

ZX80 IN SPACE

You face the perennial problem of docking your space-craft before your fuel runs out. David Bickerdike invites you to RUN this program, enter W and press N/L twice. You are then in total control of an inverse 'X'. Entering the letter X moves your space craft up the screen, W moves you down and L and R moves you left or right respectively. Keep your eye on the fuel, and good-luck - can you dock with the Shift A (space-station CLIVO) before your fuel eventually runs out. Only 1K ZX80's are powerful enough to complete this mission.

```

10 CLEAR
20 GOSUB 310
30 LET A = 16821
40 LET C = 2100
50 LET J = 0
60 LET V = 16848
70 LET D = 17114
80 FOR E = 1 TO 20
90 POKE (V + J), 148
100 LET J = J + 20
110 IF V + J = A THEN STOP
120 NEXT E
130 POKE (A), 189
140 POKE (D), 9
150 PRINT
160 INPUT AS
170 IF AS = "X" THEN LET A = A - 33
180 IF AS = "W" THEN LET A = A + 33
190 IF AS = "L" THEN LET A = A - 1
200 IF AS = "R" THEN LET A = A + 1
210 PEINT
220 LET C = C - 50
230 PRINT "FUEL "; C; " GALLONS"
240 IF C < 1 THEN PRINT "NO FUEL"
250 IF C < 1 THEN STOP
260 IF A = D THEN PRINT "YOU WIN"
270 INPUT IS
280 GLS
290 GOSUB 310
300 GOTO 50
310 FOR B = 1 TO 160
320 PRINT CHR$(128); CHR$(128);
330 NEXT B
340 RETURN

```

(c) DAVID BICKERDIKE



SUBMITTING PROGRAMS TO INTERFACE

Please make sure you include a FULL description of what the program does, and what sort of display is generated, plus any instructions which are not included in the program, but that you must know in order to run it. We are being drowned in programs in which the ZX80 just displays a board (such as NOUGHTS & CROSSES) for two people to play. These are of little interest. We'd like games in which the computer is the opponent.

To increase the chance of your program being selected for publication, please type the program, or write it clearly on white paper, with blank lines between each program line. Many people have, for some reason, submitted programs written in green or brown on darkly printed graph paper. Such programs are almost illegible.



It is essential that you enter the program from the listing which we are to get, before you send it, to decrease the chance of mistakes (and then you can blame us for any errors which do get through). It is also essential (please!) that you indicate how much memory a program occupies.

NEXT MONTH IN INTERFACE:

*GEOFF CHESHIRE OF CARDIFF DISCUSSES WAYS OF SAVING MEMORY WHEN PROGRAMMING YOUR ZX81, AND GIVES A USEFUL ROUTINE WHICH SAVES A LOT OF TYPING WHEN MANY VARIABLES ARE REQUIRED IN A PROGRAM

*ANDREW STEVENS DISCUSSES SOME TRICKS AND IDEAS HE HAS DISCOVERED ON HIS ACORN ATOM, INCLUDING HOW TO SCAN THE KEYBOARD, WITH A CLOSE APPROXIMATION TO THE INKEY\$ FUNCTION

*TONY BAKER REVIEWS HINTS AND TIPS FOR THE ZX80, PUBLISHED BY HEWSON CONSULTANTS, AND EXPLAINS A SYSTEMATIC METHOD OF DEBUGGING PROGRAMS WHICH REFUSE TO WORK AS PLANNED

*STEVE ADAMS, IN 'HARD FACTS' DISCUSSES THE MYSTERIOUS WORLD OF THE LATCH, AND EXPLAINS HOW IT OPERATES AND CAN BE 'LOCKED' AND 'RELEASED'

*DAVID HARWOOD BRINGS US THE FIRST OF A NEW, REGULAR FEATURE, A PAGE FOR YOUNGER READERS, WHICH INCLUDES WAYS OF USING YOUR ZX80/1 TO RAISE MONEY FOR CHARITY

*OWEN LEWIS OF DEVON RECENTLY ATTENDED A TIES COMPUTER COLLEGE COURSE - AND THOUGHT IT WAS GREAT. HE TELLS ABOUT HIS EXPERIENCE

*PLUS ALL THE USUAL FEATURES, INCLUDING ERIC DEESON'S EDUCATION SECTION AND MANY PROGRAMS. THE PROGRAMS INCLUDE: AN INVADERS TYPE PROGRAM FOR THE ZX81, A ZX80 RABBIT CATCHER PROGRAM (.), YAHTZEE FOR A ZX80, PLUS MANY MORE PROGRAMS FOR ZX80, ZX81 AND - OF COURSE - THE ACORN ATOM

ALL THIS IN NEXT MONTH'S INTERFACE.....

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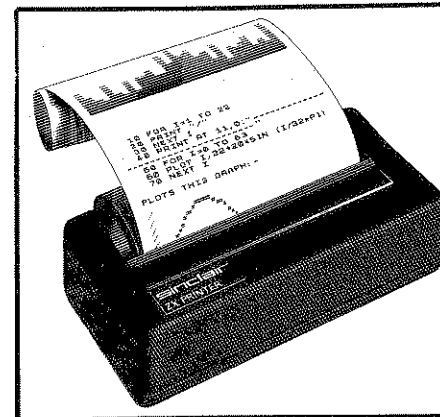
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CLUB NEWS....



Each month in INTERFACE we list local clubs for ZX80, ZX81 and Atom. If you've started a club, or you'd like to start one, let us know and we'll put your name on this page. Please let us know what activities your club is carrying out, meetings, hobby nights or whatever, and we'll share your news with other members in the clubs. Just a reminder, 44-46 Earls Court Road is just a mail address. None of us are there, so there is no point in trekking up there, as many club members have done. Also, please don't phone them, because they don't like it much, and can't help you with anything.

Also, if you write, please allow up to a month for a reply. We are now getting nearly 100 letters a day, so the backlog is pretty awful. INTERFACE is published at the same time each month, so take note of when this copy arrived, and you should get subsequent copies at the same time next month, give or take a day. Please note that INTERFACE is the magazine for your local club. Please make full use of it.

Last month we had a questionnaire survey form on the back cover, and at the time of compiling this page, we'd had many, many replies. We've reprinted it this month. If you haven't yet replied, we'd appreciate it if you spend a few minutes to do so. This is the only way we can reshape the clubs and INTERFACE to better serve you.

Eric Deeson is the tireless organiser of EZUG (which sounds like a painful disease), the Educational ZX80/1 Users' Group. He can be contacted at Highgate School, Birmingham, B12 9DS. A large sae will get you the latest copy of his newsletter. I see from his most recent newsletter that Sinclair is still said to be planning a BBC compatible computer which he'll offer to schools for around £60. We'll have to see. Clive's PR people are playing "No comment" on that one at the moment.

Richard Altwasser of Sinclair Research invites educational, business and games programs for the ZX81, with the view to possibly adding them to the software range they're now selling. He wants original material in the form of two tape recordings, a listing, a title and a description of not less than 200 words. They don't pay too well, but you might be interested.

Clive's PR folk tell me that Uncle C and a Cambridge bookseller Patrick Browne are going into the publishing business. They will initially publish about 20 books a year, fiction and non-fiction, 10 in the spring and 10 in the autumn. In September the company will launch a TRANSLATION BOOK CLUB which will draw on already published material and concentrate on important contemporary works.

Explaining the new company's approach to publishing, Patrick Browne told INTERFACE: "We believe that there exist a number of market sectors which are at present covered inadequately or which offer major opportunities for the future. We aim to reach the audience of concerned, intelligent laymen and we intend that, in general, all the books on our lists, fiction and non-fiction, should reflect a progressive approach to the problems of contemporary society."

The Personal Computer World show is coming up in September, and we've been offered a free stand in the club area. You'll be welcome up and chat about the clubs, your computers, That Man in Cambridge, any hassles you're having, or whatever. We'd love to see you there.

Acorn hope to exhibit the BBC version of the Proton at the PCW show, but even if that doesn't make it, they'll have games and the usual excitements, plus four new software packages.

Sinclair will be displaying the ZX81 of course, and will probably co-opt club members into helping out on his stand. You'll also get a chance to see the printer in action, although you won't be able to buy it there. Uncle C says he won't be selling anything at the show.

The show is on from September 10 to 12 at the Cunard Hotel, which is just a few minutes away from the Hammersmith underground station. Entrance fee is £2.

Now, club addresses (please let us know your local club address so we can add it to our list):
 Roger Pyatt, 23 Arundel Drive, Orpington, Kent, (66) 20281.
 Peter Vincent, 5 Upperfield Road, Welwyn Garden City, AL7 3LP.
 Austin Knott, 269 Telegraph Road, Deal, CT14 9EJ.
 Christoph Moeller, Gross Kurfurstentasse 41a, 4800 Bielefeld 1, Germany.
 Keith Heys, 14 Newsham Road, Lancaster, LA1 4DG.
 Danmarks Nationale ZX80 og ZX81 club, Skovmosvej 6, 4200 Slagelse Dk Denmark.
 Manchester Atom Users' Group, Clement M Rutter, 3 Leopold Ave., Withington, Manchester, M20 8JG.
 Steve Brumby, 38 Eatsfield Rd., Messingham, Scunthorpe, South Humberside, DN17.
 Ken Knight, 22 Mount Streetm Aylesbury, Bucks, HP20 2SE (0296 5181).
 David Blagden (the ZX80 Users' Club) PO Box 159, Kingston upon Thames, Surrey KT2 5YQ.
 Anthony Quinn, Heckenrosenweg 6, 3170 Gifhorn, W. Germany (who says second hand ZX80's sell for very large figures in Germany).
 Jonathan Meyer, Vanspaen Straat 22, 6524 H.N. Nijmegen, Holland.
 William Lawton, 5 Ash Way, Ash Bank, Bucknall, Stoke on Trent ST2 9D2 would like to contact other members in North Staffs, and J P Gibbons of 14 Avalon Road, Orpington, Kent, BR6 9AX is also interested in hearing from members in his area.

If there is not yet a club in your area, why not start one and let us know so we can publicise it.

GETTING ACQUAINTED WITH YOUR ACORN ATOM (184 pages, 80 programs)

This is it. The book every Acorn Atom owner has been waiting for. A host of programs, with detailed, clear explanations of how they were written; chapters on arrays and strings; PEEK and POKE; mastering the graphics; Atomic logic; and much more.

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GETTING ACQUAINTED WITH YOUR ACORN ATOM, by Trevor Sharples and Tim Hartnell is just £7.95, and is the one certain way to ensure you make the most of your Atom computer. Introduction by John Galt.

Order form is inside the back cover.

PRINT AS

Dear INTERFACE,
Thanks for the April issue of INTERFACE and the back issue for January. I read with interest the views of G A Bobker and Roger Pyatt. Speaking as a professional programmer, I find the programs you print the most interesting part of the magazine.

I suggest that where possible anyone wishing to submit a program should let another member/programming person check or try it out.

Keep up the good work and encourage people to send in their programs. The enthusiasm and imagination far outweighs any lack of quality control.

Chas. Lomas, New Mills, via Stockport.

Dear INTERFACE,
It has been suggested that I notify you of the problem I have since I upgraded my ZX80.

The 8K ROM caused no problems, but since adding the 16K RAM pack, the ZX80 is subject to 'black outs'. At first I assumed it was overheating, so I coated relevant bits around the heat sink with thermal compound. That had no effect, so I continued to panic until I heard that it happens to other people. Is anything happening?

I would have phoned Sinclair Research but it has apparently been swallowed by an answering service, so I must write instead.
Mrs V Broadhurst, Kings Heath, Birmingham.

ALLAN REPLIES: Yes, Mrs Broadhurst, it has happened to many other people, and the reasons for it - suggested by members, because Uncle Clive refuses to admit there is a problem - is either (a) crummy chips (b) poor contacts at the back of the computer (c) instability in the power supply; or (d) insufficient accuracy in the timer used.

Dear INTERFACE,
A heartfelt thanks to you for taking up the cudgels on behalf of our complaints re the 16K RAM. I did not receive my cash back when I complained but I did, to my utter astonishment, find myself the owner of an operational 16K (the same that I returned incidentally) and it works, it really works. I tried it with an 8K random dungeon generator with monsters, loot, etc, that I had prepared and after taping it I also LOADED it three times with success. I am now thinking of an Atom or Video Genie and tending to lean towards the V.G. as 16K at three hundred and twenty pounds seems a better offer than the Atom.

Thanks again, and more power to your press.
Dave White, Northampton, NN5.

Dear INTERFACE,
I suppose that, unless we members write in to complain, you will continue to print those infantile games (?) ad nauseam. Surely the ZX80/81 is worthy of more adult use than these pathetic programs which monopolise the pages of INTERFACE. The real need is for technique and useable practical programs, so let's have more of these.

Whilst I am writing, can I canvas for membership of my organisation STOPTAP which is a Society To Outlaw Peeking and Totally Abolish Poking. Neither of these evil practices achieve much more than a good honest LET or PRINT statement does and, more frequently, creates chaos in a program.

Les Parsell, Llechryd, Cardigan, Dyfed.

Dear INTERFACE,
As a new member of the ZX80 users' club I am glad to see that your magazine has a variety of ZX80 programs and topics. My ZX80 had to be modified by me to improve LOAD/SAVE. I also attempted a 1K EXTRA modification.

When I recently obtained a 16K RAM early variety, I started to have the usual program-losing problems, getting a black and white band then a blank screen. I tried taking the top off the ZX80 and cooling or increasing the heat sink. Then I noticed that the 'on board' memory was getting hot so I removed it. This seemed to solve my problems except after a very long session. This may be caused by the mains adaptor.

I have been waiting for my 8K ROM for three months now in spite of Clive being paid over a month ago, and a few phone calls actually getting the staff at Cambridge.

Colin B Tysall, Coventry.

TIM REPLIES: I ordered two 8K ROMs in October last year, and I still haven't got the second one. I have written to them as well, to my 'inside contacts' and even that hasn't helped. They run a funny sort of ship down Cambridge way.

Dear INTERFACE,
Many thanks for a super magazin with the many excellent programs. Long may you EDIT; and may you never RUBOUT!

A E Trice, Fleet, Hampshire, GU13 8HQ.

TREVOR REPLIES: Thanks

Dear INTERFACE,
I am in receipt of issue no. 9 of INTERFACE.

Being new to this particular hobby, my only experience being with the newly acquired ZX81, I was initially very optimistic of the potential. A view rapidly becoming very disillusioned by the whole industry, including yourselves.

I am aware of the new 'in' joke of (deliberate mistakes) having read the previous issues of INTERFACE but should these extend to printing programs which are hopelessly outside of the memory of the ZX81?

I am in receipt of the tapes I ordered from Sinclair...and have found them impossible to load by name of the "program", they can only be loaded by LOAD "...". If one attempts to load by the name, the tape machine appears not to detect the silence instruction at the end of the program, and thus give the code indicating entry of the instructions.
Bruce G Littley, Chelmsley Wood, Birmingham.

MARK REPLIES: We agree that ZX81 programs that occupy more than one K should be so marked. We will do so in future. We will pass on your comments on the software to Sinclair Research.



CHESS, the program you've been waiting for, is now available. CHESS for the 16K ZX80 is now a reality. Full graphics; easy to understand operation; intelligent, rapid responses; plays in a strictly legal way; en passant and castling available - it's all here in this brand new program that has been 15 weeks in the writing. Now, we don't want to mislead you. This program does not play the greatest chess in the world. But it manages a tolerable game, and we consider the interest in such a program is so great, that it is worth offering in its present form. Now when your friends look at your ZX80 and say "What can you do with it?" you can answer "Just play chess". ZX80 CHESS occupies nearly 13K, and requires a further 2K for working space. It is supplied dubbed once on each side of a cassette. Full instructions are included within the game.

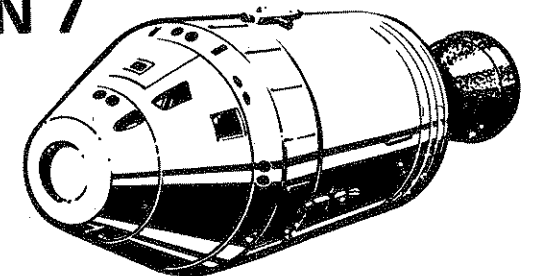
Philip Joy, 130 Rushgreen Road, ROMFORD, ESSEX.

I enclose £9.95. Please send me a copy of ZX80 Chess.

Name

Address

TRANQUILITY BASE SEVEN 7



The object of the game is to land a 'manned' capsule on to a flat plain between mountains on a Lunar surface, and at a sufficiently gentle rate to prevent injury to the occupants. The pilot is permitted to choose his initial fuel level before starting, as well as the force of gravity 'G' pertaining to the moon on which he is to land. He will find that small rocket thrusters are available to him to propel the capsule sideways (keys 5 and 8 - left and right respectively) and upwards (key 7). The thruster magnitudes are constant, when selected, at 0.25 for sideways thrusting and 1.33 for upwards thrusting. The maximum allowable landing velocity is 'G' dependant, but is of roughly constant difficulty over the suggested 'G' range.

The capsule will start at the beginning of each game at the top of screen, in a random position in the horizontal plane and with zero velocity. It will then move under the combined influence of gravity and thruster command until successfully landed or crashed. A 'honey-pot' fuel gauge is provided which empties at a proportionate rate of thruster useage, and on completion of the game the result together with summary of final fuel state and landing velocity is announced. To restart the game with the same parameters merely press any key (except space or 'C'). To change run parameters press 'C'.

Should inadvertant prolonged thrusting push the capsule off-screen, the programme will continue to plot the 'true' position, invisibly as far as the user is concerned, until either it returns back into the picture or crashes into an extended mountain off-screen. Naturally, if the pilot runs out of fuel the thrusters will become ineffective. In any case, only one thruster at a time is available - an attempt to use more than one at a time will be treated as a zero thrust requirement.

```

1  REM C B.J. OKE; MAY 1981
2  CLS
3  PRINT "MOONLANDER MK3"
4  PRINT
5  LET R = 0
10  LET VV = 0
12  LET VH = 0
14  LET S1 = 0
20  LET S2 = 0
30  LET SV = 43
40  LET SH = RND*63
45  IF R = 0 THEN GOSUB 500
50  LET F = F1
51  GOSUB 1000
52  GOTO 60
55  LET F = F - 10*ABS(AH+AV+G)
56  IF F < 0 THEN LET F = 0
58  IF F < 0 THEN LET AV = -G
59  IF F < 0 THEN GOTO 80
60  LET AV = -G + (INKEY$ = "7")*1.33
70  LET AH = (INKEY$ = "8") - (INKEY$ = "5")*.25
80  LET VV = VV + AV
90  LET VH = VH + AH
100 LET SV = SV + VV
110 LET SH = SH + VH
120 IF SH <= 20 AND SV <= 20 - SH OR SH >= 31 AND SH <= 43
AND SV <= (SH - 31)*2.75 OR SH > 43 AND SV <= 75 - SH
THEN GOTO 800
IF SV <= 0 THEN GOTO 700
UNPLOT S1,S2
150 IF SV > 43 OR SH < 0 OR SH > 63 THEN GOTO 182
160 PLOT SH,SV
170 LET S1 = SH
180 LET S2 = SV
182 LET L=INT(26*F/F1)
183 IF L>L1 THEN GOTO 55
184 UNPLOT 43,L1
185 LET L1 = L1 - 1
187 GOTO 183
500 PRINT "INITIAL FUEL LEVEL? (100 TO 500)"
510 INPUT F
520 PRINT
530 LET R = 1
540 LET F1 = F
562 PRINT " " "G" " ? (1 TO 1)"
564 INPUT G
570 RETURN
600 LET Z = VV*VV+VH*VH
605 LET Z = SQZ Z
610 RETURN
650 PRINT AT 2,2; "*** TOO FAST ***"
660 GOTO 810
700 GOSUB 600
705 IF Z>G+1 THEN GOTO 650
710 PRINT AT 0,2; "CONGRATULATIONS - "
720 PRINT AT 2,2; "A SAFE LANDING"
730 GOTO 835

```

```

800 PRINT AT 2,2; "*** HIT MOUNTAIN ***"
810 FOR I = 1 TO 10 STEP .5
820 LET AV = SH+I*(RND - .5)
822 LET AH = SV+I+I*RND
824 IF AV>63 OR AV<0 OR AH>43 THEN GOTO 830
826 PLOT AV,AH
830 NEXT I
833 GOSUB 600
835 PRINT AT 4,2; "CONTACT SPEED ";Z
836 IF VH<1E-7 THEN LET VH = 0
837 PRINT AT 6,2; "H: ";VH; "V: ";VV
838 PRINT AT 8,2; "FUEL LEFT ";F
840 FAST
844 PAUSE 10000
845 IF INKEY$ = "C" THEN RUN
850 GOTO 10
1000 CLS
1004 PRINT AT 20,23; "FUEL"
1008 FOR I = 0 TO 20
1010 PLOT I,20 - I
1020 PLOT 43+I,32 - I
1030 NEXT I
1040 FOR I = 0 TO 32
1050 PLOT 31+I/2.75,I
1060 NEXT I
1061 FOR I = 0 TO 25
1062 PLOT 43,I
1063 NEXT I

```

MASTERING MACHINE CODE ON YOUR ZX81 OR ZX80

If you survived the Sinclair instruction manual, but don't know where to go from there, then this is the book for you. If you know nothing at all about machine code; you don't know what an Opcode is; and you've never even heard of Hexadecimal, then this is definitely the book for you!

It starts off at first principles, with well understood BASIC programs. The use of the ZSR function in its simplest form is explained, then you learn how to load machine language routines, and how to run them. Two whole chapters near the start of the book concentrate on a discussion on how to make the best use of such routines before we even start thinking about doing any programming.

This great new book by Tony Baker is just £5.95

From simple arithmetic and random number generators you are slowly guided through a series of easy-to-understand routines, including a backward SCROLL for use within your own BASIC graphics games; a way of printing characters onto the screen instantly; a routine to recreate the display file entirely...and many more instant-action routines.

"MASTERING MACHINE CODE ON YOUR ZX81 OR ZX80" includes a draughts program which plays an intelligent game, makes kings, allows multiple jumps, keeps a picture of the board on the screen at all times, and DOESN'T ALLOW CHEATING. This game is given a chapter to itself. The computer makes decisions so quickly you don't even get the chance to take your finger off NEWLINE before it has made its move...and, best of all, EVEN ON THE ZX81, the game takes just 1K.

As well, you'll learn how to edit and debug your programs, how to disassemble the ROM and make use of its subroutines, both on the old and the new. All this and more! MASTERING MACHINE CODE ON YOUR ZX81 OR ZX80, by Tony Baker, is just £5.95

ORDER FORM IS INSIDE BACK COVER.

```

1064 LET L1 = 30
1065 SLOW
1070 FOR I = 10 TO 15
1072 PRINT AT 21,I; (graphic D)";
1074 NEXT I
1080 RETURN

```

(c) B. OKE

NOTES:

- Line 562 is trying to represent quote image symbols surrounding the G. char.
- Line 844 allows up to about 8 minutes before the next game restarts automatically. Altering the value of the argument will give a shorter or longer delay (indefinite if, say, 33000) as desired.

ULTIMATE 1K ZX80 DOUBLE DENSITY GRAPH PLOTTER (MARK V)

This program will prompt for an input which may be any combination of numerical functions, numbers, relations and the variable X, in correct BASIC syntax, using up to 13 keystrokes for each expression. Examples — "15", "X/2", "X AND 13", "(X-32)**2/30" "RND(X)" etc. To stop the prog. input "S".

With more RAM the prog. can be adapted to run faster, use all the screen and provide labels and axes etc.

```

10 REM (33 full stops)
20 FOR A = 16427 TO 16459
30 INPUT B
40 POKE A, B
50 PRINT B,
60 NEXT A
70 LIST

```

Now RUN and in response to the prompts input the following data:-

6, 4, 2, 7, 3, 17, 14, 5, 8, 12, 16, 11, 13, 15, 9, 0, 20, 3, 5, 2, 8, 1, 4, 9, 15, 20, 12, 10, 13, 7, 14, 11, 6.

The REM line will now contain the data in the form of graphic characters. Complete the listing with the following line, beginning by replacing lines 20 to 70.

```

20 FOR A = 1 TO 512
30 PRINT "L";
40 NEXT A
50 INPUT A$
60 FOR B = 16567 TO 16579
70 POKE B, CODE (A$)>1 AND CODE (A$)
80 LET A$ = TLS(A$)
90 NEXT B
100 FOR X = 0 TO 63
110 LET Y = (thirteen 'X's)
120 LET B = X/2-(Y/2)*33+496+PEEK(16396)+PEEK(16397)
130 LET A = NOT PEEK(B) = 49 AND PEEK(B)
140 LET A = PEEK(16426+(PEEK(16442+A+(A>8)*119) OR 4**
(X AND 1)*2**(Y AND 1)))
150 IF Y<32 AND Y>-1 THEN POKE B,A-(A>8)*119
160 NEXT X
170 GOTO 50

```

If you do adapt this program be careful to make sure that the first value for B in line 60 corresponds to the address of the first X in line 110. If you have more memory and wish to expand the display — for each extra line of 'L's add 32 to the 512 in line 20, add 2 to the 32 in line 150 and add 33 to the 496 in line 120.

(c) B. DESBOROUGH

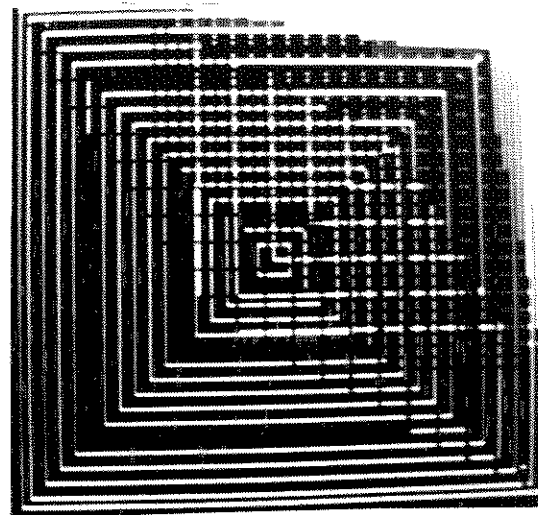
WILD MIKE YATES' PATENTED ALL-PURPOSE BIORHYTHM PANACEA

Check up on your physical and mental well-being with a little help from a 1K ZX81 — or new ROM ZX80. This program, before your very eyes, will calculate the days between O.A.D. and your birthday; the days between O.A.D. and today giving you the number of days you have lived (allowing for leap years etc.). And that's not all. It then uses the biorhythm cycles from your birthdate and establishes how close to the peak of the curve you are — 100% is at the top of the curve.

```

10 PRINT "BIORHYTHMS"
20 PRINT "WHAT IS BIRTH YEAR?"
30 INPUT Y
40 PRINT "BIRTH MONTH?"
50 INPUT M
60 PRINT "BIRTH DAY?"
70 INPUT D
75 CLS
80 GOSUB 280
90 LET X = N
100 PRINT "WHAT IS THIS YEAR?"
110 INPUT Y
120 PRINT "THIS MONTH?"
130 INPUT M
140 PRINT "DAY?"
150 INPUT D
155 CLS
160 GOSUB 280

```



```

170 LET A = N - X
180 LET A$ = "PHYSICAL"
190 LET B = 23
200 GOSUB 300
210 LET A$ = "EMOTION"
220 LET B = 28
230 GOSUB 300
240 LET A$ = "INTELLECT"
250 LET B = 33
260 GOSUB 300
270 STOP
280 LET N = INT(365-25*Y) + INT(30.4375*M) + D
290 RETURN
300 LET C = A - INT(A/B)*B
310 LET E = ABS(SIN((C/360)/B)/180*PI))*100
320 LET E = INT E
330 PRINT A$; " _IS_"; E; "PCT.OF PEAK"
340 PRINT
350 RETURN

```

(c) M. A. YATES

HARD FACTS

AND gate:

An AND gate is one that adds two or more bits together. My school teacher used to say 1 AND 1 = 2, but in binary logic 2 = 1, so 1 AND 1 = 1. In other words, when binary 1 is applied to both inputs, the output goes to binary 1.

An AND gate is shown in figure one. If one input goes to Binary 0, then the output changes back to binary 0. This applies to any number of inputs to an AND gate. That is, if any one of the inputs goes to binary 1, then the output goes binary 0, only if all the inputs are binary 1's will the output change to binary 1.

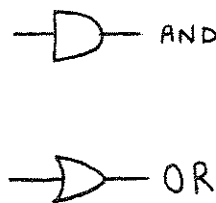
OR gate:

The OR gate is the opposite of an AND gate, that is, if any one of the gates inputs is binary 1, then the output is binary 1. Only if all the inputs are binary 0 will the output be binary 0.

NOR and NAND gates:

These two are OR and AND gates with an inverter on the output. The little circle is the inverter in figure 2. Therefore, NAND gates are binary 1 output, until all the outputs are binary 1, when it changes to binary 0. NOR gates are binary 1 output until one of the inputs is binary 1, when it changes to binary 0. These NOR and NAND gates are easier to make into chips so are more widely used than OR and AND gates.

Figure 1

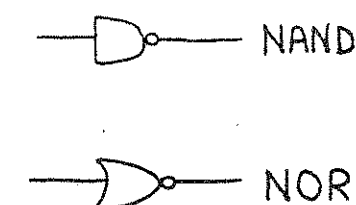


MEMORY ADDRESSING USING GATES:

These gates are used a lot in addressing memory, as the address lines can be AND'd or OR'd together to produce one chip select (CS) line that only goes binary 0 when the correct range of addresses is put onto the BUS (A0-A15), thus turning on the particular chip required. Memory chips are usually in 1K blocks so lines A0 - A9 are decoded within the chip and we only need to decode it into 1K sections from A10 - A15.

Sinclair uses the top two address lines to decode the various memory sections (A14 - A15). This is a two bit binary number and therefore has only four possible states and they are shown, together with their uses, in table 1. Each section is 16K in length and shows why there is only 16K RAM available to the user out of the total of 64K addressable memory available to the processor.

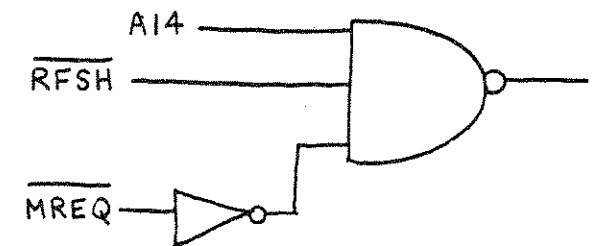
Figure 2



Now A15 turns on the display of the screen to the TV. This means that any address over 32767 turns on the display and limits the upper part of the memory.

To turn on the internal 1K RAM or the external 16K RAM pack only, requires A14 to change to binary 1. Note that the internal ROM (4K or 8K) cannot be on at the same time as the RAM. Now A14 changes at every 16K boundary which you can prove by adding up all the decimal equivalents of the 1's from A0 to A13. It should come to 16383. If you add one to that number, all the bits from A0 to A15 will be 0 and A14 alone will represent 16384, the bottom bit of the RAM.

Figure 3



Decoding the RAM:

Now to turn on the RAM memory at the right time, we need to know:

- If it is a MEMORY address (MREQ) rather than an input or output port address;
- If it is a MEMORY address or a memory REFRESH (RFSH) address. A Refresh is part of a memory's housekeeping routine; or
- If A14 is binary 1.

The bar over MREQ and RFSH means the signals are inverted. That is, when it is time for a refresh, the RFSH signal goes to binary 0, not binary 1 as expected.

So we can use NAND gates to combine all these signals, so that we get a single line that goes to binary 0 to turn on the internal 1K RAM or the 16K external RAM pack via their CS signals. Figure 3 satisfies all the conditions above as the output goes to binary 0 only when:

- MREQ is binary 0, the input goes to binary 1 at the gate as it passes through an inverter;
- RFSH is binary 1 as it is NOT a refresh address;
- A14 is binary 1, 16384 - 32767 and when display is on 49152 - 65535;
- Plus if any of these conditions are NOT met the output turns off the RAM by turning the inverted chip select signal to binary 1 (CS). If the chip select signal is not binary 0, then none of the other address lines have any effect.

STEVE ADAMS

A15	A14	USE	
0	0	INTERNAL ROM ON	USED FOR TRANSLATION OF BASIC
0	1	RAM MEMORY ON	USED FOR RUNNING PROGRAM
1	0	DISPLAY ON	NOT USED
1	1	DISPLAY ON	USED TO OUTPUT RAM SCREEN TO TV.

TABLE 1

TRIGGER

You have a limited time to shoot down the dancing targets in the Atom program. The targets appear at the top of the screen, and you move (automatically) along the bottom. You can reverse the direction of travel by use of the SHIFT key and you press the REPEAT key to fire at the targets. At the end of the game, your score is shown, plus a "best score so far". The time increments automatically, but leaps dramatically every time you press to fire.

```

10E=0
70CLEAR0
75?#E1=0
80C=0; X=0; S=0; T=0
90E=0
1000Y=482
1010WY?#8000=#AF
1011P. $30"SCORE "S" TIME "T
1012IF X=0 GOS. T
1015X?#8000=#41+A. R. X56
1017IF R. X20>17 X=0
1020Y?#8000=32
2000IF (Y>482)Y=Y-2
2010IF (?#8001&#80=0)&(Y<508)Y=Y+4
2020IF (?#8002&#40=0)GOS. U
2025 X?#8000=#40
2500T=T+1
2600IFT<1000 G. W
2700P. $30"END OF GAME - SCORE WAS "S"
2800IFSCE G. 2620
2810E=S
2815P.
2820P. "HIGHEST SCORE SO FAR "E"
2830P. "P. "PRESS ANY KEY FOR NEXT GAME";LINK#FFES
2840G. 70
6000UF. D=20T00 STEP -4
6010V=Y-448; D=32*Q+V
6014X?#8000=#7F; X?#8000=#40
60200?#8000=#55
6023?#8002=?#8002; 4
60250?#8000=#40
6030NEXT Q
6040T=T+10
6050IFV=X-32 X=0; S=S+1700+R. X200; P. $7; R.
9000TX=2*(A. R. X13)+66
9010P. $30; P. "P.
9020P.
9040RETURN
10000END

```

KEYBOARD KRAZINESS

Hey! All you 1K ZX80 old ROMers. Austin Knott has written a program of fun for you to play. Press newline and the ZX80 will PRINT one of the 36 symbols available from the keyboard in quotes. Input the symbol as quickly as possible. The ZX80 will PRINT the symbol you inputted and the time you took on the screen. Your score will also be displayed. Until you press newline no time is being used - by the way, you only get one minute. You keep on playing until the minute is used up. If your score is the highest score so far, you enter your initials.

```

10 RANDOMISE
20 LET A = 0
25 LET K = 16414
30 GOTO 410
40 LET B = 1
50 LET C = 0
60 LET D = 0
70 CLS
80 PRINT "QUESTION: "; B
90 LET E = RND (36) + 27
100 LET A$ = CHR$(E)
110 PRINT
115 PRINT, CHR$(212); A$; CHR$(212)
120 POKE K, 0
130 POKE K + 1, 0
140 INPUT B$
150 IF B$ = " " THEN GOTO 140
160 LET D = D + 1
170 IF NOT A$ = B$ THEN LET D = D - 2
180 LET F = PEEK (K)
190 LET G = PEEK (K + 1)
200 LET H = G*256 + F
210 LET C = C + H
220 PRINT, " " ; B$
230 IF C > 3000 THEN GOTO 290
235 PRINT
240 PRINT, C/50; " " ; (C-50*(C/50))/5; "SECS"
250 PRINT
255 PRINT, "PRESS NEWLINE"
260 INPUT C$
270 LET B = B + 1
275 GOTO 70
280 PRINT
290 PRINT
300 PRINT "YOUR SCORE: "; D
310 IF NOT D > A THEN GOTO 370
312 FOR J = 1 TO 8
315 PRINT "(4 shift F)";
317 NEXT J
330 PRINT "THIS IS THE BEST SCORE -"
340 PRINT "ENTER INITIALS"
350 INPUT D$
355 IF D$ = " " THEN GOTO 350
360 LET A = D
370 PRINT
380 PRINT "BEST SCORE: "; A
390 PRINT, "BY "; D$
400 PRINT
410 PRINT "PRESS NEWLINE TO START"
420 INPUT A$
430 IF A$ = " " THEN GOTO 40

```

(c) AUSTIN KNOTT



ZX EDUCATION

I know that the Interface crew have had a lot of stick about their slow reaction to the appearance of the ZX81. It is not easy to appreciate the time delay between writing something and having it reach your breakfast table. I feel this problem strongly - writing this in mid-May and knowing that it'll just about reach you for the summer holidays.

Having spent sixty or so hours exploring the ZX81 (in the past couple of weeks!), I reckon it's time to introduce it to this column. I shall do so by way of a comparison of my program "Headline sums", originally devised for the ZX80 and now updated for ZX81.

The origin of the program is the same as that of probably all the big prints you see described in the ad's - Pat Crabb's ZX80 program in Educational Computing, June 1980. It displays up to 12 characters in solid black type easily readable from 50m. It is therefore of great value for whole class use and with the partially sighted.

Here's the ZX80 version; it runs happily on 1K.

```

2 DIM A(3)
4 DIM B(7)
6 FOR C = 0 TO 7
8 LET B(C) = 2**C
10 NEXT C
12 INPUT A$
16 FOR D = 0 TO 3
17 LET A(D) = CODE (A$)
18 IF A(D)>219 AND A(D)<224 THEN LET A(D) = A(D) - 202
19 IF A(D) = 227 THEN LET A(D) = 22
20 LET A$ = TL$(A$)
21 NEXT D
22 FOR E = 0 TO 7
24 FOR D = 0 TO 3
26 LET F = PEEK(3584 + 8 * A(D) + E)
28 FOR C = 0 TO 7
30 LET G = 1 + (F<B(7 - C))
32 PRINT CHR$(G*128)
34 LET F = F - G*B(7 - C)
36 NEXT C
38 NEXT D
40 NEXT E
46 POKE 16421,24
47 INPUT B$
48 GO TO 16

```

Input is of, for instance, "1234 - 567 = 667". N/L gives the first block of four characters (after a few seconds' processing time); N/L again and again gives the second and third blocks similarly. No space here to explain how it works - try to suss it out; the effort is worth-while.

The ZX81 version does not run on 1K - too much memory is needed for the arrays and display. It works in the same way, but the ROM address is different.

```

2 DIM A(4)
4 DIM B(8)
6 FOR C = 1 TO 8 LET B
8 LET B(C) = 2**C
10 NEXT C
12 INPUT A$
14 FOR H = 0 TO 2
16 FOR D = 1 TO 4
18 LET A(D) = CODE A$(D+H*4)
20 NEXT D
22 FOR E = 1 TO 8
24 FOR D = 1 TO 4
26 LET F = PEEK (7680 + 8*A(D)+E)
28 FOR C = 1 TO 8
30 LET G = 1 - (F<B(8-C))
32 PRINT CHR$(G*128)
34 LET F = F - G*B(8-C)
36 NEXT C
38 NEXT D
40 NEXT E
46 PAUSE 40000
48 NEXT H
50 PAUSE 40000

```

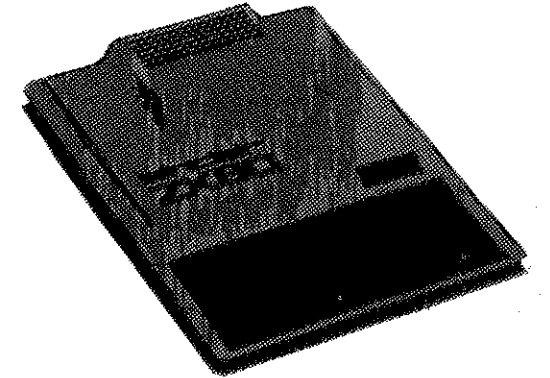
The ZX80 version works with numbers, letters, mathematical symbols and a few others. The ZX81 version has a wider range, but does not work as it stands with spaces and most graphics blocks. The solution will come from lines like IF A(D) = such and such THEN LET A(D) = whatever (as in the ZX80 program). For 1K, delete the H loop and add 24 PRINT AT 8, 0.

This program, straight or as a sub-routine, has many uses in education. Explore them; let me know your findings for the benefit of the Educational ZX80/1 Users' Group (whose fifth Newsletter will shortly be available from me).

Two bits of news:

- (a) A ZX81 + 16K RAM for £65 + VAT is the latest cut-price offer - thus Sinclair plans to get his machines into the schools. One per school from Griffin + George Ltd., Ealing Road, Alperton, Middlesex (official orders accepted of course); ZX printer to be added shortly.
- (b) Sinclair are planning to put out a "ZX81" Learning Laboratory" soon - an easy-going primer by Trevor Toms with an associated collection of cassettes for about £20. This is for those finding the Manual too unhelpful (well, it is), and will doubtless be of some use in school.

Eric Deeson,
Highgate School,
BIRMINGHAM B12 9DS



GETTING ACQUAINTED WITH YOUR ZX81

by Tim Hartnell

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Whether you've never touched a computer before you bought your ZX81, or you've had a lot of experience, you'll find much of value and interest in GETTING ACQUAINTED WITH YOUR ZX81. This 120 page book is designed to get your ZX81 up and running with worthwhile, interesting programs from the very first day.

There are 80 programs in the book, many designed for the unexpanded machine. The programs include a complete draughts game, which makes multiple jumps and captures automatically. You'll even see the computer move its pieces. Captures look very effective.

Other games to run on your ZX81 include ALIEN IMPLODERS, BACK-STABBER, ZOMBIES, BIO-RHYTHMS, MICRO-MOUSE, LIFE, BLACKJACK and RACER.

But it is not all games. The book introduces you to a number of ZX81 and BASIC language functions and statements, including the use of subroutines, PLOT and UNPLOT, SCROLL, PRINT AT, INKEYS and PEEK and POKE. If you're interested in exploring the great mathematical abilities of the ZX81 and new ROM ZX80, you'll find a host of programs to get you underway, from plotting cascading sine curves, printing out tables and graphs, sorting data, solving quadratic and other equations, determining mean, variance and standard deviation. There is even a program to work out how much interest you must pay on a loan.

The program WORD PROCESSOR turns your ZX81 (and printer, when you get one) into a word processor which justifies text, turns the printer on when the screen is full, and allows you to modify and correct text with a mobile cursor.

The book is just £4.95 and you'll find an order form inside the back cover.



REVIEW - "THE ATOM MAGIC BOOK"

THE ATOM MAGIC BOOK. Published by Timedata, 57 Swallowdale, Basildon, Essex at £5.50, this delightful book features a number of very good games, including BREAKOUT, 3D MAZE, and SPACE BATTLE written by D Dini. The most sophisticated program in this 80-page book is TALKBACK which allows you to record a few seconds of speech (which is converted to digital form, then stored in the VDU RAM area), then play it back on demand.

There is little overt 'teaching' in the book, and it suffers a little from having no coherent development, but you can learn a lot (as I did) by reading the listings carefully, plus the comprehensive notes, and working out why the routines within programs do what they do.

Mike Lord makes a very worthwhile contribution to the field of Atom knowledge with the material towards the back of the book, with warnings (repeated jumping out of FOR/NEXT loops will cause you to crash), ideas ('unlisting' a program so no-one can read it), chaining (a method of getting a BASIC program to load and run another program from tape, the original program being deleted from RAM in the process) and much more.

There is also an invaluable reference section in the book, which compensates for some of the things left out of the otherwise most comprehensive manual (such as the character and graphics codes). All in all, it is a good book which will repay careful reading, although you'll be disappointed if you expect the information it contains to be laid out on a plate. Many gems of wisdom there are, but they take a little searching.

TIM HARTNELL

SPACE SAVING ON THE ZX81

If you have only 1K built into your ZX81 and no 16K pack to plug into it then you could find yourself rather limited. Many 1K OLD ROM programs wouldn't even dream of fitting into 1K on the NEW ROM without being completely rewritten and in some cases streamlined beyond recognition. An understanding of why this is so will help you to write space-optimised programs, that is, programs which are as efficient (in terms of space) as it is possible for them to be. We shall look at some of the pros and cons of the way in which the ZX81 uses up memory here.

SYSTEM VARIABLES. These are unfortunately something you can do nothing to change. They take up 125 bytes, as opposed to the 40 bytes that the OLD ROM's system variables occupied, partly because of one or two additions like RAMTOP and NXTLIN (and because 16417, 16507, and 16508 are simply not used!) but mostly because of the existence of two mega-system-variables FRBUFF, which takes up 33 bytes, and MEMBOT, which takes up 30 bytes. You can use PRBUFF to store information in provided you don't clear it all by using LPRINT - in fact if you characters are in the range 0-63 or 128-191 then you can use LPRINT to put the information there in the first place.

LINE NUMBERS. On the OLD ROM the existence of a line of program took an extra three bytes to store - two for the line number and one for the NEWLINE at the end of the line. The NEW ROM takes five rather than three, since it uses another two to store the length of the line.

NUMBERS. Numerical constants such as 0, 1, or 123.456789 (but NOT PI) take up the number of digits you can count, including the decimal point if there is one, PLUS SIX. This is because a numerical constant in mid-program is immediately followed by a special character (126) which is followed by five bytes of data (The number itself in a form the ZX81 can use) None of these six extra bytes appears in the listing. Thus

LET P=1 occupies a total of fifteen bytes. (It would have taken seven on the OLD ROM.) However, if you use the letter P instead of the digit 1 throughout the rest of the program you save five bytes each time, so if you're going to use the number 1 more than three times in your program it makes sense to assign it to a variable at the start of the program. In fact you can shorten things even more by saying something like LET P VAL "1" or LET P PI/PI, which take twelve and eleven bytes respectively. (Although you'll need calculating space for this. If your program takes up so much space there's no room left for a simple division then it's too long.) Zero is used rather frequently too, and can be replaced by PI-PI or P-P. Two is P+P.

THE DISPLAY FILE. It is possible to fill the screen up completely, but only just! The program 1 PRINT "inverse asterisk"; 2 RUN will give you a completely full screen, but unfortunately you can't do anything with it. Type PKK 16389,77 as a direct command, and then type CLS as a direct command - this will give you a permanently full screen. Now try typing in a program to see how much room is left - you'll be quite shocked!

VARIABLES. Numeric variables occupy five bytes each plus the number of characters in the name of the variable. On the old ROM it only took two bytes plus the name. An array such as A(N) took 2+N 4 bytes on the old ROM, but 5+N 6 bytes on the new. Strings only use one extra byte (unless you dimension them, in which case they use four extra bytes!)

THE CALCULATOR STACK. This is a new feature which the OLD ROM never had because it was never actually needed (because of integer arithmetic). However because numbers on the NEW ROM take five bytes each then calculating space is needed. Every number that is used in an individual calculation, and also every intermediate result, is temporarily stored on the stack. If you can eliminate the number of intermediate results (eg by using less brackets if possible) then you will save a small amount of space.

TESTING. Here are some tests to find out how much memory you have left. These should be used as direct commands.

PRINT PEEK 16396 256*PEEK 16397-16509

The number of bytes occupied by the program, ignoring variables etc.

PRINT PEEK 16404 256*PEEK 16405-16509

The number of bytes occupied by the program plus variables as they stand, plus the number of bytes in the empty screen (25). If used in mid-program it will include the number of bytes currently occupied by the screen.

PRINT PEEK 16404 256*PEEK 16405-16384

The number of bytes occupied by the system variables, the program, the screen, and the variables.

PRINT PEEK 16386-PEEK 16412 256*(PEEK 16387-PEEK 16413)-50

A rough idea of the number of bytes you have LEFT in which to work.

Most of this information is probably not very useful. After all who wants to know WHY saving space is difficult, rather than how to do it? So here in brief is a quick guide on how to cut down your byte-count, hopefully into 1K!

1) POKE information into the system variable if you want it stored, rather than into REM statements. Safe ones to use are VERN, E-FPC, X-PTR, 16417, S-TOP, OLDPPC, SEED, FR-CC, FRBUFF, 16507, 16508.

2) Streamline your programs so as to use as few a number of lines as possible.

3) Use variables in place of numerical constants whenever that number is used more than three times in the program (or ALL THE TIME if you save the variables and use GOTO 1 instead of RUN.)

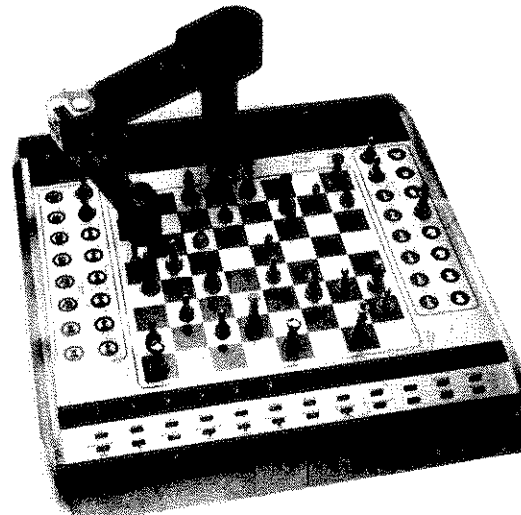
4) Print all of your pictures and messages at the left hand edge of the screen.

5) Don't dimension strings unless you have to.

6) Minimise the number of intermediate results needed in calculations, eg A/(B+C) has one intermediate result, whereas A/B/C, which has the same effect, has none.

Tony Baker

Picking Up the Pieces



No, this chess machine isn't run by a ZX80, but we thought you might like to see it. It's called the "Robot Adversary" and, as you can see, plays chess by actually moving the pieces. It costs only \$1300 in the U.S.A. Now, if only we could convince Uncle C to hook something like that on the back of the '80, just where the RAM pack falls off, and move the printer to one side.....

GETTING ACQUAINTED WITH YOUR ACORN ATOM

This is it. The book every Acorn Atom owner has been waiting for. A host of programs, with detailed, clear explanations of how they were written; chapters on arrays and strings; PEEK and POKE; mastering the graphics; Atomic logic; and much more.

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Order form is inside the back cover.



FRANTIC FLY

In this ATOM program, a tiny fly (cunningly disguised as an ordinary, everyday hash symbol) is trying very, very hard to escape from the fiendish maze the Atom has created on the screen. A great demonstration program, which shows how very, very quickly the processor works under pressure.

FRANTIC

```
10CLEAR0
12MOVED0
14PLOT1,63,0:PLOT1,0,47:PLOT1,-63,0:PLOT1,0,-47
15GOS2000
20F=A,R,X9+1;G=P,P?#8000=#23
22S=0
25TQ=P
27Z=0
30EZ=A,R,X12+1
40M=P+AA(Z)
45IF(M?#8000=#40)P=M
50IF(P<Q)G,Y
55G,E
60YQ?#8000=#40;P?#8000=#23
70S=S+1
80IF(P>474)GOS,R
900G,T
1000END
2000DIMAA12
2010AA1=033;AA2=01;AA3=32;AA4=31;AA5=-1;AA6=-31;AA7=-32;AA8=-33
2015AA9=33;AA10=1;AA11=33;AA12=-31
2020F,J=1T075;Z=A,R,X430+10;Z?#8000=#DE;N
2025F,J=445T0447;J?#8000=#70;N
2030RETURN
3000RP,$7;P,$30;P,"TIME TAKEN"$
3010F,R=1T09;P,$7;N,G,10
```

TECHNICAL QUERIES ANSWERED BY S ADAMS:

ROBERT BOYER of New York asks: Any ideas on how to connect up a memory-mapped video? YES! A kit is available from NEWBEAR at Newbury, UK, but addressing it as 1K of memory and converting it into 280 operation from the 6800 MPU will have to be done via the edge connector.

MALCOLM KNIGHT, Crawley, West Sussex asks if he can use a monitor on the ZX80/1. The video output should be taken from the input to the modulator. The braid of a coax cable should be soldered to the case of the modulator and the bare wire going through the plastic bit at the side soldered to the centre conductor. Just connect the cable up to the monitor's 75 ohm input.

SGT T V SCRAGG, BFPO, 40, Germany, wants to know if it is possible to use the 4K ROM wired externally to the ZX80 as well as the 8K ROM. No. The 4K and 8K ROM's must be in the same socket within the ZX80. I'm at present writing an article to do this, as just switching the power between the ROMs will not work.

D CAVE, Beaminstor, Dorset deplores the ripoff by some people advertising software and books. He also wants more details on hardware and would like to know of other uses other than games for the ZX80. Well Dave, we are going to do hardware reviews on all the additions for the ZX80/1 as soon as we get them (advertisers please note) but need readers to help with software and usage recommendations (I know of a church accounts and a stock list program).

J P BONNETT, Slough, Berks, wants to know about using the 8K space. Well, I'm selling the details of how to convert 3K packs into the 8K space at three pounds. It also includes information on how it works, so you can make maximum use of it for memory-mapped screens, ports etc. If you'd like it, send three pounds to me at 1 Leswin Rd., London, N16. Also, send your hardware problems, solutions or uses to me, care of HARD FACTS, INTERFACE, 44-46 EARLS COURT ROAD, LONDON, W8 6EJ.

Steve Adams.

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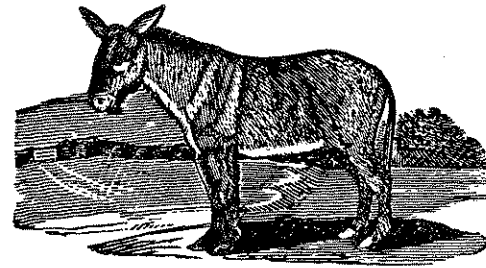
All these items are available separately. Send s.a.e. for details.



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Telephone (Romford) 751-906



RAMBUG! RAMBUG!



Philip Herrod, of Solihull, sent us the program below, under the startling heading "STOP PRESS. Cause of 16K RAM pack trouble found, RUN this program." Underneath this amazing assertion, he wrote: The listing is EXACTLY right - no bugs! IF you should decide to publish it, AND you publish it with so much as ONE bug in it, in the words of my youngest - 'I will never, NEVER speak to you again'. The prospect was too terrifying, so we're running Mr Herrod's original listing --- just as we got it.

```

1 LET A$ = "RA"
2 LET B$ = "B"
3 LET C$ = "WAR"
4 LET D$ = "UG"
5 LET E$ = "E"
6 LET F$ = "M-"
10 FOR G = 420 TO 782 STEP 2
20 LET H = PI*G/50
30 LET K = (400 - G)/400
40 PLOT 20*1/EXP H+3*G/50*K, (20*- SIN H+20)*K
50 NEXT G
60 PAUSE 150
70 POKE 16437,255
80 PRINT AT 9,20;"/- graphic 4"
90 PRINT AT 8,20;" graphic 8 /- graphic 4"
100 PRINT AT 6,25; A$;F$;B$;D$
110 PRINT AT 5,21;"inverse space graphic 7 * * THE 16K"
120 PRINT AT 4,21;"graphic Q graphic S graphic 1 <<";B$;E$;C$;E$
130 PRINT AT 2,21;"graphic 3 //"
140 PRINT AT 1,23;"**"
150 STOP

```

LISTING "TAILPIECE"
FAST MODE
ZX81 with 16K RAM
or ZX80 with 16K RAM and 8K ROM

Simon Pavitt raises a few questions which may have been in your mind:
Could you tell me if there is any chance of an INTERFACE binder becoming available?

It's a good idea, but we have no plans to introduce one at the moment

Could you tell me where I can purchase a 'proper' keyboard for my new ROM ZX80?

There is one advertised in the classifieds. Also, you can get suitable secondhand ones (if you can rig it up to your ZX80) from Henry's in Edgware Road.

To reduce screen flicker, when using PAUSE, I stretch green cellophane over the screen. It also adds to the contrast (and makes the ZX look more professional).

It works! I've just tried it. (Red seems to work fairly well also.)

I also have a Minolta SLR camera with electronic shutter and when used on a tripod, without additional lighting, I've managed to get very good screen photographs.

FREE SOFTWARE!

Well, not exactly free, unless you win. This month's competition, suggested by Michael Kirkland, is to spot the deliberate mistake(s) in the TV screen in Uncle C's advertisements for the ZX81. A free cassette of software from our list to the first correct entry we open. This competition closes on the 4th of August.

UP YOUR PYTHAGORAS

Dave Cave writes: I recently wanted to make the ZX80 do some scientific work and earn its keep. This involved trig functions. Having only got an old fashioned steampowered 4k ROM MK1 model this required cobbling together a little routine for SIN and COS functions. The following program takes the first three terms of the Maclaurins series and attempts to juggle them to keep the terms short and sweet and within 32k. The results are fairly close to the real thing but go a bit crazy over SIN 70. Thanks to Joe Fitzpatrick (issue 5) on the anti-crash routine"

```

3 LET P = 0
4 PRINT "ENTER RANGE IN DEGREES BETWEEN 0 AND 90"
5 GOTO 155
10 INPUT A
20 INPUT B
30 FOR Z = A TO B
35 LET X = Z
40 LET SINX = ((349 * X)/40) * ((1000 - X**2/20) + ((X**2/100) * (X**2/25))/450)/50
45 IF PEEK (16421) < 3 THEN GOSUB 100
50 LET x = 90 - Z
60 LET COSX = (repeat as line 40)
65 PRINT Z, SINX, COSX
70 NEXT Z
100 PRINT "PRESS NEWLINE"
110 LET P = 1
120 INPUT A&
130 CLS
140 IF A& = " " THEN GOTO 155
155 PRINT "X", "SIN X", "COS X"
156 PRINT "DEGREES", "X 10000", "X 10000"
160 IF P = 1 THEN RETURN
161 GOTO 10

```

(c) DAVE CAVE

CATCH 22

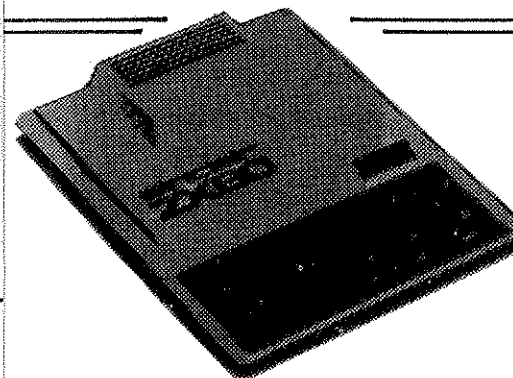
And the catch is the title. If you have a 1K ZX81 or new ROM ZX80 then this game is for you. Oswald Lewis has written a program designed to illustrate the PRINT AT and PAUSE functions. It's very near the limit in memory, so don't go adding any more print statements - it won't work with a RAM pack attached. Sit back and watch the '81 take pot-shots at itself.

```

10 RAND
20 PRINT AT 7,9;"0"
30 LET A = 0
40 LET B = 0
50 FOR C = 1 TO 22
60 PRINT AT A, B; "X"
70 PAUSE 15
80 PRINT AT A, B; "SPACE"
90 LET A = INT(RND*15) + 1
100 LET B = INT(RND*15) + 1
110 IF (A = 7 OR A = 8) AND (B > 7 OR B < 11) THEN GOTO 210
120 NEXT C
130 PRINT "BAD LUCK"
190 GOTO 260
210 PRINT AT 7,9;"XXX BANG X BANG X WHOOMPFFF"
220 PRINT
230 PRINT
240 PRINT
250 PRINT "YOU GOT HIM IN"; C
260 PRINT "ANOTHER GO?"
270 INPUT A$
280 CLS
290 IF A$ = "Y" THEN GOTO 10

```

(c) O. LEWIS



ZX80

ZX80 PERSONAL BANKING SYSTEM
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ZX81

PAYE-PAYROLL by M Salem £24.95*
Menu driven, gives all monthly figures, can be used in conjunction with printer when available. Requires 16K RAM. You get: program on C20 cassette, User Manual, free backup service, plus C20 cassette for storage. Training and personalising software are available. Enquire for price.

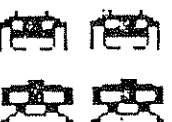
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*Includes VAT and p&p. Send large s.a.e. for latest catalogue.



The variable C is not defined. Use line 30 from the program above, and add it as line 27, i.e.

```
27 LET C = (400 - A)/400
```

DRAUGHTS - final game

Add the following:

```
9250 LET MOVE = 0
2310 IF Q = 0 OR A(Z+X(D)) <> B THEN GOTO 2340
2340 LET Q = 0
```

(If you like, you can cut the above three lines out, and stick them in the correct places in your book.)

On page 102, change line number 2020 to 2030, and change 2030 to 2020. The program works as listed, but sometimes takes a couple of moves to recognize that a king has been created. Changing the order of the two lines ensures a king will be recognised immediately.

At the end of line 2170, delete the * before X(D), so the end of the line reads...THEN LET M = X(D)

In line 2290, add a left hand bracket between the final AND and A(Z - 2*X(D)...etc and a right hand bracket after the =C and the word THEN

Finally, change the 40 at the end of line 2360 to a 49.

Corrections to "Getting Acquainted With Your ZX81"

These corrections have been made in 2nd print., ed. 2:

Page 12 - Temperature
210 INPUT Z
Page 18 - Interest
20 INPUT R
Page 14 - Table & Graph
60 DIM C(B)
Page 27 -
50 LET A(B,C,A) = 1
Page 18 - equation
Add 245 LET F = G
Page 77
Line 110 needs a greater than sign

BAKER'S DOZEN

```
10 LET A$="graphic 1 graphic 2 two graphic 7 graphic 4 two graphic 5
  graphic T two graphic E graphic A graphic 1 graphic D graphic S"
  CHR$(11)+CHR$(11)+"$? left-bracket graphic D right-bracket
  ><<+--+< graphic 2 graphic S > graphic 4 &= graphic T :-
  graphic A (/ "
200 LET M$(M)="graphic 1"
240 LET S$(Z)=CHR$(CODE M$(CODE L$(Z,1))+CODE M$(CODE L$(Z,2))
  +CODE M$(CODE L$(Z,3)))
250 IF S$(Z)<>"graphic 7" THEN GO TO 310
650 IF L$(Z,K)=L$(J,L) THEN LET A$=L$(Z,K)
800 PRINT AT 11,11;"inverse space inverse I inverse space";TAB 11;
  "three inverse space";TAB 11;"WIN"
1000 PRINT AT CODE B$(M),CODE C$(M);CHR$(K);"space"
```

WORD PROCESSOR

```
92 LET L=L+1
185 PRINT AT L-1,0;A$
455 IF X<=0 THEN GOTO 460
457 LET Y=Y-1
```

GRAFFITI

```
120 LET B=INT (F/H-INT (F/2/H)*2)
140 LET D=INT (G/H-INT (G/2/H)*2)
```

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Order now from
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Unit 3, 33 Woodthorpe Road,
Ashford, Middlesex TW15 2RP

ODDITIES IN ZX MATHS

We've received letters from two club members who've found some funny things in the way ZX's do their sums.

L F Sinfield writes: I've found that on my ZX81 the **2 function does not give correct answers for some input figures. Try the following:

```
10 FOR N = 0 TO 1 STEP .125
20 PRINT N
30 PRINT N*N, N**2
40 NEXT N
```

N*N should be the same as N**2, but on mine .125**2 comes up wrong at 46.577469 and .25**2 comes up at 3.4123844.

Malcolm Stuart of Baldock sent us a copy of a letter he sent to S.R.:

May I remind you of our conversation of two weeks ago and invite you to examine the following program (see above right) which illustrates the strange way ZX machines do their maths.

You will no doubt be interested to know that three machines 80/81 show exactly the same results.

Your early comments on this situation would be appreciated.

M Stuart
6 Heath Hall
Baldock
Herts

```
10 PRINT "SQR FUNCTION TEST"
20 PRINT
30 PRINT "I/P STEP VALUE PLEASE:—"
40 INPUT S
50 PRINT S
55 PRINT
60 FOR A = D TO 5 STEP S
70 LET B = SQR A
80 LET C = B*B
90 PRINT A;TAB 10;B;TAB 22;C
100 NEXT A
110 PRINT "N/L FOR NEXT TABLE"
120 INPUT Z$
130 CLS
140 RUN
```

HOT SAUCE

HOT SAUCE is a variation on the 'guess my number' games in which the feedback is not completely clear, and is in word (rather than number) form.

```
SREM HOT SAUCE
10P $12. ?#E1=0
20DIMZ10
40IN "WHAT'S YOUR NAME, PARTNER"$Z;P.$12;?#E1=0
50S=0;P."OK. "$Z", I AM THINKING OF";?#E1=0
110P "A NUMBER BETWEEN 1 AND 100"
120P "YOU HAVE 8 GUESSES"
130J=A.R. %100+1
140S=S+1; IFS= 8 G. 420
170P ";P. ";IN "WHAT NUMBER AM I THINKING OF"A
200IFA=J G. 360
210IFACJ G. 300
220IF A-J<5 P. "BOILING. "$Z
230IF (A-J<12)&(A-J>4)P. "HOT"
240IF (A-J<25)&(A-J>11)P. "WARM"
250IF (A-J<45)&(A-J>24)P. "COLD"
260IFA-J>44 P. "FREEZING. BABY"
280P ";P. "NEXT GUESS";G. 140
300IFJ-A<5 P. "VERY, VERY CLOSE"
310IF (J-A<12)&(J-A>4)P. "PRETTY CLOSE"
320IF (J-A<25)&(J-A>11)P. "JUST SO SO"
330IF (J-A<45)&(J-A>24)P. "PRETTY HOPELESS"
340IF J-A >44 P. "PATHETIC. "$Z
350G. 280
360P "YOU WERE RIGHT. "$Z
370P "I WAS THINKING OF "J
380P "SO YOU GET ANOTHER GO";S=0;FORN=1TO7000;N;P.$12;G. 90
420P "SORRY, "$Z", YOU DIDN'T GUESS IT"
440P ";P. "I WAS THINKING OF "J
450END
```

CLASSIFIEDS

You can advertise in Interface. Personal ads (contacts, selling off unwanted memory boards, computers and the like) are £2 for up to 20 words, 15p each additional word. Business ads (all software and listing advertisements are considered business ads) are £5 for up to 20 words, 20p each additional word. Copy date is 15th of month preceding month of publication. Display rates on application.

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Classifieds continued next page

ATOM BREAKOUT

```
5 D = 8;E = 8
7 M = #B002
9 W = 10
10 CLEAR 0
11 PLOT 12,0;PLOT1,0,47;PLOT1,63,0;PLOT1,0,-4;
  PLOT1,-63,0
12 F.A.=1TO24 STEP2;A?#80A4=#66;N.A
13 P = 460;R = P
15 F.A.= -1TO24 STEP2;A?#8064=#59;N.A
20 A = -1;B=1;L=8;C=8
30A Z=32*L+C
32 ?#80A1=48+W
33 X=32*D+E
35 X?#8000=32
40 Z?#8000=33+RND%10
41 R?#8000=32
45 P?#8000=#43
46 R=P
47 IF(?#B001&#80=0) & (P>449);P=P-2
48 IF(?#B002&#40=0) & (P<477);P=P+2
50 D=L;E=C
60 IF(L>13) & (ABS((P-449)-C)<3))L(L<2) A=-A;?M=?M
  :4
65 IF (L>15) & (ABS((P-449)-C)>2))GOSQ
70 IF (C<2)/(C>29) B = -B; ?M=?M:4
80 L = L+A;C=C+B
90 G.A
100q F.I=1TO 2000;N.I
110 C=4+2*(ABSRND%10)
115 A=-A
120 W=W-1;P.$7
125 IF W>0 R.
140 P. "GAME OVER"
150 END
```

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Old ROM ZX80

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ZX81

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