JULY 1982

Z-XTRA

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All the features of the arcade game in a fast machine code program. Swooping attackers, explosions and personalised scoring.

ZXBUG £7.00
A 30 in 1 machine code tool and disassembler, allows access to registers and search through and modify memory; with cassette routines.

MICHAEL ORWIN'S ZX81 CASSETTES

QUOTES

"Michael Orwin's £5 Cassette Two is very good value. It contains 10 stolid well designed games which work, offer plenty of variety and choice, and are fun."
from the ZX Software review in Your Computer, May '82 issue.

"I had your Invaders-React cassette . . . I was delighted with this first cassette."
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"I have been intending to write to you for some days to say how much I enjoy the games on 'Cassette One' which you supplied me with earlier this month." *E. H. London SW4*

". . . I previously bought your Cassette One and consider it to be good value for money!"
Richard Ross-Langley, Managing Director, Mine of Information Ltd.

CASSETTE 1

(eleven 1k programs)

machine code:
React, Invaders, Phantom aliens, Maze of death, Planet lander, Bouncing letters, Bug splat.
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IChing, Mastermind, Robots, Basic Hangman.
PLUS Large screen versions of Invaders and Maze of Death, ready for when you get 16k.
Cassette 1 costs £3.80

CASSETTE 2

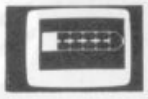
Ten games in Basic for 16k ZX81

Cassette Two contains Reversi, Awari, Laser Bases, Word Mastermind, Rectangles, Crash, Roulette, Pontoon, Penny Shoot and Gun Command.
Cassette 2 costs £5.

CASSETTE 3

8 programs for 16k ZX81

STARSHIP TROJAN



Repair your Starship before disaster strikes. Hazards include asphyxiation, radiation, escaped biological specimens and plunging into a Supernova.

STARTREK This version of the well known space adventure game features variable Klingon mobility, and graphic photo torpedo tracking.
PRINCESS OF KRAAL
An adventure game.
BATTLE Strategy game for 1 to 4 players.
KALABRIASZ World's silliest card game, full of pointless complicated rules.
CUBE Rubik Cube simulator, with lots of functions including 'Backstep'.
SECRET MESSAGES This message coding program is very txlp qexi jf.
MARTIAN CRICKET A simple but addictive game (totally unlike Earth cricket) in machine code. The speed is variable, and its top speed is very fast.
Cassette 3 costs £5.

CASSETTE 4

7 games for 16k

ZX-SCRAMBLE (machine code)

Bomb and shoot your way through the fortified caves.

GUNFIGHT (machine code)

INVADERS (machine code)

GALAXY INVADERS (machine code)
Fleets of swooping and diving alien craft.

SNAKEBITE (machine code)
Eat the snake before it eats you. Variable speed (very fast at top speed)

LIFE (machine code)
A ZX81 version of the well known game.

3D TIC-TAC-TOE (Basic)
Played on a 4×4×4 board, this is a game for the brain. It is very hard to beat the computer at it. 6 of the 7 games are in machine code, because this is much faster than Basic. (Some of these games were previously available from J. Steadman).

Cassette 4 costs £5.

Recorded on quality cassettes, sent by first class post, from:
Michael Orwin, 26 Brownlow Rd., Willesden, London NW10 9QL (mail order only please)

The most attractive feature of the newly announced ZX Spectrum is its price.

At the rock bottom cost of £125 for the basic system it means many people will be able to afford a personal computer system providing plenty of memory, comprehensive colour graphics and sounds facilities.

Sinclair Research has managed to produce a micro-computer with 16K RAM memory space aimed at both first time users and those with a basic knowledge and understanding of computers and programming for use in leisure, business and education. By the end of May the first batch of Spectrum computers should have reached the public.

The Spectrum has been brought out to compete directly with the BBC Microcomputer and although it is a fraction of the size of the BBC machine in some respects it equals the BBC Microcomputer in performance.

The main advantage the BBC Microcomputer has over the Spectrum is the keyboard. Whereas the BBC computer has a full size typewriter style keyboard, the Spectrum has an inferior calculator push-button style keypad. An improvement over the ZX81 but still not for us typists.

It is not as easy to use because the buttons are small and to perform some operations you have to use a number of keys instead of one or two, prolonging the process. Despite this, Sinclair Research says it does not detract from the computer's capabilities.

Based around the Z80A microprocessor the Spectrum incorporates a 16K ROM containing the operating system, the BASIC interpreter, character set and monitor, (which checks that the computer operations are performed correctly).

A 48K RAM version is available for £175 although an internal expansion board is scheduled for release later in the year, which will upgrade the 16K Spectrum to 48K.

It can handle 52 user-definable functions, 16 graphics characters, 20 colour control codes and 21 user definable graphics characters.

These graphic characters are high resolution and are memory mapped into the RAM. There are eight colours available, black, red, blue, magenta, cyan, green, yellow and white and you have the option of using normal or extra brightness and flashing or steady mode. But it is difficult to tell the difference. You can use the colours both for graphic definitions and screen borders. The colour on the computer distorts the graphic characters and this cannot be avoided. On screen the Spectrum can cope with 24 32 character lines of text with the option of using the bottom two lines for editing and checking your programs.

This new machine is designed to be easy to use and comes with an introductory instruction booklet to the world of computers. ZX81 BASIC is a subset of ZX Spectrum BASIC and incorporates the standrd features of string handling, single stroke keyword entry, editing facilities and additional features including a sound command, colour control commands, a checking facility and a merge command allowing you to combine programs in the computer's memory with those on cassette.

The Spectrum's sound output facility leaves a lot to be desired. Sounds can only be emitted from a "loud" speaker on the Spectrum and cannot be put through a television as in the BBC Microcomputer's case. An alternative is to link the system up to your hi-fi amplifiers and transmit via those. Another drawback for games players is the exclusion of a socket to connect joysticks.

Because the two BASICS are similar it is easy to convert existing ZX81 software for use on the Spectrum.

Loading software is done via a cassette recorder or the newly developed Sinclair Microdrive three inch disc drive units which will be released at the end of the year selling for about £50 each.

Z-XTRA

Welcome to Z-Xtra the first Computer & Video Games' Sinclair supplement rushed out in response to the launching of the ZX Spectrum.

The Sinclair range causes us some problems in providing for every category of owner. Those of you who are still proud owners of a ZX80, those have not yet managed to add any extra memory to your '81 and those who are only-too-eager to use up all the spare capacity of the RAM pack.

In Z-Xtra we present four listings which should keep just about every Sinclair user happy. These include the arcade-speed Microvaders which is our first experiment in printing machine code listings. Let us know if you approve of the practice.

Although orders are flooding in for the new colour Spectrum computer. Naturally most Sinclair owners will have an interest in the product so we have taken this opportunity of telling you a little about the machine's capabilities (left side of the page). We hope that this supplement helps you gain a little Xtra from whichever Sinclair machine you own.

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PONTOON 13
Take a gamble with your ZX80.

TOWERS OF HANOI 14
Test your powers of concentration and strategic thinking in this game dating back to ancient Egypt.

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✸ PRINTER INTERFACE

The ZX99 has a RS232C interface allowing you direct connection with any such serial printer using the industry standard ASCII character code (you can now print on plain paper in upper and lower case and up to 132 characters per line.)

✸ MANY SPECIAL FEATURES

There are so many different features that it is difficult to list them all;
For example:

AUTOMATIC TAPE TO TAPE COPY: You can copy any data file regardless of your memory capacity (a C90 has approx 200K bytes on it) as it is loaded through the Sinclair block by block.

TAPE BLOCK SKIP without destroying the contents of memory.

DIAGNOSTIC INFORMATION to assist in achieving the best recording settings.

✸ TAPE DRIVES

We supply (and guarantee its compatability) a Tape Drive that works with your computer.

✸ COMPUTER CASSETTES

We supply quality (screw assembled) computer cassettes. Please enquire for any not shown:

The ZX99 contains its own 2K ROM which acts as an extension to the firmware already resident in your ZX81'S own ROM. The ZX99's ROM contains the tape operating system, whose functions are accessed via Basic USR function calls. Each function has an entry address which must be quoted after the USR keyword. All of the functions can be used in program statements, or in immediate commands (i.e. both statements with line numbers and commands without them).

There is an extension board on the rear to plug in your RAM pack (larger than 16K if required). The unit is supplied with one special cassette lead, more are available at £1 each (see below).

COMPREHENSIVE USER MANUAL INCLUDED IN PRICE

✸ ZX99 SOFTWARE ✸

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HARD TIMES

A thriving peripheral market, currently standing at over 120 companies, has sprouted around the Sinclair ZX81. It can be confusing for beginners but Robin Bradbeer shows how to expand your Sinclair logically.

Memory expansion should be compulsory for the ZX81 as it is impossible to do anything serious without it.

Expansion packs come in all shapes and sizes, ranging from those that have just 3K of extra memory to those that can hold 64K or more. The ZX81 as it comes from Sinclair is capable of taking another 16K without any trouble. Anything above that requires some software and hardware techniques so that the extra memory can be accommodated.

The Sinclair RAM pack did have some problems when it was first introduced. They were mainly due to contact and support problems associated with the RAM pack moulding. These have now been overcome and most packs are quite reliable. However the odd stray one does still get through. One of the more popular alternatives is made by Caps and is called the Byg Byte.

The Byg Byte is about four times the size of the Sinclair pack, and at £34.95 £5 more expensive. This extra volume and mass does mean that the whole package sits more securely on the back of the ZX81. There is also an indicator to tell you that things are working OK. Having used the Byg Byte for a number of weeks it certainly seems a more reliable and sturdier expansion unit that the Sinclair original.

The next item that becomes useful to the serious user is a proper keyboard.

Most keyboards are connected to the main printed circuit board of the ZX81. This means that the casing must be unscrewed. This is done by removing a couple of the rubber feet to get at two of the screws that hold the case together. The Sinclair keyboard is connected to the main board by flexible strips of printed wiring. These are actually part of the keyboard itself. All the large keyboards on the market fix into the sockets that take these flexible leads. Most can also be used externally with the case reassembled. For a permanent fixture it is possible to use multiway cable that can be soldered to the keyboard and the pcb. This does involve some quite tedious and complicated desoldering and is not recommended to the novice.

Two keyboards that work very well come from Computer Keyboards and Kayde Electronic Systems. Both cost £27.95 and have moulded tops to the keys that have the keywords printed on them. The Computer Keyboards unit has six extra keys that can be used to control other things, such as an electronic circuit to turn the tape recorder motor on or off remotely, or even to fix some sort of repeat key or shift lock. The Kayde unit does have a case which costs £10.95, and also comes with a repeat key.

Instead of having a keyboard hanging onto the ZX81 by a flexible cable it is clearly desirable to put the whole lot into a single box. Most electrical suppliers, like Vero, have a whole range of boxes ranging from around £9, up to quite expensive and well made units costing £30 or more.

If a ready made case is purchased then it should have fixing holes and mounts for the Sinclair board. Unfortunately cases purchased from most general suppliers do not have these and therefore some experience in mounting pcbs and the taking into account such factors as what to do about the very hot heat sink that sits just under the ZX81 keyboard.

Fuller Micro Systems provides a built keyboard and case which can include an expanded keyboard and costs £39.95 or £33.95 in kit form. Easy to assemble and a reliable system.

The next addition to the system will be a decent printer. The ZX printer, although cheap, is not capable of producing copy that can be used for letters, notes etc. If a normal printer is going to be attached to the system then an interface is required to change the signals coming out of the back of the ZX81 into those that can be understood by that printer. Most printers use a standard interface called RS232C.

One of the newest, and most flexible, interfaces has been produced by Capital Computers. This interface not only has RS232C i/o but also a parallel output to the other common printer standard called Centronics Parallel. This allows the system to be connected to a whole host of things including not only printers but also modems for connecting to the telephone network, but also other computers.

The use of an EPROM with the conversion routines inside means that any other non standard interfaces can be accommodated quite easily. The motherboard to take the i/o interface costs £14.50, or £34.95 depending on the number of slots required, and the i/o board costs £39.95.

Now your system has cost around £250 — approaching the price of a computer which was designed to cope with all these tasks from its conception. But the beauty of expanding this way is that you can pace it to suit your pocket.

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SOFT CELL

CENTIPEDE

The centipede's contorted run through its mushroom patch set whole new tactical problems to the trigger-happy arcade players when it appeared as a video game.

This Sinclair ZX81 version has lost some of the creatures which feature in the arcade version but still remains an addictive and frustrating game.

The instructions are well displayed at the beginning of the game, and easy to read. It can get a little monotonous going through these before every game, but this is the only slightly dirty mark against an otherwise excellent game.

As in the arcade version, a centipede meanders across the screen and moves down one line when it hits an obstacle or the side of the playing area. The players task is to fire missiles at the centipede and destroy it before it reaches you bases at the bottom of the screen.

Easy? Well it would be if the centipede didn't split in two every time it gets hit. Unfortunately it does. The player can decide at the start as to how many obstacles he puts on the screen, and obviously the more obstacles there are, the faster the centipede goes.

Anyone who beats the game with the obstacles rating set at 20 deserves a creepy-crawly medallion. I found it quite impossible as it takes about five seconds at this speed to reach the bottom of the screen!

A very professional game and well worth the £4.95 it costs. Centipede is available from DK'tronics of Great Yarmouth.

ASTEROIDS

You blast asteroids by numbers in Quicksilva's version of the arcade game.

The spaceship fightings its way through the rocks is represented by the numbers one to seven. Each number corresponds to a firing direction so that you can either aim your shots carefully at any oncoming asteroid, or keep the base spinning — picking off and splitting up rocks haphazardly.

The asteroids themselves are shown on the screen as white squares. These are the smaller rocks, while the larger clusters are randomly shaped blocks. When you score a direct hit on a large asteroid it breaks up into numerous smaller ones.

Although this 16K ZX81 version does not match up to the arcade game graphically Quicksilva's attempt to emulate it is very good. It is written in machine code so the asteroid storm is lightning quick.

As the game progresses the rocks fall faster and more furiously and in more profusion. Points are scored for each asteroid you hit, with bonus points awarded when you blast a large rock.

I found it ranged between 50 and 700. When you blow up one of these the game stops momentarily the number of bonus points is displayed.

You get three spaceships to play with and a bonus ship is given if you score 10,000 points.

This addictive game is certainly worth spending £5.50 on. It occupies 4K RAM and 8K ROM

FOOTBALL

If you think you can follow in the footsteps of John Toshack or Graham Taylor then Football Manager is the game to test out your theories on.

Running on a Sinclair ZX81 in 16K, this Addictive Games package has a shortened Football League of just 32 teams with eight in each division.

You choose which team to manage — hoping that your favourite will be among the 32 on offer — whichever team you choose will start life in division four. You must also select a skill level, there are seven, ranging from Beginner to Genius.

The computer generates a small squad of players, either defenders, attackers or midfield men with a rating for each and an energy level.

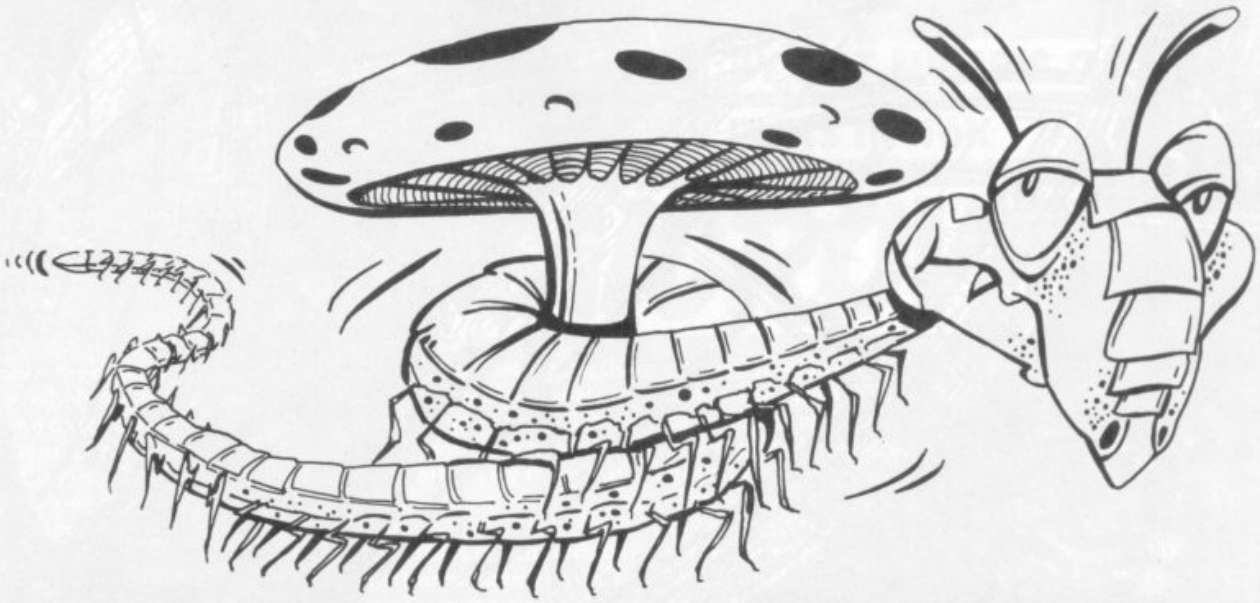
Managers are given the option of strengthening their squad by buying players who come on the market. He can also sell players who he thinks are surplus to the squad's requirements.

Ground rent and wage bills must be met each week and these increase as the team goes higher up the league but if you are winning or playing well in cup matches you can meet these with the good crowds you can attract.

Matches are played by looking at the energy levels, morale and defence, attack and midfield ratings of the two opposing sides.

I came to review this game fresh from writing C&VG's World Cup Manager and was expecting a little more. Football fans will enjoy it and the game is good as far as it goes but I would have welcomed the opportunity of having more decisions. And it is not idiot-proof. This idiot managed to crash it as United were well on their way to promotion.

It comes with an instruction book and a save game feature from Milton Keynes-based Addictive Games and costs £7.95.



```
  1 REM 5NOT RND)F?777777/ PAUS
E RETURN ↑4▪TAN CHR$ 0▪▪▪▪7▪CHR$
 0)<7/ TO .....
  2 LET X=USR 16514
  3 GOTO 950
  4 REM 3E00323C401853F5C501000
20B78B120FBC1F1C9
  6 REM E5D5F52A0C40111800197EA
7FE0020023E1C3CFE262005361C2B18E
E77F1D1E1C9
  8 REM E5D5F52A0C40110C00197EA
7FE1D2006F1D1E13E00C93D77F1D1E1C
9
  9 REM 3A3440903OFD803CC9
 10 REM 2A0C40119602192223403E1
C3221403E01323640 2A0C40119502192
27B40
 12 REM 3E01322B403E02322C400E0
6793237400601CD7C7532094006 07CD7
C753DB7874F3A3640323640812A7B402
27B40472310FD
 15 REM 112100B7ED527EA7FE03280
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97EA7FE0D2004360018EAFEAE
 16 REM 201D3600CD6075FE00200F0
10100C90160C1C900000000000000CD5
97918C9FE1628C5363B18C1
 18 REM 2A0C40233E1E323240197EA
7FE3B2039360019 7EA7FE0D20043600 1
8ECFEAE201A3600CD6075FE0028BA000
00000
 20 REM 000000D0000000CD597919 1
8D8FE17200218F7FE162808363B18C0F
E1620BCB7ED527EA7FE17
 22 REM C20577360 0B7ED527EA7FE0
D2004360018E7FE3B200500360018DEF
E13200216E4FE122002 18DEFE03
 24 REM 280CFE81200216D4FE82202
718CE36002B3600232336002B3E0547C
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0C9322140C37176FE0A201536002B
 26 REM 3600232336002B3E1447CD3
F7510FBC36B79FE1B200F233A3240FE0
028133D323240C32D763617C37176
 28 REM FE1BC2717618E53A2B40FE0
2282A0603CD7C75FE022808 3E01322B4
0C37F773E02322B402A0C40231121001
9193681
 30 REM 23360A233682C37F773E023
22B402A0C40231121001919237EA7FE8
220F92323
 32 REM 7EA7FE7620122B2B36002B3
6002B36003E01322B40C37F772B2B360
02B36002B3600233681233 60A233682
 34 REM 06EF0EFEED78FE7D20232A2
34023237EA7FE762008 2B2B222340C3F
D77
 36 REM 2B2BCD4C7936002336AE222
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E7620082323222340C3FD77
 38 REM 2323CD4C7936002B18D7FE7
E2025C37379000000000007EA7FE0D2
0093600192223 40C3FD77FE3B
 40 REM 2005B7ED5218E836171807F
E7F2803CD4C793A37403DFE002806323
740C3B375
 42 REM 1121002A0C402319C33C790
0000000000000000061F2310FD061F
 44 REM 197EA7FE122014360028360
02B3600233613233 6032336122B18E5F
E1620E1B7ED52
 46 REM 7EA7FE1B20F72B10D53A364
03C3236403A21400601B820080E01322
140C3AF750602B8F27178
 48 REM 0E0218F00606B8F27B780E0
318E6060DB8F285780E0418DC0615B8F
28F780E0518D20E0616CE
 50 REM 000000061F197EA7FE13202
619197EA7FE162004010500C9B7ED52B
7ED5236002336002336002B
 52 REM 36122B3603 2B3613231 8D3F
E1620CFB7ED527EA7FE1B20F72310C33
A36403DFE01
 54 REM 280B061F2B10FD323640C35
778323640 3E00F5061F2B10FD0612191
0FD06121121007EA7FE132014
 56 REM 3600233600233600193612 2
B36032B3613B7ED52F13CFE202804F52
318DC3E00F550
 58 REM 061F2B10FD012100B7ED424
210C7F13E00323C40C35778
 60 REM 06053A3C403C323C40B8FA1
E78C39378F5C501000 10B78B120FBC1F
1C9E52A0C401196021936AE222340E11
12100C9
 65 REM 3E01322B40C371762A23401
12100B7ED527EA7FE0320213600 2B360
02323360 02B192223403A21403DA7FE0
0200401090 0C9322140C3FD77FE13200
3C3ED77FE12C2DC77C3ED77**
 500 LET A$="<▬> <▬> <▬> <▬> <▬>
 <▬> <▬>"
 510 LET B$="$$$      $$$      $$$
"
 520 PRINT "      LIVES 3    SCORE
      "
 530 PRINT ".....
.....
 540 PRINT AT 3,0;A$
 550 PRINT AT 5,0;A$
 560 PRINT AT 7,0;A$
 570 PRINT AT 9,0;A$
 580 PRINT AT 16,6;B$
 590 PRINT AT 17,6;B$
 600 PRINT AT 18,6;B$
 610 PRINT AT 20,1;"▪"
 620 PRINT "----------
----------"
 700 PRINT AT 12,8;"NEWLINE TO S
TART"
 710 IF INKEY$<>"" THEN GOTO 710
 715 IF INKEY$="" THEN GOTO 715
```
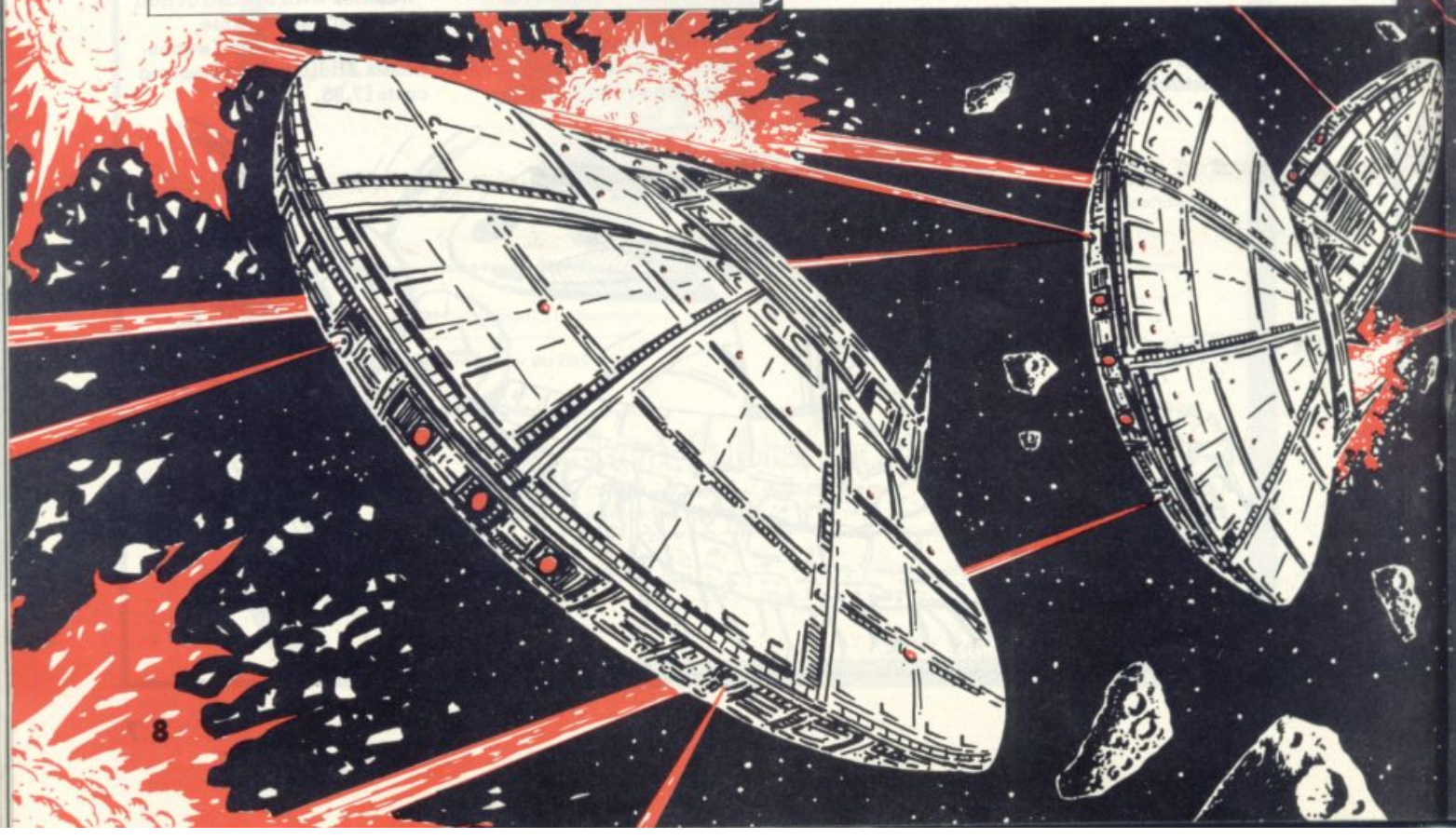
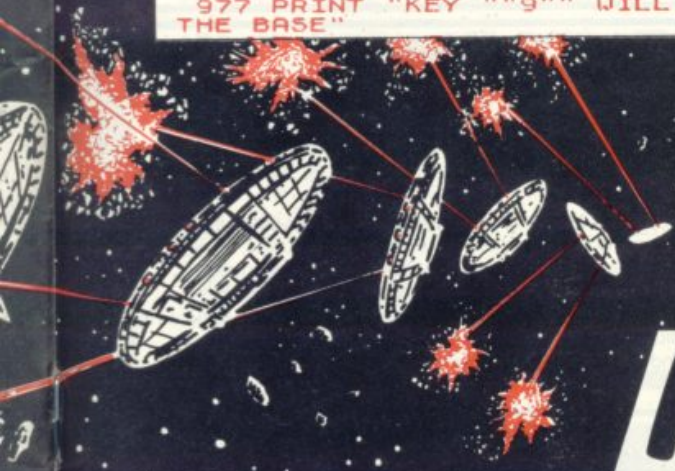



```
 725 PRINT AT 12,8;"
     "
 730 FOR V=1 TO 50
 735 NEXT V
 740 LET X=USR 29995
 750 IF X=5 THEN GOTO 800
 755 IF X=9 THEN GOTO 870
 760 IF X=1 THEN GOTO 900
 770 STOP
 800 PRINT AT 20,0;"
                    "
 802 PRINT AT 8,3;"THE ALIENS HA
VE BEATEN YOU"
 805 PRINT
 810 PRINT "     ANOTHER GAME? (Y
 OR N)"
 815 IF INKEY$="Y" THEN GOTO 825
 820 IF INKEY$="N" THEN NEW
 822 GOTO 815
 825 CLS
 830 PRINT AT 8,1;"INPUT SKILL L
EVEL (1 TO 9)"
 831 PRINT
 832 PRINT "              (9 IS SLOWE
ST)"
 835 LET I$=INKEY$
 840 IF LEN I$<>1 THEN GOTO 835
 845 LET O=CODE (I$)
 850 IF O<29 OR O>37 THEN GOTO 8
35
 851 POKE 30126,3+(O-28)
 852 POKE 30816,O-28
 853 POKE 30830,O-28
 854 POKE 30840,1+(O-28)
 855 POKE 30850,2+(O-28)
 856 POKE 30860,2+(O-28)
 857 POKE 30864,3+(O-28)
 858 CLS
 860 GOTO 500
 870 PRINT AT 8,3;"CONGRATULATIO
NS"
 875 PRINT
 880 PRINT "     ALL ALIENS WIPE
D OUT"
 885 GOTO 805
 900 PRINT AT 0,11;"0"
 901 PRINT AT 3,0;"
                    "
 902 PRINT AT 5,0;"
                    "
 903 PRINT AT 3,9;"ALL LIVES LOS
T"
 905 GOTO 805
 950 PRINT "MICROVADERS---"
 961 PRINT
 965 PRINT "(C) 1982 MICROX"
 970 PRINT
 971 FOR M=1 TO 50
 972 NEXT M
 973 CLS
 977 PRINT "KEY ""9"" WILL MOVE
THE BASE"
```

```
1000 PRINT "TO THE RIGHT, KEY ""
6"" WILL"
1005 PRINT "MOVE THE BASE TO THE
 LEFT"
1010 PRINT "KEY ""0"" WILL FIRE
YOUR"
1012 PRINT "MISSILES"
1014 PRINT
1015 PRINT "EVERY ALIEN HIT WILL
 SCORE 5"
1020 PRINT "EVERY SAUCER HIT SCO
RES 20"
1021 PRINT
1022 PRINT "NEWLINE TO CONTINUE"
1023 IF INKEY$<>"" THEN GOTO 102
3
1024 IF INKEY$="" THEN GOTO 1024
1025 CLS
1030 PRINT "TO DESTROY AN ALIEN
OR A"
1035 PRINT "SAUCER YOU MUST HIT
THE CENTRES"
1036 PRINT
1037 PRINT "A HIT FROM AN ALIEN
MISSILE"
1038 PRINT "LOSES YOU 1 LIFE, AN
D YOUR"
1039 PRINT "BASE MOVES BACK TO T
HE START"
1040 PRINT "POSITION AT THE BOTT
OM LEFT OF"
1041 PRINT "THE SCREEN"
1042 PRINT
1043 PRINT "NEWLINE TO CONTINUE"
1044 IF INKEY$<>"" THEN GOTO 104
4
1045 IF INKEY$="" THEN GOTO 1045
1048 CLS
1049 PRINT "IF YOU LOSE MORE THA
N 3 LIVES"
1050 PRINT "OR THE ALIENS REACH
THE BOTTOM"
1055 PRINT "OF THE SCREEN, THEN
YOU LOSE"
1060 PRINT "THE GAME"
1065 PRINT
1066 PRINT "THE MORE ALIENS DEST
ROYED"
1067 PRINT "THE FASTER THEY MOVE
"
1068 PRINT
1069 PRINT "YOU MAY DESTROY ALIE
N"
1070 PRINT "MISSILES WITH YOUR M
ISSILES"
1071 PRINT
1075 PRINT "NEWLINE TO START AND
 ENJOY THE  GAME"
1085 IF INKEY$<>"" THEN GOTO 108
5
1086 IF INKEY$="" THEN GOTO 1086
1090 GOTO 825
```



BY PAT NORRIS OF MICROX.

RUNS IN 16K

MICROVADERS

Space Invaders was the name behind the computer game craze and has since appeared in many forms on the Sinclair ZX81.

Here we produce a fast machine-code version, written by the Microx software company for you to key-in to your ZX81.

We have steered clear of machine code listings in the past as they look rather forbidding to type in. But we felt you should be given the opportunity to try them out and let us know your reaction.

Instructions are included in the listing but a few tips on play will not go amiss. The base starts at the bottom left of the screen in a very vulnerable position, so the first requirement is to get out of the way of the missiles quickly.

Try to wipe out those invaders on the left of the screen as soon as possible because, if a life is lost, the base appears right under this column.

The shields do not last long, hits on the saucers will boost your score but on level 1 — the highest — time runs out very quickly.

Only three lives to play with, so good luck.

Microvaders is available in cassette form from Microx at 52, The Strand, Worthing, Sussex — price £5.95.

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BREAKDOWN OF MEMORY AREAS

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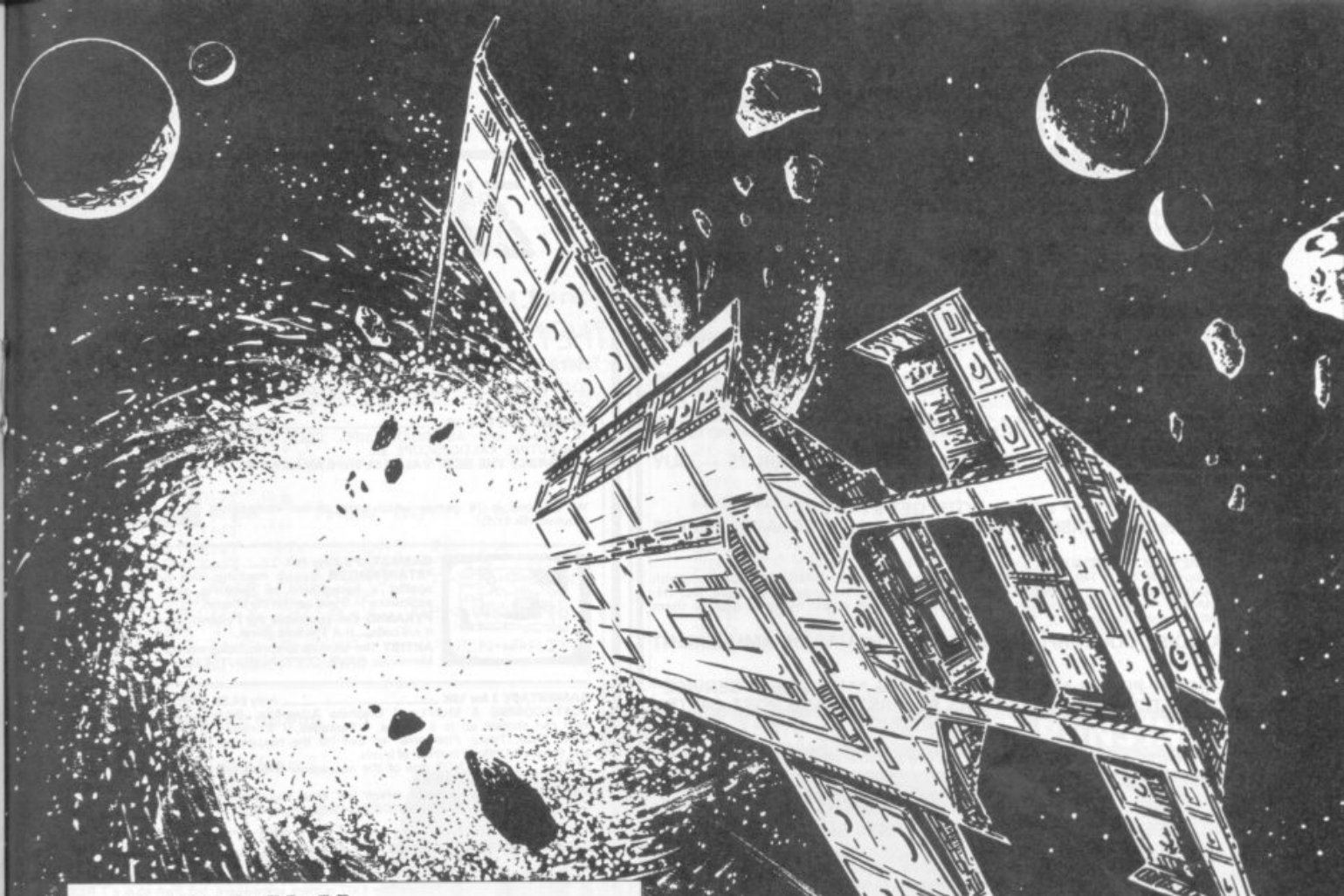

```
  10 LET A=PI/PI
  20 LET B=PI-PI
  30 LET R=B
  40 LET V=600
  50 LET S=20
  60 LET T=15
  70 LET Y=15
  80 CLS
  90 LET X=INT (RND*25)
 100 PRINT AT Y,X;"▄▀▄"
 110 PRINT AT S,T;" ▄▀▄"
 120 PRINT AT S+A,T+A;"   "
 130 LET V=V-A
 140 IF INKEY$="Q" THEN LET T=T-
A
 150 IF INKEY$="P" THEN LET T=T+
A
 160 IF INKEY$="1" THEN LET S=S-
A
 170 IF T<B THEN LET T=B
 180 IF T>25 THEN LET T=25
 190 IF V=B THEN GOTO 500
 200 IF S=B THEN GOTO 350
 210 IF T=X AND S=Y-A THEN GOTO
300
 220 IF S=Y-A AND T<>X THEN GOTO
 50
 230 GOTO 110
 300 LET Y=Y-5
 310 GOTO 80
 350 LET R=R+A
 360 GOTO 50
 500 CLS
 510 PRINT AT 10,11;"GAME OVER"
 520 PRINT AT 12,11;R
```

RUNS IN 1K

BY DAVID HEALEY

STARGATES

A series of stargates block your escape route from the holocaust resulting from the sun turning to super nova.

Time ticks by before the blazing explosion occurs during which you must navigate as many of your ships as possible to escape the solar system.

When the ships pass through each stargate they can be propelled into warp drive and are then freed from the surrounding destruction.

The space ship is centered at the bottom of the screen with the first stargate positioned just above it. Using the inkeys you must guide your precious ship through it. Once successfully navigated a second ship appears for you to negotiate.

If your piloting prowess is good you will eventually warp your way through all the stargates that appear on the screen. Only when you have cleared one gate will the next one materialise on the screen.

Key 1 moves your ship vertically upwards, key Q enables you to fly your ship left, and key P gives you movement to the right.

Star Gates fits into 1K of memory and runs on a Sinclair ZX81. If your 81 has additional memory space you can add titles, instructions and a scoring system. More complex scenary can be added and you can achieve a space like background by reversing the colours with inverse video. It was written by David Healey.

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A SMASH HIT at the ZX Microfair (most of the other software houses wanted a copy), a game not to be missed!

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```
  5 REM PONTOON BY RMS 21/12/81
 10 LET X=(RND*7)+14
 20 LET V=0
 30 LET A=0
 40 LET J=(RND*13)
 41 IF J=1 THEN GOTO 200
 42 IF J=11 THEN GOTO 240
 43 IF J=12 THEN GOTO 270
 44 IF J=13 THEN GOTO 300
 45 PRINT J;
 50 LET K=(RND*4)
 51 IF K=1 THEN PRINT "OF SPADE
S"
 52 IF K=2 THEN PRINT "OF HEART
S"
 53 IF K=3 THEN PRINT "OF DIAMO
NDS"
 54 IF K=4 THEN PRINT "OF CLUBS
"
 60 LET V=V+1
 70 LET A=A+J
 80 IF A=13 OR A=14 THEN GOTO 3
30
 90 INPUT A$
100 IF A$="" THEN GOTO 40
110 PRINT ""
120 PRINT "MY SCORE IS";X
130 PRINT "YOUR SCORE IS";A
131 IF A>X AND A<21 THEN PRINT
"YOU WIN THIS TIME"
132 IF A=X OR A<X THEN PRINT "Y
OU LOSE TURKEY"
133 IF V=2 AND A=  THEN PRINT
"YOU HAVE BLACJACK
```

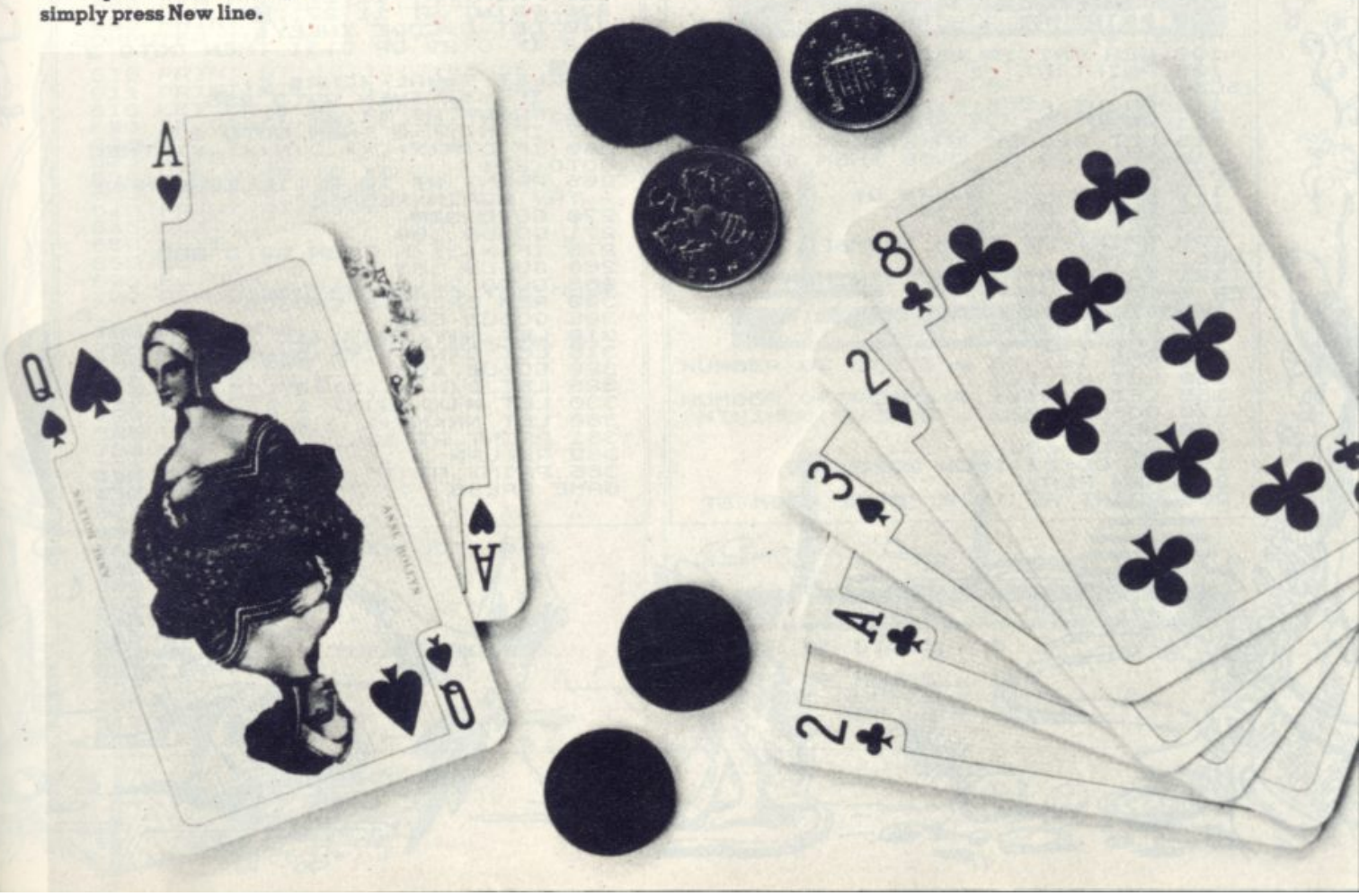
```
134 IF V=2 AND A=21 THEN GOTO 1
50
135 IF A=21 THEN PRINT "YOU HAV
E PONTOON"
136 IF A>21 THEN PRINT "YOU ARE
BUST"
140 IF V>4 AND A<22 THEN PRINT
"YOU HAVE A";V;"CARD TRICK"
150 PRINT "DO YOU WANT ANOTHER
GO"
160 INPUT B$
170 IF B$="" THEN CLS
180 IF B$="" THEN GOTO 10
190 STOP
200 PRINT "ACE";
210 INPUT G
220 LET J=G
230 GOTO 50
240 PRINT "J";
250 LET J=J-1
260 GOTO 50
270 PRINT "Q";
280 LET J=J-2
290 GOTO 50
300 PRINT "K";
310 LET J=J-3
320 GOTO 50
330 PRINT "WHAT DO YOU WANT TO
BURN?"
340 INPUT W$
350 IF W$="" THEN CLS
360 IF W$="" THEN GOTO 10
370 GOTO 50
```

BY RICHARD SAMMUT RUNS IN IK

PONTOON

Here's a ZX game for all you card sharps out there. Pontoon was written for a ZX80 and runs in 1K — although it does work better in more according to the author.

To twist all you have to do is press New line. To stick just press any key then New line. To burn — when asked — press New line. If you draw an ace, key in the value you want — 1 or 11. When you want another go simply press New line.



BY ALAN CROWE RUNS IN 16K

TOWERS OF HANOI

A brain teasing puzzle is posed for you to try and solve bound to make you feel fraught and frustrated.

This is a version of an old game concept, the Towers of Hanoi which is thought to have first been played by the ancient Pharoahs of Egypt. Some people believe is originated in the Indian town Benares, but most people think Hanoi was the true place of origin.

The Towers of Hanoi is a strategy game requiring an agile mind and the power to concentrate. It's association with Hanoi is that a secret brotherhood of monks play the game in its traditional form to this day.

On the floor of their temple are positioned three vertical rods set in a brass plate. Sixty-four gold discs are put on the left-hand rod but each disc is a different size, the bottom one being the largest and the topmost the smallest.

As part of the monks' mental exercise they must move all the discs from the left-hand rod to the right-hand rod. The snag is they can only move one disc at a time and according to the rule they cannot place a large disc on top of a smaller one.

In order to achieve the correct sequence they have to use the middle rod. The computerised version is played on a much smaller scale, in this particular one there are eight discs in total for you to use. The fewer you play with the easier the game.

Keeping count of your number of moves is the computer and it will also let you know if you make an illegal move by placing a big counter over a small one.

To move a disc you have to specify which rod number you want to place the counter on, one, two or three. It will, as if by magic, automatically transfer to the rod of your choice.

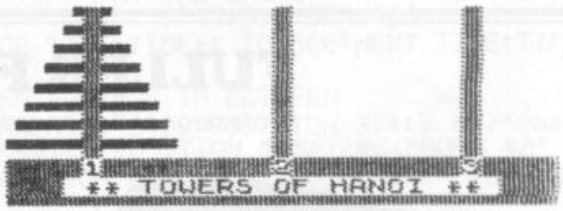
If you get too bogged down in the calculations let the computer take the strain. There is an option allowing the computer to take over.

You will need a 16K RAM pack to play the Towers of Hanoi as well as your ZX81.

```
   1 SAVE "TOWER▒"
  65 CLS
  70 FOR I=0 TO 7
  75 PRINT AT I,7;"▒";TAB 17;"▒"
;TAB 27;"▒"
  80 PRINT AT 8,5+I;"▒";AT 8,31-
I;"▒";AT 8,11+I;"▒";AT 8,23-I;"▒
"
  81 PRINT AT 9,5+I;"▒";AT 9,31-
I;"▒";AT 9,11+I;"▒";AT 9,23-I;"▒
"
  85 NEXT I
  86 PRINT AT 10,3;"▒▒▒▒▒▒▒▒▒▒▒▒▒▒
▒▒▒▒▒▒▒▒▒▒▒▒▒▒"
  90 PRINT AT 8,7;1;TAB 17;2;TAB
 27;3
  95 PRINT AT 9,6;" ** TOWERS OF
 HANOI ** "
 100 REM INITIALISATION
 105 PRINT AT 11,0;"NUMBER OF DI
SCS =                  "
 110 PRINT AT 11,16;"?"
 111 PRINT AT 11,16;"█"
 115 LET C=CODE INKEY$
 116 IF C<29 OR C>36 THEN GOTO 1
10
 117 LET N=VAL (CHR$ C)
 118 PRINT AT 11,16;N
 119 LET NN=0
 120 PRINT AT 13,0;"NUMBER OF MO
VES = ";NN
 121 PRINT AT 14,1;"MINIMUM NUMB
ER = ";2**N-1
 140 DIM N(3)
 145 DIM D(N,3)
 150 LET Y=1
 155 FOR I=1 TO N
 160 LET N(Y)=I
 165 LET D(N(Y),Y)=N+1-I
 170 GOSUB 400
 180 NEXT I
 185 GOSUB 600
 195 IF CC=62 THEN GOTO 700
 200 REM PLAY
 205 PRINT AT 11,0;"MOVE FROM ST
ACK    TO STACK         "
 210 PRINT AT 11,15;"?"
 211 PRINT AT 11,16;"█"
 214 LET C=CODE INKEY$
 215 IF C<29 OR C>31 THEN GOTO 2
10
 216 LET X=VAL (CHR$ C)
 220 IF N(X)>0 THEN GOTO 230
 225 PRINT AT 12,0;"STACK ";X;"
IS EMPTY                  "
 226 GOTO 210
 230 PRINT AT 11,16;X
 231 PRINT AT 12,0;"
                  "
 235 PRINT AT 11,27;"?"
 236 PRINT AT 11,27;"█"
 240 LET C=CODE INKEY$
 242 IF C<29 OR C>31 THEN GOTO 2
35
 245 LET Y=VAL (CHR$ C)
 250 IF Y=X THEN GOTO 235
 255 PRINT AT 11,27;Y
 257 IF N(Y)=0 THEN GOTO 271
 260 IF D(N(X),X)<D(N(Y),Y) THEN
 GOTO 271
 265 PRINT AT 12,0;"ILLEGAL MOVE
 - TRY AGAIN PLEASE"
 270 GOTO 200
 271 GOSUB 300
 275 IF N(3)<N THEN GOTO 200
 280 GOSUB 383
 285 GOTO 2
 300 REM EXECUTE CHOICE
 305 GOSUB 500
 310 LET N(Y)=N(Y)+1
 315 LET D(N(Y),Y)=D(N(X),X)
 320 GOSUB 400
 325 LET D(N(X),X)=0
 330 LET N(X)=N(X)-1
 380 LET NN=NN+1
 381 PRINT AT 13,16;NN
 382 RETURN
 385 PRINT AT 15,0;"TO START NEW
 GAME PRESS    ","""NEW-LINE""" KEY
"
```

```
  390 LET C=CODE INKEY$
  395 IF C=115 THEN GOTO 597
  396 GOTO 590
  397 GOTO 2
  400 REM PLOT ROUTINE
  405 LET D=D(N(Y),Y)
  410 LET H=20*Y-5
  412 LET V=27+2*N(Y)
  420 FOR J=1 TO D
  425 PLOT H+1+J,V
  426 PLOT H-J,V
  440 NEXT J
  480 RETURN
  500 REM UNPLOT ROUTINE
  505 LET D=D(N(X),X)
  510 LET H=20*X-5
  512 LET V=27+2*N(X)
  520 FOR J=D TO 1 STEP -1
  525 UNPLOT H+1+J,V
  526 UNPLOT H-J,V
  540 NEXT J
  580 RETURN
  600 REM COMPUTER PLAYS?
  605 PRINT AT 15,0;"DO YOU WISH
COMPUTER TO MAKE","THE MOVES?
    "
  610 PRINT AT 16,11;"YES OR NO"
  611 PRINT AT 16,11;"YES OR NO"
  615 LET CC=CODE INKEY$
  620 IF CC=62 OR CC=51 THEN GOTO
  630
  625 GOTO 610
  630 FOR V=15 TO 16
  635 FOR C=0 TO 31
  640 PRINT AT V,C;" "
  645 NEXT C
  650 NEXT V
  655 LET C=0
  695 RETURN
  700 REM COMPUTER MAKES THE MOVE
S
  703 LET NN=0
  705 IF N=1 OR N=3 OR N=5 OR N=7
  THEN GOTO 800
  710 REM EVEN N
  715 LET P=1
  720 LET Q=2
  725 GOSUB 900
  730 LET P=1
  735 LET Q=3
  740 GOSUB 900
  745 LET P=2
  750 LET Q=3
  755 GOSUB 900
  760 IF N(3)=N THEN GOTO 385
  780 GOTO 715
  800 REM N ODD
  805 LET P=1
  810 LET Q=3
  815 GOSUB 900
  820 IF N(5)=N THEN GOTO 385
  825 LET P=1
  830 LET Q=2
  835 GOSUB 900
  840 LET P=3
  845 LET Q=2
```

```
  850 GOSUB 900
  855 GOTO 805
  900 REM P AND Q
  905 LET X=P
  910 LET Y=Q
  915 IF N(P)=0 THEN LET X=Q
  916 IF N(P)=0 OR N(Q)=0 THEN GO
TO 925
  920 IF D(N(P),P)>D(N(Q),Q) THEN
  LET X=Q
  925 IF X=Q THEN LET Y=P
  930 GOSUB 300
  935 RETURN
```

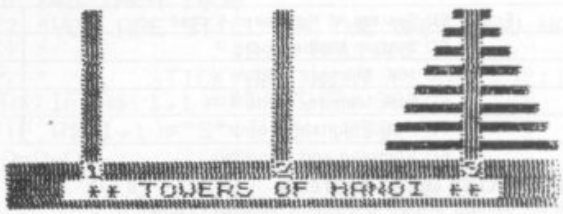



```
NUMBER OF DISCS = 5

NUMBER OF MOVES = 0
 MINIMUM NUMBER = 255
DO YOU WISH COMPUTER TO MAKE
THE MOVES? YES OR NO
```

```
NUMBER OF DISCS = 5

NUMBER OF MOVES = 104
 MINIMUM NUMBER = 255
```




```
NUMBER OF DISCS = 5

NUMBER OF MOVES = 255
 MINIMUM NUMBER = 255
TO START NEW GAME PRESS
"NEW-LINE" KEY
```

ZX HARDWARE . . .

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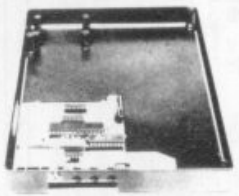
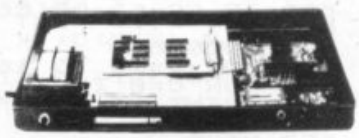


INSTALLATION
Simply unscrew the ZX printed circuit board from its case and screw it into the FD Case.



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AD Code vg

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