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26 August 1982 Vol 1 No 19

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How to submit articles
Articles which are submitted for publication should not be more than 1000 words long.

All submissions should be typed and a double space should be left between each line.

Programs should, whenever possible, be computer printed.

At present we cannot guarantee to return every submitted article, so please keep a copy.

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.

This Week



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Editorial

Prospective Spectrum buyers will undoubtedly know that there have been some considerable delays in delivering the machine. Delays of 10, 12 or even 15 weeks have been reported.

This is admittedly a different order of magnitude to the BBC saga where delays of six or nine months have been all too common. But, even delays of 10 weeks are still too long.

Sinclair claim to have solved their production problems and are confident that they will have cleared their backlog of orders by the end of September. This may be somewhat optimistic, but it does look as though Sinclair will be producing Spectrums in quantity by the beginning of September.

Sinclair are also writing to all their customers who have ordered Spectrums, telling them the position and offering refunds to anyone who feels dissatisfied. In addition, those people who have been waiting for their Spectrums will receive a £10 voucher.

This is a welcome change in Sinclair policy. People who are kept waiting for their micros do not object half as much if they know why they are being kept waiting. It is being fobbed off with unexplained "production difficulties" that really upsets people.

Next Week



Trapped in the deeps . . . can you survive Under Pressure — a new game for Spectrum

Atari declares copyright war on Pac-Man rivals

ATARI has fired the opening shots in what promises to be a copyright war with far-reaching implications.

Commodore has been the first to feel the effects but other companies, including Bug-Byte, A and F Software and Micropower are also involved.

Graham Daubney, Atari's software manager, would not comment on his company's actions but issued the following official statement.

"Atari International (UK) Inc is at present campaigning against video games which infringe the *Pac-Man* copyright. The campaign is being pursued to protect the customer against imitations.

"As part of the campaign, Atari is applying for an injunction against Commodore Business Machines (UK) Ltd, *Jellymonsters*.

"Atari allege that *Jellymonsters* is an infringement of their copyright. Atari are pressing for a full hearing as soon as possible and will claim substantial damages."

Atari's campaign is being conducted on two fronts.

Both the Commodore and Bug-Byte actions concern Vic-20 cassettes. In each case the companies have been instructed to stop sale of the tapes, to surrender all remaining stocks and promotional material to Atari, to pay Atari all revenue gained through their sale and to allow Atari access to their business records.

by David Kelly

Commodore is not prepared to comment on the situation at present. A spokesman for the company would only say: "We are aware of the Atari claim."

Bug-Byte, however, has agreed to abide by the first two of Atari's instructions. It has stopped all sale of its *Vic-Men* program and has surrendered all remaining stocks and promotional material to Atari.

"We had the choice of doing what we did or getting involved in a very expensive legal battle that could have cost tens of thousands of pounds," said Bug-Byte's managing director, Tony Baden.

"We do not agree that they have got copyright except on the *Pac-Man* program listing — and all our listings are completely different," he told *Popular Computing Weekly*.

"There is no way that we can afford to stand up against a company the size of Atari, but it obviously needs something like this to go to court to sort out the position.

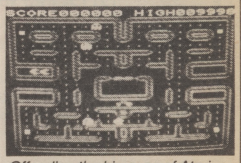
"In the long term I suppose it will be good for the industry. The arcade situation is becoming stale at the moment and it will force companies to think up original games.

"Atari's action has not affected us at all. Admittedly *Vic-Men* was one of our most successful games but we will survive."

In the other series of moves A and F Software and Micropower have received instructions to send copies of certain programs to Atari for inspection.

Mike Fitzgerald, managing director of A and F Software explained: "The letter from Atari requested us to send them a copy of our *Polecat* program for the Acorn Atom to look at and play. If they decided that the program is not an infringement then Atari would send us the recommended retail price of the cassette.

"We have no intention of sending them a copy of *Polecat*. It does not, in our view, infringe the Atari copyright. If Atari wish, they are quite welcome to call and we will demonstrate the program.



Offending the big guns of Atari . . . Bugbyte's Vic-Men.

"Whatever happens, we are not removing our program *Polecat* from the market and it will need a court order for us to do so.

"A and F fully intend to go ahead and develop the *Polecat* program for any computer we choose.

"We believe that the program does not infringe Atari copyright either in machine-code or visual image."

Micropower has now received three letters similar to that received by A and F, relating not only to alleged infringements of the *Pac-man* copyrights but also that of another Atari game, *Centipede*. Managing director, Bob Simpson, said: "It is unlikely that we shall be supplying copies of any of our games. We have over 150 games on sale and if we start sending out tapes in this way, where will it all end?

"There is no doubt, though, that any injunction taken out against us would be quite damaging, bearing in mind that the average life of a computer game is at most three or four months."

Video module for Microtan

THE Video 80/82 is a new Microtan add-on, produced by the Tangerine Users Group.

The unit handles the video display, thereby freeing the host microcomputer for other tasks.

With the addition of the Video 80/82, which incorporates its own 16K Ram and 6502E processor, 80 character lines and ultra hi-resolution graphics can be created.

Out in front

Bob Green of the Tangerine Users Group explained: "It is one of the biggest projects we have undertaken and it will put the Microtan well out in front of its competition."

The Video 80/82 will be priced at around £200.



The new Merlin integrated system . . . launched this week.

Merlin micro system launched

A NEW low-priced business micro system is launched this week.

The Z80-based Merlin will cost in the region of £1500 and will run TRS80 software.

It has 64K Ram, twin floppy discs, a 63 × 16 display and incorporates a full-size keyboard with separate numeric pad and high-contrast monitor.

Extras include a CP/M® operating system, RS232 interface, hard discs, dot-addressable hi-resolution graphics board and networking.

More information is available from C T Maddison Ltd, Eagle Industrial Estate, The Crofts, Witney, Oxford.

The NewBrain goes global

GRUNDY Business Systems has signed a distributorship agreement to export NewBrain microcomputers to France.

The Paris-based company, Sanocor International, is to handle the NewBrain's French sales.

Initially, Grundy will export 300 of the machines fitted with French keyboards and UHF tv modulators.

Andy Surtees, Grundy's Marketing Manager, said: "We have similar dealership plans for the rest of Europe and the USA."

It is planned to step up the French exports to 200 per week. This figure represents 40 per cent of the current NewBrain output.

Cut price ZX81s hit the High St

SINCLAIR Research is to sell its ZX81 microcomputer through an increased range of high street outlets.

This announcement follows last week's cut in the price of the micro to under £50.

In this new move, selected branches of Boots and Greens (a subsidiary of Debenhams) will begin selling the ZX81 and associated product range at the end of August.

Sinclair Research has also appointed a wholesaler, Prism Microproducts, to distribute the range to smaller retail companies.

A Sinclair spokesman commented that the retail expansion represented a "mature second phase in the marketing of the machine as a household item".

Bob Denton, managing director of the newly-appointed wholesaler, said: "There is now spare ZX81 production capacity. We think that the £20 price cut will open up a new stratum of the market. Initially we have contacted over 1000 established micro suppliers but we shall soon be looking at toy shops, newsagents and video rental shops."

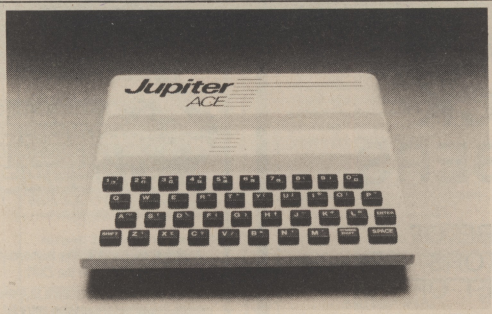
Prism Microproducts is a sister company of ECC Publications who produce the magazine *Sinclair User*.

A fair Autumn is assured!

A SURFEIT of micro shows is planned for the second weekend in September.

The 5th annual *Personal Computer World* show will be held in the new Barbican Centre, London, from September 9 to 12. Entry is £2.50 and the show will be open from 10 am to 7 pm from Thursday to Saturday, and from 10 am to 5 pm on Sunday.

Microscene Brum '82, catering mainly for the Sinclair user, will be held at the Bingley Hall Exhibition Centre, Birmingham, on September 11. The show will feature many Midlands companies and will be open from 10.30 am to 7 pm.



By Jupiter, it's a Forthcoming micro attraction!

Spectrum team deal their Ace

A NEW microcomputer for less than £90 has been launched by the same design team that produced the ZX Spectrum.

Called the Jupiter Ace the machine represents a departure from convention since it runs the high-level Forth language.

The machine is based around the Z80A microprocessor and features 8K Rom, 3K Ram, 32 × 24 display output, sound and full-size moving keyboard.

The launch follows considerable speculation concerning the activities of the two designers, Richard Altwasser and Steve Vickers, following their departure from Sinclair in April this year.

The Jupiter Ace, at £89.95, is the first low-priced micro to use the Forth language.

"We chose Forth in preference to Basic," says Richard Altwasser, "because of its speed and flexibility.

"It is a very compact language and memory goes much further. In Forth you can define your own functions and tailor your program exactly to your needs — that's why it is so exciting.

"Basic has a fixed set of functions and, because of this, they are made as unspecific as possible.

"In Forth you can define new functions in terms of those that exist in the Rom or in terms of those you have already defined. In this way you can extend the language in the direction of the program you want to write in a very concise way.



Steve Vickers (left) and Richard Altwasser (right)

"Forth is also so much faster — it is ten times faster than Basic."

Initially the machine will only be available in a 3K black-and-white version but there are plans for a 48K Ram expansion, colour board and printer interface. The expansion and interface units should be available before Christmas.

The Jupiter Ace will be manufactured close to where the two designers live in Bury St Edmunds, initially at a rate of 1000 per month.

Richard Altwasser sees a broad market for the unconventional machine. "It will be popular in the educational field because Forth is an easier language for children to learn," he said.

"But it will also have appeal as a games machine because of its very high speed and because the language allows such sophisticated user-defined graphics."

The machine will be available in September by mail-order from Jupiter Cantab, 22 Foxhollow, Bar Hill, Cambridge.

Acorn seeks to boost Beeb sales

ACORN will offer its dealers improved margins on the BBC machines in the next two or three months.

The announcement of the improved offer — a reduction in cost of more than 10 percent — follows the decision of the Computer Retailers Association to fold its Acorn/BBC dealer group.

At present the BBC models are sold to retailers at the full retail price.

Until now the incentive for a dealer to stock the BBC range has been the normal profit margins on sales of the up-grade kit, printers and the new disc drives.

Some retailers have also been combining the Model A machine with the up-grade kit to produce the Model B machine which is in short supply.

Sounding off with a ZX81

ZON X-81 is a new sound effects add-on for the ZX81.

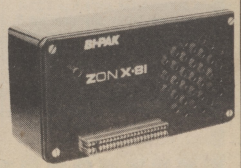
Bi-Pak Semiconductors has produced the unit, based on a three-channel sound chip.

The attack/decoy envelope of the three channels can be controlled using simple Basic statements from the ZX81. In this way the sound of a piano, organ or bell, helicopter or explosion can be simulated and added as part of a ZX81 program.

Own speaker

The ZON X-81, pictured below, is self-contained, with its own loudspeaker and volume control.

It costs £25.95 and is available from Bi-Pak Semiconductors, 63a High Street, Ware, Herts (Tel: 0920 3442/3182).



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VIDEO GENIE, plus Roxburgh (Star) printer with Centronics Interface. 16k RAM upgraded 135k *Rom*. Word Processor, books, tapes etc, £325. Phone 01-653 0186.

16K ZX SPECTRUM TO ZX80/81 ADAPTOR. Use your existing 16K RAM pack (even Sinclairs) to give 32K. Don't throw away your peripherals, make use of existing ZX81 add-ons. Only £7 (built) from Stephen Adams, 1 Leswin Road, London N16 7NL.

ZX81 16K cassette: Nightmare Park, Nibblers, Brands, Zombies, Galactic War, Tank, Dambusters — over 50K with instructions, £5. G. Smith, Brynllwyd Capelseion, Aberystwyth.

SIX (5K) ZX81 PROGS. With hints and tips, bargain, £4. D. G. B., 47 Rossfold Road, Luton, Beds.

SPECTRUM MUSIC : Printer listings for 10 classic tunes. Only £1+sae. Gary Hynes, Jasmine Cottage, Chapel Lane, Maidford, Northants, NN12 8HQ.

PROGRAMMERS WORKSHEETS. Sample pack £1.10 p&p, state basic or machine code (and machine), s.a.e. for list. Business Services (C2), 16 Grosvenor West, Baldock, Herts, SG7 6NZ.

VIC20 SOFTWARE: Hang-man, requires additional 3K Ram. User defined graphics, an excellent well written program, on tape, only £4.95. S. Fund, 10 Gladstone Court, Anson Road, NW2 4LA.

ZX81, 32K, many software tapes, etc, £110. Nesbitt, phone 01-242 6844 day or 979 4258 evenings.

MUNCHMAN, RACETRACK, CONNECT 4, Puzzle, Mastermind, cassette 5 for standard Vic20, excellent sound and colour, hi-res graphic, £5. I. Ingham, 64 Dunsmuir Grove, Gateshead, Tyne and Wear.

THE POOLS PROGRAM for ZX81 (16K). Three different forecasting methods used, menu driven, on cassette with full instructions, £5.95. 72 Mullard Drive, Whitnash, Leamington Spa.

COVER STORY

Pegasus

A new game for Vic20 by Robert Harrold

You are a prostetnic vogon, Jeltz, captain of a vogon constructor ship. Your mission is to construct a galactic hyperspace bypass.

Fellow Confederation members the Pegasuses, a species of sentient winged horses, are in imminent danger of destruction. Their sun is about to go nova, which will destroy their home planet Laiteri and the rest of their solar system.

But, aware of the danger, the Confederation has banded together to try and save the Pegasuses from their fate. An armada of hyperdrive transports has been rushed to Laiteri. The entire population is ready to be evacuated to Heliconia, an uninhabited world in the outer arm of the spiral nebular.

However, there is a problem. Laiteri is close to the galactic core which is packed with other solar systems, asteroids and dwarf stars. Any attempt to use hyperdrive would be fatal. Consequently, you have been detailed to clear a path out of the core.

The Confederation Council has assigned you a sector of the galaxy that is devoid of sentient life. But, you must be on the look out for the teasers.

This program runs on an unexpanded Vic20. Instructions for the control of your vogon constructor ship are included in the body of the program.

Lines 0-20 call the game instructions and initialise some of the display variables. Lines 20-47 generate a random field of 20 planets while lines 52-58 govern the vogon craft control sequence.

The subroutine at line 1000 pokes the vogon ship to the latest screen position. Lines 5000-6000 generate the flashing teaser. The end of game sequence is generated by the subroutine at line 11000.



```
2 POKE36879,42
4 PRINT"■■■■■■■■■■■■ PEGASUS      "
6 PRINT"■■■■■■■■■■TAB TO CONTINUE"
8 GETA$:IFA$=""THEN8
10 QT=INT((RND(1)*10)+5):GOSUB8000
14 XB=7944:OO=0:O1=0:TI$="000000"
16 PRINT"■":POKE36879,8
20 FORA=1TO20
25 X=INT(RND(1)*396)
27 Y=INT(RND(1)*7)+1
29 IFPEEK(7768+X)=81THEN25
30 POKE7768+X,81
35 POKE7768+30720+X,Y
40 NEXTA
42 X1=7725+RND(1)*5
43 IFPEEK(X1)=81THENGOTO42
47 GOSUB1000
51 PRINT"■■TIME ";RIGHT$(TI$,3);PRINT"QUOTA";O1;" OF";QT
52 GETA$
53 IFA$="A"THENX2=-22:GOTO60
54 IFA$="Z"THENX2=22:GOTO60
55 IFA$=":"THENX2=-1:GOTO60
56 IFA$=";"THENX2=1
58 IFA$<>""THEN52
59 IFTI$>"000500"THEN11018
60 X1=X1+X2
61 IFX1<=7725ORX1>8184THENGOSUB4000
62 IFPEEK(X1+1)=810RPEEK(X1-1)=81THENGOSUB2000
65 GOSUB1000
67 IFPP=0THENXA=(RND(1)*21)+7724
69 IFPP=1THEN75
70 IFRND(1)<0.05THENPP=1
75 IFPP=1THENGOTO5005
90 IFRND(1)<.06THENGOSUB9010
95 IFXB>=7965THENGOSUB11000
100 IFPEEK(X1+2)=1020RPEEK(X1)=1020RPEEK(X1-2)=102THEN00=1
110 IF00=1THENGOSUB10000
120 IF00=0THENGOTO200
130 FORI=X1-2TOXB
135 POKEI,32:NEXTI
145 IF00=1THENXB=X1-3:00=0
150 IFXB<=7944THENXB=7944
160 IFTI$>"000400"THEN900
200 GOTO51
900 END
1000 FORB=-1TO1STEP2
1002 POKEX1+B-X2,32:POKEX1+B,86:POKEX1+B+30720,1:NEXTB:RETURN
2000 POKE36878,8:POKE36876,220
2004 FORI=1TO100:NEXTI
2006 POKE36878,0:O1=O1+1:RETURN
4000 IFX1<7725ANDX2=-22THENX1=X1+22:GOSUB1000:A$="Z":GOTO54
4002 IFX1>8184ANDX2=22THENX1=X1-22:GOSUB1000:A$="A":GOTO53
4004 IFX1<7725ANDX2=-1THENX1=X1+1:GOSUB1000:A$=";":GOTO56
4006 IFX1>8184ANDX2=1THENX1=X1-1:GOSUB1000:A$=":":GOTO55
5005 POKEXA,90
5020 POKEXA+30720,2
5025 FORI=1TO15:NEXTI
5040 POKEXA+30720,7
5041 FORI=1TO15:NEXTI
5050 IFPEEK(XA+23)=102ORPEEK(XA+22)=102ORPEEK(XA)=102THENGOSUB10000
5055 IFPEEK(XA+23)=86ORPEEK(XA+22)=86ORPEEK(XA)=86THENGOTO6000
5060 IFPEEK(XA+23)=81ORPEEK(XA)=81THENGOSUB7000
5062 IFPEEK(XA+1)=86ORPEEK(XA)=86THENGOTO6000
5065 POKEXA,32
5070 XA=XA+23
5075 IFXA>8164THENPP=0
5090 GOTO90
6000 POKE36878,10:FORM=180TO235STEP2
6006 POKE36876,M
6008 FORN=1TO5:NEXTN,M
6012 POKE36876,0
6014 FORM=1TO50:NEXTM
6020 POKE36878,0:POKEXA,32:PP=0:GOTO51
7000 POKE36877,220:FORL=15TO0STEP-2:POKE36878,L
7015 FORM=1TO150:NEXTM,L:POKE36877,0:POKE36878,0
7055 POKEXA,32:POKEXB+23,32:PP=0:GOTO70
8000 PRINT"■■INSTRUCTIONS■"
8005 PRINT"■■AS PROSTETNIC  VOGON  JELTZ CAPTAIN
     OF  A  VOGON CONSTRUCTOR SHIP
8010 PRINT"■YOU MUST CLEAR A PATH FOR THE PEGASUSES
     ON THEIR WAY TO HELICONIA"
     8015 PRINT"■USING THESE CONTROLS  STEER
     YOUR  CRAFT TO OBLITERATE THE PLANETS"
8020 PRINT"  ■■=UP,■=LEFT
8025 PRINT"  ■■=DOWN","■=RIGHT"
8030 PRINT"■■TAB TO CONTINUE"
8035 GETA$:IFA$=""THEN8035
8040 PRINT"■■HAZARDS■"
8045 PRINT"■■AS WELL AS  CLEARING  THE AREA LOOK OUT FOR THE TEASERS!"
8047 PRINT"■■DURING THE GAME  YOU  MUST DESTROY
     AT LEAST ";"■";"OF";"PLANETS"
8050 PRINT"■■■■■■■■HR TO CONTINUE"
8060 GETA$:IFA$=""THEN8060
8065 RETURN
9010 IFPEEK(XB+2)=81THENGOTO9500
9015 POKE(XB+1),102:POKEXB+1+30720,3:XB=XB+1:RETURN
9500 POKE36874,220:POKE36878,10
9700 FORI=1TO500:NEXTI
9795 POKE36874,0:POKE36878,0:RETURN
10000 POKE36877,220
10005 FORL=15TO0STEP-2.5:POKE36878,L:FORM=1TO200:NEXTM,L
10025 POKE36877,0:POKE36878,0
10035 IFOO=1THENRETURN
10040 FORI=XA+22TOXB+1
10045 POKEI,32:NEXTI:XB=XA+21:POKEXA,32:GOTO5065
11000 FORI=1TO200:NEXTI
11005 PRINT"■■":POKE36879,42
11010 PRINT"■■■■GALACTIC HYPERSPACE","■■PLANNING  COUNCIL"
11015 PRINT"■■  HYPERSPACE  BYPASS  COMPLETED"
11016 IFO1>=QTTHEN11030
11018 PRINT"■■FOR NOT MEETING YOUR  PLANET  QUOTA  THE
     PEGASUSES  HAVE  JUST  BEEN"
11020 PRINT"■■■■■ FED TO THE","■ DREADED  BUGBLATTER  BEAST OF TRAAL"
11030 GOTO900
```



Play safe with crash barriers!

David Lawrence explains how to write programs that are idiot proof.

'Idiot proofing' refers to the practice of refining an interactive program in such a way that it is capable of dealing with nonsensical inputs without crashing or producing equally nonsensical responses. There is, of course, no such thing as a perfectly idiot-proofed program. If you think your program is infallible, then you simply have not run up against a creative enough idiot yet.

The majority of invalid inputs arise from two causes: either the user has become blasé and, rather than playing close attention to the prompts supplied, is responding mistakenly to the prompt he *thinks* is next, or the user is unknowingly inputting nonsense, eg hitting the wrong key inadvertently.

The best check on such errors is simply to remind the user of the input that has been made and supply an opportunity to change that input before it is finally accepted. Listing (1) shows a typical subroutine designed to achieve this.

This subroutine can handle all of the program's prompts, printing each of them to a different part of the screen if desired and clearing the prompt and the input lines after use. In order to call the subroutine, three lines are required in the program, eg:

```
1000 LET P$="INPUT NUMBER OF FISH:"
1010 LET P=3
1020 GOSUB 5000
```

These three lines will cause 'INPUT NUMBER OF FISH' to be printed at line three. Once the response has been input, the user is given two displays of the answer and can confirm it by pressing *Newline*.

Once the response is confirmed, the subroutine returns Q$ to the main program as the correct response to the prompt contained in P$. Numerical inputs can be dealt with by taking the *Val* of Q$ when it is returned.

But, this subroutine will not deal with errors caused by the user misunderstanding what the program is asking for. Faced with the prompt "WHAT IS THE MONTH?" the user may understandably put '8'. But, if the program expected the name of the month to be spelt out in full, it will stop.

To cope with such mistakes, the program must be able to recognise inputs which might resut in a crash or a meaningless result. A common check is to examine numerical inputs to ensure they do not contain any non-numerical characters. Listing (2) is an example of a subroutine designed to achieve such a check, working on the Q$ returned by listing (1).

Please note that, if the input is rejected, the user is told exactly why. There is nothing more confusing than a program which simply refuses to accept what the user thinks is the right response — if the input is unacceptable, say why!

Listing (3) gives the necessary lines to operate listings (1) and (2) together for numerical inputs. Having obtained a valid numerical input, it is sometimes possible to check whether the value of the input falls within the range the program was designed to accommodate, as in listing (4).

Finally, after all these precautions have been taken, the program will crash at the moment calculated to cause the maximum inconvenience and irritation. Since this will happen, it is wise to program on principles that will minimise the damage.

Take the example of a filing program designed to store a large number of entries, each of which is made up of five numbers. Having input 99 entries, the program crashes on the fifth number of the hundredth entry.

The extent of the disaster depends upon what has been done with the four numbers that were accepted. If they have already been added to the main file then you are in trouble, since the structure of the file is now corrupted and it may be very difficult to sort out. The right course with any set of interdependent inputs is to store each temporarily and use them only when the program has successfully accepted all of them.

LISTING (1)

```
5000 REM ************************
5010 REM PROMPTS AND RESPONSES
5020 REM ************************
5030 REM Q$ IS AN EMPTY ARRAY 32
CHARACTERS LONG
5040 PRINT AT P,0;Q$
5050 PRINT AT P,0;P$;
5060 INPUT Q$
5070 PRINT Q$
5080 PRINT AT 20,0;Q$;Q$
5090 PRINT AT 20,0;">>";Q$;"<<"
5100 PRINT AT 21,0;"NEWLINE TO C
ONFIRM"
5110 INPUT R$
5120 PRINT AT 20,0;Q$;Q$
5130 IF R$="" THEN GOTO 5150
5140 GOTO 5040
5150 RETURN
```

LISTING (2)

```
6000 REM ************************
6010 REM CHECK NUMERIC INPUTS
6020 REM ************************
6030 IF LEN Q$=0 THEN GOTO 6080
6040 FOR I=1 TO LEN Q$
6050 IF CODE Q$(I)<27 OR CODE Q$
(I)>37 THEN GOTO 6080
6060 NEXT I
6070 GOTO 1010
6080 PRINT AT 20,0;"UNACCEPTABLE
.",,,"PLEASE INPUT NUMBERS ONLY."
6090 FOR J=1 TO 50
6100 NEXT J
6110 PRINT AT 20,0;Q$;Q$
6120 LET Q$="ZZZ"
6130 GOTO 1010
```

LISTING (3)

```
1000 LET P$="HOW MANY FISH?"
1010 LET P=3
1020 GOSUB 5000
1030 GOSUB 6000
1040 IF Q$="ZZZ" THEN GOTO 1000
```

LISTING (4)

```
1050 IF VAL Q$>=1 AND VAL Q$<=12
 THEN GOTO 1110
1060 PRINT AT 20,0;"NUMBER SHOUL
D BE IN RANGE 1-12"
1070 FOR I=1 TO 50
1080 NEXT I
1090 PRINT AT 20,0;Q$
1100 GOTO 1000
```

Street Life

The men who put Maplin on the map

***David Kelly** talks to Roger Allen, a co-founder of Maplin Electronic Supplies.*

For almost ten years Maplin has been supplying a huge range of electronic components to DIY enthusiasts.

The mail-order company has recently branched out into micros and now produces a selection of electronic kits for the ZX81. It also sells the full range of Atari home computers and software and offers a broad selection of micro books.

The company was started in 1972 by Doug Simmons and Roger and Sandra Allen. Now situated in a sizable warehouse unit, just outside Benfleet in Essex, Maplin has grown considerably in the last 10 years.

"At first, like most other small businesses, we ran the thing from home," said Roger. "Both Doug and I worked during the day. Doug was employed by the GPO and I worked for the local paper, so Sandra had to take the orders to the post office during the day.

"I suppose we were never the cheapest supplier, but what we offered was quality components by return of post. We only stocked manufacturer's guaranteed items. All the orders were — and still are — sent out on the day they are received."

They moved into their first business premises in 1973. Now, three moves later, they have a mail-order company with 150,000 customers, three shops and their own quarterly magazine.

The Maplin Electronics Magazine contains projects and circuit diagrams of designs that can be built up using kits sold by Maplin.

In a corner of the warehouse there are two rooms. In one the development team invent new projects. In the other there is a department that sorts out problems encountered by enthusiasts assembling the kits.

If, after telephone tuition, they still cannot get the project to work the partly constructed kit can be returned to Maplin for repair. An electronic organ kit had just been returned after being struck by lightning.

But it is only comparatively recently that they have become involved in microcomputers.

"About five or six years ago," explained Roger, "we did the National SCAMP kit, but in no time it was out of date. We held on then, and it is only recently that we have committed ourselves to selling a complete system.

"Two years ago, we were trying everything that was available. We eventually chose the Atari system, because the more we discovered about the machine, the more we discovered it could do. We sell both the 400 and 800 machines and we still have not stopped learning about them. They have been on the market for nearly two years now and are still, in our opinion, in front of the competition.

"They now have the GTIA chip incorporated into them which is completely dedicated to screen formatting, leaving the CPU free and there is now a massive library of software available for it. We are just about to add a further 70 titles to the 80 we already offer."

Maplin have also produced a full-size moving keyboard kit for the ZX81. The design features shift-lock, function and graphics keys — alleviating the need to press more than one key at a time. Over 15,000 of these kits have been dispatched in the three months it has been on sale.

Maplin have also added a ZX81 16-line input/output port kit and over 75 computing books to their range.

The company receives more than 1000 orders per day and is continuing to expand. It opens its third retail shop in Birmingham in mid-August. The mini computer system used for order processing is soon to be expanded to have a 1Mbyte core store.

The ZX81 keyboard will soon be available in a ready-assembled form. Maplin also plans to produce its own Atari software through its subsidiary, Mapsoft.



Doug Simmons (sitting) and Roger Allen . . . offering quality components by return of post.

What's happening

Bangor and Gwynedd Area computer club is soon to be set up. Those interested in receiving more information should contact Dilwyn Jones, Fodol Farm, Hafod Lane, Caernarfon Road, Bangor, Gwynedd.

Vic Question Club is being set up to answer problems and give advice to Vic owners. The club will also provide free programs and software tips for its members. Contact A. Shadi, 67 Worcester Street, Werneth, Oldham, Lancashire.

Southampton Spectrum Users who want to get together to exchange programs and ideas should contact Tom Selby, 16 Candlemans Place, Westwood Road, Southampton (Tel: 0703 552830).

Reviews
software

Alien Intruder

Carnell Software, 4 Staunton Road, Slough, Berkshire SL2 1NT.
ZX81, 16K cassettes.
Price: £5 each + 50p p & p.

Alien Intruder is based loosely on the film *Alien*. You are on board an Explorer-type spacecraft. A bloodthirsty alien is hunting for you, after massacring the rest of the crew. As you stumble around the different levels of the spacecraft, looking for the escape shuttle, you will find various weapons to help you fight the monster, along with objects needed for your voyage after escaping.

The alien is suitably frightening when it finally confronts you and, as in the film, is immortal. You can only scare it away temporarily — it will keep coming back to terrorise you!

On side 2 of this tape is *Hieroglyphics*. This is very similar to Carnell's *Hangman* program, which was the support for *Volcanic Dungeon* on the previous tape.

Here, the player is presented with several graphic symbols, and then given a list of words, with the graphic symbols replacing the letters. As the code is broken, the letters may be inserted beneath the symbols, to be used in decoding successive words. The hangman element is replaced in this version, by a graphic representation of Wullie Makeit, the famous Scottish archaeologist, being slowly buried alive.

With each wrong guess, a block of sand inches along a gangplank, to finally fall on poor Wullie's head, eliciting suitable comment from the poor man. In *Hangman,* the victim's last words were, "Snap . . . aargh" — here they are, "Och, that sand's rough . . . gurgle". Very amusing, and draws forth shrieks of delight from the kids.

Wumpus Adventure is Carnell's version of the old favourite, and the least successful of the three tapes. The player is set loose in a system of caves, in the hunt for Wumpuses (Wumpi?), and is provided with weapons to kill the dreaded monsters (can anyone tell me what they *are*?).

My main criticism is that the player is not given enough information about the location of these deadly hazards. One wrong guess and you are dead, with no opportunity for combat. However, a challenging game — for one or more players.

On the reverse side of the tape is *Movie Mogul,* an hilarious role-playing game. You are cast as a Big-Time Film Producer, and are given a budget with which to make a film. Natural and fiscal disasters occur regularly during filming. That the film gets finished at all is a miracle, but then one has to try and make a profit from the released film.

Both the latest additions to Carnell's range include a loading program at the start of each tape. It is 75 seconds long and will enable you to set the volume of your tape machine before loading the main program.

Summary
A varied mix from Carnell, all featuring imaginative responses and graphics, and all of them good games, for all ages (*Heiroglyphics* is particularly good for children). I shall eagerly await Carnell's forthcoming 64K adventure, *Black Crystal,* which will be available for both the ZX81 and Spectrum. **TB**

Drawing Board

Cadsoft, 24 St James Street, Cheltenham, Gloucestershire.
ZX81, 16K, cassette.
Price £4.00.

Beneath the nausea-inducing yellow-green of the cassette art-work lies a tape which will become an essential aid for the programmer.

There are many programs available today which enable the ZX user to draw pictures with his computer. The better ones allow the user to *Save* his creations on tape for future viewing. Drawing-Board offers far, far more.

On loading, a grid appears (the program did not *Auto-run*, as promised), and a flashing pixel can then be moved with the cursor keys, drawing a black line as it goes. Using the grid, one can plan pictures in advance.

There are many commands available to the user, most of them on the named keys. Thus, *Plot* (ie draw) is executed with the "Q" key, while *Unplot* (ie erase) is executed with the "W" key. While erasing, one is effectively "drawing" with a white line, and a command is available to fender the whole screen in black, in order to check the erasing process.

As well as the basic black pixel, you are able to use any of the letters, numbers and graphics characters available on the ZX81's keyboard. Certain combinations or strings of characters can also be repeated around the screen.

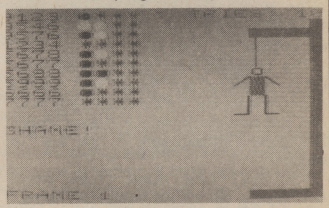
Now the program gets really interesting. Up to six pictures may be held in a store and recalled at anytime. In addition, two pictures can be merged. As far as I know this is a unique feature, and an extremely useful one.

One picture is termed the foreground picture, and the other the background picture. The foreground may be moved up, down and sideways until in the correct position against the background, and the resulting composite placed in the store. In this way a picture may be built up from many smaller ones.

All these pictures may be copied to a printer, or *Saved* for future use.

Probably the most powerful command in this program is the "place in *Print* statement" routine. As it says, this command will place up to five of the stored pictures into *Print* statements in your own program. Having struggled myself for hours trying to construct graphics in *Basic*, this, I am sure, will be a boon to many programmers.

Summary
Detailed and thoughtful instructions that leave nothing to chance, together with the information displayed on-screen throughout, make this program easy to use. **TB**



Vicpendium

Opus 2 Software, 525/531 London Road, Westcliff-on-Sea, Essex.
Vic20, cassette.
Price: £7.95.

Vicpendium 1 is a cassette on which there are four games — Gorgon's Tomb, Invaders, Othello and Digitman, a combination of Mastermind and Hangman.

Gorgon's Tomb is no more than another version of a maze program. You have 30 seconds to memorise the maze before it disappears from the screen. You must then try and find the hidden treasure, picking up talismen as you go. Not a very exciting game.

Invaders, the program which Opus 2 calls "the original game", was far too slow. Missiles fired by the player and the aliens passed through each other without cancelling each other out.

Othello was a poor version of the game. The program was slow to respond and included a silly rule concerning invalid moves.

Digitman produced the greatest amusement, because there were few, if any, error traps.

Summary
A poor set of programs that are over priced. To have no defined graphics in a space invaders type of game, only oval blobs, makes one suspicious of the value of the other programs. **BA**

Reviews
hardware

Video Inverter

D Fritsch, 6 Stanton Road, Thelwall, Warrington, Cheshire WA4 2HS.
Price: kit £4, ready built and attached to a ZX81 £7.50.

This is one development for the ZX81 which most people will welcome. It inverts the normally black writing on white background into white writing on a black background. This is easier on the eyes and is also what most computers use.

But, unlike most inverters, this device has an added bonus. The inverter module actually sharpens the appearance of the picture on both normal and inverse modes. This gives a very crisp display.

The inverter is easy to fit, if you are willing to use a soldering iron, and the instructions are a model of clarity. Even a template, for marking out the hole to fit the switch at the back, has been provided.

There are only four connections to make. The printed circuit board is one inch long and is stuck to the top of the ULA by a sticky pad. The switch on the back is essential as it is difficult to see the *Saving* and *Loading* stripes in inverse video.

If you would like the inverter, but do not want to delve into the machine, the company will do all the work for you.

Summary
This is the first video inverter that I have found that also amplifies the video signal. This is because the design is based on a transistor array instead of the more usual TTL logic gates. The unit is simple and easy to fit and I would recommend it to anyone without hesitation. **SA**

BBC Programming

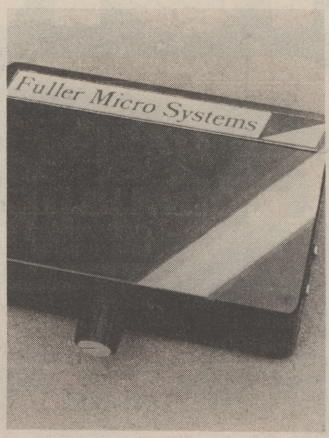
Published by Interface, 44-46 Earls Court Road, London W8 6EJ.
By Tim Hartnell.
Price: £6.45.

"Another great book from Interface Publications" screams the back cover. "This book by best-selling author Tim Hartnell is the ideal companion for you if the BBC Microcomputer is your first."

These claims are too generous. I would not have found this book too helpful had it been my first glimpse of computing.

Tim Hartnell's books are usually a collection of useful programs and they have normally arrived on the market so early that they are eagerly snapped up. In this BBC book, *Let Your BBC Micro Teach You To Program,* he has obviously determined to go a bit further by trying to give it the structure of a manual.

The first section dives straight in with the *Print* statement, closely followed by a short introduction to the *Editing* commands.



Fuller's high quality sound unit

Page by page, he then runs through most of the BBC Micro's Basic statements and commands. Most of the sections are accompanied by one or two illustrative programs.

Many of the listings offered very early in the book make use of some of the more advanced commands which are not explained until nearer the end of the book. For example, on page 18 he presents a listing for a game of Squash which is supposed to illustrate the use of the *Tab* statement. Unfortunately, the listing includes the use of Modes, variables, string variables, procedures, Repeat . . . Until, *FX, If . . . Then, Sound, Vdu and others, none of which are explained until later. As the introduction to the program says "This listing may look pretty horrifying at the moment. Once you have finished . . . the book . . . you will be surprised how much you can decipher."

The author, of course, recognised the limitations of his approach and refers the reader back to the BBC manual at several points in the text.

Summary
BBC Basic is too complex to be explained in detail in a 200-page book. The breathlessness of the explanations given are more likely to confuse than clear the mind of a beginner.

The book is, however, well produced and all the programs have been reproduced direct from original printouts. It could, therefore, serve as a useful and interesting collection of 40 programs. The explanations of all the Basic commands could also offer an interesting alternative explanation, but only once the BBC manual has been read and mastered. **DS**

Fuller Sound Box

Fuller Micro Systems, The ZX Centre, Sweeting Street, Liverpool 2 (Tel: 051-236 6109).
Price: £5.95.

The sound on the Spectrum is not exactly brilliant. Inside there is only a small crystal speaker, activated by the *Beep* command. The Fuller sound box offers you an alternative speaker with higher quality reproduction and some volume control.

Those of you who have now received your Spectrums and have tested sound and music programs will know that the internal loudspeaker is not loud enough for any general use. There are, however, several ways round its limitations.

The sound signal is also transmitted through both the ear and mic sockets on the back of the Spectrum. It is not normally possible on cheap cassette recorders to play a signal directly through the recorder's own speaker. You can, however, record your sound on tape and then play it back.

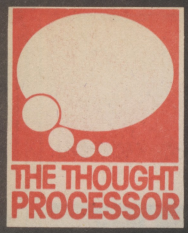
This is not very useful for those games which need the sound to accompany the program — such as a very loud game of Space Invaders. But, if you have a more sophisticated recorder, a hi-fi system or a music centre, then you will be able to play the sound directly through the speaker(s).

The advantages of the sound box are that it is small, convenient and relatively cheap. It is well constructed in a standard black plastic box 118mm × 78mm × 35mm. Across the top is a multi-coloured strip of paper, to remind you that it is for the Spectrum. On the front there is a knob for the volume control. The holes to allow the sound to escape from the internal speaker have been drilled underneath the box, which is supported by four rubber feet.

The box draws its power from the Spectrum's power pack. The lead from the power pack plugs into one side of the box. An identical lead from the other side is then plugged into the Spectrum. There is one further socket, into which you plug either the ear or mic lead from the Spectrum. This is for the sound signal.

There is a small circuit board inside the box to translate the signal from the Spectrum, and a cheap but quite adequate loudspeaker.

Summary
The Fuller sound box is a convenient and simple way of getting round some of the limitations of the Spectrum's sound facilities. **DS**



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PCWk1

Open Forum

Open Forum is for you to publish your programs and ideas.
It is important that your programs are bug free before you send them in. We cannot test all of them.
Contributions should be sent to: Popular Computing Weekly, *Hobhouse Court, 19 Whitcomb Street, London WC2H 7HF.*

How to contribute

Each week the editor goes through all the programs that you send to Open Forum in order to find the Program of the Week.
The author of that program will qualify for DOUBLE the usual fee we pay for published programs.
(The usual fee is £10.)

Presentation hints

Programs which are most likely to be considered for the Program of the Week will be computer printed and accompanied by a cassette.
The program will be well documented, the documentation being typed with a double spacing between each line.
The documentation should start with a general description of the program and then give some detail of how the program has been constructed and of its special features.
Listings taken from a ZX Printer should be cut into convenient lengths and carefully stuck down on to white paper, avoiding any creasing.
Please enclose a stamped, self-addressed envelope.

Smashout

on Spectrum

This program runs on a 16k Spectrum. It is a version of the arcade game Breakout. Every brick destroyed is worth 10 points. An extra ball is given if you reach 900 points. This is achieved by clearing one sheet.

The program makes use of the sound and colour of the ZX Spectrum. Instructions are contained in the program to tell you which keys move up and down.

Program Notes

Lines

5 Sets up a random border and sets the paper to blue.

60-90 Sets up the playing area.

100 Checks for obstacle in ball's way. If it is a brick then 10 is added to the score, makes a noise and rebounds ball.

110-130 If balls hit border then rebounds ball and makes a noise.

600 If ball hits bat then rebounds ball.

605 If sheet is cleared then plays tone and sets up extra ball and resets playing area.

Smashout
by John Reynolds

```
    1 REM SMASHOUT
    2 CLS : GO TO 8000
    5 LET r=INT (RND*6)+1: BORDER
r: PAPER 1
   10 LET b=1
   20 LET a=2
   30 LET c=1
   40 LET d=1
   50 LET p=8
   60 LET o=p
   62 LET s=0: LET f=7
   63 LET e=1
   65 INK 4: PRINT "
                    "
   66 FOR y=1 TO 15: PRINT TAB 31
;"": NEXT y
   67 PRINT "
                    "
   70 FOR y=1 TO 15: INK (INT (RN
D*6)+2): PRINT AT y,20;"#": PRIN
T AT y,21;"#": PRINT AT y,22;"#"
: NEXT y
   80 FOR y=1 TO 15: INK (INT (RN
D*6)+2): PRINT AT y,27;"#": PRIN
T AT y,28;"#": PRINT AT y,29;"#"
: NEXT y
   90 PRINT AT 19,3;"Score
   Ball"
   94 INK 7: PRINT AT 20,5;s;AT 2
0,18;e
   95 GO TO 200
  100 IF SCREEN$ (a,b)="#" THEN L
ET d=-d: BEEP .01,2: LET s=s+10
  102 PRINT AT a,b;"O"
  104 LET k=a: LET j=b
  105 LET a=a+c
  110 IF a>=15 OR a<=1 THEN LET c
=-c: BEEP .01,1
  125 LET b=b+d
  130 IF b>=30 OR b=1 THEN LET d=
-d: BEEP .01,2
  140 IF b=1 THEN GO SUB 600
  150 PRINT AT k,j;" "
  160 IF INKEY$="6" AND p<13 THEN
 LET p=p+1: GO TO 200
  170 IF INKEY$="7" AND p>1 THEN
LET p=p-1: GO TO 200
  180 GO TO 100
  200 PRINT AT o,1;" ": PRINT AT
o+1,1;" ": PRINT AT o+2,1;" "
  205 PRINT AT p,1;"  "
  210 PRINT AT p+1,1;"  "
  220 PRINT AT p+2,1;"  "
  230 LET o=p
  300 GO TO 100
  600 IF p=a OR p+1=a OR p+2=a TH
EN RETURN
  603 PRINT AT k,j;" "
  605 IF s=900 THEN CLS : LET f=f
+1: FOR v=1 TO 30: BEEP .1,INT (
RND*60): NEXT v: GO TO 65
  607 LET a=INT (RND*3)+2
  610 LET e=e+1: IF e>=f THEN GO
TO 900
  620 PRINT AT 20,5;s;AT 20,18;e
```

Open Forum

Lunar Lander

on BBC Micro

This program will run on either the Model A or B BBC microcomputer.

Can you land the Lunar Module on the moon without crashing it? To play the game you select your thrust (1-8) of the rockets on your Lunar Module. Z, X and C are your controls. Z is left, C is right and X is vertical thrust.

The program was actually written on a model B and uses mode 0 in line 15. To run the program on a model A change line 15 to mode 4. You have to sacrifice colour but you get a higher screen resolution.

Program notes

Lines

10-26 set up the screen and game variables.
30-70 read and plot the landscape.
80-110 set up the array to check for a good landing.
120-170 plot over the old landing ship.
180-230 plot a new landing ship.
240-280 check to see if the landing ship has crashed.
290-400 read in control information from the keyboard and change the fuel, thrust and vertical speed.
410-430 check to see if the landing ship has left the screen limits.
440-520 print out your landing information and then goes back to line 120.
530-600 check for a good landing or a crash landing.
610-700 make explosions if you have crashed.

Good luck. A successful landing needs a vertical velocity of less than 2 and horizontal velocity of 0 and, of course, a landing pad underneath.

```
 850 PRINT AT 21,0;"Press Break
for next ball": IF INKEY$<>" " T
HEN GO TO 850
 860 PRINT AT 21,0;"
                   ": GO TO 100
 900 PRINT AT 10,4;"GAME OVER":
BEEP .3,INT (RND*12): IF INKEY$=
"r" THEN GO TO 925
 905 PRINT AT 20,5;s;AT 20,18;e
 910 PRINT  AT 10,4;"GAME OVER":
 BEEP .5,INT (RND*12): GO TO 900
 925 RUN
8000 BRIGHT 1: PRINT TAB 9;"SMAS
HOUT";TAB 9; INK 3;"********"
8010 PRINT AT 3,8;"By J.Reynolds
"
8050 PRINT
9000 BRIGHT 0: INK 7: PAPER 1: B
ORDER 2
9005 PRINT TAB 9;"Instructions":
 PRINT TAB 9;"            "
9010 PRINT : PRINT "  To control
 the bat use the      following K
EYS:"
9020 PRINT : PRINT "6 moves the
BAT down": PRINT : PRINT "7 move
s the BAT up"
9030 PRINT : PRINT "  Bonus play
er at 900"
9035 PRINT : PRINT "Press R for
a new game"
9037 FOR e=1 TO 40: IF INKEY$<>"
" THEN BEEP .1,INT (RND*40): NE
XT e
9040 PRINT AT 21,0;"Press any ke
y to start": IF INKEY$<>"" THEN
GO TO 9050
9045 GO TO 9040
9050 CLS : GO TO 5
```

Machine code

on Vic20

Most of the small micros around (BBC and Atom excepted) are totally *Basic* oriented. This is hardly surprising as the idea is to encourage beginners. This leads to problems, though, when machine code is used with *Basic*. Where can it be stored so that no corruption or overwriting occurs?

The Vic comes with 3.5K as standard, but this can be expanded with 3K, 8K and 16K to give a maximum usable of 28K with 3K lying spare. This 3K becomes free (from *Basic*) when more than 3K expansion memory is added, so the problem only occurs with 3.5K or 6.5K Vics.

The Sinclair method of *Pokeing* machine code after *Rem* statements can be used, but it is a very tricky operation as no 0 value bytes must be used. If they are used the *Basic* will treat them as end-of-line markers and act very strangely with a very high probability of losing the program when reloaded after saving.

What seems to be the safest way is to trick *Basic* into thinking it has less *Ram* and then using the *Ram* this leaves free.

On both 3.5K and 6.5K Vics the top of memory is at address 7680. This value is held in locations 55 and 56 (enter *Print*

Lunar Lander
by Ben Randall

```
10CLS
15MODE0
17VDU19,3,2,0,0,0:VDU19,2,1,0,0,0
20HS=5:VS=0:X=100:Y=900:FU=300:MX=100:MY=900:
  DI$="V":TH=0:DIML(6):TIME=0
26 FU=1300
30FOR A=25 TO 1250 STEP 25
40READ P:PLOT5,A,P*15
50NEXT A
55 DATA 5,10,10,15,21,27,21,15,16,18,21,23,23,29,23,18
60DATA 15,10,5,3,2,2,3,6,12,6,13,17,20,20,25,30,22,22,14
70DATA 9,6,8,6,4,8,8,4,5,6,10,15,21,24,30
80FOR A=1 TO 6
90READ L(A)
100NEXT A
110DATA 50,300,525,725,825,1025
120REM PLOT OVER OLD SHIP
130PLOT 71,MX,MY
140PLOT 7,MX+5,MY+15
150PLOT 7,MX+10,MY
160PLOT 7,MX+5,MY+5
170PLOT 7,MX,MY
180REM PLOT NEW SHIP
190PLOT 69,X,Y
200PLOT 5,X+5,Y+15
210PLOT 5,X+10,Y
```

To next page

Peek(55)+ 256***Peek*(56) to see this). This value can be changed by a *Poke*.

```
POKE 56,28
CLR
PRINT FRE(0)
```

This will show that your memory (for *Basic* programs) has dropped by 512 bytes. The value in 55 and 56 will now be 7168.

You can now *Poke* values into locations 7168 up to 7679 (not 7680).

It is a fairly simple task to save character sets and/or machine code on to tape just like a *Basic* program, so that they can be reloaded and not need to be *Poked* into memory. A program which used special characters can save a lot of memory by having the character set on tape before the program. This saves a lot of memory which is now not needed for the *Data* statements.

Here is how to save an area of memory from address A to address B. Before doing the following ensure that the area has been protected as in the first part of this article.

Enter the following lines at the keyboard directly without putting in line numbers:

```
N$ = "CHARSET"
L = LEN (N$)
POKE 183,L
FOR I = 1 TO L:POKE 672 +I,ASC
(MID$(N$,I)):NEXT
POKE 187,161:POKE 188,2
POKE 193,0:POKE 194,28
POKE 174,0:POKE 175,30
POKE 185,1:POKE 186,1
SYS 63109
```

At this point your Vic will say the usual 'Press record and play on tape' and when you do this your character set or whatever will be saved on cassette. It can be reloaded by the usual *Load* command, but make sure you enter *New* afterwards because the end of program pointers will go funny and give weird values when you print *Fre(0)*. Typing in *New* will not lose your character set, but after loading, enter the *Pokes* needed to protect, before running any more programs. You can load *Basic* programs so long as they are not too big.

The above pokes can be altered for your own programs as follows:

LOCATION	WHAT IT DOES
183	Length of file name.
187-188	Two byte address of file name.
673-767	An area of memory that is totally free (used in the example above for the file name).
193-194	Address of start of memory to be saved.
174-175	Address of end of memory to be saved.
185	Must be 1. (Changed by LOADS etc.)
186	Must be 1.

Note that 174 and 175 must point to the end of memory +1, or else you will lose the last byte of your saved memory. The values I used above (0,28) for 193 and 194, and (0,30) for 174 and 175 will save memory from 7168 to 7680.

```
220 PLOT 5,X+5,Y+5
230PLOT 5,X,Y
240REM CHECK GROUND BELOW AND SIDES
250FOR A=1 TO10
260P=POINT(X+A,Y-5):PL=POINT(X-5,Y+A):PR=POINT(X+15,Y+A)
270IF P<>0 OR PL<>0 OR PR<>0 THEN 530
280NEXT A
290G$=INKEY$(1)
300MX=X:MY=Y
310IF G$="Z"THEN DI$="L"
320 IF G$="X"THEN DI$="V"
330IF G$="C"THEN DI$="R"
350 IF VAL(G$)>0 AND VAL(G$)<9 THEN TH=VAL(G$)/2
355 IF G$="0" THEN TH=0
360FU=FU-TH:IF FU<0 THEN FU=0:TH=0
370VS=VS+3:IF DI$="V" THEN VS=VS-TH
380 IF VS>15 THEN VS=15
390IF DI$="R"THEN HS=HS+TH
395 IF DI$="L" THEN HS=HS-TH
400X=X+HS:Y=Y-VS
410REM SCREEN LIMITS
420IF X<10 OR X>1257 THEN X=MX
430IF Y>1000 THEN Y=MY
440REM INFORMATION
450PRINTTAB(22,2);"TIME:";INT(TIME/100)
460PRINTTAB(22,3);"V.VELOCITY:";VS;"      "
470 PRINTTAB(22,4);"H.VELOCITY(";:IF HS>0 THEN PRINT">";
475 IF HS<0 THEN PRINT"<";
480PRINT");";ABS(HS);"        "
490PRINTTAB(22,5);"HEIGHT:";Y;"m";"       "
500PRINTTAB(22,6);"FUEL LEFT:";FU;"    "
510PRINTTAB(22,7);"THRUST:";TH;"    "
520GOTO 120
530REM
535 N=0
536 IF VS>2 THEN 640
540FOR B=1 TO 6
550IF X>L(B)AND X<L(B)+15 THEN N=10
560NEXT B
565 IF N=10THEN 570 ELSE640
570PRINTTAB(13,16);"A GOOD LANDING"
580J=INKEY(10200)
590MODE 4
600 END
610MX=100:X=100:MY=900:Y=900
620FU=FU+100
630RESTORE:GOTO  30
635 SOUND 0,-15,254,20
640 SOUND 0,-15,254,40
641FOR C=1 TO 20
650U=RND(200):V=RND(200)
660PLOT69,X+5,Y+5
670PLOT 5,(X+95)-U,(Y+105)-V
680NEXT C
690X=INKEY(1000)
700MODE 4:END
```

Chas And I

on ZX81

This program takes about one hour to enter but is good fun and worth the effort.

Start by entering lines 100-110 and 400-420. Then as each line of the picture is added it can be checked by running the program to ensure that it builds up correctly.

Readers may create animation effects by making the lips move and/or printing speech on lines 20 and 21, which have been left clear.

The heads can be printed separately by changing line 410 as follows:
PRINT A$(L, TO16) or
PRINT A$(L, 17 TO)

To make the picture rise from the bottom of the screen, add this line:
405 SCROLL.

Hi-Res Sketcher

on Vic20

This program allows the use of hi-resolution graphics on the unexpanded Commodore Vic20. It uses the Vic's in-built facility for hi-res graphics and provides a resolution of 64 by 176. The program can be controlled using either the keyboard or a joystick.

The program works by bit mapping the screen. This involves giving every pixel on the screen its own bit in memory. To bit map the whole screen takes just over 4K of memory so only part of the screen is used and the Vic registers are used to centre the display to an 8 by 22 screen instead of a 23 by 22 screen.

The instructions are contained in the program. A breakdown of the main parts of the program is given below:

Line 10 moves down the start of the screen.
Line 20 this lowers the top of the memory to protect the hi-res area in the memory.
Line 35 gives a repeat key function.
Line 40 this changes the character memory pointer to the Ram.
Line 50 clears the hi-res screen.
Lines 70-90 fill the screen with characters for the hi-res to work on.
Line 100 horizontal and vertical position of dot.
Lines 110-230 get the direction from the keyboard or joystick.
Lines 240-280 calculate the bit needed using the following routine:

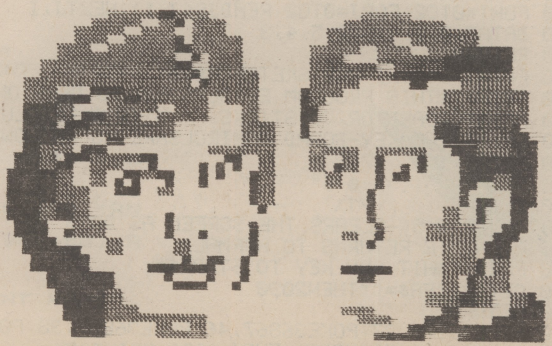
```
Character=Int(X/8)*8*Int(Y/8)
Row=(Y/8-Int(Y/8)*8
Byte=7168+Character*8+Row
Bit=7-(X-(Int(X/8)*8))
Poke Byte,Peek(Byte) or (2↑Bit).
```

Subroutine 1000 sets up joystick variables.

To next page

Chas And I
by Diane Cox

```
100 REM CHAS AND I
110 DIM A$(20,32)
120 LET A$(1)="
130 LET A$(2)="
140 LET A$(3)="
150 LET A$(4)="
160 LET A$(5)="
170 LET A$(6)="
180 LET A$(7)="
190 LET A$(8)="
200 LET A$(9)="
210 LET A$(10)="
220 LET A$(11)="
230 LET A$(12)="
240 LET A$(13)="
250 LET A$(14)="
260 LET A$(15)="
270 LET A$(16)="
280 LET A$(17)="
290 LET A$(18)="
300 LET A$(19)="
310 LET A$(20)="
400 FOR L=1 TO 20
410 PRINT A$(L)
420 NEXT L
```



Open Forum

Subroutine 2000 prints out the instructions.
Subroutine 3000 returns the Vic back to normal.

Variables used in the program are as follows:

X—horizontal position of dot.
Y—vertical position of dot.
I—For/next loops.
DD—Data direction registers for joysticks (37154).
PA—Joystick register A (37137).
PB—Joystick register B (37152).

L—Joystick input.
D—Keyboard input.
CH—Character of dot.
RO—Row of dot.
BY—Byte of dot.
BI—Bit of dot.
JS—Joystick array.

Hi-Res Sketcher
by Simon Parker

```
0 REM***HI-RES SKETCHER***BY SIMON PARKER****4/1982****.
5 GOSUB2000
10 POKE36865,60
20 POKE52,24:POKE56,24:CLR
30 GOSUB1000
35 POKE650,255
40 POKE36869,254:POKE36866,PEEK(36866)OR128:POKE36867,144
50 FORI=6144TO7679:POKEI,0:NEXT
60 POKE36879,143:PRINTCHR$(147)
70 FORI=0TO21:FORM=0TO22
80 POKE7680+M*22+I,I*8+M
90 NEXT:NEXT
100 X=164:Y=32
110 POKEDD,127:S3=-((PEEK(PB)AND128)=0):POKEDD,255
120 P=PEEK(PA):S1=-((PAND8)=0):S2=((PAND16)=0):SO=((PAND4)=0)
130 FR=-((PAND32)=0):A=S2+S3:B=SO+S1
140 L=JS(A+1,B+1)
145 GETA$:D=VAL(A$):IFA$="E"THEN3000
150 IFL=2ORD=6THENX=X+1:GOTO240
160 IFL=0ORD=8THENY=Y-1:GOTO240
170 IFL=4ORD=2THENY=Y+1:GOTO240
180 IFL=6ORD=4THENX=X-1:GOTO240
190 IFL=1ORD=9THENY=Y-1:X=X+1:GOTO240
200 IFL=3ORD=3THENY=Y+1:X=X+1:GOTO240
210 IFL=5ORD=1THENY=Y+1:X=X-1:GOTO240
220 IFL=7ORD=7THENY=Y-1:X=X-1:GOTO240
230 IFFR=1ORD=5THEN50
240 CH=INT(X/8)*8+INT(Y/8)
250 RO=(Y/8-INT(Y/8))*8
260 BY=6144+CH*8+RO
270 BI=7-(X-(INT(X/8)*8))
280 POKEBY,PEEK(BY)OR(2↑BI)
290 GOTO110
1000 DIMJS(2,2):POKE37139,0:DD=37154:PA=37137:PB=37152
1010 FORI=0TO2:FORJ=0TO2:READJS(J,I):NEXTJ,I
1020 DATA7,0,1,6,8,2,5,4,3
1030 RETURN
2000 PRINT"■***HI-RES SKETCHER***"
2010 PRINT"■THIS PROGRAM ENABLES YOU TO DRAW ON THE SCREEN USING THE KEY'
2020 PRINT"BOARD OR JOYSTICKS    WITH A RESOLUTION OF  64 BY 176."
2030 PRINT"THE KEY-BOARD CONTROLSARE AS FOLLOWS:-"
2040 PRINT"■     7 8 9                    \|/"
2050 PRINT"      4-●-6"
2060 PRINT"       /|\                   1 2 3"
2070 PRINT"■'5'-CLEARS THE SCREEN AS DOES THE 'FIRE'    BUTTON."
2075 PRINT"'E'RETURNS TO NORMAL"
2080 PRINT"■HIT ANY KEY TO START■"
2090 GETA$:IFA$=""THEN2090
2100 RETURN
3000 POKE36879,27:POKE36867,46:POKE36865,38:POKE36869,240
3010 POKE198,0:PRINT"■":END/ 3020 PRINT"■"
```

Scene

on Spectrum

This program will demonstrate how good the new Sinclair micro's hi-resolution colour graphics really are.

When *Run* it starts by drawing the sky and ground and then plots a light snowfall on the ground. Then it proceeds to draw a road and rainbow in perspective.

Finally, after an approximate pause of 10 seconds, night falls on the scene and the moon and randomly twinkling stars place themselves in front of the eyes of the viewer. Then the scene turns to daytime and the program starts again.

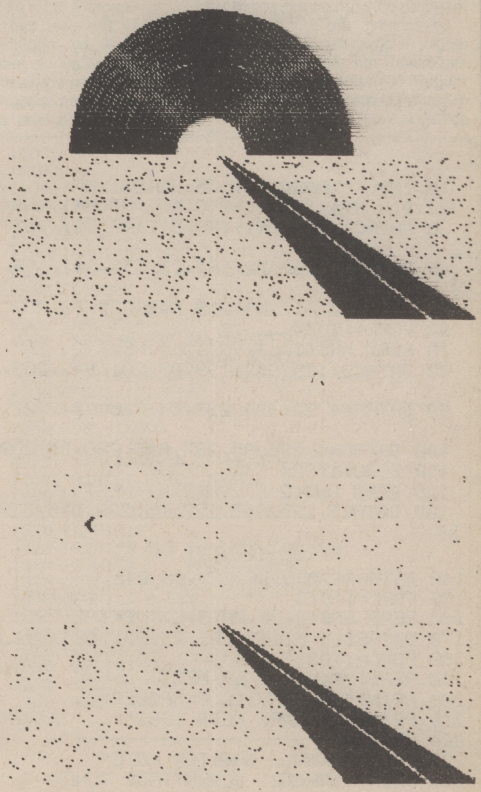
Program notes

Lines 60-80 define the character for the moon.
Line 110: In between the quotes are 32 spaces.
Line 135 is the number of snowflakes to be plotted. The variable "N" can be adjusted for more or less density.
Lines 160-210 draw the road and line 185 misses out three lines to represent the line down the middle of the road.
Line 350 sets the colours of the rainbow.
Line 490 resets the colours of the rainbow in the data in line 350.
Line 9999 resets the colours of the screen to a readable white paper and black ink. This should be obtained by a *Goto* statement followed by 9999 after pressing *Break* to stop the program.

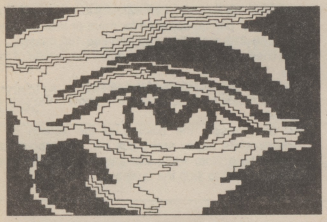
PROGRAM OF THE WEEK

Scene
by Tim Whittaker

```
   10 REM      "scene"
   20 REM by T.M.Whittaker
   30 REM    © T.M.W-1982
   40 REM
   50 REM character
      initialisation
   60 FOR r=0 TO 7
   65 READ a: POKE USR CHR$ (144)
+r,a
   70 NEXT r
   80 DATA BIN 00001100,BIN 00011
000,BIN 00110000,BIN 01110000,BI
N 01110000,BIN 00110000,BIN 0001
1000,BIN 00001100
   90 REM SKY AND GROUND
  100 PAPER 5:: BORDER 1: CLS
  105 FOR n=11 TO 21
  110 PRINT PAPER 4;AT n,0;"
  120 NEXT n
  130 REM snow
  135 FOR n=1 TO 500: REM
approximately 1/2 a minute
  136 BRIGHT 1: INK 7
  140 LET y=RND*86: LET x=RND*254
  150 PLOT INK 7;x,y: NEXT n
  160 REM road
  170 INK 0: PAPER 7
  175 LET x=-70
  180 FOR n=185 TO 255
  185 IF n=230 OR n=231 OR n=229
THEN GO TO 210
  190 PLOT n,0
  200 DRAW x,86
  205 LET x=x-1
  210 NEXT n
  250 REM rainbow
  260 LET a=90: LET r=40:
  270 FOR m=1 TO 5
  280 READ c: INK c
  290 FOR n=1 TO 10
  300 PLOT a,88: DRAW r,0,-PI
  310 LET a=a-1: LET r=r+2
  320 NEXT n
  330 NEXT m
  350 DATA 2,6,4,1,3
  400 REM Night
  410 PAUSE 500
  430 FOR n=0 TO 10: PRINT PAPER
0;AT n,0;"
                ";: NEXT n
  440 FOR n=1 TO 75
  450 PLOT INK 6;RND*254,(RND*70)
+104: NEXT n
  460 PRINT PAPER 0; INK 6;AT 4,5
;"A": REM GRAPHIC "A"
  464 FOR m=1 TO 300
  470 PLOT INK 6;(RND*190)+60,(RN
D*70)+104
  475 INK 0: PLOT (RND*190)+60,(R
ND*70)+104
  480 NEXT m
  490 RESTORE 350
  500 FOR n=0 TO 10: PRINT PAPER
5;AT n,0;"
                ": NEXT n
  510 GO TO 250
9999 PAPER 7: INK 0
```



Sound & vision



Name that tune on your Vic

This routine enables the user to write, play and save musical compositions on a Vic20. The program occupies 3.2K and will therefore only run on expanded Vics.

On running, the program asks for the length of composition. On a Vic with 3K expansion the maximum tune size is roughly 55 notes. The program is menu driven and has the following commands:

a) *Key in tune.*

The user is asked to enter the composition note by note. Each "voice" (1, 2 and 3) can be programmed and they carry the following octaves:

Voice 1: C1 to B3 (2 octaves)
Voice 2: C3 to B5 (2 octaves)
Voice 3: C5 to C6 (1 octave)

The note name is entered followed by its octave, eg, D2. Sharpened notes are entered in a similar way, eg C#4. Flattened notes are entered as the corresponding sharp, eg A3 flat = G#2. If the voice is to be silent then input S.

This is repeated for each voice giving a one, two or three voice note. Once the voices have been defined, the "value" of the note is input. Five values are allowed and the note can be dotted giving a further five values. A rest can be played by inputting S for all three voices.

The user can leave this mode at any time by inputting "Q". This gives the opportunity to test the tune. The mode can be re-entered using *Continue tune.*

b) *Tempo change.*

This command sets the duration of the longest note. All other notes are played at the correct speed relative to this base rate. The input value is a simple integer, eg 500, 2100.

c) *Play tune.*

This plays the tune at the required tempo. The number of each note is displayed in the top left-hand corner as the note is played.

d) *Single step.*

This command plays the tune note by note. The "S" key is pressed to step through the tune. Again, the note number is displayed. This instruction enables the user to locate incorrect notes.

e) *Alter note.*

This allows the alteration of specific notes in the tune.

f) *Continue tune.*

This resumes the keying in phase after the last note written.

g) *Record to tape & Load tune.*

Saves and loads the tune on cassette.

h) *New tune.*

Resets for a new composition.

Alan Webb

```
 10 INPUT"■MAX. NO. OF NOTES";MN
 20 DIM NT$(3,MN),NV(3,MN),ND(MN),NN$(3,24),VN(3,24),ND$(MN)
 30 DATAC1,135,C#1,143,D1,147,D#1,151,E1,159,F1,163,F#1,167,G1,175,G#1,179,A2,18
3
 40 DATAA#2,187,B2,191,C2,195,C#2,199,D2,201,D#2,203,E2,207,F2,209,F#2,212,G2,21
5
 50 DATAG#2,217,A3,219,A#3,221,B3,223
 60 FORL=1TO24
 70 READ NN$(1,L),VN(1,L):NEXT
 80 DATAC3,195,C#3,199,D3,201,D#3,203,E3,207,F3,209,F#3,212,G3,215,G#3,217,A4,21
9
 90 DATAA#4,221,B4,223,C4,225,C#4,227,D4,228,D#4,229,E4,231,F4,232,F#4,233,G4,23
5
 100 DATAG#4,236,A5,237,A#5,238,B5,239
 110 FORL=1TO24
 120 READ NN$(2,L),VN(2,L):NEXT
 130 DATAC5,225,C#5,227,D5,228,D#5,229,E5,231,F5,232,F#5,233,G5,235,G#5,236,A6,2
37

140 DATAA#6,238,B6,239,C6,240
150 FORL=1TO13
160 READ NN$(3,L),VN(3,L):NEXT
170 DATASB,1,MI,.5,CR,.25,QU,.125,SQ,.0625
180 FORL=1TO5
190 READTY$(L),DU(L):NEXT
200 PRINT"■■■■■MUSIC COMPOSER"
210 PRINT"■■■■■A. WEBB 1982"
220 PRINT"──────────────────────"
230 PRINT"■■■■1. ■A■TER NOTE"
240 PRINT"■■■■2. ■C■ONTINUE TUNE"
250 PRINT"■■■■3. ■K■EY IN TUNE"
260 PRINT"■■■■4. ■L■OAD TUNE"
270 PRINT"■■■■5. ■N■EW TUNE"
280 PRINT"■■■■6. ■P■LAY TUNE"
290 PRINT"■■■■7. ■R■ECORD TO TAPE"
300 PRINT"■■■■8. ■S■INGLE STEP"
310 PRINT"■■■■9. ■T■EMPO CHANGE"
320 GETI$:IFI$=""THEN320
330 IFI$="L"THEN1300
340 IFI$="K"THEN420
350 IFI$="T"THEN660
360 IFI$="P"THEN680
370 IFI$="N"THENRUN
380 IFI$="C"THEN420
390 IFI$="S"THEN800
400 IFI$="A"THEN960
410 IFI$="R"THEN1190
420 CO=CO+1
```

Sound & vision

```
430 PRINT"■NOTE";CO:PRINT"■■(INPUT 'Q' TO
    QUIT)■":FORL=1TO3
440 PRINT"VOICE";L;:INPUTNT$(L,CO)
450 IFNT$(L,CO)="Q"THENCO=CO-1:GOTO200
460 IFNT$(L,CO)="S"THENNV(L,CO)=0:GOTO520
470 J=1
480 IFNT$(L,CO)=NN$(L,J)THEN510
490 J=J+1:IFJ<=24THEN480
500 PRINT"NOT ON THIS VOICE":GOTO440
510 NV(L,CO)=VN(L,J)
520 NEXT
530 PRINT"■■■RS■EMI ■B■REVE, ■MI■NIM"
540 PRINT"■■■■CR■OTCHET, ■QU■AVER"
550 PRINT"■■■■■RS■EMI ■Q■UAVER"
560 INPUT"■NOTE NAME";ND$(CO)
570 J=1
580 IFND$(CO)=TY$(J)THEN610
590 J=J+1:IFJ<=5THEN580
600 PRINT"NO SUCH NOTE":GOTO530
610 ND(CO)=DU(J)
620 INPUT"DOTTED";I$
630 IFI$="Y"THENND(CO)=ND(CO)*1.5
640 CO=CO+1:IFCO=MN+1THENCO=CO-1:GOTO200
650 GOTO430
660 INPUT"■TEMPO";TE
670 GOTO200
680 POKE36878,12:PRINT"■NOTE":FORL=1TOCO
690 PRINT"■"TAB(5)L:POKE36874,NV(1,L)
700 POKE36875,NV(2,L)
710 POKE36876,NV(3,L)
720 FORJ=1TOTE*ND(L):NEXT
730 NEXT
740 POKE36874,0
750 POKE36875,0
760 POKE36876,0
770 POKE36878,0
780 GOTO200
800 POKE36878,12:PRINT"■NOTE":L=1
810 PRINT"■"TAB(5)L
820 GETI$:IFI$=""THEN820
830 IFI$="S"THEN860
840 IFI$="Q"GOTO200
850 GOTO820
860 POKE36874,NV(1,L)
870 POKE36875,NV(2,L)
880 POKE36876,NV(3,L)
890 FORJ=1TOTE*ND(L):NEXT
900 POKE36874,0
910 POKE36875,0
920 POKE36876,0
930 L=L+1:IFL<CO+1THEN810
940 POKE36878,0
950 GOTO200
960 INPUT"■NUMBER OF NOTE";NU
970 PRINT"■CHANGE NOTE";NU:PRINT"■■(INPUT
    'Q' TO QUIT)■":FORL=1TO3
980 PRINT"VOICE";L;:INPUTNT$(L,NU)
990 IFNT$(L,NU)="Q"THEN200
1000 IFNT$(L,NU)="S"THENNV(L,NU)=0:GOTO1060
1010 J=1
1020 IFNT$(L,NU)=NN$(L,J)THEN1050
1030 J=J+1:IFJ<=24THEN1020
1040 PRINT"NOT ON THIS VOICE":GOTO980
1050 NV(L,NU)=VN(L,J)
1060 NEXT
1070 PRINT"■■■RS■EMI ■B■REVE, ■MI■NIM"
1080 PRINT"■■■■CR■OTCHET, ■QU■AVER"
1090 PRINT"■■■■■RS■EMI ■Q■UAVER"
1100 INPUT"■NOTE NAME";ND$(NU)
1110 J=1
1120 IFND$(NU)=TY$(J)THEN1150
1130 J=J+1:IFJ<=5THEN1120
1140 PRINT"NO SUCH NOTE":GOTO1070
1150 ND(NU)=DU(J)
1160 INPUT"DOTTED";I$
1170 IFI$="Y"THENND(NU)=ND(NU)*1.5
1180 GOTO200
1190 PRINT"■INPUT FILENAME"
1200 INPUTFI$
1210 PRINT"■ PUT IN CASSETTE AND"
1220 PRINT"■     PRESS SPACE"
1225 GETII$:IFII$<>" "THEN1225
1230 OPEN1,1,1,FI$
1240 PRINT#1,CO:PRINT#1,TE
1250 FORL=1TOCO
1260 FORK=1TO3
1270 PRINT#1,NV(K,L):NEXT
1280 PRINT#1,ND(L):NEXT
1290 CLOSE1:GOTO200
1300 PRINT"■INPUT FILENAME"
1310 INPUTFI$
1320 PRINT"■ PUT IN CASSETTE AND"
1330 PRINT"■     PRESS SPACE"
1335 GETII$:IFII$<>" "THEN1335
1340 OPEN1,1,0,FI$
1350 INPUT#1,CO:INPUT#1,TE
1360 FORL=1TOCO
1370 FORK=1TO3
1380 INPUT#1,NV(K,L):NEXT
1390 INPUT#1,ND(L):NEXT
1400 CLOSE1:GOTO200
READY.
```

Learning to clock the right answer

Roger Swift introduces a program to learn multiplication tables.

I wrote this program so that my children could practise their times tables. It started as a standard program which allowed any amount of time for the answer to be entered.

But I once found my daughter was using a calculator to work out the answers and build up enormous scores. This program stops that sort of cheating by introducing a time element. If you answer the question correctly inside one second you score 10. For each second of delay the score for a correct answer drops by one.

Right answer

After 10 seconds, the program assumes you do not know the right answer and tells you what it is (after a short, rude noise). You get a percentage score after 10 questions and an invitation to try again. I have yet to score 100 percent.

The score is represented by s while c is the question count. Lines 130 to 180 print a rectangle of dots to illustrate the question. Line 1030 sets the time interval for the count down. Once you press the first digit of your answer you have a maximum of one second between subsequent digits (lines 1070 + 1120).

Bits 'n' pieces

Llamasoft offer a version of *Centipede* for the 16 or 48K Spectrum. The game is written by Jeff Minter.

For more details contact: Llamasoft Software, Lindon House, The Green, Tadley, Basingstoke (tel: 07356 5038).

Contribute!

You can share your own favourite Spectrum routines and programs with other readers by sending lists with explanations to us at *Popular Computing Weekly*.

WRITE TO: Spectrum, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.

```
   10 REM "fastables"
   20 LET s=0
   22 LET c=0
   25 INPUT "Please enter your na
me.";n$
   30 CLS
   32 LET c=c+1
   35 LET x=INT (RND*11+2): LET y
=INT (RND*11+2)
   40 PRINT AT 7,22;"score =";s
   50 PRINT AT 6,22;n$;"'s"
  100 PRINT AT 0,x/2;x
  110 PRINT AT y/2,x+1;y
  120 PRINT AT 1,0;
  130 FOR f=1 TO y
  140 PRINT
  150 FOR n=1 TO x
  160 PRINT " ■";
  170 NEXT n
  180 NEXT f
  200 PRINT AT y+5,x/2;x;" X ";y;
" = ?";
  210 GO TO 1000
  230 REM wrong answer or too slo
w
  240 LET s=s-1
  245 IF s<0 THEN LET s=0
  250 PRINT AT 7,29;s
  255 BEEP .5,-40
  260 PRINT AT y+7,x/2;"No, ";x;"
X ";y;" = "; FLASH 1;x*y
  265 PAUSE 300
  270 GO TO 350
  290 REM  correct answer
  300 BEEP .5,30
  305 PRINT AT y+7,x/2;"Well done
"
  310 LET s=s+q
  320 PRINT AT 7,29; FLASH 1;s
  330 PAUSE 100
  340 REM finish after 10 questio
ns
  350 IF c=10 THEN GO TO 2000
  360 GO TO 30
 1000 REM timing
 1010 LET q=10
 1020 PRINT AT 17,20;"0 score = "
;q;" "
 1025 IF q=0 THEN GO TO 240
 1030 PAUSE 50
 1040 IF INKEY$="" THEN LET q=q-1
: GO TO 1020
 1050 LET k=VAL INKEY$
 1055 PRINT AT y+5,x/2+10;k;
 1060 IF k=x*y THEN GO TO 300
 1070 PAUSE 50
 1080 IF INKEY$="" THEN GO TO 240
 1090 LET l=VAL INKEY$: PRINT l;
 1100 LET k=k*10+l
 1110 IF k=x*y THEN GO TO 300
 1120 PAUSE 50
 1130 IF INKEY$="" THEN GO TO 240
 1140 LET m=VAL INKEY$: PRINT m
 1150 LET k=k*10+m
 1160 IF k=x*y THEN GO TO 300
 1170 GO TO 240
 1999 REM finish
 2000 PRINT AT 10,0; FLASH 1;n$;"
, you score ";s;"%."
 2010 LET c=0: LET s=0
 2020 INPUT "again?";s$
 2030 IF s$(1)="y" THEN GO TO 30
 2040 STOP
```

Peek & poke

Peek your problems to our address. Ian Beardsmore will poke back an answer.

WATCH OUT I'M ON THE RAM-PAGE!

Dave Coomber of King Edwards Avenue, Leeds, writes:

Q I have recently read that the ZX Spectrum needs 7K of Ram to drive the colour screen. Yet Sinclair say in their adverts that 16K is available to the user. Who is right?

A Strictly speaking they both are. As the display on the screen changes, the screen locations have to be stored in the systems variables. On the ZX80 this took up just 40 bytes. On the ZX81 it rose to 125 and with the Spectrum it is nearly 7K bytes.

To be fair to Sinclair, they do make it clear that this is in fact the case. Their most common advertisement is the glossy handout which has a comparison chart. The third line of this chart reads 'Standard Ram available using high resolution Graphics — 9K'.

But, it is quite fair to say that 16K is available. It is just that you have to use 7K if you want good graphics.

RAM BAM THANK-YOU MAM!

Andrew Hooley, Branmay Drive, Tottington, Bury, Lancashire, writes:

Q I own a ZX80 with 16K Ram and new 8K Rom. At Christmas I got the Comp Shop's *Slow* mode kit. It is very good, but even before I got it I had trouble with my ZX80 crashing. It continued to crash after Christmas, with the *Slow* mode fitted.

In the end, I sent it back to Sinclair having banged it by accident. Two weeks later it came back and worked well for ten minutes. Then it crashed again. This was without the *Slow* mode attached.

It kept on crashing until eventually I could not get the cursor back. So I sent it back to Sinclair again.

Two weeks later it came back with a letter saying that the warranty had run out and it would cost £200 if I wanted them to repair it. Can you tell me if I should pay the money, as the computer was not working properly when it was returned the first time?

A Unfortunately, if your ZX80 did not work when it was returned the first time, then you should have returned it immediately. By not doing so, you have in effect accepted that the work they have done on it was satisfactory.

I can fully sympathise with you not wanting to send your computer back and be without if for yet more weeks. I mentioned the catch 22 of sending a computer back to Sinclair a few weeks ago. However, to be fair to them, the horror stories of six and eight weeks delays seem to have dried up in the last few months. They do seem to be a lot better now in returning things within a reasonable time.

But, this still leaves you with a computer that does not work, and one which will cost you £20 to put right again. Before you part with your £20, there are a few simple checks that can be made to see if there is a simple solution to your problems. The two obvious things to check are the Ram pack and the power supply lead. How well does you computer work without the Ram pack fitted?

The ZX80 is also infamous for overheating. The heat sink is on the left as you look at the computer, near the back. It is also therefore near the Ram pack. Too much heat will corrupt the Ram pack and cause a crash.

The other thing to check is the power supply unit. Though this has not caused as many problems in the 80 as the 81, it is not by any means unknown for an 80 to crash because the power supply jack was loose in the socket. This is more likely to happen if the Ram pack is attached. Remember the Ram is volatile, and needs to be constantly topped up to maintain its contents. Even the slightest loss of power can cause trouble.

If you find that overheating is the problem, then you must either keep something cold always on the left of the computer's 'hump' or try and dissipate the heat some other way. You can keep a supply of ice cubes in plastic containers in the computer, but this is cumbersome and dangerous. One drop of stray water can ruin your computer.

By far the most common remedy is to drill holes or cut slots above the heat sink. Indeed, I do not know of a ZX80 still in use that does not have this, or a similar, modification. It does of course void your guarantee, but as yours has expired it does not matter.

If you want to drill holes in the case, take the top off the computer by pressing out the centres of the white studs. At the back, near the I/O port, you will see a piece of aluminium rising up off the pcb and bent towards the modulator. This is the heat sink. Drill holes in the case above it.

If you think that the power supply jack is the cause of the trouble then take the top off. Next, carefully press down the clips on the power supply socket so they grip better.

If you do not think that either of these two things are the cause of your problem, then do not try either modification. Instead, you must decide whether you think that your ZX80 is worth another £20. If you think it is, send it back again. When it returns check it throughly! If it still does not work, then send it back at once.

I'M SORRY TO RAM-BLE ON . . .

Alan Errington of 79 Mayfields, Spennymore, Co Durham, writes:

Q I wrote a data processing program for the ZX81, with Audio Computers 32K Ram board. The program ran well until I decided to speed it up by adding *Fast* to some of the computing sections. This worked, too, and I *Saved* it, overwriting the original recording. Now the program *Loads* well enough but will not stop in the computer for more than four minutes even if I do not *Run* the program.

I suspect the trouble arises from the fact that I have used the *Pause* statement without *Poke* 16347,255 as suggested in the manual. The snag is that the program is about 10K long and I have not got time to make all the deletions before I lose the program. Can you help?

I have also started a computer club in Spennymore, that meets on Thursdays at six o'clock. I would be interested to hear from anyone in the area who has a computer, or is thinking of buying one.

A The command *Poke* 16437,255 puts the command *Copy* into the second address of *Frames*, the actual systems variable which controls the timing. Unfortunately, if you are in *Fast* then the lack of an instruction to *Copy* will just cause the computer to stop when the time runs out.

I cannot think of a quick way round your problem, other than by editing out the *Fast* commands, or by adding the necessary *Poke* commands. To buy yourself the necessary time to do this you might try adding:

```
1 PAUSE 32766
2 POKE 16437,255
3 SLOW
```

This might be enough to keep the program in the memory for as long as you want it. However, I doubt it. What it should do though is to buy you nearly 11 minutes of time in which to *Edit* the remaining lines.

I do not know how many *Fast* commands you have, or if you have an independent list of them. As it takes longer to enter the *Poke* command than to edit out a line, you might find it best to *Edit* out all the *Fast* commands, so that the program is again in *Slow*. Then you can add the *Fast* commands, followed by their *Pokes* at your leisure) I hope you have left space in your line numbering).

I wish you well with your club, and have included your full address so that anyone who wants to join it can contact you.

Send your questions to Peek & poke, Popular Computing Weekly, *Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.*

Competitions

Will it go round in circles?

by Gordon Lee

The circle is the most perfect of shapes. The mathematical constant, π, defined by the ratio of a circle's circumference to its diameter, occurs in many applications, some of which seem far removed from any 'circular' connections.

Pi has a value of 3.1415926536 . . . which is an approximation to this 'irrational' number. By irrational we mean that the number cannot be expressed as a finite number of decimals.

In the last century, Shanks calculated π to over 600 decimal places. It has now been computed to over a million decimal places and no order or pattern of repetition has so far been detected in the digits.

In view of this it may seem surprising that the number can be evaluated as the sum of a simple series:

$\pi = 4 \times (1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} \ldots)$

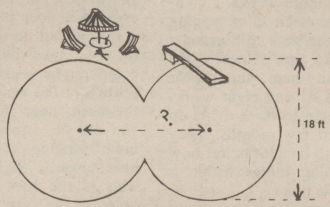
This series lends itself to translation into a simple computer program to generate the stages of the series. If you do this, note how each term brings the value nearer π and how the values alternate each side of the expected value as they converge. That is why this type of series is known as 'convergent'.

Another way to calculate π was noticed by the 18th century mathematician, George Louis Leclerc. He saw that if a series of straight lines, a distance *a* apart, are drawn on a flat surface, and a needle of length *1* is dropped at random on to the surface, then the probability of the needle touching or crossing a line is $2/a\,\pi$. If $a \pm 1$ the expression reduces to $2/\pi$.

Try this for yourself but, be warned, to get a statistically acceptable result the 'drop' must be performed hundreds of times.

Puzzle No 19

Ever since the Jones' moved to Sycamore Avenue their movements have been carefully observed by the whole street. Their most recent venture has been a magnificent circular swimming pool — 25 feet in diameter. As the work proceeded, the Smiths next door plotted their response. They designed an enviable pool in the shape of two intersecting circles, as shown in the diagram.



The original plan was to have a much bigger pool than the Jones'. Unfortunately, because of a bye-law which limits such things they discovered that there is a maximum allowable surface area for a pool — this area being that of the Jones' pool. If each of the circular sections has a diameter of 18 feet, how far apart should the centres be if the Smith's pool is to have an area as large as the bye-law permits?

The closing date for the competition is Tuesday, September 7.

Solution to Puzzle No 15

The program works by squaring successive integers in the range 11112 to 31426 (the minimum and maximum numbers which have squares of nine digits).

The main difficulty in solving the problem is that we are handling nine-digit numbers and some computers only work with a maximum of eight numbers. This is overcome by evaluating the 'higher' order of digits and the tens-and-units digits separately (Lines 20 to 60). Then, by linking the strings together, these are combined into a single string (Line 80), where a check for the presence of zeros or the duplication of digits can be made.

```
 10 FOR N = 11112 TO 31426
 20 LET N$ = STR$ N
 30 LET S$ = STR$ (N * N)
 40 LET U( = STR$ (VAL N$ (4 TO 5) * VAL N$
    (4 to 5))
 50 IF LEN U$ = 1 THEN LET U$ = " 0 " + U$
 60 LET U$ = U$ (LEN U$ - 1 TO LEN U$)
 70 IF U$ (2) = "0" THEN GOTO 160
 80 LET S$ = S$ (1 TO 7) + U$
 90 FOR P =1 TO 8
100 FOR Q = P + 1 TO 9
110 IF S$ (P) = "0" OR S$ (P) = (Q) THEN
    GOTO 160
120 NEXT Q
130 NEXT P
140 PRINT N, S$
150 STOP
160 NEXT N
```

This program finds the lowest value. To find the highest value Line 10 should be amended to

```
10 FOR N = 31426 TO 11112 STEP -1
```

These programs give the lowest and highest squares as 139854276 and 923187456 (11826^2 and 30384^2, respectively.

Winner of Puzzle No 15

The winner is: Ray Reaves, Longford Avenue, Southall, Middlesex, who receives £10.



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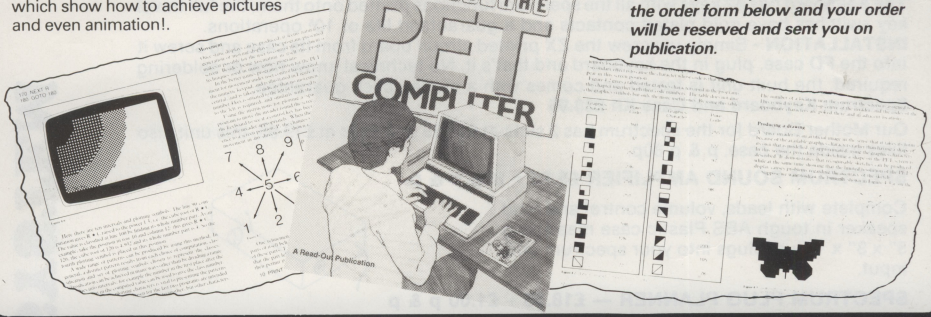
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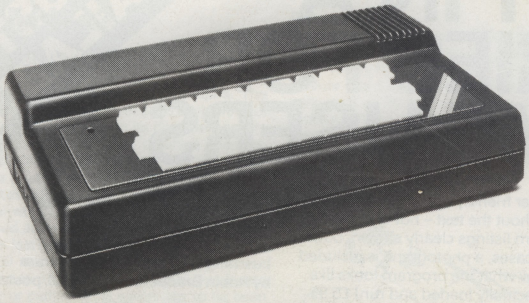
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FD System for the

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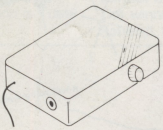
This unit has the same high standard as our ZX81 unit.
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Spectrum Keyboard and Case Kit £33.95

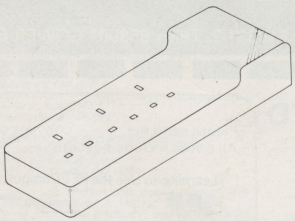
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