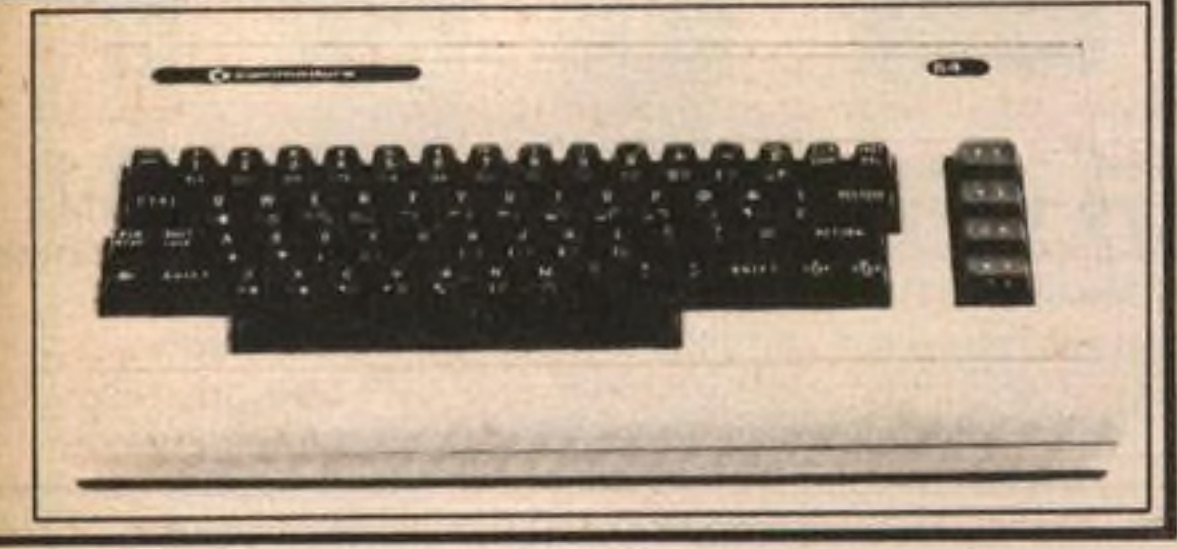
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Note: Order codes shown in brackets. Prices correct at time of going to press. (Errors excluded).

OPEN FORUM

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the *Program of the Week* double our new fee of £6 for each program published.

Once the operator has moved the car its present location is compared with those stored previously, and if they match up the car has crashed because it is now in the same position as part of the wall. The program takes full advantage of the sound and colour facilities available on the Vic.

Grand Prix

on Vic 20

This is a simple game to play and is basically a race against time. Don't be put off by that, because although it is a fairly basic game there is still room for expansion.

The game involves controlling a character anti-clockwise around a set track (the character can be changed by changing the poke values in lines 260, 330, 390 and 800). If you hit a wall you are sent back to

the beginning of the lap. There are also hidden oil slicks on the track, and these also cause you to spin and crash.

The whole course is three laps long. The program fits into the 3.5K which is available on the unexpanded Vic. The program also makes use of the Vic's auto-repeat function, which is not widely known about.

The problem of how to get the computer to recognise whether the car has crashed or not was solved by making it check the 4 characters around the car and if any of them is part of the wall its location is stored for later reference.

Program notes

Line(s)	Description
1 to 9	Set counters and variables.
10 to 250	Draw the track.
259 to 260	Draw the car on the screen.
261 to 265	Check the area around the car for walls.
266 to 356	Check keyboard for keys being pressed and set volume.
390 to 405	Check if the car has crossed the finish line and if it has print the number of laps completed.
505 to 530	Make explosion sound.
640 to 750	If three laps have been completed make the sound to tell the operator and print the time taken to complete the course.
800 to 820	Refill the holes in the wall.
1000 to 1140	Print the instructions to the player.

```

0 GOSUB1000
1 POKE36879,108
2 Y=13:X=3
3 POKE650,255
4 POKE36878,15
5 TI$="000000"
6 POKE36879,108
7 PRINT" "
8 A1=0:A2=0:A3=0:A4=0
9 DIMA(10)
10 PRINT"J"
12 PRINT"J"
20 PRINT"  "
30 PRINT"  "
31 PRINT"  "
40 PRINT"  "
50 PRINT"  "
60 PRINT"  "
70 PRINT"  "
80 PRINT"  "
90 PRINT"  "
100 PRINT"  "
110 PRINT"  "
120 PRINT"  "
130 PRINT"  "
140 PRINT"  "
150 PRINT"  "
160 PRINT"  "
180 PRINT"  "
190 PRINT"  "
200 PRINT"  "
210 PRINT"  "
220 PRINT"  "
230 PRINT"  "
241 POKE36878,5
250 PRINT"  "
259 A(1)=8164-13*22+3:Y=13:X=3
260 POKE8164-Y*22+X,94
261 A1=0:A2=0:A3=0:A4=0:A5=0:A6=0:A7=0:A8=0
262 IFPEEK(8164-Y*22+X+1)=160THENA1=8164-Y*22:A5=X+1
263 IFPEEK(8164-Y*33+X-1)=160THENA2=8164-Y*22:A6=X-1
264 IFPEEK(8164-(Y-1)*22+X)=160THENA3=8164-(Y-1)*22:A7=X
265 IFPEEK(8164-(Y+1)*22+X)=160THENA4=8164-(Y+1)*22:A8=X
266 POKE36874,128
270 GETA$
280 POKE8164-Y*22+X,32
290 IFA$="Q"ANDY>1THENY=Y+1:P=2
300 IFA$="A"ANDY<23THENY=Y-1:P=7
310 IFA$="N"ANDX>1THENX=X-1:P=3
320 IFA$="M"ANDM<22THENX=X+1:P=10
321 POKE36878,P
330 POKE8164-Y*22+X,94
340 IFA1=8164-Y*22ANDA5=XTHEN500
345 IFA2=8164-Y*22ANDA6=XTHEN500
350 IFA3=8164-Y*22ANDA7=XTHEN500
355 IFA4=8164-Y*22ANDA8=XTHEN500
356 IFY=4ANDX=20THEN500
380 FORT=2T05

```

```

390 IFPEEK(8164-16*22+T)=94THENLP=LP+1:IFLP=3THEN 640
400 NEXT
405 PRINT"  LAPS="LP
410 GOTO260
500 FORT=10T019
501 FORT=10T012
502 IFY=9ANDX=TTHEN260
503 NEXT:NEXT
504 IFY=9ANDX=2THEN260:IFY=9ANDX=4THEN260
505 POKE36877,220:FORT=15T01STEP-1
506 POKE8164-Y*22+X,42
510 POKE36878,U
520 FORT=1T050:NEXT
530 NEXT
540 POKE36877,0
590 GOTO800
640 POKE36878,15
650 Q=Q+1:IFQ>10THEN700
655 POKE36876,220
660 FORT=1T050
665 NEXT
666 POKE36876,0
670 GOTO650
700 PRINT"J  YOU HAVE COMPLETED 3 LAPS IN A TIME
OF:"POKE36874,0:Q=0
710 PRINT
720 PRINT"H /M/S"
730 PRINTTI$
740 FORT=1T05000:NEXT
750 CLR:GOTO1
800 POKEA(1),94
810 POKEA1,160:POKEA2,160:POKEA3,160:POKEA4,160
815 POKE8164-Y*22+X,160
820 GOTO259
1000 PRINT"J*****"
1010 PRINT"  GRAND  PRIX"
1020 PRINT"  "
1030 PRINT"X IN THIS GAME YOU ARE THE DRIVER OF
A FORMULA 1 RACING CAR"
1040 PRINT" TO CONTROL YOUR CAR USE:"
1050 PRINT" Q TO MOVE UP"
1060 PRINT" A TO MOVE DOWN"
1070 PRINT" N TO MOVE LEFT"
1080 PRINT" M TO MOVE RIGHT"
1090 PRINT" HIT ANY KEY"
1091 PRINT" WATCH OUT FOR OIL ON THE ROAD,IT IS
DEADLY."
1095 PRINT"*****"
1100 GETC$:IFC$=""THEN1100
1110 PRINT"J"
1120 PRINT"X YOU HAVE TO COMPLETE 3 LAPS OF THE
COURSE AS FAST AS POS."
1130 FORT=1T03000:NEXT
1140 RETURN

```

Grand Prix
by Brandon James

Splkey

on Vic 20

This program is written for a Vic20 with a Super Expander fitted. It uses the *Draw* command to its fullest potential. When the program is run the title page is shown for a few seconds and then a choice of three kinds of spikes, ranging from fine spikes to

course spikes are shown. The user then chooses the required spike width.

The user then inputs the number of spikes which is going to be displayed. The spikes will then be displayed with a small delay between each spike. After all the spikes have been displayed, the program is re-run.

Program notes:

Line 5: freeze to upper case, *Gosub* subroutine 270

(setting up program), *For-Next* loop for drawing certain numbers of spikes.

Line 20: setting up random number, setting up random width between spikes.

Lines 30-230: drawing spikes from top left-hand corner going clockwise around the screen.

Line 240: delay loop.

Line 250: Clears the screen.

Line 260: end of loop, re-run the program.

Lines 270-320: display title page, delay loop.

Lines 330-400: choosing gap between each spike.

Lines 400-410: choose how many spikes to be shown.

```

0 REM   SPIKEY
1 REM(C) R.HAYNES 1982
5 PRINTCHR$(8):GOSUB270:FORRI=0TOS
10 GRAPHIC3
20 N=1+INT(RND(1)*14):W=P+INT(RND(1)*RN)
30 COLOR0,0,N,N
40 T=0
50 DRAWN,T,0T0511.5,511.5
60 T=T+W
70 IFT>=1023THEN90
80 GOTO50
90 T=0
100 DRAWN,1023,TT0511.5,511.5
110 T=T+W
120 IFT=>1023THEN140
130 GOTO100
140 T=1023
150 DRAWN,T,1023T0511.5,511.5
160 T=T-W
170 IFT<=0THEN190
180 GOTO150
190 T=1023
200 DRAWN,0,TT0511.5,511.5
210 T=T-W
220 IFT<=0THEN240
230 GOTO200
240 FORDE=1T03000:NEXT
250 SCNCLR
260 NEXT:RUN

270 GRAPHIC0
280 PRINT"XXXXXXXXXX":POKE36879,10
290 A$="          SPIKEY          XXX (C)R.
          HAYNES 1982  XXX      THORPE BAY
          "
300 B$="   ESSEX." :A$=A$+B$
310 FORT=1TOLEN(A$):PRINTMID$(A$,T,1);
          :FORI=0T065:NEXTI,T
320 FORDE=1T05000:NEXT
330 PRINT"J"
340 A$="1:FINE SPIKESXXXXXXXXX2:MEDIUM
          SPIKESXXXXXXXXX3:COURSE SPIKESXXXXXXXXX
          XXXXXXXXXXXXINPUT CHOICE"
350 FORI=1TOLEN(A$):PRINTMID$(A$,I,1);
          :FORT=0T065:NEXTT,I
360 INPUTA
370 IFA=1THENRN=25:P=5
380 IFA=2THENRN=200:P=30
390 IFA=3THENRN=1023:P=205
400 IFA<10RA>3THEN330
410 FORI=1T038:PRINTMID$("XXXXXXXXXINPUT NUMBER
          OF SPIKESXXXXXTO BE SHOWN",I,1);
          :FORT=0T065:NEXTT
420 NEXTI
430 INPUTS
440 RETURN
    
```

Spikey
by Robin Hayes

Defender

on Spectrum

This is a version of the popular arcade game. You must shoot down the oncoming alien, because if he passes you, you are obliterated. Sounds easy? You only have 20 shots per 10 aliens! If you accomplish this then you have an extra 20 shots.

Line 55 is a graphic A; 310 is graphic B and C and 420 is graphic D and E. The program is very fast for Basic, eg, the landscape movement and the firing rate.

When you are killed, press *Break* and then press *R (Run)* and *Enter*. My highest score is 14.

```

1 FOR f=0 TO 7: POKEUSR "b"+
f,RND*255:POKEUSR "c"+f,RND*25
5: NEXT f
2 LET i=0: LET bl=20
3 LET s=0: LET d=0
6 FOR f=0 TO 7: READ a: POKE
USR "a"+f,a: NEXT f: DATA 230,0,
4,255,255,4,5,220
7 FOR f=0 TO 7: READ x,y: POK
    
```

```

EUSR "d"+f,x: POKEUSR "e"+f,y:
NEXT f: DATA 24,7,32,174,64,192,
63,128,63,128,64,192,32,174,24,
7
8 LET b$="-----"
          : LET c$="
          "
9 LET f=0: LET x=10
10 LET a$="XXXXXXXXXX"
11 LET a$=a$+a$(1)
12 PRINT INK 2:AT 0,0:"XXXXXXXXXX"
13
14
15
16
17
18
19
20
21
22
23
24
25 GO TO 45
30 PRINT INK 2:AT 20,0:a$
40 LET a$=a$+a$(1): LET a$=a$(
2 TO )
43 RETURN
45 GO SUB 30
46 GO SUB 49: IF i<0 THEN GO
SUB 410
47 IF i=0 THEN GO SUB 400
48 GO TO 45
49 PRINT AT x,0:" "
50 LET x=x+(INKEY$="z" AND x<1
9)-(INKEY$="a" AND x>1)
55 PRINT AT x,0:"z"
57 IF f<0 THEN RETURN
60 IF INKEY$=" " THEN GO TO 70
70 RETURN
300 FOR v=1 TO 20
310 PRINT AT q,f: FLASH 1:"X"
320 GO SUB 49: GO SUB 30: NEXT
v
330 PRINT AT d,i-1," " : LET
i=0: LET s=s+1: PRINT AT 0,0,s:
IF INT (s/10)*10=s THEN LET bl=
bl+20
340 PRINT AT 0,10;bl," " : LET f
=0: RETURN
400 LET d=RND*10+1: LET i=30: L
ET d=INT d
    
```

```

410 PRINT AT d,i," " : LET i=i-
1: IF i=0 THEN GO TO 500
415 LET d=d-1: IF RND*.5 THEN L
ET d=d+2
417 IF d<1 THEN LET d=1
418 IF d>19 THEN LET d=19
420 PRINT AT d,i:"X": RETURN
500 PRINT AT x,0:"---" : FLASH 1
:AT 10,10:"INVADED SCORE="s:AT
d,i: FLASH 1:"---"
510 GO SUB 30: GO TO 510
700 LET bl=bl-1: IF bl=-1 THEN
GO TO 800
701 PRINT AT 0,10;bl," " : IF d=
x THEN GO TO 750
710 PRINT AT x,1,"-----" : PRINT AT x,
1," " : RETURN
750 PRINT AT x,1;bl:( TO i)
751 FOR v=1 TO 3: NEXT v
752 PRINT AT x,1;c$( TO i)
760 LET q=x: LET f=i: GO TO 300
800 PRINT FLASH 1:AT 10,10:"No
bullets left": GO TO 510
    
```

Defender
by Nick Wilson

Tips

on ZX81

Hobbyists, on purchasing the ZX81, will have found its slow Basic and lack of facilities very limiting. The former can only be overcome by using machine code, but for those content with Basic, here are a few programming tips for use in longer programs.

1. The first of these is similar to the Spectrum's *Attr* or *Screen\$*. It is a way of addressing any square on the screen.

The system variable D-FILE contains two bytes, showing where the memory mapped screen starts (it moves around the memory). So by *Peeking* D-FILE and adding the displacement of the required position, it is possible, in effect, to read data from the screen. This is how it is done.

```
IF PEEK ((PEEK 16396 * 256 + 1 + PEEK 16397) +
33 * line + position) = CHR$ code THEN ...
```

If you want to use this a lot in a program then set a variable at the start:

```
LET DFS = (PEEK 16396 + 256 * PEEK 16397) + 1
```

Then to use it just type:

```
IF PEEK (DFS + 33 * line + position) = CHR$ code
THEN ...
```

On a ZX81 with less than 3.5K this does not work, since any line without a character on it is not memory mapped.

2. Passing variables to subroutines. Imagine you are writing a game in which

the player moves around the screen chased by two or more monsters. To move the monsters you need two or more almost identical subroutines, which could well be something like 30 lines long — that means 60 lines at least. Instead of doing that, you could use this technique. Here the variables M11 and M12 are the co-ordinates of the first monster and the variables M21 and M22 are the co-ordinates of the second:

```
LET M1 = M11
LET M2 = M12
GOSUB routine
LET M11 = M1
LET M12 = M2
•
•
•
LET M1 = M21
LET M2 = M22
GOSUB routine
LET M21 = M1
LET M22 = M2
```

The routine can alter M1 and M2 as necessary. The new values are always assigned to the correct variables.

3. In a program you may want to use the bottom two lines of the screen. To do this, at the start use this statement, which makes the bottom two lines available for *Printing*.

```
POKE 16418,0
```

Beware of *Input*, which clears the bottom two lines; report codes, which overwrite the first few positions of line 24 and *Scroll*, which crashes the system.

4. The effect of *Run* is to go through the program in the computer and clear out all the variables. Hence, when programming a game with a "high score" feature it is necessary either to use GOTO 1 or to employ a *Goto* instead of a *Stop* at the end of the program.

Here is another way. The very first line of the program should be:

```
REM space
```

This saves one byte of data to hold a score of up to 255. Here is how to change the byte for a "high score" (the score is S).

```
IF S > PEEK 16514 THEN POKE 16514,S
```

To print it:

```
PRINT PEEK 16514
```

This makes a safe "high score" which is proof against RUN and even against *Clear*. If you *List* the program you will find another character in the place of the space. Look it up in the Sinclair.

To have a high score of more than 255 is a little harder. The REM statement should contain two spaces. To use it:

```
9000 IF S < PEEK 16514 * 256 - PEEK 16515
THEN GOTO 9030
9010 POKE 16514, INT (S/256)
9020 POKE 16515, S - 256 * (INT (S/256))
9030 PRINT "HIGH SCORE "; PEEK 16514 * 256 -
PEEK 16515
```

Again, this has its limits if the score is over 65535.

by Michael Brookes

Graphics utility

on BBC Micro

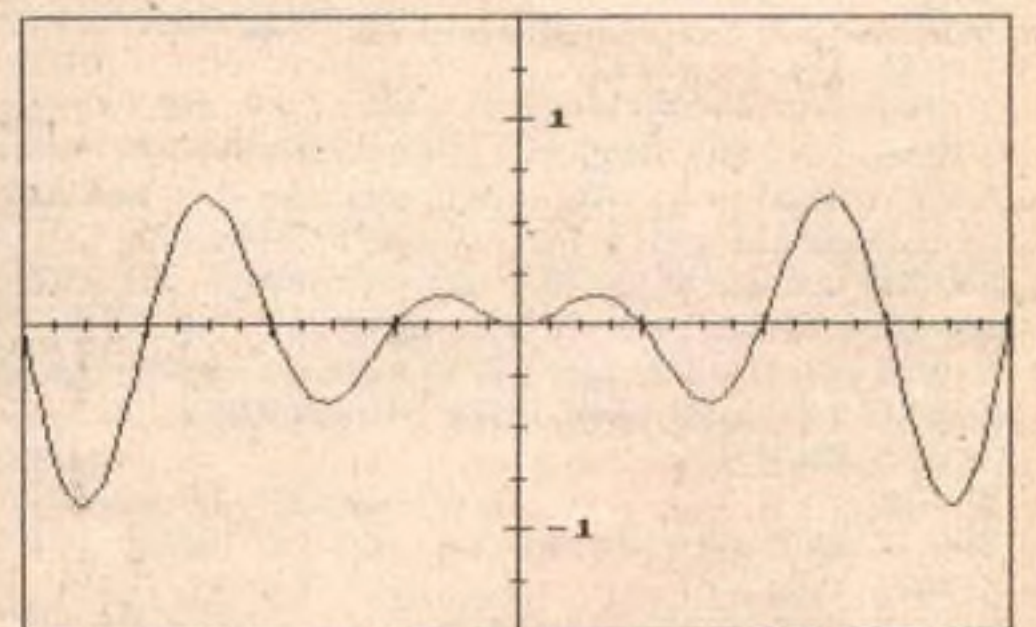
One of the strong points of BBC Basic is the facility to define procedures which take all the work out of routine operations and

add polish to the most mundane programs. I have put together a package of the most often used procedures which should be particularly handy for anyone producing output in the form of graphs.

A full explanation of the program is

contained in *Rem* statements which can be deleted if required, and I have included a short program which uses most of the procedures as an example. The digitised procedure can be used to plot points and draw simple figures.

```
100 REM *****
110 REM ** Simple Example **
120 REM *****
130 MODE4:PROCinit
140 PROCshow(50,1200,50,950)
150 PROCscale(-4*PI,4*PI,-1.5,1.5)
160 PROCaxes(0,0,PI/4,0.25,4,4,.025,PI/16)
170 PROCframe:PRINTTAB(0,31)"y=x*SIN(x)/360 (x= -360 to
360 degrees)";
180 PROClabel(0,1.05," 1");PROClabel(0,-.95," -1");
PROCmove(0,0)
190 FOR angle=-PI*4 TO PI*4+.1 STEP PI/16
200 PROCdraw(angle,angle/PI*4*SIN(angle))
210 NEXT angle
220 PROCdigitize(0,0,cross)
```



y=x*SIN(x)/360 (x= -360 to 360 degrees)

Turn to page 20


```

30096 scalex=A
30097 scaley=B
30098 REM set screen limits
30099 minx=minX:miny=minY
30100 maxx=maxX:maxy=maxY
30101 ENDPROC
30102 :
30103 REM ** Draw frame around screen **
30104 :
30105 DEF PROCframe
30106 PROCmove(minx,miny):PROCdraw(maxx,
miny)
30107 PROCdraw(maxx,maxy):PROCdraw(minx,
maxy)
30108 PROCdraw(minx,miny)
30109 ENDPROC
30110 :
30111 REM ** Draw axes **
30112 :
30113 DEF PROCaxes(intX,intY,spaceX,
spaceY,majorX,majorY,xsi)
30114 LOCAL A,B%,C,D
30115 REM Draw axes
30116 PROCmove(minx,intY)
30117 PROCdraw(maxx,intY)
30118 PROCmove(intX,miny)
30119 PROCdraw(intX,maxy)
30120 REM Draw Horizontal ticks
30121 IF spaceX=0 THEN 30135
30122 B%=0
30123 FOR A=intX TO maxx STEP spaceX
30124 IF (B% MOD majorX)=0 THEN
C=xsize*2 ELSE C=xsize
30125 PROCmove(A,intY-C)
30126 PROCdraw(A,intY+C)
30127 B%=B%+1
30128 NEXT A
30129 B%=0
30130 FOR A=intX TO minx STEP
-spaceX
30131 IF (B% MOD majorX)=0 THEN
C=xsize*2 ELSE C=xsize
30132 PROCmove(A,intY-C):PROCdraw
(A,intY+C)
30133 B%=B%+1
30134 NEXT A
30135 :
30136 REM Draw Vertical ticks
30137 IF spaceY=0 THEN 30148
30138 B%=0
30139 FOR A=intY TO maxy STEP spaceY
30140 IF (B% MOD majorY)=0 THEN
C=ysize*2 ELSE C=ysize
30141 PROCmove(intX-C,A):PROCdraw
(intX+C,A)
30142 B%=B%+1:NEXT A
30143 B%=0:FOR A=intY TO miny STEP
-spaceY
30144 IF (B% MOD majorY)=0 THEN
C=ysize*2 ELSE C=ysize
30145 PROCmove(intX-C,A):PROCdraw
(intX+C,A)
30146 B%=B%+1
30147 NEXT A
30148 ENDPROC
30149 :
30150 REM ** Print label **
30151 :
30152 DEF PROClabel(X,Y,A$)
30153 REM Move to graphics point
30154 MOVE FNpointx(X),FNpointy(Y)
30155 REM Join cursors and print label
30156 VDU 5
30157 PRINT A$;
30158 VDU 4
30159 ENDPROC
30160 :
30161 REM ** Digitize point **
30162 :
30163 DEF PROCdigitize(X,Y,type)
30164 LOCAL X%,Y%,ix%,iy%
30165 cursorx=X: cursory=Y
30166 REM Get co-ord of cursor
30167 X%=FNpointx(X)
30168 Y%=FNpointy(Y)
30169 ix%=4:iy%=4
30170 GCOL 3,127
30171 PROCdrawcursor(X%,Y%,type)
30172 REM Switch of cursor keys
30173 *FX 4 1
30174 A=GET
30175 IF A=13 THEN 30185
30176 IF A<&8B OR A>&8B THEN 30174
30177 REM Move cursor
30178 PROCdrawcursor(X%,Y%,type)
30179 IF A=&88 THEN X%=X%-ix%
30180 IF A=&89 THEN X%=X%+ix%
30181 IF A=&8A THEN Y%=Y%-iy%
30182 IF A=&8B THEN Y%=Y%+iy%
30183 GOTO 30171
30184 REM reset cursor co-ordinates
30185 cursorx=X%/scalex
30186 cursory=Y%/scaley
30187 PROCdrawcursor(X%,Y%,type)
30188 ENDPROC
30189 :
30190 REM ** Draw cursor **
30191 REM For internal use
30192 :
30193 DEF PROCdrawcursor(X%,Y%,type)
30194 IF type=cross THEN MOVE X%-20,Y%:
DRAW X%+20,Y%:MOVE X%,Y%-20:DRAW X%,Y%+20
ELSE MOVE FNpointx(minx),Y%:DRAW
FNpointx(maxx),Y%:MOVE X%,FNpointy(miny)
:DRAW
X%,FNpointy(maxy)
30195 ENDPROC

```

Graphics Utility
by David Elliot

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Automatic loading

John Ingham presents an index routine to sort through different programs on one tape.

This tape index program is a fully automatic, electronic digital counter for the Vic20. It allows for the selection, automatic loading and running of your other programs.

Enter the index program in your Vic and change the data lines from 340 to 450 to the program names which you wish to save. Then save this program at the beginning of a C60 tape cassette.

To save each of the programs you wish to put on the C60 tape cassette take the following steps:

- 1) Load and run the index program off the C60 tape cassette.
- 2) Select the program you wish to save on the C60 tape cassette — the computer will use the fast forward to find the correct position on the C60 cassette.
- 3) When the computer asks you to "Press play on tape", press the stop key and clear the screen.
- 4) Remove the now set C60 tape cassette from the tape unit.
- 5) Insert your selected program in the unit.
- 6) And fully rewind the tape to its beginning.
- 7) Type the word 'Load' on the screen and press 'Return key'.
- 8) When the program has loaded, remove the tape cassette.
- 9) Insert the previously set C60 in the tape housing right way up.
- 10) Type the words Save "your program name" then press 'Return' key.
- 11) Your program has now been saved on the C60 cassette.
- 12) To 'Verify' the program take steps 1-9 then type verify and 'return' key.
To load a program using tape index, just follow program instructions.
To compensate for different tape units, measure the fast forward time from beginning to end using a C60 cassette. Then enter it in line 160 — FFT=time in seconds.
Always use good quality cassette tapes. I use Sony CHF60.

Variables description:

FFT=WINDING TIME
PC=REWIND DIVIDED BY PLAY TIME
A=CASSETTE MOTOR ON & OFF
FT=PROGRAM INDEX
TI=VIC CLOCK COUNT UP
B=KEYBOARD BUFFER
D=SCREEN LINE FOR CURSOR
L\$=STRING OF SPACES
A\$(?)=A-N CODES
A\$(B)=PROGRAM NAMES
BS=8k EXPANDED CHUNKS ON C60
TIS=24 HOUR CLOCK
C=CHARACTER BUFFER

```

100 REM*****
110 REM# TAPE INDEX#
120 REM# PROGRAM #
130 REM# FOR VIC 20#
140 REM#BY J. INGHAM#
150 REM*****
160 FFT=98:REM C60 WINDING TIME SEC
170 PC=5.073E-2:REM REWIND/PLAY TIME
180 POKE37148,52:A=37151:B=631:C=198:D=211
190 PRINT"*****":DIM A$(12),B$(12):L$=""
200 FORI=0TO38:L$=L$+CHR$(32):NEXT:L$=L$+" "
210 FORI=65TO76:READ B$(I-65):IF LEN(B$(I-65))>16 THEN 230
220 A$(I-65)=CHR$(I):GOTO 270
230 PRINT"*****STRING TOO LONG*****":PRINT"IN
'DATA' LINES"
240 PRINT"COUNT THE CHARACTORS"
250 PRINT"OF DATA LINES 340-450"
260 LIST340-450
270 NEXT:GOSUB 600
280 PRINT"*****SELECT APROPRIATE CODE FOR
290 PRINT"POSITION ON TAPE ? ";
300 POKE C,0
310 GETA$:IFA$=""THEN310
320 IFA$<"A"ORA$>"L"THEN300
330 BS=ASC(A$)-64:PRINT A$:B$=B$(ASC(A$)-65)
:A$="LOAD"
340 DATA PROGRAM 1
350 DATA PROGRAM 2
360 DATA PROGRAM 3
370 DATA PROGRAM 4
380 DATA PROGRAM 5
390 DATA PROGRAM 6
400 DATA PROGRAM 7
410 DATA PROGRAM 8
420 DATA PROGRAM 9
430 DATA PROGRAM 10
440 DATA PROGRAM 11
450 DATA PROGRAM 12
460 PRINT"*****YOU ARE GOING TO "A$;" ";B$
470 PRINT"*****IS IT CORRECT ? ";
480 POKE C,0
490 GETD$:IFD$=""THEN490
500 IFD$="N"THEN RUN
510 IFD$<"Y"THEN480
520 GOSUB750
530 PRINT"*****PRESS REW ON TAPE"
540 IFPEEK(37151)<>62GOTO540
550 FORI=1TO600:NEXT
560 PRINT"*****PRESS STOP ON TAPE"
570 PRINT"*****WHEN FULLY REWOUND."
580 IFPEEK(37151)<>126GOTO580
590 GOSUB750:PRINT"*****":GOSUB600:GOSUB620:
GOSUB660
600 FORI=0TO11:PRINT"*****";A$(I);"=";B$(I);
NEXT
610 RETURN
620 TI$="000000":BS=BS*8000
630 FT=.1159E1+.13985E-2*BS-.71234E-8*BS^2+.
24540E-13*BS^3-3.5562
640 FT=FT*FFT/98*19.7134*PC
650 RETURN
660 PRINT"*****PRESS F.FWD ON TAPE"
670 IFPEEK(37151)<>62GOTO670
680 PRINTL$
690 PRINT"*****FAST WINDING TO "B$
700 TI$="000000":FT=TI+FT*60
710 PRINT"*****INT(TI/10);INT(FT/10)
720 IFTI<FTGOTO710
730 POKE A,52:POKE37148,6
740 GOSUB750:GOTO790
750 PRINT"*****PRESS STOP ON TAPE"
760 IFPEEK(A)<>126GOTO760
770 POKEA-3,12
780 RETURN
790 PRINT"*****":POKE D,11:PRINT:PRINT"
*****"
800 PRINT"*****";A$;
810 PRINT:CHR$(34);B$;CHR$(34)"TT"
820 POKE B,12:POKE C,5:POKE B+1,13:POKEB+2,
13:POKEB+3,13:POKEB+4,13
READY.

```

Stringing up for time

In part four of our extract from *The Working Spectrum* we continue adding modules/sub-routines to the *Unifile* program, designed to enable a single program to cover a variety of filing tasks without the need for constant re-writing every time a new use comes along.

MODULE 5

This module is the most complex in the program. Before proceeding to a detailed commentary we shall discuss two issues:

1. The use of strings to store numbers.
2. The technique of the binary search.

Numbers in Strings

We have already seen, in Module 3, that the pointers for our program are stored in a string, Y\$. You may be wondering why numeric values are not being stored in a straightforward numeric array. The answer stems from both memory saving and time saving, the latter being the more significant. Let's look at memory saving first.

To cope with the maximum number of entries that are likely to be encountered, a numeric array for the pointers would have to be declared with something like 2,000 elements. It is most unlikely that you will actually have 2,000 entries, but you might. You would have serious problems if your array turned out to have too few spaces for the number of entries that have to be pointed to. An array cannot be re-dimensioned without losing everything in it. The real problem is that a 2,000 element numeric array, because of the way in which Sinclair Basic stores numbers, would occupy some 10,000 bytes of memory. This is an extravagant proportion of the total memory available.

The Spectrum allocates five bytes of memory to every number stored in an array, in an effort to cover as wide a range of numbers as possible — up to 4,294,967,295 in fact. We do not need anything like that range: our file is only 28,000 characters long so we only need whole numbers from 1 to 28,000. Using two character strings it is possible to represent these numbers.

Each character has a code value unique to it, in the range 0 to 255. A single character can be used to store any value between 0 and 255 simply by using the character that has that code. Thus the character A represents the number 65 and the keyword GOTO — just another character as far as the Spectrum is concerned — represents the number 236. Numbers larger than 255 are simply represented by using a second character to store the number of whole 256s, in much the same way that the 3 in 36 means three whole tens in our decimal system. Two characters, therefore, give us the ability to store any positive whole number up to $255 * 256 + 255$. That equals 65,535 and is more

than enough to copy with our file of 28,000 characters.

Provided you only want positive whole numbers in the range 0 to 65,535 it is possible to save three of the five bytes that the Spectrum would use if the same numbers were stored in a numeric array.

The catch is that two of the three bytes saved are then thrown away in the search for speed.

Imagine again our numeric array of 2,000 elements and imagine you want to add or delete a number somewhere near the beginning of it. If you simply delete an unwanted value you leave a hole, or rather a zero, in the place where the number once was. If you insert a number you will overwrite what is already there. To avoid either of these unwanted results you have to ensure that every element in the array can be shifted up or down one place. If the position in which you want to insert a new number is position 1, then 1,999 numbers are going to have to be shifted to make room. It can be done with three lines of Basic in the form of a simple loop but it does take time, especially on a Spectrum. Not even its best friends describe the Spectrum as blindingly fast.

Now compare that loop, repeating its operation 1,999 times with this:

```
LET A$ = "XX" + A$
```

Using the Spectrum's superb string handling we can simply insert two bytes at the beginning, or at the end, or in the middle, of a string with one instruction. This is very fast but it has a drawback — it momentarily doubles the amount of space taken by the string. The Spectrum needs to hold in its memory, even if only for a moment, the new A\$ that the line is creating, together with the old A\$ that is being used to build it. This limitation is one of the biggest drawbacks to the Spectrum's string handling and it is difficult to avoid. It means that Y\$, which is used to store the pairs of characters which we use as pointers to the entries in the main file, is effectively twice as long as it looks since, in our search for speed, it will momentarily double every time we add to it or delete from it. The doubling may only be momentary, but we must still allow memory space for it. It's a shame, but we have to learn to live with it.

This drawback is the reason we do not use the same method for actually inserting

or deleting data in our main file B\$. To do so would halve the amount of space that could be used for entries. We have set up B\$ as a fixed length array and, when we want to delete something, we move the rest of the file down chunk by chunk to fill the gap created.

Binary Searching

We will use the binary search technique to reduce the possible number of comparisons made when finding the correct place to insert a new entry from a possible 12,500 to 15. Consider the following example.

We have established a file which now contains 2,000 items and the current input needs to be inserted at position 1731, although the program has not yet discovered this. The program begins its search by looking at the first entry and comparing it with the new entry to be inserted. The new entry is found to be the greater of the two and so the program moves on to compare it with entry number 2. Eventually after making 1,731 comparisons the program comes across the first entry in the file which is greater than the new entry. It has now found the correct position for the item.

Compare this straightforward procedure with the following for a file of the same size and an insertion in the same position.

The program begins by examining the entry in position 1024, that being the great power of 2 which is less than or equal to the number of entries in the file. The entry at that position is found to be less than the new entry. The program adds $1024/2$ to 1024 giving the result 1536. The entry at 1536 is still less than the new entry so $1024/4$ is added to 1526, giving 1792. The entry at 1792 is greater than the new entry so $1024/8$ is subtracted from 1792 giving 1664. The search proceeds at the following locations in the file with the following additions or subtractions.

```
1644 (then add 64)
1728 (then add 32)
1760 (then subtract 16)
1744 (then subtract 8)
1736 (then subtract 4)
1732 (then subtract 2)
1730 (then add 1)
Final result: 1731
```

The power of a binary search should be apparent.

Commentary on Module 5 continues next week. ■

UNIFILE: Module 5

```
1650 REM *****
1660 REM PLACE DATA IN FILE
1670 REM *****
1680 IF P+LEN R$-1<LEN B$ THEN G
0 TO 1730
1690 PRINT AT 14,10;"FILE NOW FU
LL"
1700 PRINT "" Press any key t
o continue"
1710 PAUSE 0
1720 RETURN
1730 LET POWER=INT (LN (N-1)/LN
2)
1740 LET S=2*POWER
1750 LET T$=R$(2 TO CODE R$(1))
1760 FOR K=POWER-1 TO 0 STEP -1
```

```
1770 LET C=FN A()
1780 LET U$=FN R$( ) (2 TO )
1790 LET S=3+(2^K)*(T$>U$)-(2^K)
*(T$<U$)
1810 IF S>N-1 THEN LET S=N-1
1820 IF S<2 THEN LET S=2
1830 NEXT K
1840 LET C=FN A()
1850 LET U$=FN R$( ) (2 TO )
1860 IF T$<U$ THEN LET S=S-1
1870 LET B$(P TO P+LEN R$-1)=R$
1880 LET N=N+1
1890 LET Y$=Y$(1 TO 2*S)+CHR$ IN
T (P/256)+CHR$ (P-256*INT (P/256
))+Y$(2*(S+1)-1 TO )
1900 LET P=P+LEN R$
1910 RETURN
```



RAG on the Dragon

Dave Windle teaches his Dragon to produce random art generation.

Having got your computer, what do you use it for? How many times has that question been asked? There are always games of course. Or lists of phone numbers of friends whose numbers you know quite well — and even if you do not, it's far quicker to get out the family directory, which you probably used to compile the program in the first place. So, what do you use a micro for?

One possibility is RAG (Random Art Generation). Most of the available micros can cope quite easily with this type of program. The following programs are for the Dragon, but with minimal alterations will run on most types of micro.

Colour computers can, in the main, draw pictures using their various graphics capabilities. However, these can be tedious and time consuming. The answer? Random Generation. Simple programs producing perpetual displays. These displays can be a great talking point at parties and are easily as therapeutic as gazing into an aquarium, and a lot more colourful.

Our first program consists of circles of various sizes drawn one over the other ad infinitum. As some of these are painted and others just outlined, the effects can be quite stunning.

In this program, line 20 sets mode and colour set. Lines 30 to 60 set random numbers X and Y for co-ordinates R for radius and C for colour. Line 70 draws circle outline and line 80 paints circle (as some of the circles overlap others of the same colour, these usually will not be painted). Line 90 slows things down and line 100 sets the loop.

The same idea is used in the second program. Only this time we use squares and rectangles.

In this program red is the dominant colour and would eventually fill the screen. Therefore line 120 is necessary to clear the screen and send us back to the drawing board.

The next example is, more or less, a combination of the previous two. One of the advantages of this type of program is that they are readily altered. Thus allowing each 'Electro artist' to develop his or her own style.

It is sensible to build a stop device into the programs. Just in case you get a masterpiece on the screen. Then it's out with the brushes. After all, even Constable only painted what he saw. Try this:

line No AS = INKEYS: IF AS = "S" THEN n ELSE nn
line no GOTO n
(n = number of following line nn = last line of program)

These two lines should be inserted

between the penultimate and last line of your program.

The previous three programs have had,

(like the fish tank) a soothing, therapeutic effect. For an alternative, more mind blowing, result try program four. ■

PROGRAM 1 CIRCLE ART

```
10 REM CIRCLE ART DAVE WINDLE 1982
20 PMODE 3,1:SCREEN 1,0:PCLS
30 X=(RND(255))
40 Y=(RND(191))
50 R=(RND(90))
60 C=(RND(8))
70 CIRCLE(X,Y),R,C
80 PAINT(X,Y),C,C
90 FOR L=1 TO 500:NEXT L
100 GOTO30
```

PROGRAM 2 SQUARE ART

```
10 REM SQUARE ART DAVE WINDLE 1982
20 PMODE 3,1:SCREEN 1,0:PCLS:S=0
30 A=(RND(255))
40 B=(RND(191))
50 C=(RND(8))
60 D=(RND(220))
70 E=(RND(180))
80 X=D+5:Y=E+5
90 LINE(A,B)-(D,E),PSET,B
100 PAINT(X,Y),C,4
110 FOR L=1 TO 500:NEXT L
120 S=S+1:IF S=25 THEN 10
130 GOTO 30
```

PROGRAM 3 COMBO ART

```
10 REM COMBO ART DAVE WINDLE 1982
20 PMODE 3,1:SCREEN 1,1:PCLS
30 X=(RND(255))
40 A=(RND(255))
50 Y=(RND(191))
60 B=(RND(191))
70 R=(RND(90))
80 D=(RND(120))
90 C=(RND(8))
100 E=(RND(180))
110 CIRCLE(X,Y),R,C
120 LINE(A,B)-(D,E),PSET,B
130 PAINT(X,Y),C,4
140 FOR L=1 TO 500:NEXT L
150 GOTO30
```

PROGRAM 4 FLASH

```
10 REM FLASH DAVE WINDLE 1982
20 PCLS
30 X=(RND(3))
40 PMODE X,1:SCREEN 1,1
50 A=128: B=92
60 C=(RND(250)): D=(RND(172))
70 LINE(A,B)-(C,D),PSET
80 SOUND C,1
90 GOTO 30
```


PEEK & POKE

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, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.*

POISED FOR ACTION ON SEIKOSHA

Stephen Yu of Kettering, Northants, writes:

Q I have just purchased a Seikosha GP 100 printer for my BBC model B micro-computer. But I have the following problem. How do I get the (£) symbol onto my printer? However hard I try all I can get is the (') symbol.

A The problem is one of coding. The £ symbol is more or less unique to this country, and therefore does not have a place in the ascii standard. Instead, it is put in at one of the code numbers not allocated by the ascii standard. On the BBC (and the Spectrum, and the Ace incidentally) it has been put in at number 96.

However, on the Seikosha the £ sign has been put in at number 185. Therefore, every time you want to use the £ sign you should call the character at Code 185, when the computer is calling the character at 96. The only way round this is to write a procedure that will read all the input to check for a Code 96 entry, and to replace it on the printer with a 185. The following routine can be quite tedious, but it will do the job:

```
DEF PROC conv
PRINT AS
FOR P=1 TO LEN AS
VDU 1
IF MID$(AS,P,1)="£" THEN PRINT
CHR$ 185; ELSE PRINT MID$(
AS,P,1);
NEXT P
END PROC
```

PLANNING FOR CONVERSION

Paul Ferris of Coopers Cray Hill, London, writes:

Q I have a Vic20 and am very pleased with it. But now, after nearly a year, I think I want to go on to a better computer. The one I am interested in is the new Commodore 64. But, the problem is that I have a lot of software for my

Vic20. I would like to know if I can use it on a Commodore 64 if I bought one.

A In short, the answer is no. However, a reader from Birmingham, Mr McCann, has sent us a letter he recently received from Commodore telling him that there are plans to make a conversion available to up-rate the Vic20 to a Commodore 64. The letter from Commodore is labelled 'Preliminary Information Subject to Change'. However, it is hoped that more details will be available before Christmas.

ABANDONING BASIC FOR FORTH

Mr A Cranston of Upton Road, Slough, writes:

Q I have an interest in the new Jupiter Ace, and I think it is set to cause much excitement. I would like to know more about its language Forth. I was hoping that you could refer me to some books that would introduce me to Forth.

Also, is it true that the Ace will be compatible with the Sinclair 16K Ram pack?

A I think you are right about the amount of interest the Ace has engendered, though it still remains to be seen just how many people will take the plunge and abandon Basic. I feel it would be safest to recommend two of the books that are mentioned in the provisional instructions to the Ace, namely, 'Discover Forth' by Tom Hogan (published by Osborne/McGraw-Hill) and 'Introduction to Forth' by Ken Kencht (published by Howard W Sams).

The book that is placed as the best choice to look at is 'Starting Forth' by Leo Brodie (published by Prentice Hall). Unfortunately, I have not been able to track down a copy at the time of writing, so I cannot say what it is like.

I think a lot of people heard

the rumour that the ZX81 Ram pack was going to be compatible with the Ace, and maybe other ZX peripherals as well. However, the ZX81 Ram pack will have to be modified before it can be used with the Ace.

WRITING FOR JOYSTICK USE

Susan Wallis of Garth Road, Morden, writes:

Q A friend of mine is selling his Atari video games machine to buy a computer. He says that his Atari joysticks will work on my Vic. I tried them and they did. I would like to know if it is OK to use them, or will they damage my computer? Also, how do you write programs that use the joystick for moving something on the screen?

A The Atari and Vic joysticks are the same, apart from the packaging. You should have no problems using them on your Vic. As for incorporating them into your programs, we did an article on that subject in our October 14 issue.

MACHINE-CODE ON NON-STANDARD CHIP

Mr A Doodes of Hainault Road, Leytonstone, London E11, writes:

Q I have recently bought a Sharp PC-1500. While I find the machine interesting and fun, I must admit that I find the manual pretty abysmal. However, while playing around I have discovered that the computer does in fact have *Peek, Poke* and *Call*, functions built into the Basic. In other words, it is possible to write user machine code programs on it.

However, I do not know what the CPU is. The manual merely refers to a CMOS 8-bit chip. Some reading around and a few experiments convinces me that it is not a 6502, but what is it? Do you know where I can get hold of a suitable book to learn the machine code?

A I am afraid that you are going to have to wait. The chip is an 'in house' design that is not used anywhere else. It is, as you rightly say, built around a CMOS 8-bit chip, but that is almost all that is

known at the moment. Or rather that is all the information that has been released in this country to date.

The parent company in Japan still has the copyright on the chip and its mnemonics. It is unlikely that they will publish details yet. I was told that at a *rough guess* it will be about 4-6 months before the details are available over here.

The details have already been published in Japan, in Japanese! A book on the subject is available over there and is awaiting translation now.

I must be honest and say that machine code is enough for me to get to grips with. The thought of having to master it on a non-standard chip, in Japanese, is a prospect that I personally do not relish. So I can only advise you to wait, and keep an eye on the computer press for further developments. All you can do until then is *Poke* around inside the memory and see if you can learn anything that way.

SEND IT BACK TO SINCLAIR

Rupert Atkinson of Gaverston Road, Leamington Spa, Warwickshire, writes:

Q I have recently obtained my Spectrum and I have a problem with it. After about half an hour the display freezes and everything stops. No amount of key pressing will bring it back to normality. I have to remove the power supply and reset the computer. But this is happening with increasing regularity.

Should I send it back to Sinclair, or is there an easy way to solve this problem?

A This sounds very like the initial design flaw that halted the Spectrum when it was first launched. The flaw was a clash between the ULA and the Z80a, where they both try and use the same data bus at the same time. Perhaps you have an old machine that slipped through the net, or one in which the modification to rectify this error (a Nand gate added) has not been done properly.

However much you dread the thought, I can only suggest that you send your computer back to be repaired under the guarantee.

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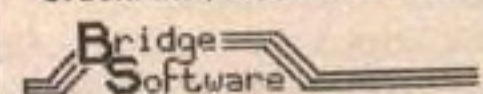
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Ziggurat



Hunting the cable

An economist, J Maynard Keynes, had a wonderful way to regenerate British industry. Writing in *The General Theory of Employment* ... (1936) he emphasised the importance of public works to pump money into the economy — he also emphasised the unimportance of the nature of the actual public work.

One example he gave was for the Treasury to fill old bottles with banknotes, bury them at a suitable depth in disused mine shafts, and then fill the mine shafts with rubble. Private enterprise was then left to dig up the notes again.

Keynes predicted there would be no more unemployment thanks to the knock-on effects of the employment generated, and also in the end the community would be far richer. His argument is now accepted strategy.

In the report of the inquiry into cable expansion and broadcasting policy, under Lord Hunt (HMSO, October 1982), the recommendations are liberal in the extreme, with the clear avowed intent of generating wealth by the knock-on effect. The Hunt Report, which is being used to encourage investment into cable television, is remarkably light on figures and finances — partly due to its rather restricted terms of reference.

Searching through the Hunt Report for details of how much it will cost to connect up a house to a cable network, and how much the rental will need to be to assure a viable network, I had to draw a blank. I was provided with lots of estimates about advertising revenue, and per-

centages of the Gross National Product, but nowhere was this basic information given.

In an earlier report (*Cable Systems*, HMSO, 1982) it is estimated that to connect up a house will cost in excess of £250 (probably much more), with a monthly rental of at least £25.

It discusses neither the technology to be used to cable up the country (ie whether co-axial or fibre-optic cables should be used) nor the provision of interactive services for business and the consumer (eg sending computer software down the line to the user's computer). What is generally agreed, or so the Hunt Report claims, is that investment in cable television for entertainment purposes will be the necessary base from which the interactive services of economic benefit (their terms) will be built up.

Instead of bottles of bank notes, there will be 30 television channels. When editors and writers in papers and magazines expound at length on what the new cable systems will bring, remember this: it will not be free. It will be rather expensive and all the new services will have to wait until the television channels are viable.

Finance for the cable network, and the television services they bring, will be first and foremost the rental charge for a basic package of cable services. (Remember that the householder will have to pay for the connection in the first place, and there will be a new type of television to be acquired.)

Once the rental for the basic service has been paid, then it will be lawful to charge extra for additional channels. But, all channels will have to have advertising to make the system pay. If there are 30 channels advertising, the attraction of each channel for advertisers will diminish — with soap opera on 15 channels, how is the subscriber (or advertiser) to choose?

About 75 percent of households are connected to the telephone network — the figure is higher for rural areas than it is for urban areas. Will the same be true for cable TV? And it is in the city that cable television will be at its most cost effective.

When you read about cabling, and hear that it is to be paid by the private sector, that's you. ■

Boris Allen

Puzzle

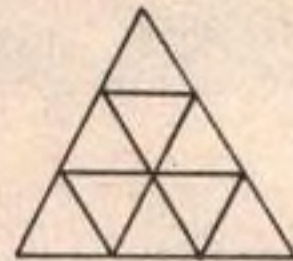
A coven to set you square

Puzzle No 34

In the diagram, 13 possible triangles can be formed. The total number of triangles in a grid of any size is given by the formula: $T = N(N + 2)(2N + 1)/8$, where N is the number of tiers. Any remainder left after the division is ignored.

The formula for finding out the number of squares in a square grid is: $T = N(N + 1)(2N + 1)/6$. So, for example, an 8×8 chessboard would contain 204 squares of various sizes.

Two pieces of paper — one with a grid of triangles, the other with one of squares, are placed on a table. Twice the number of squares as triangles can be found. What are the sizes of the grids?



Solution to Puzzle No 29

This algorithm is a standard 'bubble sort'. The last ear you put down is the largest, and the rest are ranged in sequence according to size. The stone(s) are used to indicate that the sort is complete. A program to sort out ears could be:

```
10 DIM E(n)
20 FOR A = 2 TO n
30 IF E(A) < E(A - 1) THEN LET B = E(A): E(A) =
  E(A - 1): E(A - 1) = B: S = 1
40 NEXT A
50 IF S <> 0 THEN S = 0: GOTO 20
60 STOP
```

Winner of Puzzle No 29

The winner is: Alan Honey, Endcliffe Vale Road, Sheffield, who receives £10.

Top Sellers

Atari		ZX81*	
1(2)	Submarine Commander (Thorn EMI)*	1(3)	3D Defender (JK Greye)
2(1)	Jumbo Jet Pilot (Thorn EMI)*	2(8)	Mazeman (Abbersoft)
3(3)	Soccer (Thorn EMI)*	3(1)	Gauntlet (Colourmatic)
4(4)	Preppie (Adventure International)	4(-)	Adventure 1 (Abbersoft)
5(-)	Choplifter (Broderbund Software)†	5(-)	Mazogs (Bug-Byte)
6(-)	Dragon's Eye (Epyx)†	6(9)	Chess (Artic)
7(9)	Snooker/Billiards (Thorn EMI)	7(2)	Frogger (DJL Software)
8(-)	PacMan (Atari)*	8(-)	Trader (Pixel)
9(-)	Shamus (Synapse)	9(-)	Football Manager (Addictive Games)
10(-)	Centipede (Atari)*	10(5)	Gulp II (Campbell Systems)

*Cartridge. †Disc only.

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

ZX Spectrum		Vic	
1(7)	Maze Man (Abbersoft)	1 (8)	Grid Runner (Liamsoft)
2(-)	Spectral Invaders (Bug-Byte)	2 (2)	Defenda (Liamsoft)†
3(-)	Spectres (Bug-Byte)	3 (-)	Myriad (Rabbit)††
4(2)	Escape (New Generation)	4 (10)	Scramble (Rabbit)
5(-)	Arcade pack (Control Technology)	5 (-)	Adventureland (Commodore)*
6(4)	Star Trek (Chromasoft)*	6 (6)	Jellymonsters (Commodore)*
7(-)	Football Manager (Addictive Games)	7 (1)	Sargon 11 Chess (Commodore)*
8(-)	Adventure 1 (Abbersoft)	8 (-)	Pirates Cove (Commodore)*
9(9)	Spectrum Chess (Artic)*	9 (4)	Blitz (Commodore)
10(8)	Gulpman (Campbell Systems)	10= (7)	Star Battle (Commodore)*
		10= (9)	Traxx (Liamsoft)†

*Requires 48K.

(Figures compiled by Buffer Micro Shop, London, 01-769 2887)

Books			
1(2)	ZX Spectrum Explored, Hartnell		(Sinclair/Browne)
2(3)	BBC Micro Revealed, Ruston		(Interface)
3(5)	Easy Programming for the ZX Spectrum, Stewart and Jones		(Shiva)
4(7)	Over the Spectrum, various authors		(Melbourne House)
5(6)	Z80 Assembly Language Programming, Leventhal		(Osborne)
6(8)	Programming the 6502, Zaks		(Sybex)
7(1)	Starting Forth, Brodie		(Prentice Hall)
8(9)	Machine Code and Better Basic, Stewart and Jones		(Shiva)
9(-)	The ZX Spectrum and how to get the most from it, Sinclair		(Granada)
10(-)	6502 Assembly Language Programming, Leventhal		(Osborne)

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

(Last week's position in brackets)

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