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ZX Computing.

ZX Spectrum 48K

Written by Graham Stafford.

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Popular Computing Weekly.

ZX Spectrum 48K

Written by Neil Motterhead, Simon Brattel and Martin Horsley.

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Instructions for graphics characters are printed in lower-case letters in our listings. They are enclosed by brackets and separated by colons to distinguish them and the brackets and colons should not be entered. Inverse characters are represented by the letter "i" and graphics characters by "g". Thus an inverse W would be represented by "iw", a graphics W by "gw", and an inverse graphics W by "lWw". Spaces are represented by "isp" and inverse spaces by "isp". Whenever a character is to be used more than once, the number of times it is to be used is shown before it, together with a multiplication sign. Thus "6*isp" means six inverse spaces and "(g4:44:4:3)" would be entered as a graphic four, followed by an inverse four repeated four times, followed by a graphics three.

Where whole words are to be written in inverse letters they appear in the listings as lower-case letters. Letters to be entered in graphics mode on the Spectrum are underlined. Inverse characters may be entered on the ZX-81 by changing to graphics mode and then typing the appropriate characters. Where whole words are to be written in inverse letters they appear in the listings as lower-case letters. Letters to be entered in graphics mode on the Spectrum are underlined. Inverse characters may be entered on the ZX-81 by changing to graphics mode and then pressing symbol-shift while the appropriate characters are entered. On the Spectrum graphics characters may be obtained by changing to graphics mode and then pressing the appropriate character. User-defined graphics will appear as normal letters until the program has been RUN.
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Name_________________________ Address_________________________

LOGIC 3

THE KEY TO THE WORLD OF TOMORROW.
LETTERS

ZX-81 Scroll

BEING a regular reader, I was surprised to find an unnecessary program for a ZX-81 in the October edition. I am referring to Machine Code Scroll. The thing which is unnecessary about it is that it scrolls from the bottom to the top of the screen.

Any established ZX-81 user will know that the one-word command of "SCROLL" will replace the tedious task of entering the D Jones program. I see no advantage in using the machine code unless it clears quicker; in any case a simple entering of TAB 31; after your printing of characters solves that.

Apart from that program, the magazine is still wonderful for games for the ZX-81 and Spectrum.

An example of using "SCROLL" is:

10 PRINT "EXAMPLE"
20 LET A=50
30 GOTO 10

The TAB 31; is so that when you Stop the program and press CLS and NEW-LINE it clears much quicker than without the "TAB 31;".

Garry Philips,
Dunblane,
Pertshire.

More 1K Programs

I HAVE just been reading the letters page in the August issue. I disagree with D Ferrier. This month there were 11 16K programs and three 1K programs for the ZX-81. I find the 1K games helpful as I am a learner with a 1K ZX-81. If there were fewer 1K programs I would not be able to write my own programs when I get a RAM pack. So perhaps just half as many 1K programs as 16K?

Andrew Johnson, aged 13,
Freckleton,
Preston.

Save Memory

I BUY your magazine every month and in the August issue I noticed, in the Letters section, a letter asking "Why use 'GOTO VAL "50"' when you can use 'GOTO 50'? We all know that the shorter the statement, the less memory it uses". Surprisingly, that is not the case and I am writing to explain why.

The simple answer is that numbers—other than line numbers—used alone in statements like "GOTO 50" use seven bytes per digit. Numbers used in statements like 'GOTO VAL "50"' use only one byte per digit, as they are in string form. That, therefore, helps to conserve precious RAM.

Another good way of conserving memory is to use a 'LOAD and RUN' line—a SAVE line—at the end of the program, followed by a RUN line to run the program after saving—and loading. After doing that, you then enter the variables in 'Direct' form (no line numbers). For example, using:

LET A=50
LET B=100
LET C=1

instead of:

10 LET A=50
20 LET B=100
30 LET C=1

saves 49 bytes.

Changing the subject, from memory I found a bug in the ZX-81 Invaders program in the August issue. Each time I pressed the FIRE button, a large, black sploche shot quickly up the far left-hand side of the screen, instead of coming out of my gun as any good bullet should. I checked my listing against yours—apart from the machine code part, which is just double-dutch to me—for any programming errors but I could find none. I therefore conclude that either my faithful ZX-81 does not like having Space Invaders played on it or your listing is incorrect and should take pride of place in the Errors and Mishaps section.

Thank you for a great magazine and some great programs.

Dave Cartwright,
Granitham, Lines.

Good Programs

I NOTICED in the July edition of Sinclair Programs that in Light Cycles, line 700 was slightly erased. The best program in that issue was undoubtedly Defender, which was slightly long. I then went to my local shop and bought the August Sinclair Programs issue; I programmed Spectravers and found it was not worth programming because it was almost impossible to reach 1,000 points. Tank Duel was a good program, so was Labyrinth.

Sanjay Chokshi, aged 14,
Dagenham, Essex.

Pontoon

FOR THOSE who have no sound, a unit can be made from one of the cheap radios. It is done by disconnecting the wires at the earphone socket, joining them together and insulating them.

Then take a lead from the signal connection to the centre terminal of the volume control—a suitable lead with the correct plugs—one plugged into the radio and the other in the earphone socket of the computer. The only snag is to remember to change over when loading.

I think it could be overcome by putting another socket at the side of the one on the radio and connecting together the two signal points.

Also remember to detune the radio to the Off-station part of the dial. I find it an asset when putting in a program, as I can tell if a command is going in by the clicks.

May I point out an error in program Good for the Roses, page 9, September issue? The variable HIX has not been given a value; nor has it been put in by a "LET" statement.

C Fowler,
Sheffield.

In subroutine 7000 HIX IS defined.
REM "BOXING"
2 GOTO 8000
3 LET G=22
4 GOSUB 3000
5 LET G=22
8 LET W:=0
10 FOR A:=5 TO 25
12 LET G=22
20 PRINT AT 15,A:"<(9s)>";AT 1
30 NEXT A
40 FOR B:=3 TO 15
45 PRINT AT B,5:"<(9a)>";AT B,25
50 NEXT B
60 LET F=7
70 PRINT AT 14,F:"<(w)>";AT 1
80 LET W:=INT (RND*3)
82 IF W=1 THEN LET F:=F+1
85 IF W=0 THEN LET F:=F-1
86 IF V=2 THEN GOSUB 1500
87 IF F<7 THEN LET F:=7
88 IF F>=23 THEN LET F:=23
210 PRINT AT 14,G:"<(9a)>";AT 1
30 F:="<(9a)>";AT 12,F:"<(isp)>";A T 11,G:"O"
220 IF INKEYS="B" THEN LET G:=G+1
225 IF INKEYS="5" THEN LET G:=G-1
230 IF INKEYS="0" THEN GOSUB 20 00
231 IF G:=2=F AND INKEYS="0" THEN GOSUB 4000
232 IF F:=2=G AND V=2 THEN GOSUB 4500
235 IF G:=22 THEN LET G:=22
236 IF G:=6 THEN LET G:=6
240 GOTO 78
1500 PRINT AT 12,F+2:"<(97)>";AT 12,F+2:"<(97)>";AT 12,F+2:"<(97)>"
1550 RETURN
2000 PRINT AT 12,G-1:"<(97)>"
2010 RETURN
3000 CLS
3010 PRINT "WHAT IS YOUR NAME?"
THE COMPUTER boxer stands at one side of the screen. It is controlled randomly, but fast-moving. Try to knock it out by moving backwards and forwards with keys 8 and 5 and throwing punches with key 0.

Boxing was written for the 16K ZX-81 by G Toplass of Stoke-on-Trent, Staffordshire.

5050 IF W>15 THEN GOTO 5060
5055 GOTO 7000
5060 FOR S=1 TO 100
5070 PRINT AT 10,0: "YOU ARE THE NEW boxing cham p of the world":AT 10,0:

5080 NEXT S
7000 PAUSE 200
7010 PRINT "WOUL] Y YOU LIKE ANOTHER ER GO?"
7016 INPUT R$
7020 IF R$="Y" THEN GOTO 1
7030 IF R$="N" THEN STOP
8000 CLS
8030 PRINT AT 15,10 ; "BY G. TOPLAS S"
8040 PRINT AT 21,0 ; "PRESS ANY KEY FOR INSTRUCTIONS"
8050 IF INKEY$="" THEN GOTO 8050
8060 FOR A=1 TO 22
8070 SCROLL
8080 NEXT A
8100 PRINT AT 2,0 : "THIS IS YOUR BOXER"
8110 PRINT AT 4,15; "OK SP 31 SP 31 SP 31 SP 31 SP 31"
8120 PRINT AT 10,0; "YOU MOVE HIM FOREWARD WITH 5 AND BACKWARD S WITH 8. TO MAKE HIM THROW A PUNCH PRESS 0"
8130 PRINT AT 21,0 ; "PRESS ANY KE Y TO START FIGHTING"
8190 IF INKEY$="" THEN GOTO 8190
8195 FOR S=0 TO 22
8196 SCROLL
8197 NEXT S
8199 GOTO 3
YOU MUST steal eight pieces of food from the farmer's field, avoiding the insecticides and the farmer, in this game for the 16K Spectrum.

Your player is coloured blue, while the farmer's is red, and you can move left with the '5' key and right with the '8'. **Thief** was sent by Simon Johnson of Crookes, Sheffield.
AGF
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ABOUT OUR PROGRAMMABLE INTERFACE
Surpassing the outstanding specification of our Interface Module II which still offers the best software support at its price, a Joystick Interface that is compatible with ALL SOFTWARE through its unique hard-ware programmable design.

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SINCLAIR PROGRAMS December 1983
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**Lawn Mower** was written for the 16K Spectrum by 13-year-old Matthew Edwards of Egginton, Derby.
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NEW! FOR 16K SPECTRUM
will also run on 48K Spectrum)

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ALIENKILL Control lasers, rockets and a force field to stop the aliens from landing.
PHOEBUS A puzzle.
MOUSETRAP Trap the mouse in the corner.
BLACKSPOT Gobble the stars and avoid running into black spots created by crossing your own path.
REVERS A game of skill with simple rules but sophisticated tactics. Play against the computer.
LASER DEFENCE Control the laser sight to shoot down the alien ships. Machine code sound routines.

CASSETTE 1, eleven programs (including 7 in machine code) for 1K ZX81 £3.80 for 16K ZX81 £5 for 16K ZX81 £5

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DRAUGHTS (machine code) Three skill levels.

BLITZ (machine code) MERCHANT (Basic) Make your fortune on trading voyages in the Mediterranean and beyond.

7 of the 8 games are in machine code, because this is much faster than Basic. (Some of these games were previously available from J. Steadman).

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SINCLAIR PROGRAMS December 1983
Inside... New Interface 2 and ROM cartridges! New Software!
TAKING NEW SOFTWARE IN NEW DIRECTIONS

You'll see that this issue of Sinclair Special devotes considerable space to software. Why, when we've so much to say about hardware and peripherals? Simply because at Sinclair we believe in supporting first-class hardware with first-class software.

This month sees the start of a new commitment to education in our catalogue, both for adults and children. In the field of micro theory, we've programs like Beyond BASIC and Make-a-Chip, which take you from the creation of simple Z80 assembler programs to simulated circuit design projects.

There's Musicmaster, to teach you music terminology, note values and composition. And if you're keen to beat your Spectrum at chess (which can be hard), you'll certainly want to try Chess Tutor 1, the first program in a complete chess masterclass.

Coming soon...

In the pipeline are many new releases, some of which break completely new ground. LOGO and micro-PHLOG for instance. They're fifth generation languages which will take you and your Spectrum closer than ever before to the creation and application of artificial intelligence.

A formal agreement between Sinclair and Macmillan Education has been announced, the first results of which will be published this autumn. These consist of five programs in a complete early reading course plus the first four of a series of programs based on Macmillan's top selling Science Horizons Scheme. All programs are designed for use in schools or the home.

And with Blackboard software, we're publishing six more home education programs for primary school children. Covering alphabet, spelling and punctuation, each of these programs is a true gem, unlike any other education software, and fascinating to run. Even for adults!

I believe that these new titles represent a major advance in educational software for the home.

New ROM software too!

You may well have heard news of ZX Interface 2 and ROM cartridge programs. You'll find full details of the interface and its software on the facing page (and there's an order form on the back page too!). These offer an instant games playing facility at unbeatable prices, and expand the possibilities of using your Spectrum in yet another direction.

Alison Maguire
Applications Software Manager

SOFTWARE UPDATE

The latest cassette software for ZX Computers

Chess Tutor 1
For 48K RAM Spectrum. £9.95.
Chess Tutor is a new way of learning all about chess - using your ZX Spectrum. It starts from the beginning by teaching you about the chess pieces and the way they move - including castling, en passant, promotion, check, checkmate, stalemate and perpetual check.
Then it teaches you the basic tactics - pins, forks, double attacks and skewers. There are over 720 exercises and over 200 questions for you to answer - with demonstrations and hints from your ZX Spectrum when you want them.
You can choose which parts of the course you want - and even experienced players may be surprised at what they can learn from Chess Tutor.

Musicmaster
For 48K RAM Spectrum. £9.95.
Musicmaster turns your ZX Spectrum into a musical instrument which will not only play tunes, but will also demonstrate key signatures, duration of notes, and scales.
You can write your own tunes - in any key - play them over and over again, save them on tape, modify them etc.
You can either write your music on a stave, or place a simple overlay on your Spectrum for a 17-note keyboard.

Make-a-Chip
For 48K RAM Spectrum. £9.95.
Make-a-Chip teaches you the basic elements of circuit design, shows you how they fit together, and then lets you design and test your own circuits.
When you have designed a circuit, you can give it inputs and outputs and your ZX Spectrum will check it for you. Then it will run it, or tell you what's wrong so that you can modify it.
Make-a-Chip is a fascinating way of finding out how computer logic works.

Print Utilities
For 16K and 48K RAM Spectrum. £9.95.
Increase the printing and display facilities of your ZX Spectrum with the Print Utilities program.
Print Utilities enables you to enhance your programs by generating characters of eight different sizes which you can place anywhere on your screen.

Beyond BASIC
For 48K RAM Spectrum. £9.95.
Takes the agony out of assembler. Takes the mystery out of machine code.
Beyond BASIC gives you a deeper insight into the workings of your ZX Spectrum. It explains what happens inside your micro when you run a program, and it teaches you simple Z80 machine code programming.
A major feature of Beyond BASIC is that it enables you to write your own Z80 assembler programs - then you can actually see on your screen how they affect the ZX Spectrum memory and registers.
The ZX Interface 2 is the latest new peripheral for the ZX Spectrum system. It enables you to use new ZX ROM cartridge software: plug-in programs that load instantly. It allows you to use two standard joysticks, without the need for separate, special interfaces.

To use new ZX ROM cartridge programs, just connect Interface 2 to the rear of your Spectrum or Interface 1 and plug in the cartridge of your choice. The program is then loaded, ready to run!

You can use any joystick that has a 9-way D plug. Use one or two of them for extra fun with ZX ROM cartridge or Sinclair cassette programs – or with dozens of other Spectrum-compatible programs!

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...AND BRAND NEW ROM CARTRIDGE SOFTWARE!

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New! PSSST

Robbie the Robot sits in his garden. Help him fetch compost to cultivate his prize Thryptogamian Megapot Chrysanthochil. Help him make the right choice of pesticide, to ward off devilish insects. Stop the insects breeding to overwhelming numbers before Robbie's plant has bloomed.

PSSST is horticulture with a tremendous twist!

One and two player option, with a host of features including sound effects.

New! Tranz Am

Set in a future time ruled by cars and trophies, in a land where petrol replaces gold and status is possession of the 8 Great Cups of Ultimate.

Driving your Super Blown Red Racer, use your skill to outwit and crash the Deadly Black Turbos. Use your instruments to locate and collect the trophies before you overheat or run out of fuel.

A program with outstanding multi-directional movement, graphic features, and a playing area equivalent to more than 600 times actual screen area.

New! Horace and the Spiders

Guide Horace on the hazardous journey to the cobwebbed house full of poisonous spiders.

Safely in the house, you must move along cobwebs, choose a spot... and jump on it! The spiders will be in a frenzy - scuttling to repair their precious web.

And when a spider is spinning a new section, you're safe to attack and destroy it! Kill all the spiders, and a new web appears... with even more spiders to catch.

Full-colour high-resolution graphics.

New! Backgammon

Everything you need to play the famous and deceptively simple board game. Board, stones, rolling dice and doubling dice are shown in full colour and high resolution. Choose from four levels of skill to suit experts and beginners alike - full rules are included.

New! Space Raiders

Your skill is all that's stopping successive waves of aliens from destroying Earth. Use your gun base to attack. Shelter behind buildings... move out and blast the passing alien spacecraft!

Full-colour high-resolution graphics with sound.

New! Hungry Horace

Horace is forever being chased around the park by guards. He steals their lunch, eats pathway flowers and creates chaos in the park by ringing the alarm!

You'll have to be quick to keep Horace out of trouble!

Full-colour high-resolution graphics with sound.

New! Horace and the Spiders

Guide Horace on the hazardous journey to the cobwebbed house full of poisonous spiders.

Safely in the house, you must move along cobwebs, choose a spot... and jump on it! The spiders will be in a frenzy - scuttling to repair their precious web.

And when a spider is spinning a new section, you're safe to attack and destroy it! Kill all the spiders, and a new web appears... with even more spiders to catch.

Full-colour high-resolution graphics.

New! Cookie

You're Charlie the Chef, who keeps his ingredients locked in the larder. But if the ingredients escape, they bring the inedible Nasties with them!

You must daze the escaping ingredients with flour bombs, and knock them into the mixing bowl. Stop them getting into the dustbin, at all costs! And beware - the alien ship moves fast to destroy you with cluster bombs. And when it comes to the crunch, use your hyperspace button!

Full-colour high-resolution graphics with sound.

New! Jet Pac

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10 PRINT AT 5,0; "THIS IS
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SOLVE A
DIFFERENT
MATRICES
UAL FORMULA
IT COULD
BE USED AS
A PAPER
MAT REMINDER
OR FOR
MATHS HOMEWORK....."
20 PAUSE 500
28 CLS
30 PRINT " FORMULA" ******
96 PRINT " (39g1/3)"
99 PRINT " (39g1/3)"
110 PRINT " (39g1/3) AREA OF A
RECTANGLE"
120 PRINT " (39g1/3)"
130 PRINT " (39g1/3)"
140 PRINT " L X B = A "
150 PRINT
160 PRINT " ENTER LENGTH PRESS
5 ENTER THEN ENTER BREADT"
170 INPUT A
180 INPUT B
190 LET (14*B) = "C"
200 PRINT " AREA = "1C"
210 PRINT " AREA = "1C"
220 PAUSE 200
230 CLS
240 PRINT " FORMULA" ******
250 PRINT " (39g1/3)"
260 PRINT " (39g1/3)"
270 PRINT " (9g1/3)"
280 PRINT " (39g1/3) AREA OF
RIGHT ANGLED"
290 PRINT " (39g1/3) TRIANGLE"
300 PRINT " (49g1/3) L X 1/2H"
310 PRINT
OFF FORMULAE

OLIVER STOCKTON of Salt-dean, Sussex has written a maths program which calculates the area of rectangles, triangles and circles. He wrote it to help him with his homework and thought it might be of use to other students.

Formulae is for the 16K ZX-81.

TEST YOUR reaction time by pressing any key as soon as the screen turns black. A relative Reflex time is listed, along with your average score and number of attempts so far. Be warned—anticipating the black screen will cost you five penalty points.

Jeffry Rosenthal of Ontario, Canada wrote the program for the 1K ZX-81.
STEVE RICKARD, aged 14, of Clwyd, South Wales sent Slalom, a part-machine-code program. Dodge the markers as you descend the piste, 1 = left and 0 = right. When you crash your score is displayed; press any key for the ski lift.

Rickard has had a ZX-81 for six months and this is his first foray into machine code.

Type-in the following machine code loader first:

```
10 REM
20 FOR F=16514 TO 16522
30 INPUT M
40 PRINT AT F,M,"T"
50 SCROLL
60 IF USR 16514+M THEN GOTO 80
70 PRINT " "
80 IF INKEY=0 THEN LET A=A+
90 IF INKEY=1 THEN LET A=A-
95 NEXT F
100 PRINT AT 19,10,"SCORE:";F
110 PAUSE 9999
115 CLS
120 RUN
```

Then run the program, type in the numbers below one at a time, followed by enter:

1,0,42,14,64,78,201

When the program finishes (0/0), delete lines 20-60, then enter the main Slalom program.

Take off in your helicopter to rescue Sam the sailor who is trapped on an oil rig in swelling seas. To control the helicopter you must use the cursor and arrow keys located at the top of the keyboard. Lower the hook to the 'S' sign which represents Sam and then try to pick him up. Remember that you cannot fly directly forward.

Hook-up, for the 1K ZX-81, was sent by Andrew Evans and Ian Williams of Huntingdon, Cambridgeshire.
ANTI-MISSILE defence is a part-machine code program for beginners. Radar-assisted, you must destroy the missiles aimed at your launchers. If the radar dish is destroyed, you must rely on your judgment.

Anti-missile defence was written by A M Tucker of Dorchester, Dorset. For the 16K Spectrum.

MANOEUVRE your trials bike over the rough terrain and avoid the bushes on either side. Use keys 5 and 8 to steer. When you crash, your mileage is listed.

Richard Denton, aged 14, of Leeds, who wrote Scrambler for the 1K ZX-81, has reached 1,678 miles and would like to know if anyone can beat that.
DENBAR is an obnoxious fly which jumps from segment to segment of your cake. Move your red fly-swatter to hit Denbar, moving it left with 5 and right with 8. Denbar cannot be killed but you score points each time you hit it.

Written for the 16K Spectrum by Simon Licence of Canvey Island, Essex.
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The Trickstick is compatible with any software that can be controlled by the Kempston joystick. As well as direction the player has control over the speed of movement and turn. Up to eight people can play at once. The first contest will be played as singles but future championships will include team events.

Please send full details of the Trickstick championship to
Name
Address

Post this coupon to East London Robotics, No. 11 Gate, Royal Albert Dock, London E16.
Ducks fly overhead. Move left with 5 and right with 8. Fire at the ducks with 0 and shoot down as many as possible.

Duck Shoot was written for the 16K ZX-81 by Neil Manning of Southport, Merseyside.

Duck Shoot

DUCKS fly overhead. Move left with 5 and right with 8. Fire at the ducks with 0 and shoot down as many as possible.

Duck Shoot was written for the 16K ZX-81 by Neil Manning of Southport, Merseyside.
MANOEUVRE your balloon through the minefield, using keys 5 to 8. Avoid the deadly mines. If you make contact with a mine you will lose one of your three lives but if you reach level 10 you will be awarded an extra life. If you rescue injured people you will be awarded extra points.

Crazy Balloon was written for the 16K ZX-81 by Glyn Emmett of Glamorgan.

```plaintext
2 LET Z$="***************"
3 GOSUB 9000
5 LET J$="ZK01"
10 LET H=1000
20 LET L=2
30 LET L=1
40 LET B$=""
50 LET S=0
60 LET BONUS=1000
70 LET X=20
80 LET Y=29
81 LET J=15
90 PRINT AT 0,0:"<32>h";AT 2,1:"(32>h)";AT 2,1:"(32>h)";AT 2,1:"(32>h)"
100 FOR F=1 TO 20
110 PRINT AT F,0:"<3h>";AT F,1:"<3h>";AT F,1:"<3h>";AT F,1:"<3h>"
120 NEXT F
130 PRINT AT 1,1:"
140 PRINT AT 1,23:ZK TO 8;";AT 224:ZK TO 7;";AT 3,25:ZK TO 6;";AT 4,26:ZK TO 5;";AT 5,27:ZK TO 4;";AT 6,28:ZK TO 3;";AT 7,29:ZK TO 2;";AT 8,30:ZK TO 1;";AT 9,31:ZK TO 0;";
150 PRINT AT 10,1:ZK TO 18;";
160 PRINT AT 11,1:ZK TO 14;";
170 PRINT AT 12,1:ZK TO 10;";
180 PRINT AT 13,1:ZK TO 4;";
190 PRINT AT 14,1:ZK TO 2;";
200 PRINT AT 15,1:ZK TO 14;";
210 PRINT AT 16,1:ZK TO 2;";
220 FOR F=8 TO 16
230 PRINT AT F,18:ZK TO 1;"
240 NEXT F
250 FOR F=10 TO 24
260 PRINT AT 14,F:ZK TO 1;"
270 NEXT F
271 PRINT AT 12,12:"*"
272 PRINT AT 11,16:"*"
273 PRINT AT 9,19:"*"
280 FOR F=1 TO 6
290 PRINT AT F,18,ZK TO 1"
300 NEXT F
310 FOR F=1 TO 17
320 PRINT AT 10,F,ZK TO 1"
330 NEXT F
340 PRINT AT 11,17,ZK TO 1;"
350 PRINT AT 12,16,ZK TO 2;"
360 PRINT AT 13,15,ZK TO 3;"
370 PRINT AT 14,14,ZK TO 4;"
380 PRINT AT 15,13,ZK TO 5;"
390 PRINT AT 3,12,ZK TO 1;"
400 PRINT AT 8,12,ZK TO 1;"
410 PRINT AT 15,11,ZK TO 1;"
420 PRINT AT 16,10,ZK TO 1;"
430 PRINT AT 17,9,ZK TO 1;"
440 PRINT AT 18,8,ZK TO 1;"
450 PRINT AT 19,7,ZK TO 1;"
460 PRINT AT 20,6,ZK TO 1;"
470 PRINT AT 21,5,ZK TO 1;"
480 PRINT AT 22,4,ZK TO 1;"
490 PRINT AT 23,3,ZK TO 1;"
500 LET Z=PEEK (PEEK 16399+ZK*256)*PEEK 16399+1
510 IF Z=174 THEN LET S=S+50
511 IF Z=23 OR Z=136 THEN GOTO 700
520 LET BONUS=BONUS+1
530 IF X=4 THEN IF Y>1 AND Y<9
540 GOTO 550
550 LET S=S+BONUS
560 CLS
561 LET L=L+1
562 IF L=10 THEN LET LI=LI+1
570 NEXT F
```
```vim
```
570 PRINT AT 10,10:"LEVEL=";LI;TAB 12,10:"LIVES=";LI;TAB 14,10:"LET
5 ATTCK"
571 PRINT AT 16,10:"SCORE=";S
500 PAUSE 100
580 CLS
590 GOTO 61
610 IF LI=0 THEN GOTO 900
720 PAUSE 100
730 GOTO 391
900 CLS
910 PRINT AT 10,10;"GAME OVER";
AT 12,12;"SCORE=";S
920 IF H>S THEN GOTO 950
930 PRINT AT 20,0;"PLEASE ENTER
940 INPUT J$;
941 IF S>H THEN LET H=S
950 PRINT AT 14,2;"HIGH SCORE="
951 INPUT AB;
952 IF AB=""Y" THEN GOTO 20
953 IF AB=""N" THEN GOTO 20
1000 STOP
3000 CLS
9001 PRINT TAB 6;"CRAZY BALLON"
9010 PRINT TAB 20,"MANOUVERE YOUR BAL
LON THROUGH THE MINE-FIELD. A
VOIDING THE"
9020 PRINT "ALWAYS PRESENT DEDIL
Y MINES IF YOU MAKE CONTACT WIT
H ONE YOU WILL LOSE ONE OF YOU
R 3 LIVES BUT IF YOU GET TO LE
VEL 10 YOU WILL BE AWARDED AN E
XTRA LIFE."
9030 PRINT;
9040 PRINT "USE KEYS;";
9050 PRINT TAB 10;"S=LEFT";TAB 1
0;"B=RIGHT"
9060 PRINT TAB 10;"6=DOWN";TAB 1
0;"7=UP"
9070 PRINT "BEWARE OF THE ELECTRIC FENCE WHICH SURROUNDS THE MINE-FIELD. IF YOU RESCUE THE INJURED PEOPLE "1" YOU WILL GAIN EXTRA POINTS;"
9080 PRINT AT 13,22;"HIT ";S;""
9100 PRINT AT 14,22;"TO START"
9110 PRINT AT 13,22;"";AT 14,22;""
9120 IF INKEY$<>"Q" THEN GOTO 90
90
9130 CLS
9140 RETURN
9990 SAVE "CRAZY BALLON"
9999 RUN
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IN THIS GAME for the 16K Spectrum you have to move your spider round the screen to collect money. The keys to do it are Q, W, E, A, D, Z, X and C in the direction relative to the S key. If you land on your own web trail you will die.

Initially the bank manager will accept £10, then £20, then £40. When you have £70 it will be transferred to a Swiss bank account.

Webbed Wonder was sent by Tim Pilling of Aston-under-Lyne, Lancashire.
YOUR AIM is to reach the gold
at the top of the Inca Temple.
You do so, using the
correct combination
of the 5 to 8
cursor keys on your
ZX-81.

Move with the cursor keys 5 to 8 until you reach the door. Each door must
be opened by the correct combination
and any error means that you will be
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Inca Gold was written for the 16K
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PROGRAMMABLE: A low cost adaptor performs the technically simple job of making the Trickstick programmable, and compatible with ANY software.

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USE THE COUPON OR THE PHONE: Trickstick and Attaktics are in stock and available now. Trickstick including interface is £28. Attaktics is £7.50 if ordered with a Trickstick and £10 on its own. The Programmable Adaptor is £10 for Trickstick owners and £15 for others. The Training Tape is Free with each Trickstick. Or call us for the name of your local stockist.

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**FORCEFIELD**

**OUR CRAFT** appears on the left-hand side of the screen and must travel through the gaps in the forcefield to reach the right-hand side. Skilful flying on your first flights may succeed in destroying the edges of the forcefields nearest to the gaps and thus make subsequent flights easier.

Move down with A and up with L.

*Forcefield* was written for the 16K or 48K Spectrum by G Woolnough of Coventry, West Midlands.
Can you rise from the void to meet the challenge of the Maziacs?

HAIL THE HERO
The most ingeniously animated little fellow ever seen on a Spectrum screen. Running in all directions fighting, blinking, tapping his feet and sitting down for a well earned rest.

MEET THE MAZIACS
Correction! DON'T meet the Maziacs. Herds of nasty spidery beetly things with long hairy legs and evil jaws.

MANAGE THE MAZE
And what a maze - Full of Maziacs, Food, Swords, Prisoners, and an endless succession of dead ends and false trails. But don't despair - you have lots of help in your search for a single box of treasure buried deep in the maze of heavily defended passageways.

NOBBLE THE NASTIES
A top Hollywood stunt man was specially flown in to stage the numerous fight sequences needed to defeat the evil guardians of the treasure.

HEAD FOR HOME
Face a return journey with a burden of treasure and unable to carry a sword.

FEATURES
- MACHINE CODED COLOURFUL HIGH RESOLUTION
- PAGE SELECT INSTRUCTIONS, INFORMATION, KEY CHANGE OPTIONS AT ANY STAGE - EVEN DURING A GAME!
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This game must be seen to be believed. One of the best uses of Spectrum in all aspects that I have seen.

HOME COMPUTING WEEKLY
27 SEPTEMBER 1983

Available from BOOTS, W.H. SMITH, LASKY'S, SPECTRUM, JOHN MENZIES and good computer software stockists throughout the UK or direct for only £6.95 plus 50p post and packing.

DK Tronic Ltd., Unit 6, Shire Hill Industrial Estate, Saffron Walden, Essex CB11 3AQ. Telephone: (0799) 26350 (24 hrs) 5 lines
MOSCOW RAID

MOSCOW RAID for the 16K Spectrum is a sophisticated version of City Bomber. Your aircraft is running out of fuel and you must make your final effort to land. You have no control over the aircraft but you can still open the bomb doors using the 'b' key. Level the buildings—and land safely.

Moscow Raid was sent by Guy Bates of Nottingham.
THE SPIRAL TOWER
ACE ALONG the corridors of the ancient stronghold, dodge the cannonballs and scale the ladders on your way to the treasure trove. You will encounter new hazards on each floor of *The Spiral Tower* and only your dexterity will save you in this month's program of the month.

The Spiral Tower was written by Graeme Johnston of Ascot, Berkshire for the 16K Spectrum. He was given his Spectrum for his 12th birthday in March and this is one of the first programs he has written.

```basic
USE 0 : RUN
7010 BEEP .5,10:CLS:PRINT@10,10:"SCORE:";s:PAUSE 0:PAUSE 0:RUN
7020 BEEP .5,10:CLS:PRINT@10,10:"SQUASHED!";AT 21,10:"SCORE:";s:PAUSE 0:PAUSE 0:RUN
7030 BEEP .5,10:CLS:PRINT@10,10:"RAN INTO A WALL!";AT 21,10:"SCORE:";s:PAUSE 0:PAUSE 0:RUN
7040 BEEP .5,10:CLS:PRINT@10,10:"EATN SY A WOLF!";AT 21,10:"SCORE:";s:PAUSE 0:PAUSE 0:RUN
8000 FOR #USER "x" TO #USER "v";7:READ " & POKE #15:NEXT F
8005 PRINT@0,2;AT 2,6:IF 0."DOODGE THE NOOSE (9h), JUMP THE WALL (9a), GRAB THE DAGGER (9h), SCALCE THE LADDER, ODDLE THE LADDER, JUMP THE WALLS AND GRAB THE CUP P. (9h), SCALE THE LADDER, GRAB THE TREASURE (9C), KILL THE GHOUL (9h), AND ESCAPE DOWN THE LADDER. """" CONTROLS: 5-LEFT, 0-RIGHT, 0-JUMP"""";PRESS ANY KEY
8906 PAUSE 0
8910 RETURN
9000 DATA 235,129,129,129,129,12
9,129,255
9001 DATA 66,66,66,66,66,66,66,66
126 ,66
3,129,255
9003 DATA 16,16,16,16,16,16,16,16
16
9004 DATA 0,0,0,0,0,0,0,0,0,0,0,0
9005 DATA 24,36,36,36,36,36,36,36,36,36,36,36
126,123,122,121
9006 DATA 16,56,16,56,16,56,16,56,16,56,16,56
9007 DATA 16,56,16,56,16,56,16,56,16,56,16,56
9008 DATA 24,24,16,69,46,46,129,128,12
9009 DATA 24,24,16,69,46,46,129,128,12
9010 DATA 126,126,126,126,69,24,24,24,24
9011 DATA 69,126,126,126,126,126,126,126
9012 DATA 255,0,0,0,0,0,0,0,0
```

*SINCLAIR PROGRAMS December 1983*
Now you can take a new
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With the new Timex Sinclair User magazine to link YOU into a huge network of American enthusiasts

The success of the Sinclair ZX80, ZX81 and Spectrum in the U.K. has been phenomenal. But in the States the Sinclair has been given a real American welcome — making the Sinclair range the biggest seller in the world! The American ZX81 equivalent: “The Timex Sinclair 1000” from the giant Timex organisation, has been bought by hundreds of thousands of enthusiasts.

The success of “Sinclair User” magazine in the U.K. followed a similar pattern — so now we’re matching the U.S.A. enthusiasm with a brand new U.S.A. magazine — the Timex Sinclair User!

The first issue will be published in the U.S.A. in May — packed with news, reviews, programs and User Club information to link you into the vast American Timex Sinclair user network.

Remember, this is a new magazine written from the American viewpoint — but it could open up whole new horizons for you on your Sinclair enjoyment. Take the new, American view by ordering right away and see how the U.S.A. welcomed the Sinclair!

Annual subscription rate is £20. Single copies are £2.00 each (including P & P).

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N.B. Subscribers to Sinclair User, Sinclair Programs or Sinclair Projects should be aware that Timex Sinclair User will occasionally reproduce top articles that have previously appeared in our U.K. magazines.
A list of commodities is displayed on the screen, together with the current value of one share. When it is your turn you may buy or sell shares in the commodity available at that time. You have the choice of playing yourself, the computer or a friend.

Stock Market was written for the 16K ZX-81 by Stephen Gibbon of Whickham, Newcastle-upon-Tyne.
IT IS raining heavily and the dam which could save your village is far from complete. Move your helicopter with the usual cursor keys, collect bricks from the right of the screen and place them on top of the dam. Try to build the dam to the top of the screen before the water on the left of it can escape.

**Dam Builder** was written for the 16K ZX-81 by David Jackson of Todmorden, Lancashire.

```
1220 PRINT "ON LEVEL "1230:";
1230 GOTO AT 18."0":"PRESS A KEY"
1240 IF INKEY=":' THEN GOTO 1240
1250 GOTO 3000
1260 FOR K=2 TO 8 STEP -1
1270 IF K=1 THEN PRINT AT K.0:"(<
1280 IF K=2 THEN PRINT AT K.0:"</
1290 IF K=3 THEN PRINT AT K.0:"/
1300 IF K=4 THEN PRINT AT K.0:">
1310 NEXT K
1320 RETURN
1400 PRINT AT P1;P2;"(19")
1410 IF P1=0 THEN GOTO 3000
1420 LET P=P+1
1430 LET P=P+1
1440 LET GOTO 1220
1450 FOR K=21 TO 30
1460 PRINT AT P;P;"(1+L"
1470 NEXT P
1480 PRINT AT N;N;"(18")
1490 NEXT K
1500 PRINT AT N;N;"(1")
1510 NEXT N
1520 PRINT AT 1;1;"(1")
1530 PRINT AT 1;1;"(1")
1540 RETURN
1600 LET P=0:"YOU HAVE LET THE DAM OVERFLOW"
1610 GOTO 1220
1620 LET P=0:"YOU HAVE LET THE DAM OVERFLOW"
1630 PRINT AT 1;1;"(1")
1640 RETURN
1650 CLS
1660 LET P=0:"YOU HAVE LET THE DAM OVERFLOW"
1670 PRINT AT 1;1;"(1")
1680 RETURN
1690 LET P=0:"YOU HAVE LET THE DAM OVERFLOW"
1700 PRINT AT 1;1;"(1")
1710 RETURN
1720 LET P=0:"YOU HAVE LET THE DAM OVERFLOW"
1730 PRINT AT 1;1;"(1")
1740 RETURN
```

**SINCLAIR PROGRAMS December 1983**
JUST AROUND THE CORNER, A NEW

BLACK CRYSTAL
The Classic six program adventure game for the 48K Spectrum and 16K ZX-81 computers. No software collection is complete without it. "BLACK CRYSTAL is an excellent graphics adventure and a well thought out package" (Sinclair User, April '83). "BLACK CRYSTAL has impressed me by its sheer quantity and generally high quality of presentation. I am afraid I have become an addict" (Home Computing Weekly, April '83). Spectrum 48K: 16K over 100K of program in seven parts only 7.50 ZX-81 16K over 100K of program in seven parts only 7.50 Why pay more for less of an adventure?

THE ADVENTURES OF ST. BERNARD
An exciting, fast moving, machine code, arcade game where you guide your intrepid St. Bernard through the perils of the icy wastelands to rescue his Mistress from the clutches of the abominable snowman. 48K Spectrum £3.95.

THE CRYPT
written by Stephen Renton
Prepare yourself for the many challenges that shall confront you when you dare to enter "THE CRYPT". You will battle against giant scorpions, Hell spawn, Crazers, Poe-Nugs and if you are unlucky enough - the Dark Cyclops in this arcade style adventure. Available now for the 48K Spectrum at £4.95.

THE DEVIL RIDES IN
Futtered the last incantations as the clock struck thirteen. All fell silent except for a faint rustling in the corner. From out of the shadows they came, all Hell's fury against me but I was not defenceless until the Angel Of Death, astride a winged horse, joined the battle. Avoiding his bolts of hellfire, I took careful aim. My chances were slim, but if my luck held... 48K Spectrum £4.95. (Fast Moving, Machine Code, all action. Arcade game.)

ZX-81 COMPENDIUM
Alien Invaders, Wumpus Adventure, Numerology, Hangman, Hieroglyphics, Movie Mogul.
The ideal software package for all ZX-81 owners. Six major programmes on two cassettes for only 16.50.
"Alien Invaders/Hieroglyphics - Both programs make good use of graphics and words to make a very entertaining package." (Sinclair User, Aug '82)
"Alien Invaders/Hieroglyphics/ Wumpus/ Movie - A varied mix from Carneil, all featuring imaginative responses and graphics and all of them good games for all ages (Hieroglyphics is particularly good for children)." (Popular Computing Weekly, Aug '82)

STARFORCE ONE
Take on the robot guardians of the central computer in a superbly stylised three dimensional battle game. 48K Spectrum £5.95. (100% MACHINE CODE ARCADE ACTION.)
COMING SOON
"THE WRATH OF MAGRA"

The first born has been destroyed. The Black Crystal of Berath has been banished. The alliance of Evil has been defeated by the armies of Lord Fendal. So ends the Third Age. Now we invite you to write your name in the history of the Fourth Age of the Third Continent.

You will meet friends and enemies, old and new in the long awaited sequel to Volcanic Dungeons. Using high resolution graphics and combining the best qualities of "Black Crystal" and "Volcanic Dungeon", we will allow you to become part of this tale of revenge.

"The Wrath Of Magra" comes as three 48K programs on cassette, boxed with instruction manual and book detailing the history of the Third Continent and the many spells you will be using throughout the game.

NOTE: "The Wrath Of Magra" is a complete adventure. You need not buy "Volcanic Dungeon" or "Black Crystal" to play it.

Available through most good computer stores or direct from: Carnell Software Ltd, North Weylands Industrial Estate, Molesey Road, Horsham, Surrey KT12 3PL. Dealers: Contact us for your nearest wholesaler.

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$5.50 each including VAT, first class postage and packing within UK.

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DIANE BIRD, aged 12, of Porthmadog, Gwynedd wrote *Sharpshooter* for the 16K or 48K Spectrum. A row of ducks appears on the screen and you must shoot them all down by pressing F to obtain your rating as a sharpshooter.
97 PRINT AT 11,0; "SPRING"
98 PRINT AT 11,0; "SHOTS"
99 PRINT AT 11,0; "EVEN"
100 IF INKEY$ = "f" THEN GO TO SUB
120 105 LET A$ = A$(2 TO 1) + A$(1); PAUSE
106 IF A$ = "20"
107 THEN GO TO 200
110 GO TO 95
120 IF A$(16) = "x" THEN LET D = 1; BEEP .2; 16
125 IF D = 1 THEN LET A$(16) = "h"
130 PRINT AT 10,0; INK 2; A$
135 IF D = 1 THEN PRINT AT 8, 15,
140 "GOOD SHOT"
145 FOR J = 0 TO 10
146 NEXT J
150 IF D = 1 THEN LET A$(16) = "1"
155 PRINT AT 10,0; A$
YOU ARE standing on the bridge, looking at an unknown part of the galaxy; suddenly you find yourself under alien fire.

You are equipped with port and starboard guns, M and Z, which can return fire on both flanks but not in the centre area of the screen when the aliens are firing. There are three levels of competence.

Enterprise was written by D Turn-er of Hull for the 16K ZX-81.
If you only buy ONE computing book

THIS IS THE CLASSIC!

An entertaining, but thorough reference source with the most readable, comprehensive glossary you'll find anywhere. The Good Computing Book for Beginners is an essential A-Z of all the facts you need to know about computing — and none you don't!

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The author, Dennis Jarrett, is a successful journalist who was also founder editor of Which Computer? magazine — so his first edition quickly became a standard work. Now this new, substantially enlarged and revised edition covers the latest trends, terms and technology with the relevant facts — and ONLY the relevant facts — in plain English.

Here's another fact you'll find fascinating: it will only cost you £2.95!

Use the coupon below to get your copy right away — or buy it soon from your bookshop. It's the one book you'll turn to again and again.
THE SPIRIT of Dunkirk lingers in this game for the 48K Spectrum. You must sail your barge through the canals off the beaches of Dunkirk and pick up the refugees waiting to be evacuated.

Whatever you do, do not cross the enemy lines or hit a sandbank as the result can be fatal. Dunkirk was sent by Robin Larham of Chatteris, Cambridgeshire.
680 INK 2: REM Print mines
710 FOR z=1 TO 30
720 IF ATTR (z,1)=10 THEN PRINT AT x,y//(z"):" "\n730 IF ATTR (x,y)=14 THEN PRINT AT x,y"\n740 IF INK 2 AND y=12 THEN PRINT AT x,y"\n750 IF ATTR (x,y)=12 THEN PRINT AT x,y"\n760 NEXT z
770 PRINT AT P. //"\n780 IF INK 2 END X(Y)=G00 THEN PRINT INK 4 AT P.x\n790 IF INK 2 AND X(Y)=G00 THEN PRINT INK 4 AT P.x\n800 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n810 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n820 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n830 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n840 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n850 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n860 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n870 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n880 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n890 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n900 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n910 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n920 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n930 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n940 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n950 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n960 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n970 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n980 IF X(Y)=G00 THEN PRINT INK 4 AT P.x\n990 IF X(Y)=G00 THEN PRINT INK 4 AT P.x
1000 REM moving boat
1010 PRINT AT x//\n1100 IF INK 2 END X(Y)=G00 THEN LET x=x\n1110 IF INK 2 END X(Y)=G00 THEN LET x=x\n1120 IF INK 2 END X(Y)=G00 THEN LET x=x\n1130 IF INK 2 END X(Y)=G00 THEN LET x=x\n1140 IF INK 2 END X(Y)=G00 THEN LET x=x\n1150 IF INK 2 END X(Y)=G00 THEN LET x=x\n1160 IF INK 2 END X(Y)=G00 THEN LET x=x\n1170 IF INK 2 END X(Y)=G00 THEN LET x=x
1180 IF INK 2 END X(Y)=G00 THEN LET x=x
are rescuing the evacuees you must beware the dangers that face you.
9556 PRINT AT 11,0: "Be careful not to strike one of the many mines ( * ) ."
9558 PRINT AT 14,0: "Avoid beaches or the craft on the sand ( 3669 ) ."
9560 PRINT INK 5: AT 19,0: "F or further instructions press enter.
9562 IF INKEYS"" THEN GO TO 95
9564 CLS
9566 PRINT AT 0,7: "DUNKIRK EVALUATION"
9568 PRINT AT 3,0: "Try and dodge the 88mm shells that are fired from the beach at the top of the screen ( 9 ) ."
9570 PRINT AT 7,0: "And be sure not to run short of fuel. A message will appear at the bottom of the screen when you are getting low.
9574 PRINT AT 14,0: "To begin you rescue bid:""
9576 PRINT AT 17,0: "Press - ENTR
9578 IF INKEYS"" THEN GO TO 95
9580 GO TO 200
FOOTBALL POOLS PROGRAM

- The program lists out, in order of preference, the sixteen most likely score draws; also the sixteen most likely homes, draws and aways.

- It picks out the results on the bookmakers' FIXED ODDS coupons that have been given over-generous odds. Calculates your expected profit!

- The program will be initialised to the English and Scottish league tables. You will be able to update these league tables week by week as results come in — or enter a complete new set of league tables in other words, the program will never become "out of date"!

- All programs are recorded on a top quality cassette (usually Sony) and are accompanied with an instruction leaflet giving a brief explanation of the theory.

Available for the ZX-81 16K (Price £8.95) and the ZX Spectrum 48K (Price £9.95) from:

HARTLAND SOFTWARE
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The NEXT GENERATION...
of Spectrum software

DIGITAL INTEGRATION

SINCLAIR PROGRAMS December 1983
RACE AROUND the track at Silverstone but be careful not to crash into the edges. Your super-racer will be alone on the track but there is still room for error. The car will move left with Q and right with R but do not hold down the key too long or you could crash into the next corner.

Silverstone is for the 16K Spectrum from Nasser Gazi of Coventry.
JET PAC - 16/48K ZX Spectrum or 8K Expanded VIC 20

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These games should be available from W. H. SMITHS, BOOTS, JOHN MENZIES, LASKYS, SPECTRUM CENTRES, other large department stores and all good major software retailers. Alternatively, send the coupon to ULTIMATE PLAY THE GAME for immediate dispatch by return, subject to availability.

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SP48, 32K Memory Extension with Program — £23.00

Now our SP48 offers even better value. Because now we're not only offering you the facility to upgrade your 16K Spectrum to 48K, we're also offering you the opportunity to be able to utilise this vastly extended memory quickly and easily.

For £23 all you need to do is plug the chip set into the sockets provided by Sinclair on your Issue 2 (or £35 for Issue 1) and you have a standard 48K Spectrum fully compatible with all Sinclair add-ons and very low in power consumption.

There is no soldering required. Fitting and removal are easy. And the SP48 carries our full warranty and is upgradeable, on a part exchange basis, to SP80. Then all you need to do is LOAD our specially written 48K guide program, 'Beyond Horizons', and your 48K computer will guide you through its memory.

With no need to labour through manuals this will save you time, because we all know how easy it is to get lost with memory maps.

SP80 Paged Memory Extension — £46

This ingenious device gives a 16K Spectrum two memory banks of 32K each and a massive total of 80K of RAM. It can be used as a standard 48K machine but pages can be switched by software instructions within your program. The SP80 is not recommended for absolute beginners unless used with 48/80 FORTH. Fitting, power consumption and Sinclair add-on compatibility are identical to the SP48.

Fit and Test service at our premises £3, by registered post £7.

48/80 FORTH — £14.95

This new FORTH compiler/editor is the latest, best and most complete version of FIG-FORTH for the Spectrum. Each tape includes both a 48K version and a 80K version. (Don't forget that an SP48 can be part exchanged for an SP80)

48/80 FORTH gives you the speed of machine code with the programming simplicity of BASIC, and is ideal for games writing. Unlike other FORTH versions, all the Spectrum's excellent graphics commands are retained, and sound is still available using BEEP. Cassette handling routines are also included.

48/80 FORTH includes a separate FORTH editor which uses part of RAM as if it were disc. The 48K version allows a 16K "RAM disc" and the 80K version a massive 32K "RAM disc".

48/80 FORTH comes with a comprehensive user manual covering both compiler and editor.

ZX Slowloader — £10

This classic piece of software loads ZX81 BASIC programs and arrays straight onto your Spectrum, ready for SAVEing and EDITing. It can be done in a few minutes what would normally take weeks of keyboard time.

Fitting, ceramic sockets and as new, £5 on return. (24 hour dispatch for phoned Access and Visa orders.)

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SINCLAIR PROGRAMS December 1983
CHANGE examination marks into percentages, place the marks in order, and have a graphical representation of them. Teacher's Pet for the 16K ZX-81 will do it all for you. It was written by Alan Richmond of Golborne, Cheshire.
THE STORY SO FURTHER

OUT NOW

WHAT IS THIS, THE STAMPEDE SAFARI? WE'VE GONE NUTS...

MY NAME IS UNCLE GROUCHO. IT'S EXACTLY WHAT IT SAYS.

THIS HONEY HAS PERSONALED THE GAME, AND NOT TO MEET HIM/HER FLY OUT BY CONCERTO, STAY AT A REAL LUXURY HOTEL AND HAVE A 500% SPEED.

THEY MUST BE OFF TO GET THEIR UNCLE GROUCHO.

THE 'PIMANIA' FOLLOW-UP

THAT NIGHT WAS SLOW TO THE LAST. IT'S BEEN WROUGHT IN MY STOMACH AND COMPAREP FOR 2 DAYS NOW.

WE SHOULD NEVER HAVE TRAVELED THE MAY SITTING IN MY STOMACH AND COMPARE FOR 2 DAYS, WE'RE JUST AGAIN.

I THINK THAT MUST BE THE LAST OF THEM NOW.

ARE YOU SURE THIS IS MIZORA?

ON THE OTHER HAND, IF YOU'D LIKE TO SEE YOU DO BETTER, BIG BABY JUST COS YOU'VE NOW GOTTEN TO THE END OF THE Intro PANEL...

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SINCLAIR PROGRAMS December 1983
SCROLLVADERS

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vaders, a three-part game. At

first, the raiders appear on reconnais-

sance missions and you have to cover

the position quickly where they disap-

peared. Next they advance en masse and

you have to fire accurately before they

take cover. Finally, on a night mission,

you have to eliminate as many raiders as

you can. 48K Spectrum.

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you can. 48K Spectrum.
THE PYRAMID is an arcade style game which has a very adventurous feel to it. The Pyramid contains 120 chambers on 15 levels. In order to get from one chamber to another you must fight off the indigenous aliens to collect an energised crystal which will neutralize the force field guarding the two exits.

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You proceed to explore the Pyramid from top to bottom with the difficulty generally increasing with the depth of level. Depending on the choice of exit from each chamber you are likely to have a different game every time you play.

Apart from the challenge of trying to achieve the highest score possible the pyramid contains a number puzzle to solve. The more chambers you successfully visit the more information is gathered to enable you to discover the secret numbers of the pyramid. The puzzle won't take you a few days to solve, it will probably take you a few months.

This is "ZIGGY". He is shown above in his exploratory capsule and is a true representation of the on-screen graphics. You have total control over his movements as you explore the many chambers of "THE PYRAMID".

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The program was sent by Paul Jones of Tuffly, Gloucestershire.

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SP12
Your go-cart is speeding recklessly towards the village pond, without brakes. Your only hope is to guess the correct letter—the computer will tell you whether your choice is too low or too high. You have 10 attempts before your ducking in Duck Pond, written for the 1K ZX-81 by 13-year-old Robin Timpton of Wellingborough, Northamptonshire.

**Duck Pond**

```plaintext
1 REM "Duck Pond"
3 LET Y=11
5 CLS
10 LET X=INT (RND*26)+38
20 FOR I=1 TO 10
30 PRINT AT 3,0:"Round ":I
40 PRINT "Enter the letter"
50 INPUT 2$
55 LET Y=CODE 2$
60 IF Y<X THEN PRINT "Too low"
70 IF Y>X THEN PRINT "Too high"
90 IF Y=X THEN GOTO 160
110 FOR F=1 TO 50
120 NEXT F
130 CLS
132 PRINT AT 0,Y:"":TAB 0:""3$
9d,9*15p":;AT 0,Y:""<i0>"
134 LET Y=Y-1
136 IF I=10 THEN GOTO 145
140 NEXT I
145 PRINT AT 1,Y:"":AT 0,
Y-1":"<w>"";TAB 2":""<at>"
147 PRINT .....,
150 PRINT "Splash you have landed in the Duck-Pond"
155 GOTO 170
160 PRINT "You have survived getting wet"
170 PRINT "Another go (Y/N)?"
180 INPUT AS$
190 IF AS="Y" THEN RUN
200 PRINT "Thank you for playing"
```
PING PONG allows two players to play on the 16K or 48K Spectrum. As the body of the program is written in machine code, super fast shoots the ball across the screen and...
should be played by expert players only. When the game is run, wait until the title page is displayed before pressing any key. Written by Claus Jensen of Vaerlose, Denmark.

SINCLAIR PROGRAMS December 1983
Here's a sure-fire way of making certain this Christmas is packed full of fun for you and your friends. We've searched for brilliant new program sources throughout the U.K. and North America to find an exciting collection of new games — and business programs — many of which cannot be bought by mail order from any other source! These are our latest exclusive offerings. Make sure you place your order now to receive them in time for Christmas.

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