interface

Official newsletter of the ZX80 Users Club - ISSUE 1

Welcome to the ZX80 Users Club. Because the ZX80 has only recently been put on the market, the club is just getting underway. But those in the club are as enthusiastic about the ZX80 as you are, and are determined to get the maximum use and enjoyment out of both the club and their ZX80.

We need you to help. If you've developed any original programs - for games, simple business, or just to demonstrate some aspect of the ZX80 - we'd like to share them with other ZX80 owners. Full copyright on the programs will, of course, remain yours.

Also, if you've hit any snags in working with your ZX80, we'd like to know about your problems....and if you've found a solution, so much the better.

In this first edition of the newsletter, we've decided to survey some of the things the computer industry press have said about the ZX80, and in future editions we'll include some other clippings likely to be of interest.

So we can find out what you want out of this club, we'd be pleased if you could take a few minutes to answer the questions below (send a copy if you don't want to cut up the newsletter).

NAME.....

ADDRESS.....

.....

.....

What was the main reason for buying your ZX80?

What sort of programs would you like to see listed in the newsletter?

More questions!

Do you have any original programs, written in ZX80 BASIC, which you'd be willing to share with other club members? YES/NO
If yes, please include a program listing when you send this back. You'll get full credit and protection when we print it.

Are you willing to correspond with other ZX80 Users Club members in your area? (Your name and address will not be given to ANYONE without your clear and specific permission)

What else would you like to see in this newsletter besides programs?

Boy oh boy, have we hit a nerve! Since the notice appeared in Personal Computing World we've been drowned in inquiries about the club. Many of the applications contained specific questions. If we thought the answer was likely to be of general interest, we have not replied to you personally. The answer will be printed in the next issue of the newsletter. So, please be patient. However, one question was asked by a lot of people, so we'll answer it here. Club member Robin Cope of Winchester wrote: "I hope the club will be independent - rather like the one for Ohio Scientific - and so be able to keep Uncle Clive on his toes." Our thoughts exactly. A copy of this newsletter has been sent to Mr Sinclair. We guess he's interested in keeping tabs on his new baby, but we think it in the best interests of all of us to keep the club totally independent.

Our thanks to Dennis Bradbury From Sale who has sent us a pretty good "ONE-ARMED BANDIT" program. We'll give the complete listing in the next newsletter.

SATISFYING MUD THUD

Some people find it reassuring to detect feet of clay in an idol. The more impressive the idol, the more they like to find the pottery.

These people will be relieved to know that Sinclair, the original - the inventor of the mini TV, the microradio, has stepped into computing with a satisfying earthenware thud. His new micro is the neatest of the kits, the cheapest of the pack ged systems, the cleverest of the software packages, and impressed the pants off everyone.

The man himself demonstrated the machine with a program to play the game of Nim.

He had already loaded the program off an ordinary cassette recorder. This, he explained, would save us all time; he would just be able to run it.

The program asked how many matches he wanted to start; and Uncle Clive said 15 and the program crashed. Admittedly, Clive did warn us it was written by a 13 year old. He tried again.

The computer won.

British electronics pioneer Clive Sinclair has introduced a personal computer costing about one quarter the price of American rivals like PET and Apple. The Sinclair ZX80 is the first complete personal computer developed in Britain. It costs under £110, including a mains adaptor but excluding a visual display screen, although it can be plugged into an ordinary TV set.

Just 9" by 7" by 2", the new computer has the slim style which has made Sinclair well-known in the calculator market. The compactness and low cost is achieved by a number of design innovations, including placing all essential control functions on a single chip and the use of a fast chip to store all the BASIC software.

The ZX80 will be sold by mail order from February, and through retail outlets later in the year.

A FASCINATING DEVELOPMENT

Like thousands of others I find the Sinclair ZX80 personal computer a fascinating development. Carefully handled - and if it proves to be reliable - it could be used by many non-specialists to learn something about computers and programming cheaply and privately at their own pace.

But I wonder why no-one has so far mentioned that in the area of decimal calculations it is less powerful than a £5 calculator. One has to search deeply into the manual to find that intergers in the range -32K to +32K are allowed, but no real numbers and no floating point hardware or software.

Any machine which does only interger arithmetic is likely to be much faster than one which does only floating point arithmetic. So it is a bit misleading to claim that it is faster than a PET.

The ZX80 may shake the market and point the way to very much more powerful systems at similar prices, but as a computer it is about as satisfying as watching the Cup Final on a two-inch television set.

ROY ATHERTON
Head of Computer Education Resources Centre
Bulmershe College, Reading.

SINCLAIRS ZX80 BETTER THAN ANYONE EXPECTED

Clive Sinclair's personal micro, exclusively predicted on this page (CT, Jan) has surpassed expectations.

The plastic-covered system is small and rugged, and light enough to post back to Sinclair if it breaks down - it weighs a mere 12 ounces.

It uses few enough chips to sell for £79 - inc. VAT as a kit; and few enough to need no ventilation holes for cooling.

And at first sight it would seem that Sinclair's ambitious claims, for the memory saving techniques he has included in the des design, are entirely justified.

The only disappointment registered by those who saw it launched last week is over the fact that the display, through a standard television, flickers.

The microprocessor which drives the unit, called the Z80A, is a version of Zilog's Z80 made by NEC.

It runs fast enough, Sinclair said, to be used to drive the video output direct, thus saving several chips. However, this means that when the micro is running a user program, the screen output disappears.

Even a key depression on the keyboard can interrupt the display long enough to cause a flicker - though normally only a NEWLINE key will do this (as it compiles another line of BASIC).

A FEW SIMPLE PROGRAMS FOR YOU TO TRY (AND IMPROVE UPON):

```
10      PRINT , "DECISION MAKER"
20      PRINT
30      PRINT "WHAT IS YOUR NAME?"
40      INPUT A$
50      CLS
60      PRINT "THINK OF A QUESTION, ";A$
70      PRINT "PRESS NEWLINE, AND I WILL GIVE"
80      PRINT "YOU A DECISION ON IT."
90      INPUT D$
100     LET J = RND(3)
110     IF J = 1 THEN PRINT "YES"
120     IF J = 2 THEN PRINT "NO"
130     IF J = 3 THEN PRINT "MAYBE"
140     PRINT
150     PRINT ,"ANOTHER GO, ";A$;"?"
160     INPUT B$
170     IF B$ = "YES" THEN GOTO 50
180     CLS
190     PRINT "OK, ";A$;" BYE, BYE"
200     STOP
```

```
10      PRINT "HOW OLD ARE YOU IN YEARS?"
20      INPUT A
30      PRINT ,"AND MONTHS?"
40      INPUT B
50      LET X = (365 * A) + (30 * B)
60      PRINT "ARE YOU FEMALE?"
70      INPUT A$
80      CLS
90      IF A$ = "YES" THEN GOTO 130
100     LET Y = 24637 - X
120     GOTO 140
130     LET Y = 27192 - X
140     PRINT "YOU ARE ";X;" DAYS OLD AND"
150     PRINT "HAVE ABOUT ";Y;"DAYS TO LIVE,"
160     PRINT "BASED ON STATISTICS"
170     PRINT "YOU HAVE SLEPT FOR ABOUT ";X/3
180     PRINT "DAYS SO FAR, AND WILL SLEEP"
190     PRINT "FOR ABOUT ";Y/21;" WEEKS OF"
200     PRINT "YOUR REMAINING LIFE"
210     STOP
```

```
10      FOR J = 1 TO 6
20      PRINT ,"XXXXXXXXXX",   (put your first name in place of
                                the Xs)
30      FOR S = 1 TO 99
40      PRINT "(shift S)";
50      NEXT S
60      NEXT J
```

ZX80 interface

Official newsletter of the ZX80 Users Club - ISSUE 2

The ZX80 Users Club is going from strength to strength. We now have over 300 members. Many of you have sent in programs, and a selection is printed in this copy of Interface. Uncle Clive wrote to us regarding the floating-point ROM (his letter is inside) and we're negotiating a deal with a company which sells books on micros to give club-members discounts. When the club was first set up, we thought there might be 30 or so people who wanted to join. But - as you know - the interest in the club is a little higher than that, which means suddenly we've been saddled with a rather giant postage, printing bill, plus the very long time it takes to address all the envelopes. We decided in the beginning that club membership would be free, and we want to stick to that decision for as long as possible. However, somebody has to cover the postage and the printing, so we proposed to work as follows: If you want to continue to receive Interface please send us six self-addressed stamped envelopes, plus another six 10p stamps (to contribute towards the duplicating cost). If you do this you will get the next six copies of Interface (which we plan for about every six weeks from now on). Please do this as soon as possible.

Thank you to those who sent back answers to the questionnaire.
If you haven't written back, and you were on the list for the first Interface, we would like to hear from you. It will help with the activities of the club in the future.

"I had a great day!
The computer broke down and I replaced it."

In February, Mr Sinclair unveiled the ZX80. Faster than a speeding Apple, more powerful than a PET, he claimed. Science of Cambridge are believed to be selling more than 1000 of the computers a month, although delivery of the machine is months behind, and delivery of the add-on memory chips is even further behind. Has anybody actually got the extra K they ordered? Some buyers are disillusioned with their machines. The lack of moving graphics is the biggest complaint.

Those who bought kits are generally very happy. We've heard from several people whose ZX80s worked right from the first turn on. The 1K onboard RAM supplied - although Science of Cambridge claim it is equal to three or four of anybody else's RAM because it stores many commands and statements in a single byte - is pretty miserly. But at least it teaches ingenuity in programming. Sinclair's dialect of BASIC has no facility for READ/DATA or STEP, and works only with whole number (integer) arithmetic.

These limitations can be overcome, to some extent, with subroutines. For example, Clive Davies of Cheltenham has written to the users club with a subroutine to replace the missing READ/DATA function:

```
1000    REM SUBROUTINE TO SUPPLY NEXT 5 DIGITS OF DATA STORED AS Z$
1010    LET N = 0
1020    FOR I = 0 TO 4
1030    LET N = (N*10 + CODE (Z$ - 28)
1040    LET Z$ = TL$ (Z$)
1050    NEXT I
1060    RETURN
```

In Basildon, Essex, Dave Fenn developed an elegant subroutine to overcome the lack of a STEP facility in Sinclair BASIC:

Instead of:

```
10      FOR X = 0 TO 130 STEP 10
20      PRINT X
30      NEXT X
```

Dave suggests substituting:

```
10      FOR X = 0 TO 130
20      PRINT X
30      LET X = X + 10 - 1
40      NEXT X
```

To STEP down, substitute for line 30: LET X = X - 10 - 1

An efficient way of making the most of memory in some programs is to arrange for subroutine destinations to be specified by a multiple of, or a multiple plus an arithmetic manipulation of a randomly generated number. That sounds more complicated than it is in practice. Look at the following program:

```
10    LET K = RND(4)
20    GOSUB 10*K + 50
30    PRINT
40    PRINT "THIS IS LINE 40"
50    STOP
60    PRINT "SUBROUTINE 60"
65    RETURN
70    PRINT "SUBROUTINE 70"
75    RETURN
80    PRINT "SUBROUTINE 80"
85    RETURN
90    PRINT "SUBROUTINE 90"
95    RETURN
```

As you can easily see, line 20 simply manipulates the random number generated in line 10 to produce a destination for the subroutine jump. The manipulation can be a simple multiple (GOSUB 5*J), a multiple plus an addition (as in line 20) or subtraction, or a conditional expression plus a manipulation of the random number (IF J>10 THEN GOSUB 10*J + N)

Science of Cambridge have an optional plug-in 8K ROM which will provide floating-point arithmetic, but without it, ZX80 owners have to fall back on subroutines, or 'tricks' to get an approximation of decimal places. There is a subroutine in the manual, but this uses a lot of precious memory.

The following is not really satisfactory but there is a way to approximate a few decimal places. One suggestion is to multiply one of the integers you're dealing with by, say, 1ØØ before you start division, and then mentally add the decimal point yourself, two digits from the right when you get the result.

For example, to divide 12 X 7 (if you'd ever bother to use your ZX80 to do such a thing) you would normally input:

```
1Ø  LET J = 12/7
2Ø  PRINT J
```

This would give the answer 1 which is pretty useless.
To get two 'decimal places' you could input the following program:

```
1Ø   INPUT A
2Ø   INPUT B
3Ø   LET J = 100*A/B
4Ø   PRINT J;" WITH DECIMAL POINT TWO DIGITS FROM RIGHT" (A subroutine can be
```

written to get the ZX80 to put the decimal point in, but it scarcely seems worth it). This program would give you, if you let A equal 12 and B equal 7, a value for J of 171 (1.71) which is a lot better than 1 as an answer. Multiply A by 1ØØØ and you get three 'decimal places', i.e. 1.714, but this would limit you to numbers less than 32, to avoid exceeding the ZX80's upper integer limit.

The subroutine is useful if you want the ZX80 to give the result of a computation as an approximate percentage.

For example, if you wanted the ZX80 to express 7/12 as a percentage, you could not use the line: PRINT "THE ANSWER IS ";7/12*1ØØ;" PER CENT". This would give you the result Ø. However, if you change the order of the computation to read: PRINT "THE ANSWER IS ";7*1ØØ/12;" PER CENT" you would get an answer within 1 per cent of the correct one.

```
1000 PRINT "ANOTHER QUESTION-Y/N?"
1010 INPUT A$
1020 IF NOT(A$="Y") THEN STOP
1030 CLS
1040 GOTO 5
2000 INPUT A$
2010 PRINT A$
2020 RETURN
3000 PRINT "WELL DONE."
3010 GOTO 1000
4000 PRINT "SORRY- WRONG ANSWER."
4010 GOTO 1000
1 PRINT "BRITISH GEOGRAPHY QUIZ"
2 LET N=10
3 REM TEN QUESTIONS PRESENTED AT RANDOM
4 RANDOMISE
5 GOTO RND(N)*10
6 REM
7 REM COPYRIGHT C. BOLDAREFF 1980
8 REM MICROPROCESSOR SOFTWARE UNIT, SAUROC
9 REM BATH UNIVERSITY, BATH BA2 7AY
10 PRINT "ENGLISH CAPITAL?"
11 GOSUB 2000
12 IF A$="LONDON" THEN GOTO 3000
13 GOTO 4000
20 PRINT "SCOTTISH CAPITAL?"
21 GOSUB 2000
22 IF A$="EDINBURGH" THEN GOTO 3000
23 GOTO 4000
30 PRINT "LARGEST COUNTY IN ENGLAND?"
31 GOSUB 2000
32 IF A$="YORKSHIRE" THEN GOTO 3000
33 GOTO 4000
40 PRINT "HIGHEST PEAK IN BRITISH ISLES?"
41 GOSUB 2000
42 IF A$="BEN NEVIS" THEN GOTO 3000
43 GOTO 4000
50 PRINT "NORTHERN MOST POINT?"
51 GOSUB 2000
52 IF A$="JOHN O'GROATS" THEN GOTO 3000
53 GOTO 4000
60 PRINT "SOUTHERN MOST POINT?"
61 GOSUB 2000
62 IF A$="LANDSEND" THEN GOTO 3000
63 GOTO 4000
70 PRINT "LONGEST ENGLISH MOUNTAIN RANGE?"
71 GOSUB 2000
72 IF A$="PENNINES" THEN GOTO 3000
73 GOTO 4000
80 PRINT "DEEPEST BODY OF WATER?"
81 GOSUB 2000
82 IF A$="LOCH NESS" THEN GOTO 3000
83 GOTO 4000
90 PRINT "PRINCIPAL LANGUAGE SPOKEN?"
91 GOSUB 2000
92 IF A$="ENGLISH" THEN GOTO 3000
93 GOTO 4000
100 PRINT "PRINCIPAL OCCUPATION?"
101 GOSUB 2000
102 IF A$="DRINKING TEA" THEN GOTO 3000
103 GOTO 4000
```

Uncle Clive a rip-off?

From M J Pearce

I read that 'Uncle' Clive Sinclair (in Guy Kewney's personal column, May 1) is somewhat upset about a possible rip-off of his ZX80 microcomputer. He's worried that people might place orders for a rival to the ZX80 which might not work and spoil the market.

Tut, tut, 'Uncle' Clive, how about putting your own house in order first before criticising your competitors? I ordered one of your ZX80 computers plus memory expansion board on February 4 and I was promised delivery before March 4.

In fact the ZX80 took seven weeks to arrive, not the 28 days of the advertising blurb. The free basic manual took a further two weeks, and the memory expansion board still has to arrive.

I have written to and phoned Science of Cambridge. They are very sorry but they expect to be able to deliver by the end of May.

However I suspect they thought they would be able to deliver in 28 days when they placed ads with all the magazines.

So 'Uncle' Clive's 28 days delivery has turned into four months. I would like to know if he thinks that does any good to the micro market. I mean isn't advertising 28 delivery for four months a bit of a rip-off of customers, 'Uncle' Clive?

It seems Uncle 'Rip-off' Clive Sinclair has problems with his Basic and is prepared to act on this. I would like to see a bit of action from him in the supply situation.

P.S. I'm sorry too!

M J Pearce

Delivery of the ZX80

From Clive Sinclair

Your correspondent, M J Pearce, was justifiably irate that his ZX80 took seven weeks to deliver when we had said 28 days in the advertisement (*Computing*, May 29).

I would like the chance to explain how this arose. We originally expected the 'hobbyist' magazines to produce a maximum of one thousand orders per month and we were fully prepared to deliver this quantity. This was, after all, a fairly ambitious target since it would have made us overnight the largest supplier of personal computers outside the US.

In practice we received over 3000 orders in the first month, making it impossible for us to stick to our 28 day promise. However, we wrote at once to all our customers to advise them of this and to offer an immediate refund.

Demand has remained high since then, but we have acknowledged every order by return of post, at the same time making an accurate commitment on delivery. I am glad to say that production is running exactly according to plan and that we have stuck to our promises.

I believe it is true to say that we are now shipping more personal computers into the UK market each month than all other suppliers of personal computers put together.

Court backs Sinclair in MicroAce imitation case

Clive Sinclair, the man who launched Britain's under £100 microcomputer, has won court action to stop a rival cribbing his design.

He claimed that a company called MicroAce had copied his ZX80 system just as he was about to hit the American market.

Last week's action, issued by London's High Court, awarded Sinclair an injunction which entitles him royalties from the rival if it sells any ZX80 facsimilies.

'And MicroAce will only be permitted to sell their product in kit form, in the States, and nowhere else,' said Sinclair.

But he believes that since MicroAce 'imitated' the original design, which does not have statutory American refinements, he is safe.

His ZX80 had just been modified to meet Federal Communications Commission requirements, and been given its seal of approval.

In the past, Sinclair has said MicroAce's imitation would 'definitely not pass' FCC scrutiny.

And this week, he will give his approved ZX80 its first American airing at the Consumer Electronics show in Chicago, both in kit and assembled form.

Sinclair micro gets excellent review

Guy Kewney writes: A review kit arrived at *Computing* at the end of March and after spending about two hours working on it, over three days, it was working perfectly.

As a kit, it suffers only from the fact that the metal lines on the board are susceptible to solder bridges — because the very fine lines run between the pins of other integrated circuits.

However the number of components is low, making the job of checking for, finding and removing these solder overflows easy. The glass fibre board being translucent helps: a light shone through the board immediately shows the black smudges of excess solder — caused by using a dirty iron.

As a computer, its only failing is the fact that the decision precludes simultaneous processing and display, because the processor drives the display. This means you cannot study the screen while the program searches for more data.

The limitations of the Basic are mainly arithmetic — it must all be integer, or the results will be wrong, and there is no trigonometry. These faults are due to be eliminated by the new, 8 Kbyte monitor and tape operating system that is due out in June.

ZX80 will be Prestel terminal

Clive Sinclair is planning to turn his £100 ZX80 computer into a Prestel terminal.

Sinclair told *Computing*: 'The changes needed are very slight, and we can do them in a single new read-only memory chip.'

The changes needed are: a switch from the 32 characters per line of the ZX80 to the 40 characters of the Prestel messages; and a cheap modem.

Sinclair said: 'The modem is still only in the planning stage, but it has to be done for the same cost frame as the computer.'

That ruled out direct connection through an additional socket, he said, because the cost of the socket would push the total price too high. 'I expect we'll use some cheap acoustic coupler,' said Sinclair.

Another project scheduled for later this year is a cheap diskette, planned to be definitely under £200, and possibly under £150.

The new rom chip would also provide an enhanced Basic, said Sinclair, with all trigonometric and log functions and high speed maths instructions.

Science of Cambridge Ltd.

6 King's Parade

Dear Tim,

Many thanks for your letter and for the copy of the ZX80 Interface.

The new ROM will not change the ZX80 in any way - it will only be available as an optional extra which can be plugged into the socket occupied by the present ROM. We have no plans to offer the machine with the new ROM in as a standard fitting.

I would be most grateful if you could put us on the circulation list for future copies of the ZX80 Interface.

Yours sincerely,

Clive Sinclair.

Sought after Sinclair kit in the post

The long awaited, well publicised and much sought-after Sinclair ZX80 home computer has arrived.

The first kit versions were sent out last week and the first assembled versions are scheduled to be delivered next week.

But those who have placed mail orders for the ZX80 through electronics magazines may be waiting until May, and anyone hoping to buy it from retailers will probably have to wait until the end of the year.

There is some concern about whether Sinclair will be able to cope with demand for the ZX80. Clive Sinclair said last week that the company has so far received "several thousand" orders, and there is still a national advertising campaign to come.

Strong demand is also expected to come from institutions, especially from schools. Already Hartlepool College of Further Education has set up a user group for local schools (*Datalink* 25.2.80).

Previous Sinclair ventures have been marred by a variety of marketing problems. The Black Watch, for example, a sleek looking digital wrist watch introduced in late 1975, suffered from acute problems of availability and reliability. Sinclair's subcontractors couldn't deliver the goods.

Future plans for the ZX80 include add-on memory, mathematical functions, and a Prestel adaptor to make it a terminal for the Post Office's viewdata system.

DATALINK MARCH 17 1980

THE ultimate test of whether a truly personal computer market actually exists has now started, following the introduction last week of the ZX80, the new microcomputer from Clive Sinclair's Sinclair Research company, which has been developed specifically with a price of under £100 in mind.

Among the interesting novelties of the system is the use of dedicated control keys on the keyboard for some Basic programming commands, such as PRINT." This, with a newly developed but unspecified method of packing data more efficiently into memory, has allowed the ZX80 to use just K-byte of RAM. According to Sinclair, this is the equivalent of to 4K-bytes in other systems.

Memory can be expanded up to 16K-bytes by the addition of external modules, through the system's single undedicated I/O port. The other port is dedicated to interfacing with an audio cassette storage system.

Another interesting aspect of the system is that, although there is only one undedicated port, it can be continued through the expansion modules so that peripheral devices can still be used. A printer, therefore, can be attached to the memory expansion system, which is itself attached to the main I/O port.

The main disadvantage of this would appear to be that the "bus" is not buffered, and any full expansion attempt would probably need a specifically engineered buffered interface that would effectively become a motherboard on which the system hung.

The company has also used "wild" technology to help break through the £100 price barrier. It claims that the ZX80 has a tenth of the components of comparable systems, and has helped to achieve this by discussing with the use of dedicated controller chips for such items as the display.

This fine program was written by, and is copyright, Paul Jobling.

```
80    PRINT "ENIGMA CODING/DECODING MACHINE."
90    PRINT "-------------------------"
100   PRINT
110   LET A=-1
120   PRINT "MESSAGE-WHEN CODING USE : FOR A SPACE?"
130   INPUT U$
140   PRINT "CODE OR DECODE?"
150   INPUT O$
160   LET O$=CHR$(CODE(O$))
170   IF O$="C" THEN GO TO 200
180   IF O$="D" THEN LET A=1
190   IF A=-1 THEN GO TO 150
200   PRINT "CODE NUMBER?"
210   INPUT Z
220   RANDOMISE Z
230   CLS
240   IF CODE(U$)=1 THEN GO TO 280
250   PRINT CHR$(CODE(U$)+A*RND(10));
260   LET U$=TL$(U$)
270   GO TO 240
280   PRINT
290   PRINT
300   PRINT
310   PRINT "MESSAGE SUCCESSFULLY ";
320   LET Q$=""
330   IF A=1 THEN LET Q$="DE"
340   PRINT Q$;"CODED,SIR."
350   PRINT
360   PRINT "ANY FURTHER MESSAGES?"
370   INPUT P$
380   LET P$=CHR$(CODE(P$))
390   IF P$="Y" THEN GO TO   420
400   CLS
410   GOTO 120
420   PRINT "THANK-YOU,SIR."
430   STOP
```

This method of obtaining random numbers and adding them to the code of the first letter of the message remaining, the sam e letter does not neccesarily mean the same letter each time it occurs, and conversely, the same letter when coded will not neccessarily become the same letter. It codes by the subtraction of the random numbers, and decodes by their addition, because if they were added to code the message, the letters Q to Z could become the ?s of codes 64-127. Another hint when doing a program like this-use the codes listed on pages 116-117, as those on pages 76-77 do not tell you which code is used for the characters- i.e. is (16 or 218?

This program imitates the method of modern cipher machines very well, due to the addition of a fixed list of random numbers to a coded message. It does this by accepting an input, Z, for the code number, and then randomises on that number(line 220). By randomising on a number in this

A ZX80 Program by Dennis Bradbury.

One-Armed Bandit

This Program simulates a One-Armed Bandit or Fruit Machine in presenting a random series of three fruits on the screen. The program assumes the input of 5p pieces and keeps account accordingly. Three CHERRIES, LEMONS or ORANGES wins 25p for the player.

The Program fills the 1K memory as presented here. Spacing and repartee could be improved with more memory capacity.

```
10  PRINT ,"ONE-ARMED BANDIT"
20  PRINT
30  PRINT "I USE 5P PIECES. HOW MANY DO YOU HAVE ?"
40  PRINT
50  INPUT M
60  CLS
70  LET P=Mx5
80  PRINT "YOU START WITH ";P;"PENCE"
90  LET C=ϕ
100 LET L=ϕ
110 LET O=ϕ
120 PRINT
130 FOR A=1 TO 2
140 GO SUB 200
150 NEXT A
160 FOR B=1 TO 8
170 PRINT CHR$(3);
180 NEXT B
190 IF A<3 THEN RETURN
200 PRINT
210 FOR I=1 TO 3
220 LET N=RND(3)
230 IF N=1 THEN PRINT "CHERRY";CHR$(130);
240 IF N=1 THEN LET C=C+1
250 IF N=2 THEN PRINT "LEMON ";CHR$(130);
260 IF N=2 THEN LET L=L+1
270 IF N=3 THEN PRINT "ORANGE";CHR$(130);
280 IF N=3 THEN LET O=O+1
290 NEXT I
300 FOR D=1 TO 2
310 GO SUB 330
320 NEXT D
330 FOR E=1 TO 8
340 PRINT CHR$(131);
350 NEXT E
360 IF D<3 THEN RETURN
370 IF C=3 OR L=3 OR O=3
                THEN GO TO 490
380 PRINT
390 PRINT"SORRY,YOU LOST."
400 LET M=M-1
410 LET P=P-5
420 IF P=ϕ THEN GO TO 550
430 GO TO 530
440 PRINT "ANOTHER GO ?
          HIT (Y)ES OR (N)O"
450 INPUT Z$
460 CLS
470 IF Z$="Y" THEN GO TO 90
480       STOP
490 PRINT
500 PRINT "YOU WIN 25P"
510 LET M=M+4
520 LET P=P-5+25
530 PRINT "YOU NOW HAVE ";P;
540 GO TO 440
550 PRINT "SORRY. NO MONEY."
560 STOP
```

D Bradbury
May 1980

The following program, to renumber in steps of 10, was written by 13-year-old club member Colin Hughes of Luton who taught himself to program from the manual, and does not yet have a ZX80. Anyone who wants to give away a ZX80 will find a very grateful recipient in Colin.

RENUMBER

This routine sits above your program and renumbers in steps of 10. It does not renumber GOTOs and GOSUBs. Type RUN 9985 to renumber.

```
9985      REM ***RENUMBER***
9986      LET L = 10
9987      LET S = 10
9988      LET B = 16424
9989      LET E = PEEK(16393) * 256 + PEEK(16392)
9990      LET F = 0
9991      FOR N = B TO E
9992      IF F THEN GOTO 9998
9993      LET F = -1
9994      IF PEEK(N) * 256 + PEEK(N+1) = 9985 THEN STOP
9995      POKE N,L/256
9996      POKE N+1,L-(L/256) * 256
9997      LET L = L + S
9998      IF PEEK(N) = 118 THEN LET F = 0
9999      NEXT N
```

```
  1 REM LOOKING AT CHARACTERS.
    BY P.CATTLE. CHELTENHAM.
    ------------------------
 10 LET SL=3599
 20 LET CDE=2
 30 IF SL=4095 THEN GO TO 10
 40 PRINT "BYTE  DECIMAL","BIN
ARY"
 50 PRINT "----  -------","---
---"
 60 FOR A=0 TO 7
 70 LET SL=SL+1
 80 LET BYTE=PEEK(SL)
 90 GO SUB 1000
100 NEXT A
110 FOR L=0 TO 5
120 PRINT
130 NEXT L
140 PRINT "THE CHARACTER IS ->"
;CHR$(CDE);"(- CODE ";CDE;"."
150 PRINT
160 PRINT
170 PRINT "HIT N/L TO CONTINUE
OR ($)","N/L TO STOP."
180 LET CDE=CDE+1
190 PRINT
200 INPUT A$
210 IF A$="$" THEN STOP
220 CLS
230 GO TO 30
1000 PRINT SL,
1010 IF BYTE<100 THEN PRINT " ";
1020 IF BYTE<10 THEN PRINT " ";
1030 PRINT BYTE,
1040 FOR B=0 TO 7
1050 LET C=7-B
1060 LET D=2**C
1070 IF BYTE>D OR BYTE=D THEN GO
 TO 1100
1080 PRINT "0";
1090 GO TO 1120
1100 PRINT "1";
1110 LET BYTE=BYTE-D
1120 NEXT B
1130 PRINT""
1140 RETURN
     END.
```

INPUT NEXT CONT SAVE RUN FOR LIST CLS SAVE

INTERFACE

ISSUE NUMBER THEN 3

OFFICIAL NEWSLETTER OF THE NATIONAL ZX80 USERS CLUB

The users club continues to grow. We've got nearly 600 members at the time of compiling this newsletter, and the number is growing by about eight a day. And what a motley crew we are. At least four priests and assorted religious, a policeman or three, accountants, teachers, many people who work with computers and electronics, a generous sprinkling of under-16s, a handful of members in Holland and Belgium and beyond, and sizeable groups in Devon, the Home Counties, and north of Hadrian's Wall.

If this is your first copy of INTERFACE (and it is only distributed to members of the users club), welcome to the club. This is the way we work. Membership is free, but if you want to continue to get the newsletter (and they come out every six weeks or so) please send FIVE stamped, addressed envelopes, PLUS five 10p stamps. This will ensure you get the next five issues. There are no back copies, of any issue, available. If you desperately want one, we suggest you write to another club member, and send money (around 10p a page) to get a photocopy done for you. If you do do this, make sure you send a stamped, addressed envelope to the member concerned.

The club exists to share ideas, subroutines, programs, gripes, hardware problems and the like. We have a pretty good link now with Science of Cambridge, so can take up matters with Uncle Clive and his crew on behalf of members. Also, the very size of the club gives us some marketing muscle. Starting from this issue, we have a feature called "ZX80 MARKETPLACE", which will be used to offer members special deals on any products to do with the ZX80, or with computers generally. In MARKETPLACE for this issue, there is a chance to get a memory expansion board (or some extra 1K RAM chips) at a lower price than S.O.C. sell them for, and Mine of Information, a mail-order book company, have agreed to give members 10% discount on books bought through the newsletter.

We met Clive Sinclair at the North London Polytechnic Personal Computer Show, and pointed out the great dissatisfaction many people have expressed to the club regarding tardy deliveries by Science of Cambridge. Uncle C. said they had recently doubled their monthly production, and were clearing the backlog of orders. It appears that delivery times have dropped considerably, and the MEB and extra RAM orders are certainly well underway.

Another new feature from this issue is BACKBYTES, in which Mark Charlton looks through our mailbag. Please send all comments, programs, etc to: ZX80 Users Club, 44 - 46 Earls Court Road, LONDON, W8 6EJ. This is only a mail address. There is nobody there to talk ZX80 with.

Software

At the moment there is not much commercial software available. The Users Group is probably the best source after magazines like Computing Today, but there are very strong indications that a professional software house will be supplying the user with a range of programs. For users who are looking for software now the following points should be borne in mind;

a) the BASIC is Integer only.
b) the cassette format is not "standard".
c) you can't use interactive graphics, PEEK and POKE.
d) The BASIC is not compatible with Microsoft types, in *either* direction.

The "Course in BASIC Programming" that is supplied with the system is a very poor substitute for books such as "Basic BASIC" and "Illuminating BASIC" but is adequate for finding your way round the ZX 80.

Conclusion

Sinclair and his Science of Cambridge team have produced what is probably the forerunner of the 1980 generation of personal computers and in common with most "firsts" it has a number of faults that its competitors will rapidly seek to iron out of their, yet to be released, products. The currently poised opposition include Acorn with their Atom, Newbear with the New Brain and (allegedly) Sharp with a similar type of system. The competition is going to be fierce and as yet Sinclair is the only runner in the race.

PROGRAM CONTRIBUTORS: Please check and RUN the exact listing you send us before you send it. A few boo-boos crept into the programs listed in INTERFACE 2. Many people wrote in pointing out bugs in the programs. The most comprehensive list came from Michael Kirkland (clever lad, Mike) who points out: The deepest body of water in Britain is Loch Morar, not Loch Ness; Line 410 of the enigma program should be GOTO 110; Line 290 of the One Armed Bandit should be followed by 295 PRINT (this is only one of a number of ways to make this particular program RUN); Line 9989 of the renumber program should be LET E = PEEK (16392) + PEEK (16393)*256. There is a shortened version of the renumber program in Mark Charlton's section of this newsletter. Richard Lloyd suggests line 250 of the enigma program should read 250 PRINT CHR$(CODE(U$) + A*RND(11)-A);

Broadboard '80 (computers, audio, radio, music, logic, test gear, CB, games, kits) at the Royal Horticultural Halls, Elverton Street, London, SW1, November 26 - 30.

Sharp PC-1211. A users club for the Sharp PC-1211 has just been started by Robert Valt (a happy member of the ZX80 Users Club) and Jonathan Dakeyne, 281 Lidgett Lane, Leeds, LS17 6PD. Rob and Jon are very interested in hearing from people who own both a Sharp PC-1211 and a ZX80. For a copy of their club newsletter, called OUTPUT, send a stamped, addressed envelope to the above address. They are also interested in getting programs for the PC-1211.

Southend-on-Sea. R Knight, secretary of the South East Essex Computer Society, 128 Lt Wakering Road, Lt Wakering, Southend-on-Sea, Essex, SS3 0JH, invites National ZX80 Users Club members in the area to write (s.a.e. please) for details of how to join the society.

Horses. If you have any ideas on how to use the ZX80 to increase your chances of picking winners at the races, get in touch with A.N. Ford, 77 Grange Lane, Winsford, Cheshire.

Hardware. Thomas Kenarski, 131 Turnpike Drive, Luton, Beds, LU3 3RB is interested in D.I.Y. hardware expansion (memory and peripherals) and wants to set up an exchange pool of ideas, the best to be submitted to INTERFACE for publication.

INTERFACE is the newsletter of the National ZX80 Users Club. Programs and comments for the newsletter are welcomed. Club membership is open to all those interested in the Sinclair ZX80 computer.

B A C K B Y T E S with M A R K C H A R L T O N

a machine code expert to write something for INTERFACE which ....We need will enlighten club members, any volunteers?...Many members have found their kits worked right from the beginning, others have problems like H Ferring of Surrey who got only a steady line hold, his kit is now back with SOC...Richard Harris of NW1 wants to see more non-game programs in INTERFACE...Many members report that their extra memory is now arriving, Clive seems to have got his delivery act together...at last...Most buyers who responded to the questionnaire in INTERFACE 1 say the price was the reason for buying...Jeremy Ruston of Kensington has contributed a very useful one line program. Just input the following, type RUN 9999, and you'll find out how many bytes your current program takes up: 9999 PRINT PEEK (16392) + PEEK (16393)*256 - 16361, it works a treat...Many members, including David Stodell of Mansfield, have pointed out that Uncle C. has dropped his claim about "running a power station" from recent ads, when I first read the ad I hoped that the CEGB were not going to get a ZX80 to run one of the nuke stations...D Griffin thinks the users club should be ready to act on behalf of ZX80 owners, especially if S.O.C. started renegging on promises, or anything like that. We agree, and we'll already had more than one go at Uncle C. over very slow deliveries. If you have problems getting an answer to your letter, or to the phone (and I've had to wait an hour and a quarter to get through on the phone), let the users club know, and we'll see what we can do...Don't use blank REM statements. As Gavin Thompson points out, these cause the ZX80 to skip the following line...In the book THE ZX80 COMPANION, Bob Maunder points out that the P3U mains coil on his transformer melted when he kept the ZX80 on for 12 hours, the same thing happened to Steven Earl. Turn your little machine off when not using it, you've probably discovered it runs very, very hot... Mr Dale complimented Colin Hughes on the renumber program in INTERFACE 2 and asked if there was some way the program could be fed into the ZX80 while a program was already in the RAM. Sorry, no way, put the renumber subroutine in first, before you start programming...Mr M Grizzard, 5 Cross Road, Tadworth, Surrey, would like to hear from users club members in his area, as would L F Sinfield, 2 Crescent Road, Luton, Beds, LU2 0AB; Joe Fitzpatrick, 43 Benmadigan Road, Drimnagh, Dublin 12; Mr C N England, Headlands Farm, Falhouse Lane, Whitley, Dewbury, West Yorkshire; Peter Dominey, 21 Fitzharry's Road, Abingdon, Oxon, OX14 1EL who is 14 wants to hear from people around his own age; Mr P Cattle, who contributed the LOOKING AT CHARACTERS program in INTERFACE 2 is also willing to correspond with people in his area. His address is 81 Ravensgate Road, Charlton Kings, Cheltenham, GLOS; Mike Johnston, 71 Park Lane, Tottenham, London, N17 would like to hear from club members in his area, Mike also suggests a program which would time and cost long distance telephone calls would be useful, any takers for this challenge?...If you're in the Norfolk area, James Hodgins, of "Northview", Sea Palling Road, Ingham, Norfolk, NR12 0TN would like to correspond with you; M J Pearce, 21 Hall Meadow, Wedges Mills, Cannock, Staffs, WS11 1TB, who was among those who pointed out thedangers of blank REM statements, would be

Sinclair ZX80 (£100)	Science of Cambridge 0223 311488 (N/A)	1-16K RAM; Z80-like Class T.V. [illegible] 44 pin expansion port	4K BASIC in ROM	CPU is NEC 3.25 MHz version of Z80A; available as kit, £80; mains adaptor £8.95

interested in hearing from other club members in his area...by the way, those names and addresses are intended for personal communication only, not for sending out sales literature to, so if you get leaflets which you haven't asked for, please let the club know...what about music from the ZX80, does anyone have any ideas on coupling audio amps so we can make our machines make lovely noises, asks club member Jim Harrison of Blackburn...Phil Knibb asks if a reel-to-reel recorder will work on the ZX80, we haven't tried it, but can see no reason at all why it should not work...H Jones, 6 Raynesfield, Grand Drive, SW20 9DP, who doesnt know till he reads this that he was the very first club member to enrol, is interested in getting in touch with local members...Sinclair hopes (!) to have a 16K board out by the end of the year, and "floppys" and "printers" out next year, according to R Valt, who adds the ominous line that in his letter from S.O.C. there was mention of a "Mark 11" ZX80...Uncle C has steadfastly denied there is a Mark 11 in the pipeline...we shall try to find out...

<u>if you send in programs for the newsletter, make sure they are very clearly written (preferably typed, with a dark ribbon) in black on lightly ruled</u> paper, <u>one side of the paper only</u>...Errol Broomfield, 18 Silverdale Drive, Winlaton, Tyne & Wear also would like to get in contact with users in his area....there will be more contacts listed in INTERFACE 4; if you're in Wimbledon, Alan Hayer, 55 Alwyne Road, SW19 would like to hear from you...make sure you write to these people, DO NOT just call round and see them without prior arrangement, it can cause problems...Any 2114's seem OK to use in N.E.B.s, you need two for each K, they will cost between £2.50 and £5.00 each (i.e. £5 to £10 a pair)...Mr D Foulkes, 18 Clover Close, Chantry Est., Ipswich, Suffolk is waiting to hear from users in his area...so is Nigel Andrews, Priors Farm, Priory Road, Forest Row, Sussex, RH18 (now there's a lovely address)...Nigel Menday, Lion Hotel, Cinderford, Glos GL14 2SL is a very busy man, but he said he'd have a moment to write to any local club members...Michael Cobb is full of praise for the ZX80. He writes:"Congratulations Clive on a remarkable computer which I am pleased to say works most of the time. Apart from the odd crashing during running or editing of long programs..."

...Mike Bond, who describes himself as a "raw beginner" put his ZX80 together in three hours, and contributes the following:

```
100 PRINT , "MAZES"
150 PRINT "SIDES MAY NOT BE USED"
180 PRINT ,, "■< START HERE >■"
200 FOR B = 1 TO 300
210 PRINT "□";
220 FOR C = 1 TO RND(5)+3
250 PRINT "■";
260 FOR D = RND(3) TO RND(5)
270 PRINT "■";
280 NEXT D
300 NEXT C
400 NEXT B   (c) DAVE
                KENWARD
```

Well Done, Colin Hughes of Luton. The Renumber routine is well beyond my own imagination! Unfortunately, it can hang up at 9989 or 9994, Out of Range.

How about this, it uses 15% fewer bytes, too!

```
9990  Rem Run 9900
9991  Let L=10
9992  For N=16423 to PEEK(16392)+PEEK(16393)*256
9993  If N=16423 or PEEK(n)=118 then GoSub 9995
9994  Next N
9995  If PEEK(N+1)*256 + PEEK(N+2)> 9989 Then Stop
9996  Poke N+1,L/256
9997  Poke N+2,L-(L/256)*256
9998  Let L=L+10
9999  Return
```

More in next issue,

Mark

MATHS QUIZ,BY MARTIN MELCONIAN

The comp will ask you a maths question and you have to answer,You se-lect the type and the level (12 for kiddies and morons and 100 for intellectuals)

```
10 PRINT"MATHS QUIZ.YOUR RANGE OF NUMBERS IS"
15 INPUT X
20 PRINT"ADDITION(1) SUBTRACTION(2)
MULTIPLICATION(3) DIVI SION(4)"
25 INPUT K
30 IF K=1 THEN GOTO70
40 IF K=2 THEN GOTO 100
50 IF K=3 THEN GOTO 130
60 IF K=4 THEN GOTO 160
70 LET P=RND(X)
74 LET Q=RND(X)
78 LET Y=P+Q
80 PRINT P,"PLUS",Q,"="
85 INPUT  Z
90 GOSUB 190
95 GOTO 70
100 LET Q=RND(X)
104 LET P=RND(X)
107 LET Y=P-Q
110 PRINT P,"MINUS",Q,"="
115 input  Z
120 GOSUB  190
125 GOTO 100
130 LET P=RND(X)
134 LET Q=RND(X)
137 LET Y=P Q
140 PRINT P,"TIMES",Q,"="
145 input  z
150 GOSUB 190
155 goto  130
166 LET P=RND(X)
167 LET Q=RND(X)
169 LET Y=P/Q
170 PRINT P,"DIVIDED BY",Q,"="
175 INPUT  Z
180 GOSUB 190
185 GOTO 160
190 IF  Z=Y THEN PRINT
190 PRINT "THE AN-SWER IS",Y
200 GOTO 210
210 PRINT "HIT N/L"
220 INPUT  X$
230 cln
240 IF X$="" THEN
    GOTO 10
```

This is a program by J S Aston to build a line by line pattern on the television screen.....

Press any number from 1 to 16.
Repeat for each line up to 23 lines.

```
10      INPUT  X
20      FOR A=1 TO X
30      IF A=16 THEN GO TO 200
40      PRINT "■";
50      NEXT  A
60      FOR A=1 TO (16-X )* 2
70      PRINT "  ";
80      NEXT  A
90      FOR A=1 TO  X
100     PRINT "■";
110     NEXT  A
120     GO TO 10

200     FOR S=1 TO  8
210     PRINT "■■■■■■■■";
220     NEXT  S
230     GO TO  10
```

You cannot use the cheaper dynamic RAM either because the RFSH signal produced by the Z80 CPU is utilised by the video synchronisation circuitry and this means that instead of getting a mean refresh every 2 mS that the dynamic memory needs, it may have to wait 20 mS, which is cutting things very fine. Under normal operating conditions this might not cause problems, but if the temperature of the RAM chips rises then they may well start to lose data.

The final oddity in the design of the hardware is the lack of a crystal controlled clock. It uses a ceramic filter instead. This is not to be recommended as it simply isn't accurate enough. The ZX 80 runs at 3.25 MHz, which is a multiple of the TV linebase frequency.

```
1 REM ROM CONTENTS, A IN HEX
2 REM C.1980 M. COMERIDGE
9 PRINT "START ADDRESS?"
6 INPUT A
1 CLS
2 FOR N=1 TO 20
9 LET E=A/4096
5 LET F=A-(4096 * E)
0 LET G=F/256
5 LET H=F- (256 * G)
6 LET J=H/16
7 LET J=H-(16 * I)
0 LET B=PEEK (A)
0 LET C=B/16
0 LET D=B- (16 * C)
0 PRINT " ";A,CHR$(E+28+128)
0 ;CHR$(G+28+128);CHR$(I+28+129);C
R$(J+28+129)," ";B,CHR$(C+28+
29);CHR$(D+28+128)
0 LET A=A+1
8 NEXT N
9 INPUT Y$
0 IF Y$="" THEN GO TO 11
1 STOP
```

RND tester - displays histogram; each bar is proportional to the frequency of the numbers 1-20 with the operation RND(20). Lines 10 and 20 define the RND function and how many times it is performed respec i ely.

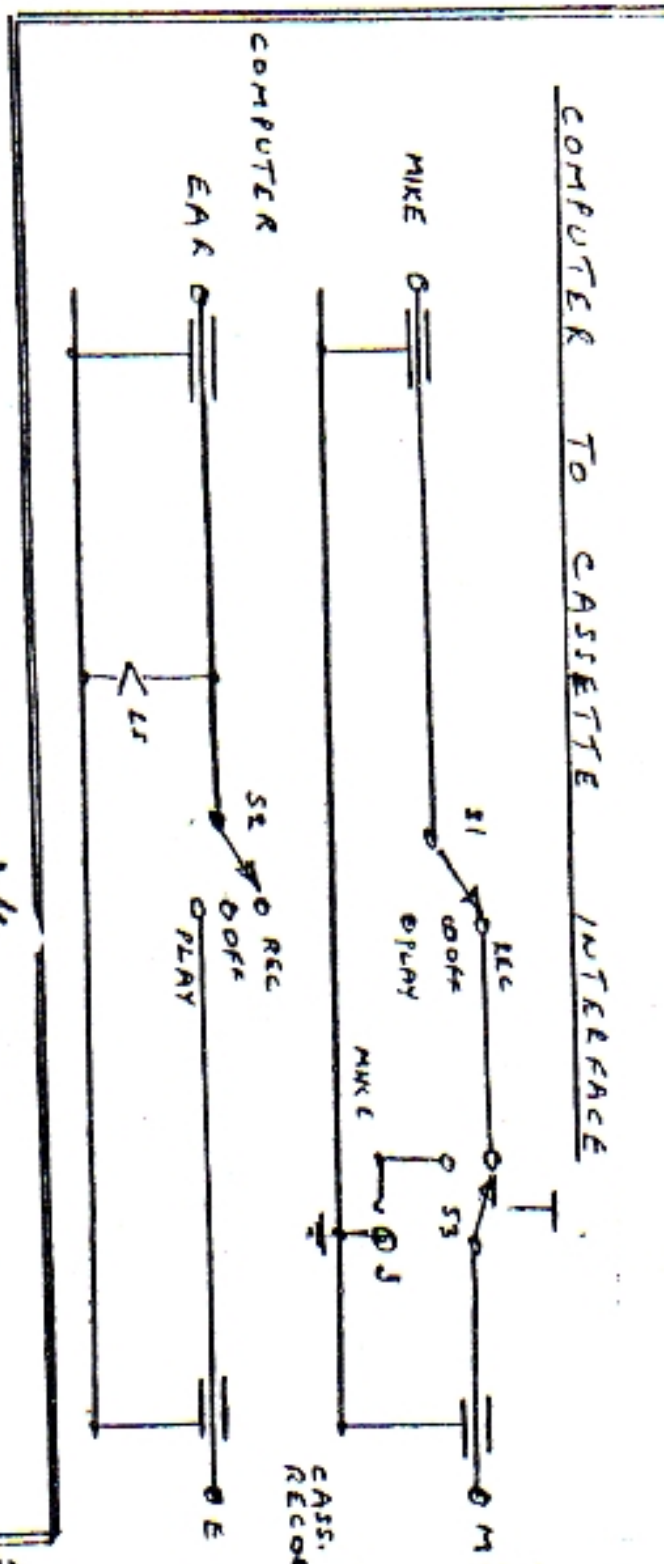
```
10      LET A = 20
20      LET B = 50
30      DIM C(A)
40      RANDOMISE
50      FOR D = 1 TO B
60      LET E = RND(A)
70      LET C(E) = C(E) + 1
80      NEXT D
90      CLS
100     FOR F = 1 TO A
110     IF F < 10 THEN PRINT " ";
120     PRINT F;" ";
130     IF C(F) < 1 THEN GOTO 180
140     IF C(F) > 29 THEN LET C(F) = 29
150     FOR G = 1 TO C(F)
160     PRINT "(shift A)";
170     NEXT G
180     PRINT
190     NEXT F
200     PRINT "PRESS N/L FOR MORE"
210     INPUT A$
220     IF A$ ="" THEN GOTO 40
```

LOAD problems: We get more letters about problems with LOAD than about any other aspect of the ZX80. It is a great pity that S.O.C. didn't come up with a more generally compatible cassette interface with the ZX80. Anyway, most of us are stuck with our computers and recorders as they are (but a hardware modification is suggested in this newsletter if you're clever with a soldering iron). If you don't want to follow that route, here's what experience suggests you try before giving up in despair:

- Always use good (preferably C12) quality cassettes
- Make sure heads are scrupulously clean before SAVEing & LOADing
- Keep your ZX80 cool. It becomes harder to LOAD and the RAM becomes unstable to some extent when the machine is hot. One idea, which works althiugh it sounds daft, is to keep a carton of long-l fe milk frozen, and place it on the 'hump' on the ZX80 when you're using it. This acts to extend the machines inadequate heatsink. It really does work (I think they call this sort of thing 'minimum support technology').
- If you can't get your machine to LOAD, even when the SAVEd bit on tape sounds OK, and with your cassette volume on full, treble on full, bass on zero, try taking a speaker tapping (not earphone) direct. There is probably a resistor across your earphone outlet on your recorder, so taking a speaker tapping will bypass this. If you have no speaker outlet on your machine, get an electronically minded friend to rig up a couple of alligator clips for you so you can hook your ZX80 direct onto the speaker. But do this with great care. Don't short the wires or your cassette machine may go down the drain. Please, please see someone who knows what happens inside cassette recorders before you hook this up. You'll probably find that you do not need full volume to LOAD when taking a direct speaker tapping.

a pontoon program for a 2k + ZX80.One or two points to note,if you have a five card trick tell the computer your points value is 22 a pontoon is 23.

```
1 REM MICHAEL JOHNSON 4/7/80
10 LET O = Ø
20 LET O = O
30 CLS
40 PRINT"                PONTOON"
50 PRINT"YOU HAVE ";O;" CREDITS SO FAR"
60 LET N = Ø
70 LET T = Ø
80 GOSUB 1ØØØ
90 PRINT"YOUR CARD IS....";V
100 PRINT"YOUR BID PLEASE:-";
110 INPUT F
120 PRINT F
130 GOSUB 1ØØØ
140 PRINT"YOUR CARD IS....";V
150 PRINT"STICK(1),TWIST(2)OR BUY(3).1,2 OR 3."
160 INPUT H
170 IF H = 1 THEN GOTO490
180 GOSUB 1ØØØ
190 IF H = 2 THEN GOTO 130
200 PRINT"YOUR BID PLEASE:-";
210 INPUT J
220 PRINT J
230 LET F = F+J
240 GOTO 130
250 GOSUB 1ØØØ
260 LET T = T+V
270 LET N = N+1
280 IF (T = 21) AND (N = 2) THEN GOTO 430
290 IF T = 21 THEN GOTO 330
300 IF N = 5 THEN GOTO 400
310 IF T> 16 THEN GOTO 470
320 GOTO 250
330 PRINT"I AM BUST...."
340 PRINT"YOU HAVE WON ";F;" CREDITS"
350 LET O = O+F
360 PRINT"DO YOU WISH TO CONTINUE?(ANSWER Y OR N)."
370 INPUT W$
380 IF W$ = "Y" THEN GOTO 20
290 STOP
400 PRINT"I HAVE A FIVE CARDER...."
410 LET T = 22
420 GOTO 490
430 PRINT"£££ PONTOON £££"
440 PRINT"YOU HAVE LOST ";F;" CREDITS"
450 LET O = O-F
460 GOTO 360
470 PRINT"STICK.....I HAVE....."
480 PRINT"...";T
490 PRINT"WHAT DO YOU HAVE?"
500 INPUT Q
510 IF Q> 23 THEN GOTO 440
520 IF Q>T THEN GOTO 340
530 GOTO 440
1000 LET C = RND(52)
1001 IF C<14 THEN GOTO 1004
1002 LET C = C-13
1003 GOTO 1001
1004 IF C>10 THEN LET C = 10
1005 LET V = C
1006 RETURN
```



S1 }2 pole 3 way slide switch
S2 }
S3 1 pole 2 way biased push button slide switch
J 3.5mm jack socket for mike
L.S. miniature 75 ohm loudspk.
4 off 3.5mm jack plugs, screened leads

All enclosed in metal box, 3" X 2½" X 1½". Only earth to box is at jack socket
Switching allows recording and playback without removing plugs
Push button allows audio inject. for identification.
Speaker for audio monitoring.

It was about this time in history that Tim's 'phenomenal bestseller' was published. I am, of course, refering to 'Making The Most Of Your ZX80' published by Computer Publications.

Tim saw very early on the need for a book to teach people all the things the ZX80 manual didn't tell you. The book grew as Tim and the club grew, each chapter logically following on from the one before. It wasn't long before the computer press got hold of it, and it turned out that they treated it very kindly indeed.

I got caught up in the tail end of the book, and I can honestly say that 'Making The Most Of Your ZX80' is full of enthusiasm - and that enthusiasm puts itself across to you, and without realising it you have learnt to program in BASIC.

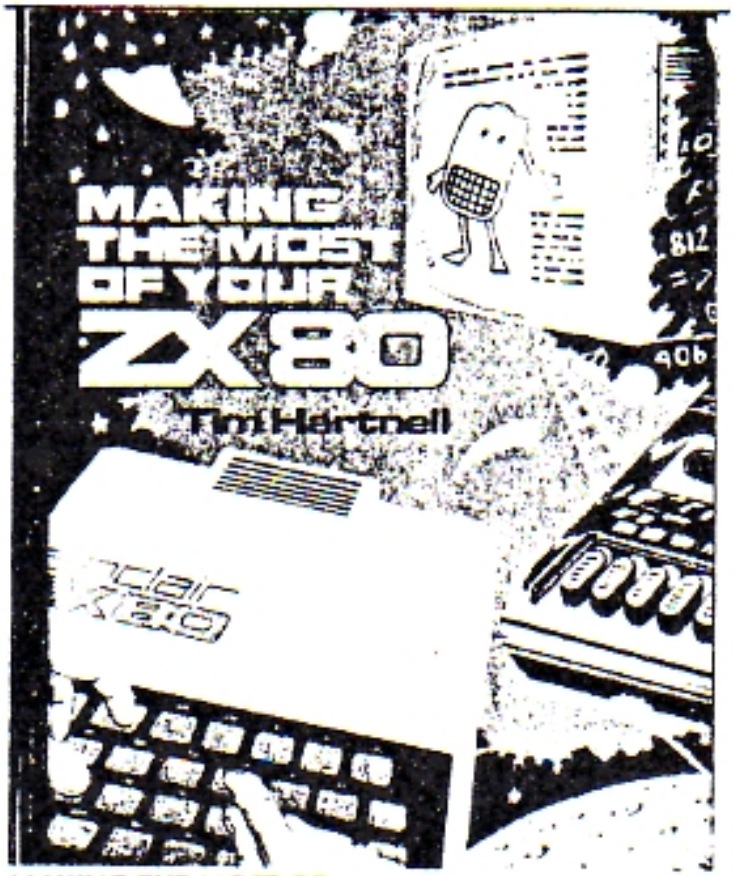
Chris

BOOKFARE

Making the Most of your ZX80 by Tim Hartnell. (Computer Publications Unit, £5.95) ISBN 0 907442 00 5.

If, in any sense you are a beginner to programming or computing, this is *undoubtedly* the book to read. Full of insight, witty, sensible and extremely funny, it eases you into programming practically from the word go. Its attractive presentation is complemented by games that beg you to improve upon them, with text that has a racy but very informative style, obviously aimed at kids of all ages. The problem for me was to borrow the book long enough from my son (aged eight) to review it! Of the 40-odd programs, my favourites were Frustration, a (literally) maddening game, and Frenzy, a very similar speed game. Like other books reviewed here, there are a few printing errors and/or bugs, but, unlike them, it provides a lively stimulus to correct them. If you have bought a ZX80 for your children, buy this as well. Don't be afraid that the new 8k ROM monitor will date the programs — it has a page (new ROM/old ROM) on converting them.

PERSONAL COMPUTER WORLD
April 1981



MAKING THE MOST OF YOUR ZX80

An interesting book. At first sight of the pages you would be forgiven in thinking — "another of those fairly expensive listings of programs, found monthly in the regular magazines". NOT SO, Tim Hartnell has certainly provided the reader with many varied programs but in the text linked to most of these listings is a well thought out "hands on" learning approach. In his introduction he suggests that many of us, having bought a ZX80 and waded through the manual, are left with a rather limited repetoire of what we can usefully do with our brand new computer. I'm sure this is true in many cases. With the very widely based advertising that Science of Cambridge have pursued there are probably a host of would be programmers just waiting for inspiration. This book could provide that trigger to firmly push them on their way. An instruction book can be a very dry piece of text, the ZX80 operating manual is not like this and puts over the main commands in a fairly digestible manner but, having done so, there is the need for something extra to cement our new found knowledge. This book provides that next step in a easily understood way. As you work your way through it, not only does your library of programs grow but also your understanding of the BASIC commands which make them possible. Throughout its pages will be found many routines that will serve as the basis for subroutines to be incorporated in your own programs. There are a large number of games ranging from the very simple to those that could well be developed into ones that will tax your ingenuity and patience to the limit. There is also a section that introduces the possibilities of using the ZX80 as a simple teaching tool (although I think it has limited potential unless used with the larger memory options). The book closes with some useful subroutines and a re-appraisal of the ZX80's functions (4K and 8K ROMs). A book to be recommended to the ZX80 owner. One or two of the programs appear to have the odd error or ommission but these only tend to keep the reader/programmer on his/her toes and are easily rectified! MAKING THE MOST OF YOUR ZX80 is written by Tim Hartnell, published by Computer Publications and will cost you £5.95 for its 106 pages. ISBN 0 907442 00 5

Computing Today
April 1981

INPUT NEXT CONT SAVE RUN FOR LIST CLS SAVE

I'N<T"E'R'F'A#C?E'

ISSUE NUMBER 10 4

OFFICIAL NEWSLETTER OF THE NATIONAL ZX80 USERS CLUB

The past few weeks have been pretty exciting and important for the development of the ZX80. Uncle Clive has unveiled the new 8K ROM and a 16K dynamic RAM pack (delivery of both promised in "late October"); two groups of people have worked out ways of getting moving graphics from the standard ZX80; and, at long last, programs have been written for good 4K games, including an exciting, hard-to-beat DRAUGHTS.

In this issue of INTERFACE we look at the new ROM and the RAM pack, discuss moving graphics, machine code and lots more. Of course, there is as usual a selection of games and other programs, plus comments from club members. Mark Charlton has a look at our mailbag, and there is some new software for sale.

As you've probably noticed in the hobby magazines, there are now about eight companies selling ZX80 software. Some of the software on sale is very, very good, and - I'm afraid - some of it is lousy.

At least one company is selling programs that have not been debugged, and another even admits in its literature that one of the programs was "adapted" from a listing given in Computing Today. There seems to be a fairly direct correlation between price and quality. If you buy the cheapest, don't expect the best.

Competing to attract ZX80 users: David Blagden (left) and Tim Hartnell have user groups

ZX80 user groups vie for notice

Our teporter was just leaving Sinclair's press conference in a self-congratulatory frame of mind at having accurately predicted his announcements for the ZX80, when Tim Hartnell came up to him and said: 'Why have you been taking photos of that guy? I have also got a ZX80 Users' Club and we are bigger and more important, and our membership is free.'

The 'other guy' in question was David Blagden, chairman of the 300-strong ZX80 Users' Club.

Spot the difference: Tim Hartnell is chairman of the National ZX80 User Club, with 600 members.

Neither person knew of the other's existence. With all good intentions Uncle Clive Sinclair had promised to support both organisations.

Hartnell's full-time job is as news editor of the *Australian Express*. And Blagden's job? He is an electronics engineer working on something which he believes to be terribly hush-hush: a new printer. Exciting.

If you want to join Blagden's outfit, it will cost you £6, and you can contact him on (01) 546 0496. Hartnell's club will cost you nothing.

Where's the catch? Well his newsletter contains programs too, but he also advertises his own and other people's programs available on cassette. He is at 44-46 Earls Court Road, London W8 6EJ. Send a SAE and you'll get his newsletter.

'We are not really an anti-Sinclair club but he needs certain pressures to produce the goods at times,' Hartnell said. All good pushy stuff.

Incidentally, Tim. We notice you have reproduced our photo of Uncle Clive in your newsletter. The invoice is on its way to you.

I spent quite a bit of time during the PERSONAL COMPUTER WORLD at the Cumard Hotel in Hammersmith on the Sinclair stand, and it was great to meet a number of club members. It's always interesting to meet people who you've been corresponding with, and discover that they are nothing like you imagined they would be.

Another good thing about being on the stand was that it gave me a chance to talk to people who were thinking about buying a ZX80 (and wanted to know how it measured up with the NEW BRAIN, the SHARP PC-1211 and the ACORN ATOM), and to speak to those who had a ZX80, but were not quite sure what to do with it.

The new ROM:

Both the ZX80's on the stand at the PCW show were fitted with the new, 8K ROM, which is an optional "drop-in" replacement chip, which gives moving graphics (almost), trig functions, inverse graphics direct from the keyboard, and nine digit floating point arithmetic.

The best thing about the new ROM, on first impression, is that it contains a function called PAUSE (see above the "M" key in the picture below). This enables you to have a display which changes, without having to continually press NEWLINE. There is still the flash when the screen goes blank, but careful programming can minimise the time when the screen is off.

The new ROM comes with a new bit of blue plastic to put in place of the one your machine was supplied with. Clive tells me there are no plans to market the ZX80 with the new ROM in it, so there is no danger that your ZX80 will become obsolete.

The key features of the new ROM: - full floating point arithmetic to nine-digit accuracy
- logs, trig and their inverse functions, graph plotting facility
- animated displays using PAUSE
- full set of string-handling facilities (including string arrays)
- n dimensional arrays
- cassette LOAD and SAVE with named programs

Moving graphics:

Two groups of people have found ways of getting moving displays - without touching NEWLINE - on the standard 1K ZX80. Ken Macdonald and Ron Bissell, of Knowle, Solihull, have developed what they call THE AMAZING ACTIVE DISPLAY, and amazing it is.

Programs offered by the new firm SYNTAX SOFTWARE include a hands-off DIGITAL CLOCK, and a fast-moving program called WHIRLPOOL which are based on the active display routine that Ken and Ron discovered. The program ROBOT MULTIPLICATION, on the USERS SPECIAL THE FIRST cassette (more about that a little further on in this copy of INTERFACE) also makes use of this exciting subroutine, to automatically print out the entire times table from 1 X 1 to 12 X 12, all without you having to do anything except press RUN at the beginning. After that, it's just sit back and watch.

Dr Ian Logan, an associate of Bob Maunder ("THE ZX80 COMPANION") has worked out a different moving display program, which calls up a series of pages, and displays them in the order, and at the rate, you decide. Dr Logan also wrote the material on machine code which is featured in the new edition of THE ZX80 COMPANION now available from Linsac.

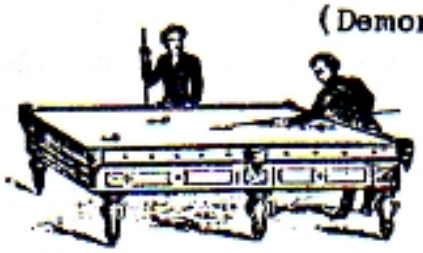
Machine code:

Michael Kirkland, of Prescot, Merseyside, writes to INTERFACE: "What is so mysterious about the USR function on the ZX80?... Partly by reading between lines, partly by trial and error, and partly by just plain luck, I've managed to worry out something on machine code. I just cannot understand why the ZX80 handbook

could not have included what I discovered and more." Mike bought the Tandy assembly code book, which he found of limited use, but managed to work out something, and said that once he had "wonder of wonders, it was not 'difficult' or 'advanced' at all. It is every bit as straightforward as BASIC..."

Mike's subroutine to enter machine code to the ZX80:

```
1000    LET I = 17000
1100    PRINT I,
1200    INPUT J
1300    POKE I, J
1400    PRINT PEEK (I)
1500    LET I = I + 1
1600    GOTO 1100
```



(Demonstration of POKEing)

Insert into main program: LET K = USR(16999)
PRINT K

and also any INPUTs and POKEs appropriate to the particular program. Delet the above SUB when entry is complete.

MACHINE CODE PROGRAM TO PRINT THE SCORES OF GAMES WHERE THE MAIN PROGRAM REQUIRES THAT VARIABLES ARE DELETED BY CLR OR RUN:

```
POKE    17001,62    Load A with n
        17002,0     n
        17003,46    Load L with n
        17004,0     n
        17005,133   A + L to A
        17006,50    Store A to nn
        17007,106)
        17008,66 )  = 17002
        17009,201   Return
```

In main program, after "YOU HAVE WON" insert Poke 17004,1
PRINT "THE SCORE IS "; PEEK(17002)

The above is in its simplest form, says Mike, only adding one to the total whenever the player wins.

Thanks very much for that Michael. Comments and developments of the above welcome for INTERFACE 5.

THE ZX80 COMPANION

Bob Maunder's book - THE ZX80 COMPANION - has just appeared in a new incarnation as its second edition, and features a host of new material on machine code by Dr Ian Logan. While the book will make interesting reading for those who find the manual child's play, it will not be of any use, and perhaps limited interest, to those who find parts of the manual heavy going. Although the book contains quite a bit of clever coding in its programs and examples, many of them (such as a machine code subroutine to emulate SAVE) are of academic interest only. However, if you've mastered the manual, and you want to tackle some of the more esoteric aspects of the ZX80, you'll find it a worthwhile purchase. Address for orders in MARKETPLACE.

The papers:

Sinclair's Home Computer Priced Under $200

The ZX80, Sinclair Research, Ltd.'s inexpensive and versatile home computer, is now available in the U.S. At 9 by 7 by 2 inches, it weighs 12 ounces and features [redacted] with 24 standard graphic symbols available. Its 130 page instruction manual includes a course in BASIC programming.

For flexibility of use, the ZX80 has been built without a dedicated visual display unit (VDU), but with the capability for connection to the antenna terminals of any color or black-and-white TV set; [redacted] and the computer can be connected to any type of computer peripheral, such as a printer. Its single super ROM contains the BASIC interpreter, character set, operating system, and monitor. Its 1K-byte RAM is equivalent to 4K bytes in a conventional computer.

Program entry is a touch-sensitive typewriter configuration, alphanumeric keyboard; the display is black on white and consists of 24 lines of 32 characters each. Software packages are available from current libraries, and Sinclair will be working with other companies to develop new programs.

To receive further manufacturer's information, circle No. 3 on Reader's Service Card.

ZX80 to get teletext next year

Speculations about a teletext/viewdata adaptor for Clive Sinclair's ZX80, the £80 computer, have been dispelled.

As predicted in last week's *Computing*, he has not announced this enhancement, but hopes to do so in 1981.

'We are not rushing that one because there is not a big enough demand for it at this stage, but it will come some time next year,' he said.

He envisages investment applications being broadcast together with equity stock prices updated half-hourly as Topic, the Stock Exchange's official private viewdata system, is currently the only o[ne]

CLIVE SINCLAIR launched his [lo]w cost and [hi]gh functions and their "Super" ZX80, last week, with the introduction of an 8K Basic ROM chip and a 16K RAM package. He also announced that the US company Image Producers would be supplying standard software packages for both versions to the UK and Europe.

"With 16K of RAM and the 8K Basic ROM," he said, "the ZX80 will rank well above equivalent memory-size versions of the Pet, Tandy and Apple systems." Sinclair uses his own Basic rather than the more commonly used Microsoft Basic, which he claims is not the best version.

Graphics

The 8K Basic ROM chip, which directly replaces the 4K ROM original, will enable the ZX80 to work in floating point arithmetic to eight-digit accuracy. It will also do [in]verses. But unfortunately there is no upwards compatibility between the two slightly-different Basics.

The ROM will also extend and improve the graphics facilities of the ZX80, and add 37 new functions for which Sinclair supplies an overlay template and supplementary operating manual. Additional features will include graph plotting, execution of scientific functions, a "pause" function to permit animated displays, a set of string handling facilities, arrays and cassette load and save facilities.

Replacing the current 1K-bytes of memory expansion boards, the 16K-byte RAM package can be attached to the rear of the ZX80 via an edge connector, and supplements the system's integral 1K-byte of RAM.

Both additions, the 8K-ROM at £19.95, and the 16K RAM at £49.95 (inclusive of VAT), [are] the price of a ZX80 system [is] from £100 to £170 plus the [cost] a cassette, say around £200. [Sin]clair considers it still a better [buy] than an Acorn Atom or a Newbrain.

Laboratories Newbrain.

Twice as fast

However, the Newbrain [has] MB, which costs £195, can op[erate] from mains or battery, has [64K] backed RAM, 16K of dyna[mic] RAM and is claimed to be [two] fast as the Pet. It uses a [Z80] processor CPU; a Z80 to pro[vide] and a National Semicondu[ctor] NMOS microcontroller, [the] COP420, which controls [the] display, keyboard and peripheral drive interfaces. It also has [two] I/O ports – the ZX80 has [one].

Sinclair pointed out that [the] Newbrain MB is not around

THE AGE, Tuesday 16 September 1980

A tale of two micros

From David Cannon

Clive Sinclair is deceiving you and the Advertising Standards Authority.

The ZX80 will not run a power station as advertised. Its power and facilities are very limited. The initial despatch dates were not accurately forecast and the would-be buyers were not *offered* their money back.

On February 16, 1980, seeing an advert in *Practical Computing*, I ordered a ready-built ZX80 on the basis of 28 day delivery.

Despatch date was confirmed as 'April', which I took to mean 'May', but there was no suggestion that I should reclaim my money.

Clive Sinclair . . . deception?

Fortunately a recorded delivery letter sorted that out and for very little more than the expanded ZX80 I bought an Ohio Superboard off the shelf from Calderbrook.

This Superboard is by comparison a superb machine. It is a delight to use with its full feature 8K Microsoft Basic, rock steady memory-mapped video output and Kansas City and RS232 I/O.

I feel sorry for Sinclair's kit buyers because by the time they find out what a horror his machine really is, they can't return it 'as received' for a cash refund.

David Cannon, 91 Glenfield Frith Drive, Glenfield, Leicester.

● **Editor:** To be fair, David Cannon is not comparing like with like. The Superboard with accessories is at least twice the price of the ZX80.

UNTIL last week, an Australian interested in a home computer would have been up for $2500 to $3000.

Needless to say demand was not great, but this is expected to change radically with the release of a British-made Sinclair home computer priced at $295 and designed to connect with standard equipment in most homes — a television set and a cassette deck.

Colin Sinclair, as most electronics boffins know, is the man who designed the first pocket calculator and the first matchbox-sized television set. When his company's home computer went on sale in England four months ago it sold at the rate of 10,000 units a week. Since then, we are told, the Melbourne distributor, Consolidated Marketing Corporation (Imports) had to open a special bank account to handle money sent in by hundreds of Australians expecting availability of the computer.

Consolidated Marketing now has supplies, a fact soon to be made known by a large city retailer which has bought most of

wot people did b4 the
zx8Ø were invented

mark's byte

Hi again. Thanks very much for the letters and programs sent into the club, and thank you also to those who wrote to Tim and I with good words about INTERFACE...as you can see, we are trying to make the newsletter better and more professional with each issue...as Tim mentioned in his rave at the beginning of this newsletter, there are now about eight firms selling ZX80 software, and we thought it an appropriate time, at least for a while, to get out of the field ourselves...with one exception. From time to time some outstanding programs descend on the club, programs that make brilliant use of the ZX80's capabilities, and manage to get around the ZX80's limitations. We've decided to package several of these together and offer them to members, paying a royalty to the people who wrote them. On page ten you'll find details of USERS SPECIAL THE FIRST which includes a moving display program, an absolutely first-rate MASTERMIND (which uses the names of six colours, instead of just working with numbers) and a way to turn your ZX80 into the worlds most expensive stopwatch...Sinclair's new 16K RAM looks great...a fatter version of the old 3K expansion board (which is being dropped)...but I don't know who is going to need all that memory... Philip James of Woking, Surrey, suggests a mini-survey to find out which cassette machines work best with the ZX80...a good idea...if you have NO loading/saving problems, please write in and tell us what machine you use... We think it's a great idea for people out of London (or even in London for that matter) to start their own local users' groups...I'm planning a meeting fairly shortly in London one Sunday afternoon (details in INTERFACE 5) but people in other areas could probably either meet, write or phone each other quite usefully now...I guess the club could act as an "umbrella" to local groups, with INTERFACE as a way of sharing news and discoveries between the groups...anyway, Richard Turner, 396 James Rockitt Ave., Hull, Nth Humbderside, HU2 OJA would like to hear from other users in Hull to start up a local branch of the National ZX80 Users Club...Phil Knibb in INTERFACE 3 asked about using a reel-to-reel taperecorder...A N Burke of Redhill says he uses a 20-year-old Phillips reel-to-reel with excellent results...If you built the cassette to ZX80 interface unit given in INTERFACE 3 you may have noticed some problems... L F Sinfield tells us a few quirks occur with some machines...if yours has developed such quirks, write to him for advice at 2 Crescent Road, Luton, Beds, LU2 OAB...Mike Bunce, 258 Hillmorton Road, Rugby, Warwickshire, CV22 5BW would like to start a local users club...if you do start such groups, please let us know, so we can publicise your group, and keep everybody sharing ideas...Mike points out that M Cambridge's ROM CONTENTS program in INTERFACE 3 has an error, line 38 should read LET I = H/16...and Mike also says Richard LLoyd's RND TESTER HISTOGRAM, given in I/F 3, makes a good basis for racing games...G Phillips, who runs the MK 14 users group, has contributed a routine to be inserted at the front of a ZX80 program to provide the equivalent of a READ function...he says the numbers to be read should be placed after the

MEMORY MAPPED SCREEN FOR THE ZX80

```
10  FOR V=1 TO 20
20  PRINT CHR$(Ø);
30  FOR H=1 TO 30
40  PRINT CHR$(128);
50  NEXT H
60  PRINT CHR$(Ø);
70  NEXT V
80  PRINT "  GIVE: PIX(1 TO 600), CHR$ NO."
90  INPUT F
100 INPUT C
110 IF F<1 OR F>600 THEN GO TO 90
120 IF C>63 AND C<128 OR C>191 THEN GO TO 90
130 LET A=((F-1)/30)*3
140 POKE 16640+F+A,C
150 GO TO 80
```

REM in line1, separated by commas... For the program to read the next number, it must execute the command GOSUB READ which will put the next number into variable N..to start the data line again, set variable 0 to 16426...

```
1 REM 2ø, 19, 18
2 LET 0 = 16426
3 LET READ = 5
4 GOTO 2ø
5 LET N = ø
6 LET 0 = 0 + 1
7 IF PEEK (0) > 4ø THEN RETURN
8 LET N = N*1ø + PEEK (0) - 28
9 GOTO 6
```

David Wyant, of Ickham, is one of many people who've enquired about a chess program for the ZX80...the guy who wrote the DRAUGHTS program mentioned in this newsletter is well on his way to completing a CHESS program and believes one should be ready by late-October...stay tuned for developments in the next I/F... M J Robertson of Billericay says he's added the line PEEK (16421) to the maze program given in I/F 3 to show the finish point...Frank Douglas, also of Billericay, says he has problems entering some of the SHIFT characters when extra memory is plugged in...sorry, Frank, this is a new one on us, perhaps S.O.C. could help?... R D Steventon, at the Royal Shrewsbury Hospital (EMHS Dept) is interested in hearing from anyone who is using the ZX80 in a teaching or medical environment, to swap ideas for applications in these fields... Mike Johnson, who wrote the PONTOON program for I/F 3 says there's a bug in it..line 170 should read IF H = 1THEN GOTO 25ø, not GOTO 4ø...Ken Gray, 8 Priory Road, Burgess Hill, W Sussex, RH15 9HB would like to hear from people in his area, as would C L Chappell, 14 Hillview, Saunderton, High Wycombe, Bucks...C L Chappell says he has improved the LOADing of his ZX80 by taking the TV lead out while LOADing...although you can't see if it's loaded, he says this improves things a lot...another member suggests placing a radio tuned near 194 AM close to your ZX80...you can hear the program going into the computer this way...C L Chappell also said (I've just reread his letter) that he bought a Waltham cassette machine for £17.50 at Woolworths because that's the one that is in the S.O.C. ads, and it now works fine...you'll recall in the last I/F I asked if someone wanted to write a program to cost telephone calls.. well, 13 year old Ian Watt, 107 Greenwood Road. Clarkston, Glasgow, G76 7LW, has written a great 1K program to do this...but we've got no room to print it...but if you want a copy, send an s.a.e. and 20p to the club, and we'll send you a photocopy...A M Coppin of Hanworth, Feltham, says he recommends INTRODUCTION TO MICRO-COMPUTER PROGRAMMING by Peter Sanderson...Leonard Gaunt, Hampton, Middlesex, suggests J S Aston's pattern builder, given in I/F 3 should have line 3ø deleted, to be replaced by 12 IF X = 16 THEN GOTO 2øø...M Orme, 2 Barripper Road, Camborne, Cornwall, TR14 7QN, has written a good "model of random decay" program, 20p and an s.a.e. to him and it is yours...John Bloxham says his ZX80 was getting pretty hot, so he's discarded the plastic top, and replaced it with a sheet of alminium about ¼" from the board, he also bought his extra 2114's (two equal 1K) for £2.95 + VAT each from Microbyte...S D Bennett, 28 Arden Gate, Doncaster, DN4 9DP owns a MK 14 and would like to swap programs with anyone else who has one...Robert Smythe conquered the problem of his ZX80 running too hot by cutting a little flap off above the bit which gets hot, then placing a hefty bolt on the heat-sink while his machine is running...R A van Woerden, 4 Bucks Lane, Sutton Bonington, Nr Loughborough, Leics LE12 5PB would like to hear from other members in the area...Graham Teague, 2 Wesley Road, Cinderford, Glos, GL14 would like to correspond with anyone working in the electronics field...P J Parr, 52 St Alban's Ave, Bournemouth, BH8 is happy to correspond with people in his area "to a limited extent"...my favourite answer to the questionnaire in I/F 1 on reasons for buying a ZX80 was the guy who said he got one "to keep him away from the TV". More in the next issue,

Mark

MEMBERS' PROGRAMS:

Two dimensional arrays: need no DIMensioning. Do not use variables of two letters only as well. They are limited to 26 by 26.

```
1     GOTO 14
2     LET X = AA
3     RETURN
4     LET AA = X
5     RETURN
6     POKE 16435,I + 38
7     POKE 16436,J + 38
8     GOSUB 2
9     RETURN
10    POKE 16445,I + 38
11    POKE 16446,J + 38
12    GOSUB 4
13    RETURN
14    ......continue program
```

To copy X into A(a,b) do:

```
LET I = a
LET J = b
GOSUB 10
```

To copy A(a,b) into X do:

```
LET I = a
LET J = b
GOSUB 6
```

(c) JEREMY RUSTON

RUN FOR STARBASE

```
10      PRINT ,"RUN FOR STARBASE"
20      PRINT
30      PRINT "PRESS NEWLINE AGAIN
        AND AGAIN TO SEE WHO WILL
        REACH STARBASE FIRST, KIRK
        OR THE KLINGONS."
40      LET A = 0
50      LET B = 0
55      INPUT A$
56      CLS
60      PRINT
90      PRINT ,"THE STARBASE RACE"
100     PRINT
110     FOR J = 1 TO A
120     PRINT " ";
130     NEXT J
140     PRINT CHR$(131);CHR$(132);
      "(shift E)"
150     PRINT
160     PRINT"(31 spaces)(shift T)"
170     PRINT"(30 spaces)(2 shift A)"
180     PRINT"(31 spaces)(shift G)"
190     PRINT
200     FOR K = 1 TO B
210     PRINT " ";
220     NEXT K
230     PRINT CHR$(132);CHR$(131);
      "(shift E)"
240     LET A = A + RND(2)
250     LET B = B + RND(2)
251     IF A + B = 60 OR A + B = 59
        OR A + B = 58 THEN GOTO
        2000
252     IF A = 29 OR A = 30 THEN
        GOTO 1000
253     IF B = 29 OR B = 30 THEN
        GOTO 1500
260     INPUT A$
270     GOTO 56
1000    CLS
1010    PRINT "ENTERPRISE ARRIVES
        FIRST. THE (3 spaces)
        FEDERATION STILL RULES IN
        THIS  SECTION OF SPACE."
1020    STOP
1500    CLS
1510    PRINT "KLINGONS RULE.
        HUMANS BEWARE."
1520    STOP
```

```
1     LET B = 20
2     LET I = RND(8) + 1
3     LET J = 2
4     LET A = RND(28) + 1
5     LET D = 0
6     LET L = I
7     LET K = B
8     PRINT "DOCK MODULE WITH
      MOTHER SHIP"
15    LET I = I + 1
16    LET D = D + 2
18    IF D > (K-1) THEN GOTO 540
19    GOSUB 1000
20    GOSUB 1040
21    PRINT ">OOOXX>";
22    PRINT
40    GOSUB 2000
50    GOSUB 2040
100   PRINT ".O.";
200   PRINT
300   LET B = B - 2
400   INPUT U$
410   CLS
500   IF U$ = "" THEN GOTO 15
502   IF U$ = "L" THEN GOTO 600
504   IF U$ = "R" THEN GOTO 620
505   STOP
506   PRINT
508   CLEAR
509   PRINT "HIT N/L TO REPLAY"
510   INPUT O$
511   CLS
512   IF O$ = "" THEN RUN
514   STOP
540   IF A = I + 1 THEN GOTO 550
541   IF A = I THEN GOTO 560
542   IF A = I + 2 THEN GOTO 580
543   CLS
544   PRINT "**MISSED**"
546   GOTO 506
550   CLS
554   PRINT "**DOCKED**"
556   GOTO 506
560   PRINT "ROUGH - BUCKLED THE
        THRUSTERS"
570   GOTO 506
580   PRINT "TERRIBLE - DESTROYED
        THE LIVING QUARTERS"
590   GOTO 506
600   LET A = A - 2
610   GOTO 15
620   LET A = A + 2
630   GOTO 15
1000  PRINT
1010  IF J + PEEK(16421) = 24 THEN
      RETURN
1020  IF J = 0 THEN IF PEEK(16421)
      <2 THEN RETURN
1030  GOTO 1000
1040  PRINT "*";
1050  IF I + PEEK(16420) = 33 THEN
      RETURN
1060  IF I = 0 THEN IF PEEK(16420)
      <2 THEN RETURN
1070  GOTO 1040
2000  PRINT
2010  IF B + PEEK(16421) = 24 THEN
      RETURN
2020  IF B = 0 THEN IF PEEK(16421)
      <2 THEN RETURN
2030  GOTO 2000
2040  PRINT "*";
2050  IF A + PEEK(16420) = 33 THEN
      RETURN
2060  IF A = 0 THEN IF PEEK(16420)
      <2 THEN RETURN
2070  GOTO 2040
```

(c) IAN WRIGHT

HOW TO PLAY "SPACE DOCK":

- press 'L' then newline to move left
- press 'R' then newline to move right
- press newline only to remain moving vertically

```
2000  CLS
2010  PRINT "A TIE. PEACE TREATY SIGNED.
      REASON RULES."
2020  STOP
```

(c) ALAN MAYER

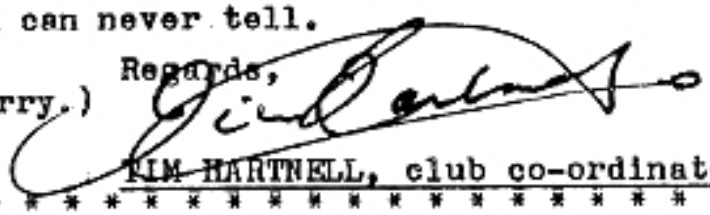
NATIONAL ZX80 USERS CLUB: Membership of the club is free and is open to all those interested in the Sinclair ZX80. The mail address (there is nobody there to talk ZX80 with, we just rent the address) is 44 - 46 Earls Court Road, London, W8 6EJ. If you want to join the club, and continue to get future issues of INTERFACE, just send FOUR stamped, addressed envelopes, and four 10p stamps to the club, and you'll automatically get future issues.

We welcome programs and comments on the ZX80, the club, Uncle Clive or anything relevant. Please note that programs listed in this newsletter are NOT in the public domain, they are copyright, so you can't use them as part of an article or program offered for sale. We include them for personal use only.

There are now nearly 1000 members of the users club, with a member in Iceland, one in Hong Kong, one in Jakarta and about 30 or so in Europe. If you'd like to correspond with other club members in your area, or perhaps, if you're a teenager, with people of your own age, please let us know. The next issue of INTERFACE should be out early November...but you can never tell.

(NOTE: No back issues of any INTERFACE are available...sorry.)

Regards,



KIM HARTNELL, club co-ordinator.

* *

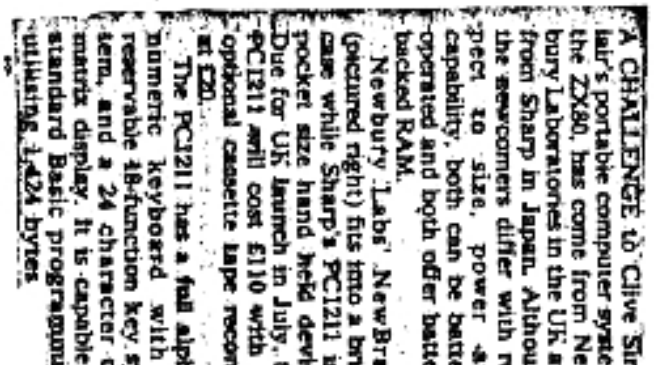
CODE EDITOR by Ole Noerregaard of Copenhagen.

This routine will help you in saving memory, when using inversed graphics or letters. (You will save 5-6 bytes pr. inversed character) *
This will be helpfull in an assignment or print - statement.
Just type in the program after your original program, an run it (RUN 9986)
You will need 4 commands, these are:
(NEW LINE) = Display next byte/code in the program-area. (ONE BYTE FORWARD)
"B" = step 1 byte backward
"S" = Stop.
"C" = Change current codevalue on screen. (type in the new value).

Somtimes some odd characters will be displayed, but ther are only the line numbers or statementdelimitor. (Don't change these).

Note: when you have inversed a L or K in an assignment, print or rem statement, you better not EDIT them the normal way, cause the ZX80 will reconize them as coursors when EDIT is used, and therfore removed when the line is returned to the program. Somtimes (not dur ing run) the inversed K or L is changin value in the program-list, but dont worry. They will come out allright when they are printed. (DUE TO RUN) THEY WILL

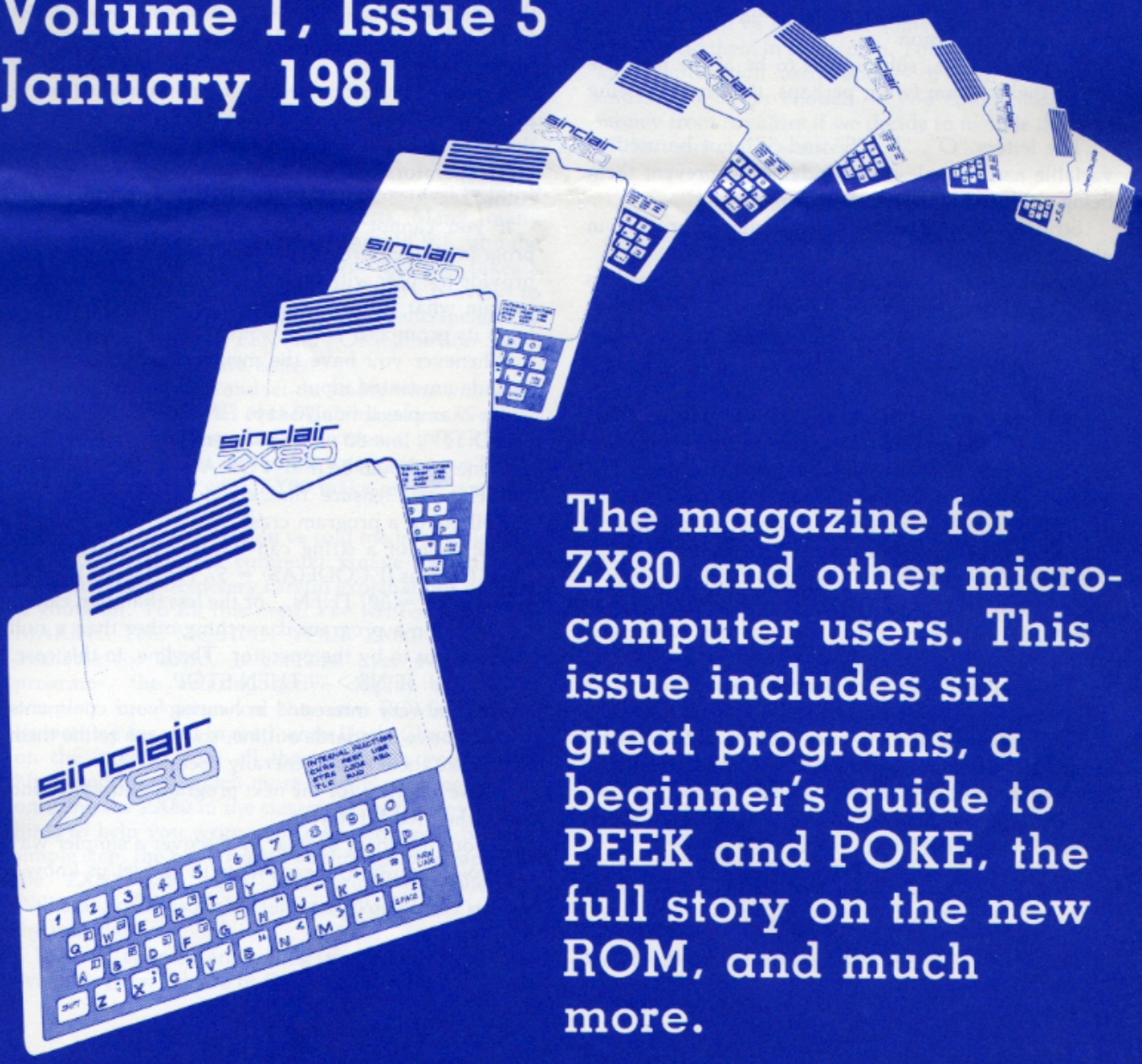
```
9986  REM CODE EDIT
9987  LET P=16426
9988  CLS
9989  PRINT PEEK(P);"=";CHR$(PEEK(P)),"ADDR=";
9990  PRINT "C,S,B OR NEW LINE?"
9991 INPUT C$
9992  IF C$="S" THEN STOP
9993  IF C$="" THEN LET P=P+1
9994  IF C$="B" THEN LET P=P-1
9995  IF NOT C$="C" THEN GO TO 9988
9996  PRINT " NEW VALUE?"
9997  INPUT V
```



A CHALLENGE to Clive Sin
lair's portable computer syste
the ZX80, has come from Ne
bury Laboratories in the UK a
from Sharp in Japan. Althou
the newcomers differ with r
pect to size, power a
capability, both can be batte
operated and both offer batte
backed RAM.
Newbury Labs' NewBra
(pictured right) fits into a bri
case while Sharp's PC1211 i
pocket size hand held devi
Due for UK launch in July,
PC1211 will cost £110 with
optional cassette tape recor
at £20.
The PC1211 has a full alph
numeric keyboard with
reservable 18-function key
tem, and a 24 character
matrix display. It is capable
standard Basic programmi
utilising 1.424 bytes

MICRO ZX80 INTERFACE USER

Volume 1, Issue 5
January 1981



The magazine for ZX80 and other micro-computer users. This issue includes six great programs, a beginner's guide to PEEK and POKE, the full story on the new ROM, and much more.

SETTING STANDARDS

IT'S TIME WE SET SOME SOFTWARE STANDARDS

It is in everybody's interests to have a set of standards for people writing and submitting software — to make sure it's easy to read and to minimise the chance of mistakes.

From now on, when you send us programs — and you'll probably find it useful to follow the National ZX80 Users Club software standards for your own work as well — could you please make sure they conform, where possible, to the following guidelines:

.Line numbers to start at 10, and increment by 10 (unless there is a special reason — such as GOSUB 5*A + B)

.Variables to start at A, and follow through as single letters, in alphabetical order (the same for FOR/NEXT loops and arrays), except where using the same letter could cause confusion

.Where possible, subroutines to be at, or near the top of the program (with, perhaps, the first line being GOTO ...)

.The letters "O", "I", "S" and "Z" not be used as variable names, unless unavoidable (to prevent them being confused with 0, 1, 2 and 5)

.Strings to start at A$ and follow through in alphabetical order

.Subroutines — where possible — to be used in place of a long string of IF/THENs

.Programs to be robust, so they do not require a GOTO command instead of RUN

.Variables to be stored, where possible, in a non-volatile manner (such as POKEing into a REM statement) so CLEAR can ensure the maximum working memory is available at all times. This procedure is not entirely trouble-free, and is less important with 4K or 16K machines, but can be very useful for programs which must be written in less than 750 bytes (most on the 1K machines cause problems is they exceed around 670 bytes, but with CLEAR you can write programs which occupy the low eight-hundreds).

.The symbol *_ (an asterisk underlines, with a space either side of it) to be used to show a single space in a PRINT statement, if such space is vital, and would not necessarily be evident from the context. A number of spaces should be shown as 20 PRINT "(3 spaces) YOU WIN", i.e. the number of spaces, and the word space, in lower case letters, within brackets

.Zero to be represented as the "slashed nought", i.e. Ø

These are not binding rules for listing, but are suggested as a means of reducing the chance of a listing being misread.

There are times when it is useful to use more than one letter for a variable (either a word like SUM, or SCORE, or a combination of letters and digits starting with the letter) but if this will not help your understanding of a listing, stick to single letters, and assign these in alphabetical order.

The standards can be ignored if there is a valid reason, *except for* the use of *_ in a PRINT statement, and Ø for zero.

DOCUMENTATION

Much documentation is a waste of time and paper.

Although computer courses at schools tend to stress the need for documentation, is it — in our opinion — unnecessary in many cases.

The cardinal rule for documentation is: If the algorithm is not transparent, document.

Saying things like "Lines 20 to 50 initialise variables" seems pretty pointless, while it is obviously of value to have supporting notes to a program pointing out things like "Line 370 produces a random number from the see produced in the previous line, and uses this as a GOTO destination to decide the computer's reaction to the player's move".

It is more important to tell an operator what to do after pressing RUN than it is to tell the operator why the computer does what it does when you do, although most operators will want to know the 'why' in due course.

If you cannot fit the instructions into the main program, either write a shorter, "preface" program, or provide the user with clearly written instructions, and explain what kinds of resposes the computer expects from its prompts.

Whenever you have the memory, include lines to exclude unwanted input.

For example, if line 70 says "INPUT YOUR GUESS (1 TO 10)", line 80 will be something like INPUT A, and line 90 should be IF A < OR A > 10 THEN GOTO 70. This will ensure that erroneous data will not contribute to a program crash.

The code of a string can be used to check string input (such as IF CODE(A$) = 57 THEN... or IF NOT CODE(A$) = 30) THEN... or the less than sign can be used to stop a program if anything other than a null string is put in by the operator. The line, in this case, could read: IF N$ > "" THEN STOP.

We'd be very interested in hearing your comments on the above standards outline, so we can refine them and make them more generally useful.

Please try them for the next program you write, and see if they work for you.

If you find them boring, or discover a simpler way to avoid confusion, please write in and let us know.

INPUT

Welcome to the new, upgraded INTERFACE. As you can see, the club's magazine has come of age. We've retained every popular feature from the smaller INTERFACE in this new magazine, and added other sections sure to prove of interest.

From now, INTERFACE will come out once a month. We guarantee there will be at least six ready-to-run, complete games in each edition, plus other routines and programming ideas. Mark Charlton will continue his section — MARK'S BYTE — in each issue, and we'll also be covering the use of the ZX80 in education.

However, all this costs money, so unfortunately, from now on we'll have to charge. Membership of the National ZX80 Users Club, plus a year's subscription (12 issues) of INTERFACE, is £7.50 for the UK, £10 for Europe, and £13.50 for the USA and elsewhere. It is vital that I do the right thing by all of you who have sent in stamped, addressed envelopes. If you have done this, your subscription for the first year is £2 *LESS* than the above prices. You'll find a subscription form inside the back cover. There's a box to tick if you've sent me three or more stamped, addressed envelopes plus stamps.

PEEK AND POKE

INTERFACE is your magazine. We want it to fulfill your needs, and reflect your interests. Many, many people have asked us about PEEK and POKE, and the USR function. In this issue, Trevor Sharples takes a look at PEEK and POKE, and tries (very bravely) to explain them in simple (!) English. He's also included a program to illustrate PEEK and POKE in action. We'll look at USR in a future issue.

Please write to me and let me know what you want to see in future editions of the club magazine. We'll try to cover your requests. In the next issue, INTERFACE 6, along with at least six complete programs, we'll look at a way to make your ZX80 make music, complete with full program listing.

For many of you, as you've told me in your letters, the ZX80 is the first computer you've owned. And first-time users need very careful explanations of what is going on. To fill this need, I've written a book — MAKING THE MOST OF YOUR ZX80 — which is available for £5.95. It contains over 60 complete programs, the amazing active display routine, a complete breakdown on the new ROM's features (something for you to read while Uncle Clive gets rich on the interest from all those £19.95's you've sent him), and much, much more. There's a large section on using the ZX80 in the classroom, and many, many hints to help you write your own programs. Step by simple step, the book leads you through programming the ZX80 from very first principles. Sheridan Williams, of *Personal Computer World*, has written the introduction.

We, of course, are selling the book. It is also available from Science of Cambridge. Although Uncle Clive told me he was unwilling to endorse the book to the extent of writing a preface for it, we consider it quite significant that — out of all the ZX80 books now on the market — MAKING THE MOST OF YOUR ZX80 is the only one that, to date, Mr Sinclair has decided to distribute himself. Tell someone in your family to buy you a copy as a present.

USEFUL ROUTINES

David Ahl, of *Creative Computing*, has also been in touch with me, and some sort of link with ZX80 owners in the USA is likely soon. Mr Ahl, as you probably know, edited the best-selling books BASIC COMPUTER GAMES and MORE BASIC COMPUTER GAMES.

So, as you can see, the future looks very exciting for ZX80 owners. Stay with us, and we'll help you squeeze every bit of possible enjoyment out of your computer. We want to help you grow as programmers and games players, and of course we want you to help us, and other club members, grow as well.

So if you've discovered any useful routines for the ZX80, or you've developed some original programs, please send them in to the club. You'll get full credit for any contribution used, and — if your program is unusual or clever enough — you could make some money from royalties if we decide to include it on one of the users club cassettes.

LOCAL BRANCHES

Please let us know if you set up a local branch of the National ZX80 Users Club in your area or school. We can probably help you with hints and programs, and we'd like to include news about your activities and discoveries in this magazine. Let us know when and where you're meeting, and give us the name and address of the area organiser, so we can help build up each local group as much as possible. If you haven't got a users group in your area yet, why not start one? We'll give you as much assistance as we can, as well as publicising your address.

See you in INTERFACE 6,
Regards,

Tim Hartnell, club-cordinator,

P.S. In the last INTERFACE, Mark asked people to write in and say which tape-recorder theyd found easy for LOAD and SAVE. In the next issue, we'll publish the results of the survey, plus summarise all the tips on this problem we've gathered since the club has been going. We'll also reprint the sheet S.O.C. send you if you write and ask them about the problem. That is all in the next issue of INTERFACE. Remember, if you don't subscribe (see page 11) you won't hear from us again.

MARK'S BYTE

Hi again. Great to have proper typesetting, isn't it? Classy literature like my column deserves the finest treatment ... Alan Bibby of Seaton, Devon, tells me he bought the ZX80 to teach BASIC in school and relieve the pressure on the main school microcomputer ... I hope his school doesn't have a (hiss) PET or a (boo) Apple ... S.A. Stock, of Somerset says he thinks INTERFACE should provide articles on PEEK, POKE and USR ... well, peeky and perky are in this issue, and USR will be a-coming along soon ... Tim and Jeanette Mariner graduated (?) from the MK14 to the ZX80, and are — like many other club members — interested in games/programs which make good use of the graphics ... so if you've written any programs with more-interesting-than-the-ordinary graphics (what we in the computer trade call M.I.T.T.O. graphics) please send them in to share ... J. Sparkes of Darlington, Co Durham would like to see programs which can be used in school maths lessons ... ugh ... Joe Fitzpatrick has written a routine to display each address, and the character stored in it ... line 30, he points out, prevents the program from crashing when the screen fills up ... Joe's routine:

NO MORE CRASHES

```
10    FOR J = 16424 to 17424
20    LET X = PEEK (J)
30    IF PEEK (16421) < 3 THEN GOSUB 100
40    PRINT J;"___"CHR$ (X); "___";
50    NEXT J
60    PRINT
70    PRINT "END"
80    STOP
100   PRINT
110   PRINT "PRESS NEWLINE TO CONTINUE"
120   INPUT A$
130   CLS
140   IF A$ = " " THEN RETURN
```

PROBLEM POSED

R. Peel, of Kennington, Oxford, sends in a problem which he says club members might enjoy solving ... a foreman in a factory builds chairs and stools from three components, and must decide the quantities of each to build to get the maximum profit ... try and write a 1K program to solve this problem, and send it into the club if you like for evaluation (we'll give a cassette of 1K programs to the best received) ... the facts for the problem: stock — 156 tubes, 64 blocks 140 slats; unit cost — tubes 5p, blocks 3p, slats 9p; quantity per chair — 4 tubes, 8 blocks, 5 slats; quantity per stool — 3 tubes, 1 block, 4 slats; cost of chair — 89p; selling price — 100p; profit — 11p; cost of stool — 54p; selling price — 58p; profit — 4p ... get to it programmers.

John Courtis of Pimlico has specified quite clearly what programs he wants members to contribute: "... as wide a spread as possible, almost anything which ingenious programming can stuff into Uncle Clives tiny RAM, business/business games/games games etc ..." ... I wonder if "business games" are what they play in Cambridge ... there's a great one S.O.C. play, it's called "promised date of delivery" ... Mr G. Bedford, of St John's, Worcester, is *not* inpressed with the quality of programs published so far in INTERFACE ... He writes: "Could I make a plea that in future, program listings should only be shown that merit it, either by skill, or cunning use of programming?" ... Dennis Bradbury, of Sale, Cheshire, whose FRUIT MACHINE program was published back in INTERFACE TWO, says he'd be interested in an article showing the conversions from other BASICs to Sinclair BASIC ... there is such a table in THE ZX80 MAGIC BOOK, published by TIMEDATA LTD., 57 Swallowdale, Basildon, Essex, SS15 ... this is a fine little book, we'll be reviewing it in a future issue of INTERFACE ... the club has received software from a number of firms, including ECONOSOFT and BUG-BYTE and we'll be reviewing that in future issues, if you've bought any software, please write to me (or Tim, or anyone at the club) and let us know what you think of it, value for money, etc.

SHORT, SAD SIGHS

Peter Croom says he had no problems with his kit, apart from a few soldering mistakes ... if you built your ZX80 from a kit, and have some tips to help other constructors, please let me know ... M.L. Taylor wrote a short, sad letter to Uncle Clive, after reading the first ads in the Sunday Express offering readers ZX80's for £99.95, which — as you may recall — was £10 less than they were being sold through PCW and the other magazines at the time ... I thought you might be interested in hearing part of what Mr Taylor wrote: "... I now note, with distress, that you are currently advertising an assembled ZX80 for £99.95 ... in the Sunday Express ... I am surprised that you offer readers of the Sunday Express a discount of approximately 8% after receiving such a good appraisal in Personal Computer World ... my main reason for purchasing your machine ... I look forward to receiving your comments in the near future and a return of £8.95 ..." ... I believe Mr Taylor is still waiting.

STEPPING OUT WITH KEITH

Keith Lunt, Elvington, York has written two STEP routines:

To step up —

```
10      FOR A = 1 TO 17
20      LET X = 10*A
30      PRINT X
40      NEXT A
```

To step down —

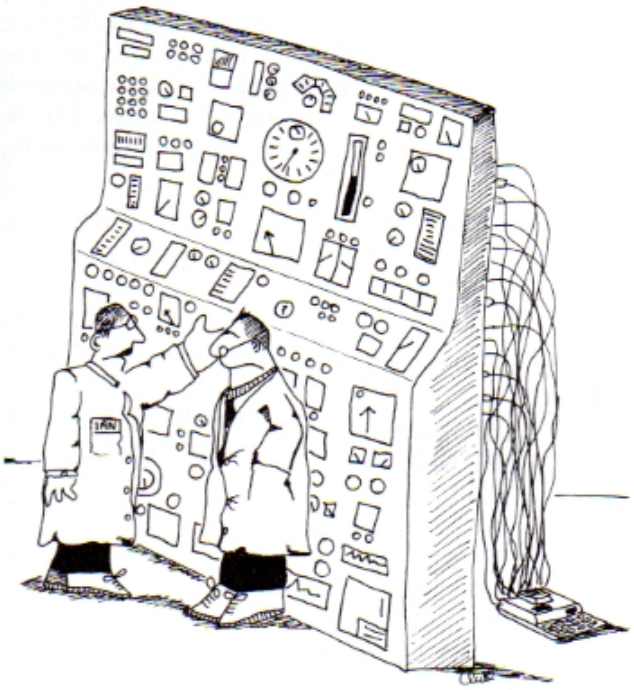
```
10      FOR A = 1 TO 17
20      LET X = 180 -10*A
30      PRINT X
```

GENEROUS TO A FAULT

D. Kenward, of Ensbury Park, Bournemouth has problems with his ZX80 kit, and reports: "... I spent a careful weekend assembling and trying to get the beast to operate ... A *lot* of checking revealed one or two suspect solder bridges ... but still no joy, no cursor, just a blank raster. Eventually, after much hunting round with a 'scope I estimated that probably the ROM or IC5 was faulty and returned it grudgingly to Sinclair ... I had taken the precaution of surreptitiously marking every IC ... the ROM and Z80 were unchanged (when it was returned) but five others were new!" They must be generous with their little chippettes at S.O.C ... G.D. Bishop, of Winsford, Cheshire, has more luck. He says: "I assembled it in two hours and found it to be in full working order. I am delighted with its performance ..."

WHEN YOU'RE HOT, YOU'RE HOT

Mr Bishop adds: Many users complain about the regulator IC heat sink getting hot. This problem can be partly overcome by ensuring that the unregulated DC input to the ZX80 is nearer 7V than the higher 11V that is quoted. In fact, about 7·5V is the lowest that is possible without the 5V falling within the ZX80. If this can be achieved, it means that the regulator does not has to dissipate so much power, and so remains cooler. A simple calculation shows that, at 500mA, the 11V input causes about 3 watts to be dissipated, the 7.5V input causes about 1·25 watts and the supplied 9V input causes 2 watts to be dissipated. With no forced cooling, this can generate a lot of heat." ... Hot little ZX80's cause many problems. Uncle C was *not* amused at a Science of Cambridge press conference when Duncan Scott (who compiles the ZX80 Line-up page in PRACTICAL COMPUTING) made a witty remark about "frying eggs" on his ZX80



"OF COURSE, BOB, BETWEEN YOU AND ME, AN AWFUL LOT OF THE NEW NEW 8K ROM ZX80 IS JUST SHOW"

Philip Dimon, Gosport, Hampshire, would like someone to write a "bank account program" ... I would like some money so I could have a bank account, then perhaps I would need such a program.

HEDGEHOGS MATE TO DOUBLE K'S

G. Phillips, who contributed the READ/DATA routine in the last INTERFACE (and the first two editions had the "greater than" sign the wrong way round, as many, many correspondents took undue delight in pointing out to me) has added an extra 4K to his first 4K by stacking the 2114's on top of each other (his little drawing looks like hedgehogs mating), soldering all pins except pin 8. Geoff warns that this can overload the power supply, so says extreme care is needed ... so, as someone used to say, keep those cards and letters coming in ... I'll see you next month in the next INTERFACE (you have sent your subscription in haven't you?) ... and I'll leave you with the thought expressed in a letter I got last week; "The best thing about INTERFACE is the deliberate mistakes in the programs. You can learn an awful lot by spotting the mistakes and correcting them ..." ... yes ... uhm ... well bye until next INTERFACE.

MARK CHARLTON

Bricks is a highly original game for the 1K ZX80 from Ole Noerregaard of Denmark. You have to prevent the computer's two robots from breaking through a wall of bricks and mashing you. But all you are armed with is a trowel and a pile of cement and bricks. When the computer prints out "ROW?" you can add one brick only to the wall in any vertical row. Input a number between 1 and 10 (left to right) to make the wall thicker. You have got 10 frantic rounds to survive. Can you do it?

BRICKS

```
2     DIM M(10)
3     DIM N(10)
4     DIM X(2)
5     DIM Y(2)
10    FOR Z=1 to 10
11    LET M(Z)=9
12    LET N(Z)=1
13    NEXT Z
14    LET X(1)=3
15    LET X(2)=7
16    LET Y(1)=1
17    LET Y(2)=1
18    FOR T=1 TO 10
19    GOSUB 200
40    PRINT
42    PRINT "ROW?"
43    INPUT S
44    LET M(S)=M(S)+1
45    IF RND(5) > 1 THEN LET Y(1)=Y(1)+1
46    IF RND(5) > 1 THEN LET Y(2)=Y(2)+1
50    FOR Z=1 TO 2
52    LET X(Z)=X(Z)+RND(3)-2
53    IF X(Z)=0 THEN LET X(Z)=1
54    IF X(Z)=11 THEN LET X(Z)=2
56    IF N(X(Z)) < Y(Z) THEN LET
      N(X(Z))=Y(Z)
59    NEXT Z
65    FOR Z=1 TO 10
66    IF NOT N(Z) < M(Z) THEN GOTO 99
67    NEXT Z
68    NEXT T
69    GOSUB 200
70    PRINT "YOU SURVIVED"
71    STOP
99    GOSUB 200
100   PRINT "YOU HAVE BEEN MASHED"
110   STOP
200   CLS
201   PRINT,"BRICKS","MOVE—";T
210   FOR L=1 TO 15
220   FOR S=1 TO 10
230   LET X$="*"
240   IF N(S) < L AND M(S) > L-1 THEN LET
      X$="(shift A)"
250   FOR Z=1 TO 2
260   IF L=Y(Z) AND X(Z)=S THEN LET
      X$="X"
270   NEXT Z
280   PRINT X$;
300   NEXT S
340   PRINT
360   NEXT L
380   RETURN
```


Sinclair's PR company sent out this picture — of a lucky owner slipping in his new-ROM overlay — before S.O.C. had second thoughts and whipped the ROM off the market. The chunky thing at the back is the 16K RAM pack which is superb value at £49.95. S.O.C. intend to distribute the RAM pack according to their original schedule.

For the more 'clued up' programmer of the ZX80, G. Bedford has written a program to convert program listings to Hex. It is useful in itself to see how Hex works, but it can also be tacked onto other programs to change the Basic listings into Hex. When you run this program, enter the start address (decimal) and then the number of bytes (decimal) of program you want converting. Press newline to continue listing or enter any letter to stop.

HEXADECIMAL PROGRAM LISTING

```
10    PRINT "INPUT START ADDRESS"
20    INPUT A
30    PRINT "INPUT NUMBER OF BYTES"
40    INPUT B
50    CLS
60    PRINT "LISTING";A;"TO";A+B
70    PRINT
80    DIM E(15)
90    PRINT
100   FOR J=0 TO 15
110   LET E(J)=J+28
120   NEXT J
130   FOR J=0 TO B
140   LET C=PEEK(J+A)
150   IF C > 15 THEN GOTO 250
160   PRINT 0;
170   LET E=C
180   PRINT CHR$(E(E));"* *";
190   NEXT J
200   INPUT X$
210   IF X$=" " THEN GO TO 230
220   STOP
230   LET A=A+B
240   GOTO 50
250   LET D=C/16
260   LET C=C-(D*16)
270   LET E=D
280   PRINT CHR$(E(E));
290   GOTO 170
```


HIGH STAKES

Have you ever wondered what it must be like to be a Paul Getty? Then look no further than Ian Turtle's program Stock Market. Your chance to play the wheeler-dealer in high finance. Can you make a killing or will you end up on the window ledge with all the others? You start with £5000 and you have to earn your fortune by buying and selling stocks. Tax is charged on money, not on stock values. You sell your stock by entering a negative number when the computer prints "DEALS?". A cheap way to earn enough money to buy your extra memory.

STOCK MARKET

```
10    LET M=5000
20    DIM P(10)
30    DIM S(10)
40    FOR X=1 TO 10
50    LET P(X)=20+RND(80)
60    LET S(X)=0
70    NEXT X
80    RANDOMISE
90    CLS
100   PRINT "FIRM","SHARE
      VALUE","HOLDINGS"
110   LET SV=0
120   FOR X=1 TO 10
130   PRINT "*";X;"* * * * *";P(X),,"* *";S(X)
140   LET SV=SV+P(X)*S(X)
150   NEXT X
160   PRINT "MONEY";M
170   PRINT "STOCK VALUE";SV
180   IF M+SV < 1 THEN STOP
190   PRINT
200   PRINT "FIRM"
210   INPUT A
220   IF A=0 THEN GOTO 300
230   PRINT "DEALS"
240   INPUT D
250   IF M-D* (A) < 0 THEN GOTO 240
260   IF S(A)+D < 0 THEN GOTO 240
270   LET M=M-D*P(A)
280   LET S(A)=S(A)+D
290   GOTO 80
300   FOR V=1 TO 3
310   FOR X=1 TO 10
320   LET P(X)=P(X)+(RND(13)-7)
330   LET M=M/400
340   IF P(X) < 5 THEN LET P(X)=5
350   NEXT X
360   NEXT V
370   GOTO 80
```

BUDDY CAN YOU SPARE A ROM?

Clive Sinclair has withdrawn the new 8K ROM. The news was a shock and disappointment to many ZX80 owners. Some reacted angrily. "If you contact Sinclair, please throttle Clive and replace him with his son, who I think is somewhat quicker off the mark" read one particularly acidic letter sent to the club.

Another club member commented: "It strikes me that a very good reason to delay the new ROM is to (a) ensure that software produced by Image Products (Clive's US software development contact) is fully compatible and (b) that the viewdata/prestel/teletex what-have-you adaptor is also available ..."

Why did Science of Cambridge do an about-face, and after a launch which included flying over two representatives from the United States, and a blanket coverage of the press extolling the virtues of the new ROM, suddenly withdraw it? The official answer was promulgated by S.O.C. word-processor: "I am sorry to have to tell you that we will not be in a position to supply an 8K ROM chip within the timescale which was originally quoted to you, and I would like to explain the reasons.

THE REASONS

"During the final stages of development we made a significant technical breakthrough. For the same money we will be able to offer a far more powerful and altogether better 8K ROM capable of driving a printer we are developing, which will be compatible with the ZX80. We expect to have these new ROMs available in production volumes by February or March next year.

"So it hardly seems fair to ask you to spend £20 now on a chip which will be outdated in a matter of months. I hope you will understand that we really are trying to 'play fair' by all our ZX80 customers — however awkward it may be for us all in the short term.

IS IT TRUE?

"As you have expressed an interest in the original 8K ROM, we have re-processed your order for the 8K ROM enhancement. However, should you decide to cancel your order, please send back the enclosed post-paid card. We will refund your money by return of post."

All very fair, and gentlemanly, And actually signed, in person, by Uncle C himself. But is it true? Or is it the whole truth?

A club member comments: "The talk of driving a printer with the ROM seems a trifle peculiar, surely all you need is an I/O port (TIMEDATA make one — or even the cassette ports — see November PCW), plus suitable buffer and a seperate ROM to convert to ASCII ... Have you a method of perhaps prodding Mr Sinclair into releasing his 8K ROMs as promised for those who don't want to wait until March for the 'enhancement'. Maybe the ZX80 Users Club has more push than individual customers ..."

Another letter suggests that people in the electronics trade know that the 8K ROMs were ready for despatch (although the keyboard overlay and new book may not have been) before they were taken off the market.

WHAT PRICE PRINTER?

What sort of printer does Uncle Clive have in mind. In August he said — and at that stage a printer seemed a long, long way away — that S.O.C. intended to produce a printer "at about the same cost as the ZX80". So, that suggests £70 — £100. What sort of market would such a printer have?

Mr S C Adams, a ZX80 owner in London, wrote to Uncle Clive late in October. His letter, perhaps, speaks for many of us. This is what he said:

A LETTER TO CLIVE

"I have just received your letter ... stating your reasons for withdrawing your much-advertised 8K ROM. I would like to say how disappointed I am that you have found it necessary to withdraw this long-awaited improvement for such a small modification. I would like to make the following points which are most likely to be the ZX80 user's reaction.

'I WOULD LIKE YOU TO COMPLETE YOUR SIDE OF OUR CONTRACT'

"1/ The ROM gives the ZX80 the best chance to convert other BASIC routines as it gives features like pause, tape names and, most important, floating point arithmetic

"2/ The printer routine involves more expense as it needs a printer to use it (when is the printer coming out?). It is not an urgent requirement by most users as cost was the prime motive for buying the ZX80 in the first place.

"3/ Why is it necessary to withdraw the ROM at all because if it is like the original ROM it contains a window so it can be reprogrammed? All that would be required in February or March would be a reprogramming service such as Transam use for their Triton hobby computer. Meanwhile, we could be using the ROM for those four to five months.

"Finally, I would like to say that seeing as some people have seen the new ROM in action, there must be some available. I would like you to complete your side of our contract and supply me with one. I am not interested in my money back or waiting till at least March to get my new ROM. I would like it now so I can use it."

PEEKING AT POKE

If you can't tell the difference between PEEK and POKE commands and a hole in the ground the don't despair, you are in very good company. To most people the PEEK and POKE commands are shrouded in mystery, a myth that the Sinclair ZX80 manual has perpetuated. I was myself, not so very long ago, in awe of these seemingly incomprehensible commands, but after sitting down and getting to grips with them I not only retained my sanity but I also added a very strong pair of BASIC instructions to my programming skills.

SUITCASES, CABBAGES AND MATCHBOXES

If you imagine a suitcase filled up with neat, ordered rows of empty matchboxes, the first matchbox being labelled "Address 1" and the one next to it "Address 2" and so on, you can build up some sort of idea of the way a computer lays out its "filing system".

When you use the PEEK command on your ZX80, you are telling the computer to look inside a matchbox (address) and tell you the number that is found there. The instruction PRINT PEEK (16425) — which can be entered as a direct command without a line number — will print the number 244 on the screen. The computer has told you that 244 is the number presently stored in matchbox (address) 16425.

A ROUTINE TO SEE PEEKING IN USE

If you give the computer the instruction PRINT CHR$(PEEK(16425)) it will look inside the address as before, find the number stored there and print the character whose code corresponds to that number. You will find that your computer will print the word PRINT. You can check this by looking on page 77 of your manual. The character for code 244 is PRINT.

A program to show exactly what is going on should help to explain the PEEK command. If you type the following program into your ZX80 you will be able to see the PEEK command in use.

```
50   LET A=16424
60   FOR D=1 TO 10
70   PRINT A, PEEK(A), CHR$(PEEK(A))
80   LET A=A+1
90   NEXT D
```

When you run this program you will see three columns appear on the screen. They should look like this:

16424	0	
16425	50	M
16426	240	LET
16427	38	A
16428	227	=
16429	29	1
16430	34	6
16431	32	4
16432	30	2
16433	32	4

The left hand column is the address numbers. Next to these are the numbers that are stored in each address that you have looked at using the instruction PRINT PEEK(A), and the third column is the characters whose code corresponds to the number found in the address.

ADDRESSES AND NUMBERS ADD TO CONFUSION

Look at the third column and write down the characters in order from top to bottom. Now return to the command mode by pressing any key. If you look at the first line of the program and compare it with the characters you have written down, you will see that they are the same. The exceptions here are address numbers 16424 and 16425. Address 16425 has 50 as the number stored inside it. This you can see is the line number, which the ZX80 stores in a single address preceeded by an address with nothing in it at all. When the program is running that tells the computer that the next number is a line number, even though the ZX80 printed the character M when it PEEKed the address.

What you have done by using this program is to look at each address in ascending order from 16424, to print the number found inside and to print the character whose code corresponds to that number. It matches the first line of the program because the program is stored, character by character, in ascending addresses from 16424 onwards.

So the PEEK command looks inside the address and tells you what is there, but what does the POKE command do? Quite simply, the POKE command changes the number inside the addresses. You have to be careful when using the POKE command, so never POKE an address number less than 16424 unless you really understand the workings of PEEK and POKE.

The POKE command is written in the form POKE A,B where A is the address number and B is the code of the character that you wish to put into the address.

Add the following lines to your program:

```
10    REM.....
20    LET A=16427
30    INPUT B
40    POKE A,B
```

AMAZING CHANGES SEEN IN REM

Now run the program, and when the ZX80 asks you for a number input consult your manual (page 78) and input the code of any one of the graphical characters. The computer will now execute the rest of the program as before, but this time you will see a different set of numbers and characters in the addresses. This is because the first line of the program has changed. Look at address number 16427 on the screen. The code number should be the number that you entered and the character should be the one that you chose from page 78 of the manual.

ZAP! AND DOTS CHANGE TO GRAPHICS

Return to the command mode and look at line 10. Originally the REM statement consisted of 10 dots, but now the first dot has been replaced by the graphical character that you chose. Run the program again and chose a different graphical character this time. You will see that the first graphical character has been replaced by the second one.

So that is how POKE command works. It puts a character of your choice into an address of your choice. You are not limited to just the graphical characters, but you can use any of the characters from pages 75-78 of the manual, as long as the code number is less than 199 and does not include the bank of question marks between 64 and 127.

Change line 30 to INPUT B$ and add the following lines:

```
32    FOR C=1 TO 10
35    LET B=CODE(B$)
42    LET B$=TL$(B$)
44    LET A=A+1
48    NEXT C
```

What you have set up is a small string-handling routine. If you run this program the computer will ask you for a string input. Try typing in your first name. When you press newline the computer will take the code of the first letter of the string (your name) and POKE it into address number 16428. It will than take the code of the second letter and POKE it into address 16429. Your ZX80 will continue to do this until it reaches the end of the FOR−NEXT loop.

After the last letter of your name has been POKEd into the REM statement, the computer will execute the rest of the program as before. You should see your name spelt out down the right-hand column on the screen. If you don't believe me then return to the command mode and look at the REM statement. Isn't that your name?

To get rid of the bulky routine at the end of the program that prints out a series of PEEK commands to see what is in the REM statement, a simple alternative presents itself.

PEEKING DIRECTLY INTO PRINT

Change line 10 to PRINT " ", putting about 20spaces between the quote marks. You can now get rid of lines 50 onwards and replace them by:

```
50    CLS
60    GOTO 10
```

It is also necessary to change line 20 to let A=16428. Can you see why? Address 16427 was the first address after REM and therefore is the first address after PRINT. However, PRINT is followed by quote marks in address 16427. If you POKE something else into it you will find that you get a syntax error as a PRINT statement must be fully enclosed by quote marks. So to avoid this, it is necessary to set A at 16428. Also, if you add line 37 IF B$=" " THEN STOP, this will enable you to get out of the loop by entering a null string (just pressing newline).

GOODNESS, WHAT WILL THEY POKE NEXT?

Now run the program and type your name again. Pressing newline tells the computer to execute the program, but this time, after POKing the characters into the print statement, the computer obeys line 60 and goes to line 10. Line 10 is the print statement, so the ZX80 should print your name on the screen. If you return to the command mode you will see your name written in the first line. Run the program again and type in another name. You can enter a different name each time the computer prompts for a string input, and see that name printed on the screen.

These are only the basics of how PEEK and POKE work. Next month I will show you how to the PEEK and POKE commands into use in a program including the simple setting up of a memory-mapped screen.

TREVOR SHARPLES

An amazing game for the mercurial mind of Colin Bodell. You are hopelessly lost in a maze and escape is obviously uppermost in your mind. However, there are hoardes of nasty little goblins who don't want to see you go. They charge exorbitant sums of money to pass a variety of obstructions: walls, gates and, you've guessed it, bridges. You wallet is tuned to the sum of £100 and you have this sneaking suspicion that there are 10 obstructions ahead ... if you get the chance to count all of them.

WALL—GATE—BRIDGE

```
5    LET T=100
10   LET X=1
15   PRINT "WALL * * * GATE * * *
     BRIDGE"
20   PRINT
25   IF T=0 OR T < 0 THEN GOTO 600
30   LET A=RND(3)
40   IF A=1 THEN GOTO 60
50   IF A=2 THEN GOTO 110
60   PRINT
70   PRINT "WALL...£10"
75   LET W=10
80   GOTO 300
90   PRINT "GATE...£20"
95   LET W=20
100  GOTO 300
110  PRINT "BRIDGE...£30"
115  LET W=30
120  GOTO 300
130  PRINT
140  PRINT "HOW MUCH OF YOUR £";T;"
     DO YOU WISH TO GAMBLE?"
150  INPUT M
160  IF RND(2)=1 THEN GOTO 210
170  PRINT "YOU LOSE, YOU NOW HAVE £";
180  LET T=T—M—(RND(M))
190  PRINT T
200  GOTO 15
210  PRINT "YOU WIN, YOU NOW HAVE £"
220  LET T=T+M+(RND(M))
230  PRINT T
240  GOTO 15
300  PRINT
310  PRINT "DO YOU WISH TO PASS
     THROUGH — (1)"
320  PRINT "DO YOU WISH TO GAMBLE —
     (2)"
330  INPUT G
335  CLS
340  IF G=1 THEN GOTO 370
360  GOTO 130
370  PRINT
375  LET X=X+1
380  IF X=10 THEN GOTO 500
385  PRINT "YOU NOW HAVE £";
390  LET T=T-W
400  PRINT T
410  GOTO 15
500  PRINT "YOU HAVE GOT THROUGH
     WITH £";T
510  PRINT "WELL DONE"
520  STOP
600  PRINT "YOU RAN OUT OF £££
     WITH";10-X;"OBSTRUCTIONS PASSED"
605  PRINT ,"YOU LOSE"
610  STOP
```


COMPETITION

Well, not exactly free — unless you win. We're having our first competition, and the winner can choose any TWO cassettes of software listed inside the back cover.

We'll have a competition in each of the future issues of INTERFACE, and will be announcing the winner of this competition in INTERFACE 7 (that is, the one after the next issue).

What you have to do for this competition is to write a program which will convert a message typed into the ZX80 in English into Morse Code.

There are no restrictions at all, except that it must run on a 1K machine.

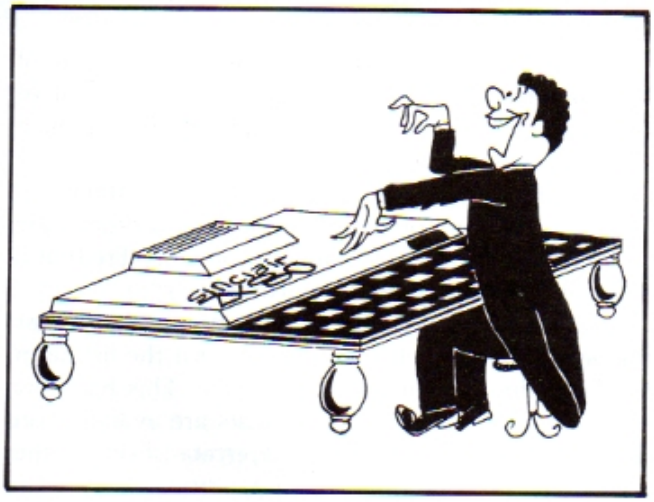
The winner will be the person who writes the shortest program — that is, the one which occupies the least memory.

Please send us a listing of your program, following the national ZX80 Users Club software standards, plus any necessary documentation.

If we get two programs which occupy about the same small amount of RAM, the winner will be the one which, in our opinion, is the most elegant solution to the problem. Note that your program does NOT have to translate Morse back into English.

JOIN THE CLUB

See page 15



LOOKING AT BOOKS

THE ZX80 COMPANION is an excellent title for a book, and Bob's venture into ZX80 literature is about as good as the title.

Bob and friends are obviously people who know their stuff as the book is full of useful information, but this information is not easy to access. The ZX80 Companion is *not* a book for beginners — and I'm sure Bob and co. will agree. If the ZX80 companion was the first book a newcomer to computing saw, he or she would be tempted to turn her (or his) back on computers and move as fast as possible in the opposite direction.

In other words (and without all the brackets) at first glance this book is 'frightening'.

Bob's Brigade have "adapted" and enlarged the last section of Uncle Clive's manual and this forms the nucleus of the book.

If you want to learn how to program in BASIC then skip this review and go on to the next, but if you feel you need an 'in-depth' autopsy of the ZX80 then this book will be immensely useful. Recommended to the 'old sweat' (I know this excellent cure for overheating...) who has some knowledge of the workings of the computer.

The book is, however, a little lacking in programs, perhaps, so there is not much you can actually *do*, but there is a lot to learn. Their maze program is worth a mention — an 'amazingly' good game.

The ZX80 Companion, now in its second edition, is a little bit over-priced at £10, I feel, and has the disadvantage of being stapled rather than spiral bound like Tim's and Fred's books. This means that the book won't lie flat when you're trying to type in a program from it unless you keep it flat with an ashtray (or the PET/TRS-80/APPLE that you keep handy for just that sort of emergency).

Get your brain in gear before you think of buying this book or you will stall at the lights!

30 GAMES FOR THE ZX80 1K

Fred Milgrom has produced a 'no-nonsense' book of 30 programs which, as you would imagine in a book of this type, range from good to bad programs with most falling somewhere in the middle.

Mr Milgrom claims that his book contains 30 programs (if you count Bubble Sorts and other little routines as programs — naughty, naughty Fred) and some of them are certainly worthwhile.

Gomoku is a game that I must mention as it is by far the best program in the book — even if the listing in the first edition didn't work properly. This has now been corrected and the amendments are available on the new, improved unabridged errata sheet in the second edition.

Other games, however, lead you to believe that computers have at last learned how to cheat.

While playing Blackjack, the computer shuffled the cards and came up with a whole deck of nines and kings. How could I win when it kept dealing itself two kings every time?

Each program is well documented, the documentation appearing in the page or so of blurb that preceeds each program.

Fred's programs are of the traditional type: Lunar lander, Pontoon (or Blackjack — Fred has both), Nim, Towers of (yawn!) Hanoi etc. There is nothing really in this book that will appeal to the experienced programmer.

If you feel like shelling out £7.45 for a book of programs then you could do worse. These are all guaranteed to fit a 1K machine and have the advantage that they are written specifically for the ZX80, unlike other books written in Microsoft BASIC which need a lot of converting to make them work.

Watch out David Ahl — Fred Milgrom is coming!

MAKING THE MOST OF YOUR ZX80 by Tim Hartnell succeeds where the other two books fail. It has something to offer the established programmer as well as providing a good, solid start in BASIC programming for the beginner. (I must add that I know Tim, so this review may be a little biased).

The strength of Tim's book lies in the fact that it contains over *60* programs that are ready-to-run on your ZX80. The programs, at the beginning of the book, are very simple (I'm sure that the more experienced of you will skip the first couple of chapters unless you *really* want to print your name in lights on the screen!) evolving into some really tight, well-programmed stuff towards the end of the book.

Making the Most of Your ZX80 also contains an appendix full of useful and important routines including the by now legendary 'Amazing Active Display' that gives you the closest thing possible to moving graphics on the ZX80.

Tim's book provides a comprehensive coverage of BASIC programming and games development for the ZX80. Worth £5.95 of anyone's money (unless you get a free copy to review!)

ALAN CARR

HELLO, MY NAME'S ZEDDY AND IF YOU BUY THE BOOK, YOU'LL BE SEEING A LOT MORE OF ME.

THE ZX80 IN EDUCATION

Eric Deeson (Highgate School, Balsall Heath Road, Highgate, Birmingham, B12 9DS) is setting up the Education ZX80 Users' Group, under the umbrella of MUSE (Micro Users in Secondary Schools). If you're interested in teaching uses of the ZX80, please send Mr Deeson a stamped addressed envelope.

Mr Deeson's outfit will be, we imagine, the major group for those involved in using the ZX80 in education, and it is hoped that other schools setting up groups will liase with him. We'll have a page in future issues of INTERFACE covering educational uses of the ZX80, and we'll also review educational software in this section.

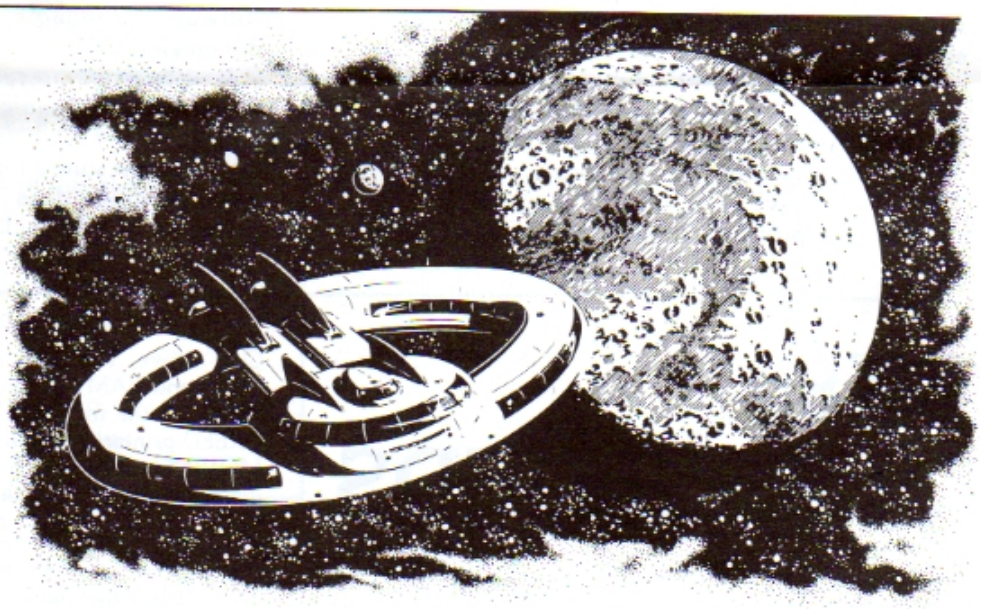
Meanwhile, J Wakefield (38 Bedford Crescent, St Ives, CAMBS, PE17 6DE) has started a company called ZX80 Junior Education Enterprises, offering, as he says, "reliable programs dealing with specific educational needs, as cheaply as possible". He'll send you a list for an s.a.e. ECONOSOFT (4 The Loont, Winsford, Cheshire, CW7 1EU) are also producing some outstanding educational software.

Tests, exams and assessed homeworks vary widely in difficulty and to try to run a continuous assessment program by adding up and averaging the raw marks gives a very inaccurate and often unfair picture of the students' performance. Finding the mean and standard deviation values for the tests allows the teacher to calculate standardised scores which can be compared with standardised scores from other tests with confidence and these new scores may be averaged to give a much more meaningful set of results. If the raw scores are standardised such that they have a mean value of 100 and a standard deviation of 15 then the results can be compared directly with the students' IQ scores. This helps the teacher to identify under-achievers. Randle Hurley has a program on cassette which allow the teacher to standardise scores in this way without spending hours with a calculator. The program — which requires 2K of memory — will cope with 4 to 10 groups of 30 students. For details and order form, send s.a.e. to Randle Hurley, 63 Green Way, Chislehurst, Kent, BR7 6AG.

The Users' Club has two educational cassettes for sale. The first -- School Pack Maths Quiz — contains a host of useful mathematical demonstration and quiz programs, each needing 1K. The second educational cassette — French Vocabulary, Series One — tests 100 French words (asking for the French equivalent of an English word selected at random, then correcting it if necessary, and scoring the student). These programs are £5.95 each. Order form on page 15.

If you use the ZX80 in the classroom, you've set up a Users Group at your school, or you'd like to move in this direction, please drop us a line, marking your envelope "ZX80 in Education".

ALIEN ATTACK



```
2    LET A=18136
3    LET M=A
5    LET A$="A"
10   LET R=1
20   DIM A(10)
30   LET B=1
40   LET P=0
50   GOSUB 700
60   FOR F=1 TO 5
70   PRINT ". . .";
72   FOR K=1 TO 29
74   PRINT "_*";
76   NEXT K
80   NEXT F
90   GOSUB 700
95   FOR F=1 TO 5
100  LET A(F+5)=A+(F-1)*33+13+RND(5)
110  LET A(F)=A(F+5)+2*RND(5)
115  POKE A(F),24
117  POKE A(F+5),24
120  NEXT F
125  POKE M,27
130  LET M=A + 33*(B-1)
140  POKE M,128
150  INPUT A$
160  IF A$=" " THEN GOTO 150
165  GOSUB CODE(A$)*10
167  LET P=P+1
170  FOR F=1 TO 5
180  LET R=RND(10)
190  POKE A(R),0
200  LET A(R)=A(R)-2
203  IF PEEK (A(R))=27 THEN GOTO 380
205  POKE A(R),24
210  NEXT F
220  GOTO 125
380  PRINT "GAME OVER — SCORE=";P
385  POKE A(R),24
390  STOP
430  IF A(B) > A(B+5) THEN GOTO 480
450  POKE A(B),0
460  LET A(B)=A+(B-1)*33+29
```

```
465    POKE A(B),24
470    RETURN
480    POKE A(B+5),0
490    LET A(B+5)=A+(B-1)*33+30
500    POKE A(B+5),24
510    RETURN
560    RETURN
600    LET B=B-1
605    RETURN
610    LET B=B+1
620    RETURN
700    FOR F=1 TO 32
710    PRINT "(shift W)";
720    NEXT F
730    RETURN
```


You too can be Duck Cloggers of the 95th Century with this program of Gerard Allen's. Sitting in your super-sophisticated starship, with a control panel that strongly resembles a ZX80 keyboard, you have got to try to knock the aliens out of the sky before they get you. With true Battlestar Galactica complexity you have five commands to use:— W moves you up the screen; X moves you down and S keeps you stationary (a feat of great ingenuity that only Star Wars has ever emulated). Press F to fire or A to see your score. One command at a time, please gentlemen. This isn't Star Trek you know.

FREE SOFTWARE!

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ZX80 CLASSIFIEDS

You can advertise in INTERFACE. Personal ads (contacts, selling off unwanted memory boards, ZX80s and the like) are £2 for the first 20 words, 15p each additional word; business ads (including sale of software) £5 for first 20 words, 20p each additional word. Payment must accompany booking. Display rates on application.

MEMORY EXPANSION BOARDS — special offer. 3K RAM boards, only £8, RAM chips just £7 per K. Take advantage of this special offer to expand your ZX80. Quicksilva, 56 Bedford Place, Southampton, Hants.

BACK ISSUES INTERFACE — Issues number 1, 2 and 3 wanted for copying. Please send — their return is guaranteed — to Brian Theasby, 44 Patterdale Street, Hartlepool, Cleveland, TS25 1RF

OVERHEATING CAN DESTROY ZX80s. For a cure (no unsightly mods) send your machine and £5 to M Wyllie, 24 Oak Grove, Hertford. Also from M Wyllie: Circuits for buffer and RAM, and for adding up to 128 I/O ports to the ZX80. At the moment, he's using the I/O board to run a CREED printer from his ZX80. Circuits 20p each, plus s.a.e. MOVING GRAPHICS using external circuitry. Circuit diagrams, details and three programs, just £2 from Martin Orme, 24 Margaret Gardens, Egloshayle, WADEBRIDGE, Cornwall.

1K GAME PROGRAMS (LISTINGS) FOR SALE. Includes UFO INVADER, GRID GAME, ACEY DEUCY and MATHS TESTER (with time limit). S.A.E. for details to C. James, 27 Portalnd Road, London, W11 (Note from Tim: I've had a look at these programs and they seem definitely worth while). Also, C (stands for Conrad) would like to get in touch with other ZX80 users around his own age (14).

RENUMBER program for the ZX80, takes up half a K, renumbers GOTOs and GOSUBS and line numbers in steps of 10, or as required. £2.50 for the listing from R Dale, 20 Blythe Avenue, Meir Heath, Stoke-on-Trent, Staffordshire, ST3 7JY.

43 KEY KEYBOARDS for your ZX80. Includes 2 shift and 2 newline keys plus a one action rubout key. Send s.a.e. for details to: Database Consultancy, 105 Fairholme Avenue, Gidea Park, Romford, Essex, RM2 5UR.

Bug-byte ZX80 Software

ON HIGH QUALITY C12 CASSETTE - ONLY £3 per cassette inc.

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8) ZX80 art (3programs) and picture drawing (all use memory-mapped video)
9) Logic gates; 7 segment display; binary to decimal converter.
10) Graph-plotter; summation; histograms; square root.

ZX80 PROGRAMMING COURSE : Book & cassette of programs explains with many useful examples, PEEK,POKE,USR,arrays,flowcharts etc. £7.50 inc.

BUG-BYTE: 251,HENLEY ROAD,COVENTRY CV2 1BX.

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Please complete form at the foot of this page.

Please send me the following:

( ) The next 12 issues of INTERFACE. I enclose £7.50 (UK), £9.50 (Europe) or £13.50 (elsewhere). £.....

( ) I sent Tim Hartnell three or more stamped, addressed envelopes, plus stamps. Deduct £2 from above prices. £.....

( ) ..... copies of the book "MAKING THE MOST OF YOUR ZX80" (containing over 60 programs) £5.95 each £.....

4K PROGRAMS:

( ) HYPERGAMES PACK 4KAA1 — Draughts (3 levels of play, full graphics), and Labyrinth (adventure) (£5.95) £.....

( ) HYPERGAMES PACK 4KAA2 — Intergalactic Trader, 24 Steps to Hell (with moving graphics) and June 21, 1969 £.....

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( ) BUMPER BONANZA CASSETTE ONE — seven great 1K programs for the ZX80: Aliens and Asteroids, Frenzy, 52 Bluff, Lost in Space, Unicorns and Griffins, Blast Off and A.I. Spook (£9.95) £.....

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( ) BUMPER BONANZA CASSETTE FOUR — Hot Sauce, Chopper, Decisions-Decisions, Snakes and Ladders, Laser Roulette, Poetry (four different versions of this program are included) and Number Juggle (£9.95) £.....

( ) School Pack Maths Quiz (£5.95) £.....

( ) French Vocabulary (tests 100 words) (£5.95) £.....

National ZX80 Users Club
Unit 3, 33 Woodthorpe Road,
Ashford, Middlesex, TW15 2RP

I enclose a total of £ _____

Name .....

Address .....

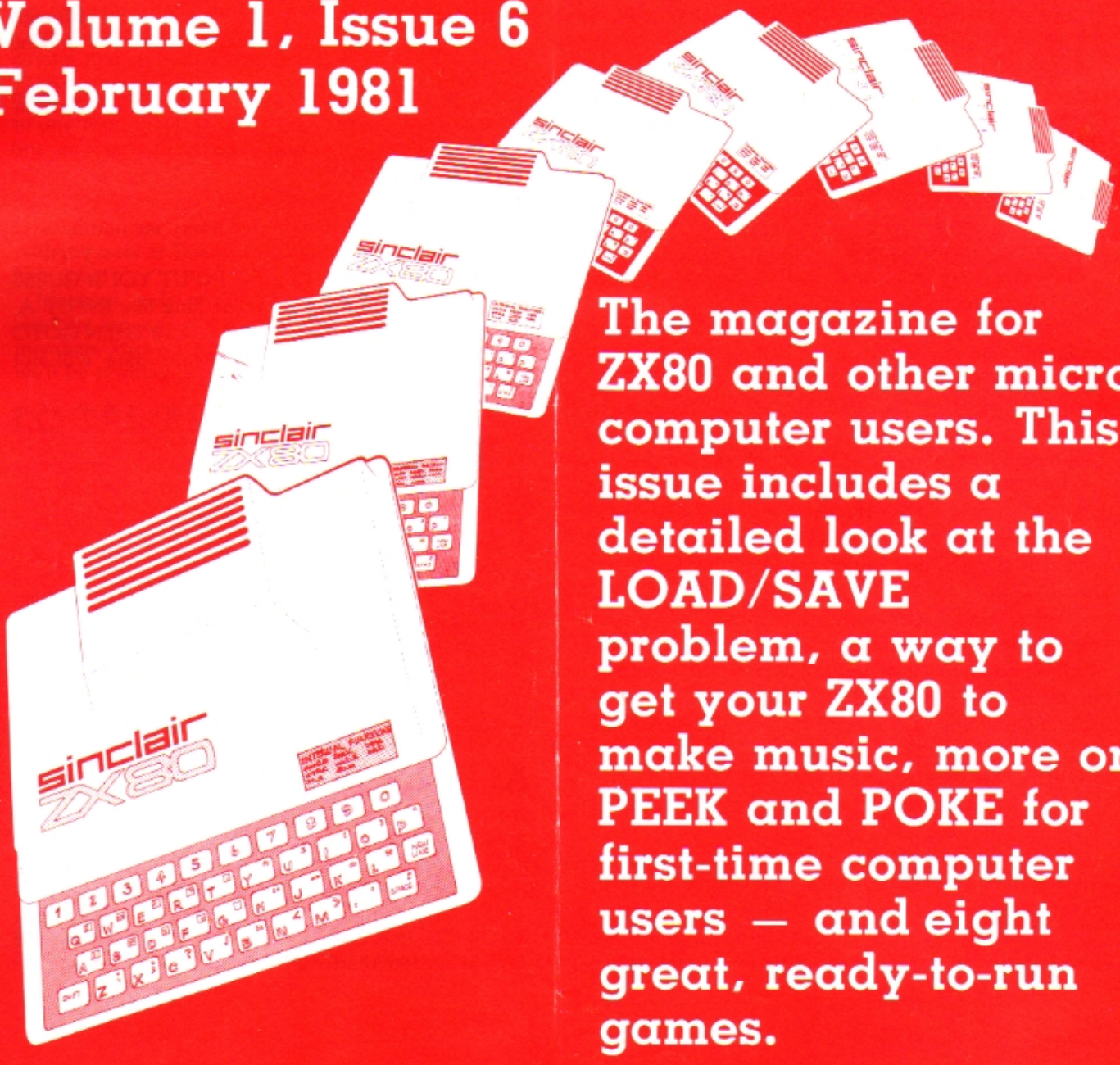
.....

(Make cheques payable to: National ZX80 Users Club)

... please send this page, or a copy if you don't want to cut up your INTERFACE ...

MICRO ZX80 INTERFACE USER

Volume 1, Issue 6
February 1981



The magazine for ZX80 and other micro-computer users. This issue includes a detailed look at the LOAD/SAVE problem, a way to get your ZX80 to make music, more on PEEK and POKE for first-time computer users – and eight great, ready-to-run games.

SETTING STANDARDS

IT'S TIME WE SET SOME SOFTWARE STANDARDS

It is in everybody's interests to have a set of standards for people writing and submitting software — to make sure it's easy to read and to minimise the chance of mistakes.

From now on, when you send us programs — and you'll probably find it useful to follow the National ZX80 Users Club software standards for your own work as well — could you please make sure they conform, where possible, to the following guidelines:

.Line numbers to start at 10, and increment by 10 (unless there is a special reason — such as GOSUB 5*A + B)

.Variables to start at A, and follow through as single letters, in alphabetical order (the same for FOR/NEXT loops and arrays), except where using the same letter could cause confusion

.Where possible, subroutines to be at, or near the top of the program (with, perhaps, the first line being GOTO ...)

.The letters "O", "I", "S" and "Z" not be used as variable names, unless unavoidable (to prevent them being confused with 0, 1, 2 and 5)

.Strings to start at A$ and follow through in alphabetical order

.Subroutines — where possible — to be used in place of a long string of IF/THENs

.Programs to be robust, so they do not require a GOTO command instead of RUN

.Variables to be stored, where possible, in a non-volatile manner (such as POKEing into a REM statement) so CLEAR can ensure the maximum working memory is available at all times. This procedure is not entirely trouble-free, and is less important with 4K or 16K machines, but can be very useful for programs which must be written in less than 750 bytes (most on the 1K machines cause problems is they exceed around 670 bytes, but with CLEAR you can write programs which occupy the low eight-hundreds).

.The symbol *_ (an asterisk underlines, with a space either side of it) to be used to show a single space in a PRINT statement, if such space is vital, and would not necessarily be evident from the context. A number of spaces should be shown as 20 PRINT "(3 spaces) YOU WIN", i.e. the number of spaces, and the word space, in lower case letters, within brackets

.Zero to be represented as the "slashed nought", i.e. Ø

These are not binding rules for listing, but are suggested as a means of reducing the chance of a listing being misread.

There are times when it is useful to use more than one letter for a variable (either a word like SUM, or SCORE, or a combination of letters and digits starting with the letter) but if this will not help your understanding of a listing, stick to single letters, and assign these in alphabetical order.

The standards can be ignored if there is a valid reason, *except for* the use of *_ in a PRINT statement, and Ø for zero.

DOCUMENTATION

Much documentation is a waste of time and paper.

Although computer courses at schools tend to stress the need for documentation, is it — in our opinion — unnecessary in many cases.

The cardinal rule for documentation is: If the algorithm is not transparent, document.

Saying things like "Lines 20 to 50 initialise variables" seems pretty pointless, while it is obviously of value to have supporting notes to a program pointing out things like "Line 370 produces a random number from the see produced in the previous line, and uses this as a GOTO destination to decide the computer's reaction to the player's move".

It is more important to tell an operator what to do after pressing RUN than it is to tell the operator why the computer does what it does when you do, although most operators will want to know the 'why' in due course.

If you cannot fit the instructions into the main program, either write a shorter, "preface" program, or provide the user with clearly written instructions, and explain what kinds of resposes the computer expects from its prompts.

Whenever you have the memory, include lines to exclude unwanted input.

For example, if line 70 says "INPUT YOUR GUESS (1 TO 10)", line 80 will be something like INPUT A, and line 90 should be IF A < OR A > 10 THEN GOTO 70. This will ensure that erroneous data will not contribute to a program crash.

The code of a string can be used to check string input (such as IF CODE(A$) = 57 THEN... or IF NOT CODE(A$) = 30) THEN... or the less than sign can be used to stop a program if anything other than a null string is put in by the operator. The line, in this case, could read: IF N$ > "" THEN STOP.

We'd be very interested in hearing your comments on the above standards outline, so we can refine them and make them more generally useful.

Please try them for the next program you write, and see if they work for you.

If you find them boring, or discover a simpler way to avoid confusion, please write in and let us know.

ALIEN ATTACK

We had a number of letters saying how great ALIEN ATTACK (INTERFACE 5) was and a few saying it wouldn't work. We've checked, and the listing as given, is correct. However, if you still can't get it to run, try changing line 2 to LET A = 17112. Both versions of line 2 work. Line 66 of BRICKS should have a "greater than" rather than a "less than".

INPUT

Hi. If this is your first contact with the National ZX80 Users Club, welcome along. We publish INTERFACE each month, and in every issue there are at least six complete, ready-to-run programs, reviews and other ideas to help you get the most out of your ZX80.

In the next issue we'll have a complete 4K ADVENTURE game, written expressly for the ZX80, plus six 1K programs. Make sure you don't miss out on your copy of INTERFACE by joining the club today. If you haven't subscribed, you won't hear from us again.

MACHINE CODE

In this issue, Trevor Sharples completes his mammoth work on PEEK and POKE, and very shortly, we'll have an article for your on MACHINE CODE. A number of people wrote into the club after the last issue of INTERFACE (all of them saying how great it was it had turned at last into a 'real magazine') saying that now that they were on top of PEEK and POKE, machine code needed explaining, as did the mysteries of successful LOADing.

Well, we've a major piece inside (written by Mark Charlton and myself) on LOADing and SAVEing. It is based on our own experience, the experience of about 50 club members who wrote to us, plus the information we picked up while discussing the topic with the crew at Science of Cambridge. We hope it will help you.

Machine code is not an easy subject, but we're working on an article now (with the help of club members Michael Kirkland and John Bloxham) which we'll be printing shortly.

LOCAL BRANCHES

Please let us know if you start a local branch of the National ZX80 Users Club in your area or school. We want to keep in touch with developments, and we can probably help you with ideas for sharing with members. Let us know when and where you're meeting, and give us the name and address of the area organiser, so we can help build up each local group as much as possible. If you haven't got a users group in your area yet, why not start one? We'll give you as much assistance as we can, as well as publishing your address.

FREE SOFTWARE

In the last issue, we asked people to write a program to change English into Morse code. Thanks for the entries (many of which show evidence of good, systematic thinking about the problem). We'll announce the winner — who gets his or her choice of two cassettes of software — in the next issue. We've got a new competition in this issue. Get your thinking caps into gear, and see if you can be the winner.

YOUR MAGAZINE

INTERFACE is your magazine. We want it to fulfill your needs. Lots of magazines say that, but we really mean it. INTERFACE should be just the kind of magazine you'd produce if you wanted to help people get the most enjoyment out of their ZX80s. So, let us know what you want to see in it. Send us your favourite programs, programming tricks and routines. Tell your friends about us (we'll send free copies to anybody you nominate). Try the programs out, and if you think you can write betters ones, or improve the ones we publish, please let us know.

DEATHSTAR DRAUGHTS

If you've got a 4K ZX80, and you enjoy playing Draughts you'll probably find a brand new program — DEATHSTAR DRAUGHTS — a lot of fun. Based on draughts, and featuring full-screen graphics, DEATHSTAR DRAUGHTS features two twists to the old rules — there is a moving warp square which sucks your piece into invisibility (can you lure the ZX80 to fall into a warp) and any piece making it to the other side of the board changes into one of the opponent's pieces. Fast, reliable action. The ZX80 generally moves within 12 seconds, even at the end of the game. DEATHSTAR DRAUGHTS is available on software cassette 4KAA5. On the same cassette are two other great 4K games — BOPPER−BINGO, in which the ZX80 draws the cards (using the moving display) and the numbers, and even crosses out the numbers that come up, and SPACE−STATION, in which you have to try and keep your space station alive, despite shortages of food and oxygen, and attacks from aliens. This is a space-age version of KINGDOMS (and is a lot more fun to play).

MEETING

There'll be a meeting of the National ZX80 Users Club on Tuesday 17th February, 1981 at The Bush Hotel, at 2 Goldhawk Road (the end of Shepherd's Bush Green) at 7.30 pm for a discussion, and question and answer session from 8.15 pm. Tim Hartnell and Trevor Sharples will be there. We'd like to see you.

ADDRESSES

The question of the mailing addresses for the club has puzzled more than a few of you. In its time, the users club has been at Coningham Road, Earls Court Road and now in Ashford. Each change has occurred when the club has out-grown its previous address. Mail from all three addresses is still being collected, but — from now on — we'd like you to write only to the Ashford address. All mail ends up there anyway.

See you in INTERFACE 7
Regards,
Tim Hartnell, Trevor Sharples, Alan Carr,
Mark Charlton
National ZX80 Users Club

MARK'S BYTE

looks at the eternal LOAD/SAVE debate.

IT'S BEEN A HARD DAYS LOAD

If there is any part of the ZX80 where the design fell down in was in that little hole at the back where — in theory — programs come a-dribbling at 300 baud from a cassette player into the receptive RAM of the ZX80. This is the theory. A very high percentage of ZX80 owners have found that the practice is not as straightforward as the theory. Granted that we have a LOAD/SAVE problem, how can we solve it. This article is based on the experience of club members, and a chat with S.O.C.

Firstly, always clean the recording head before LOADing. Use computer quality tapes (preferably C-12's; these are 45p each from Lion House in Tottenham Court Road; many other places sell them). Keep your ZX80 cool, either by adding an external heatsink, or moving the power supply, or — in a more Dali-esque solution — try putting a frozen long-life milk carton just to the left of the 'hump'. Absurd as this sounds, it works quite well (although, as Mr Milgrom of '30 Programs for the ZX80' fame pointed out to me, you have to be careful about drips from the computer getting into the works as the carton melts).

Buy good quality leads (and I don't mean the funny little things you get from S.O.C.) ready made up. Don't let the leads from the ZX80 to the power supply cross over your power supply leads. If you can afford it, get a head demagnetiser (£5 to £11) and use it regularly. Make a security copy on your own machine of any software you buy from another source. You'll find you have far less trouble LOADing programs recorded on your own equipment than you may do with software from another cassette player.

When discussing the problem with S.O.C., it was suggested that some recorders do not cut out the built-in mike while an external mike, or the ZX80, is plugged in. If this is so, there could be noise on the five seconds of silence which precedes a program on tape. Either put on your cloak of inaudibility or stick some cotton wool over the built-in mike if this happens.

The LOADing technique should be: Start the tape. When the silence begins press LOAD then NEWLINE. The ZX80 needs at least half a second of silence to LOAD. Make a tiny, three-line program, SAVE it, and then practice LOADing at different volumes. When you achieve success, make the volume setting (with a stuck-on paper arrow, or a little notch). Then, always set it at this point. Use batteries if you can, and don't use them for anything except your ZX80.

You may find that your success rate deteriorates as you use the tape over and over again. This is because magnetised heads can gradually erode the program. If you can't afford a demagnetiser, make several copies of each program on different tapes.

I always make three copies on one side of a C12, and then put NOTHING else on the cassette. Then you don't have the hassle of searching through a vast number of programs to find the one you want. And if the first dub doesn't load, you can always try the second, on a slightly different setting.

M R Kent of Aberdeen says he has no problems with his £36 ITT studio recorder 66, and says the record level indicator, tape counter and record level control all help. Previous use of a Philips N2220, he writes, had given unpredictable LOAD due to the output being borderline for the ZX80's requirements. Richard A van Woerden writes that his Prinz recorder will not LOAD at all.

Richard Allan says he has found it useful to connect a small earpiece across the plug lead to the cassette recorder so you can hear what is going on. An AM radio, tuned to Capital (194) will do much the same thing (thinks: should a computer be broadcasting an RF signal?) Theo Armour found his MIC socket did nothing, but that he could SAVE from the EAR! He later found a sneaky little solder bridge. Alan Mayer of Wimbledon said that buying proper computer tapes increased his success rate from near zero to around 80%.

G J Suggett of Chichester writes: I can report that the only problems I have had so far have been caused by a broken connection on the double jack lead supplied with the ZX80... My cassette player is a Boots CTR 500 radio cassette, and I am using a Woolworths tape! On music recordings I often get considerable wow and flutter but this does not seem to have affected the computer program recordings.

From Shrewsbury, Salop, a users club member whose name I can't decipher, says: I bought from Tandy's the tape recorder issued with the TRS-80 (boo, hiss), but found snags. However I thought I'd try Tandy's Realistic Micro Minisette II (does this man have shares in Tandy?) which I found perfect for the job. Secondly, the cassettes are ideal for postage and can be purchased for £1.25. A personal earpiece has been spliced into the load line to ensure the correct beginning of the program.

R M Smith, uses a Sony TCP55 mini tape recorder, and has no load/save problems, "even when using cheap audio cassettes". We should be so lucky.

John and Timothy Edmonds, Grays, Essex, write: We have an Interstate cassette recorder, purchased at Woolworths for £17 and in four months have yet to have a save/load error. One of the development cassettes we use constantly is about eight years old and originally cost 20p. Very Low Fi. The only setting up we did was to find the optimum position for the playback volume, which was just above the 'no load' threshold.

R Hughes in beautiful down country Torquay says he's had no problems using a Prinzsound TR225c cassette recorder. Alastair Murray, of Larbert, Stirlingshire, is not so fortunate. 'Like numerous other uses I have a loading problem, despite trying three separate cassette recorders — a Crown, a Sharp and a JVC radio/cassette recorder...'

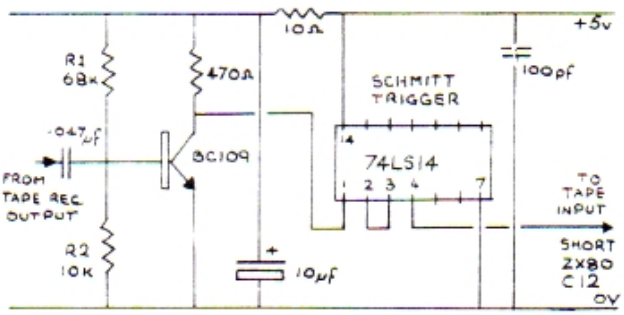
Derek Cooke, from Harrogate, bought a Tandy Realistic which he found hopeless for the job. However, his Ferguson 3T07, with a tone control (most important) works very reliably, with tone and volume set up maximum. Clive Rawlins in Romford (there are alot of ZX80 owners out there in wildest Essex) says he's had no luck at all with his Sanyo mono radio/recorder. When he wrote he was thinking of getting a separate recorder.

The little circuit in the diagram — courtesy of Francis Hobday of Crondall, Surrey — could be of use to those of you who are hardware-minded. P J Otterwell, who obviously is a hardware person (cos he built his ZX80 from a kit) says he's had no loading/saving problems with an Hitachi TRQ-291, with the volume set between 6 and 7 and the tone at 10 for both recording and playback.

Stanley Pattenden, Launcesten, has had no problems with his Sanyo M2406 F, but points out the plugs at the cassette end must be left unplugged until needed. An Hitachi TRQ-247 has given Simon Waller, Wimbourne, Dorset, no problems, and — unlike Mr Pattenden — he leaves his leads in all the time. Simon has added a 1K resistor from R1 to 5V, which reduces the required input voltage from 4V to 2V.

S C Adams, who wrote the splendid article in December's COMPUTING TODAY about using the 8K 'hidden' inside a normal ZX80, writes: I have had no problems on loading or saving my programs after soldering up pins 16 and 8 on the keyboard buffer I.C. and the regulator I.C. pins. All programs are recorded at maximum level and played back at the same level. My recorder was bought second hand in a market for £6.00.

For use with low level output from tape deck



Adjust R1 and R2 for different output from tape deck. Made for Sanyo 5050G deck 580MV at 5.6K output. This circuit has given trouble free loading for five months.

Richard King, Stoke Bishop, Bristol, has had no problems with his Ferguson 3270 radio/cassette; and Mike Collins, Elstead, has no hassels with his PRINZ SL-9 now that a friend has provided plugs which are compatible (the S.O.C. ones were not, he reports).

D Tomlison, Mickleover, Derby, continues this extraordinarily long saga with the following tale: I purchased an ITT SL59 tape recorder and at first had loading problems. I approached a friend who is more knowledgeable on these matters. He made the following alterations: The loading lead was wired direct from the output signal and a switch was fitted to enable the internal speaker to be disconnected when loading. When saving, I used a made-up lead with one of the 5mm jacks taped up. I now have no problems loading and saving.

Thirteen-year-old Ian Watt, who wrote the much-requested telephone listing program, uses an old reel-to-reel recorder, "at the fastest of the recorder's three speeds". From Denmark, Hasse Taube writes: "Use a small, inexpensive, two-transistor amplifier between the ZX80 and your cassette-recorder...only use best quality cassette tape. I have had luck with "Agfa super ferro dynamic"...the amplifier must be used when you SAVE. It amplifies the output from the ZX80 so you have a more powerful signal to record...I have success now 99% of the time..."

SKETCH PAD

An amazingly short, and important, program for the 1K ZX80 to turn it into a sketch pad. At the first input enter the code number of the character you want to appear on the screen. Then press newline ~~two~~ three more times. To move the character you can enter the following letters: R (right), L (left), U (up) and D (down). To change the character you are printing, enter C and then the code of the new character. You can now move this character as before, or you can start in a new position.

To start in a new position enter J and then a number between 1 and 640 (20 lines of 32 squares). You should only use the characters with codes numbers between 1 and 63 and 128 to 191. Picasso must be turning in his grave!

```
1       FOR S=1 TO 20
2       PRINT ,,,,
3       NEXT S
4       LET P=304
5       INPUT C
6       IF C > 63 AND C < 128 OR C > 191 THEN
        GOTO 5
8       INPUT G$
9       LET N=0
10      IF G$="R" THEN LET N=1
11      IF G$="L" THEN LET N=-1
12      IF G$="D" THEN LET N=32
14      IF G$="U" THEN LET N=-32
16      INPUT G$
18      IF G$="C" THEN GOTO 5
19      IF G$="J" THEN INPUT P
20      IF NOT G$=" " THEN GOTO 9
22      IF P+N<1 OR P+N>640 THEN LET N=0
24      LET P=P+N
26      LET S=(P-1)/32
28      POKE 16691+P+S,C
30      GOTO 16
```

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Well, that's just about the end. I hope this has been of interest. Next month, I'll go back to the normal style of my "MARK'S BYTE" (witty, knowledgeable, all them things). To close this epic, here is the information Clive and his mates in King's Parade give you in you enquire about LOADING and SAVEing. See you in the next issue (you have subscribed haven't you...I'd hate you to miss my wisdom of next month).

MARK CHARLTON

PROBLEMS WITH LOADING A PROGRAM FROM CASSETTE TO ZX80

1 *This is usually due to insufficient signal level at the ZX80 tape input socket labelled EAR. The ZX80 requires at least 4 volts peak-peak signal level. If the signal level is too low during the LOAD operation the ZX80 will carry on waiting for the program and the T.V. screen will remain light grey indefinately.*

2 *It is important that the correct type of cassette is used. This cassette must have 3.5 mm jack type sockets on it for EAR and MIC. When the 3.5 mm jack plug lead is plugged into the cassette's EAR socket during a playback of a recording, the internal speaker of the cassette should become disconnected. This will mean that the signal which was going to the speaker is now available at the EAR socket of the cassette, thus the level should be 5 to 6 volts peak-peak at maximum volume setting.*

3 *A DIN socket on a cassette recorder usually only gives 1.5 volts peak-peak or less, output, and is therefore unsuitable unless it is amplified by an external buffer circuit.*

4 *It may help to try loading with only EAR connected with batteries or mains.*

5 *Do* NOT *use the output from a Hi-Fi amplifier, as this may damage the ZX80.*

Science of Cambridge

FREE SOFTWARE!

Well, not exactly free — unless you win. We're having our second competition, and the winner can choose any TWO cassettes of software from our list.

We'll have a competition in each of the future issues of INTERFACE, and we'll be announcing the winner of this competition in INTERFACE 8 (that is, the one after the next issue).

A way to make your ZX80 make music is revealed in this issue. Using a 1K ZX80, and the music routine as given, we want you to write the "ZX80 SYMPHONY". It should not last longer than about a minute. Apart from that, there are no restrictions. Please send us a listing of your program, following the National ZX80 Users Club software standards (see page 2 of this issue), plus any necessary documentation. If we get two or more programs which produce an equally good 'symphony', we'll give all of the composers software prizes.

MAKING MUSIC

The Toccatta and Fugue in D minor is possible on the ZX80! However, it would be might difficult to program your little computer to interpret Bach's mighty organ work, and I doubt if Johann Sebastian himself would be overly pleased.

However, even though it is hard work, and despite the fact that the 'music' is somewhat far from the accepted definition of the word, you can get your ZX80 to produce semi-musical noises, under continuous program control.

This is just the bare bones of the music idea. You can use the concept to write music into programs so a win is rewarded with a trill of a few notes, or whatever. The basic routine was suggested by club member Philip Joy, and Trevor Sharples wrote the program. This uses the USR function.

First input the following:

```
10      POKE 17000, 237
20      POKE 17001, 65
30      POKE 17002, 201
```

RUN this program, then delete lines 10, 20, 30 by inputting the line number. Do not press NEW.

Next, input the following program:

```
10      INPUT A
20      INPUT B
30      INPUT C
40      FOR D = 1 TO 30
50      FOR E = 1 TO A
60      RANDOMISE USR (17000)
70      NEXT E
80      FOR E = 1 TO B*D
90      RANDOMISE USR (17000)
100     NEXT E
110     FOR E = 1 TO C
120     RANDOMISE USR (17000)
130     NEXT E
140     NEXT D
150     PRINT "HERE WE GO AGAIN"
160     INPUT A$
170     IF A$ = " " THEN GOTO 10
180     STOP
```

Try this with 50, 60 and 70 for A, B and C. Then experiment with other values. You'll need to turn the volume of the television to maximum to hear the music, and you'll probably get best results at a slightly different channel setting to the one where you normally 'watch' the ZX80 in action.

(Adapted from the book 'MAKING THE MOST OF YOUR ZX80' by Tim Hartnell, published by Computer Publications.)

PRINT A$

Dear Interface,

I am having difficulty in obtaining a built ZX80 from Sinclair, having now been waiting for seven weeks since I ordered it. The main problem appears to be that I bought a ZX80 manual only a while back, and upon claiming the £5 off the cost of the ready-made ZX80, seem to have thrown Sinclair's organisation into chaos, requiring letters and phone calls to clear it up.

On another point, I ordered "30 programs for the ZX80" from Melbourne publishing, and was dismayed at the number of errors contained within the book. They have promised a copy of their latest edition, which is supposed to be better.

D Oakley, Norwich

The second edition of Mr Milgrom's book has corrected most of the misprints in edition one. When you get hold of the new edition, try out the GOMOKU program. It is really worth playing — and quite amazing within 1K.

Dear Interface,

Many thanks for Interface. The programs and hints you printed have opened my eyes to much wider possibilities for the ZX80 than I thought possible before. I am looking forward to receiving your book from S.O.C.

I bought the ZX80 as an introduction to computing for my 15 y.o. boy, but I find myself completely hooked (at the age of 60!). It has given me more interest and pleasure than I have had in a long time.

E Christie, Cheltenham

Dear Interface,

In INTERFACE 5 (much improved format, incidentally) you asked us to send in our opinions of software purchased. I have bought several books and cassettes, and I can say that quite the best is that offered by Ken Macdonald and Ron Bissell. The programs range from TRUE moving graphics games (breakout and space intruders) to programs that allow the ZX80 the genrate music.

This is the sort of software we want. We've had enough hangman, codebreaker, dice throwers etc. When I spoke to Mr Macdonald, he said that he thought many people were reading his adverts for moving graphics programs in disbelief, after having been sent software that was falsely advertised as "moving display".

I can assure you that Ken Macdonald's software is absolutely first class, demonstrating capabilities you would never have believed your little machine possessed. It is worth every penny of it's very reasonable cost.

Jonathan Cranston, Ormskirk

PEEKING AT POKE

(PART 2)

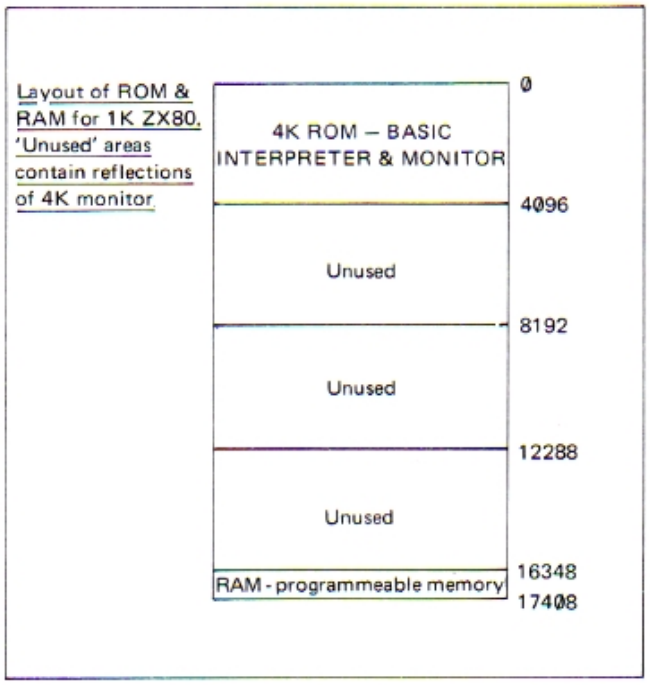
This is the second and concluding part of an article intended to open the eyes of the beginners to the uses of PEEK and POKE. I feel that I should stress the fact that it is written for the beginner to BASIC programming. In my first article I glossed over the way the computer stores its line numbers as it was not relevant.

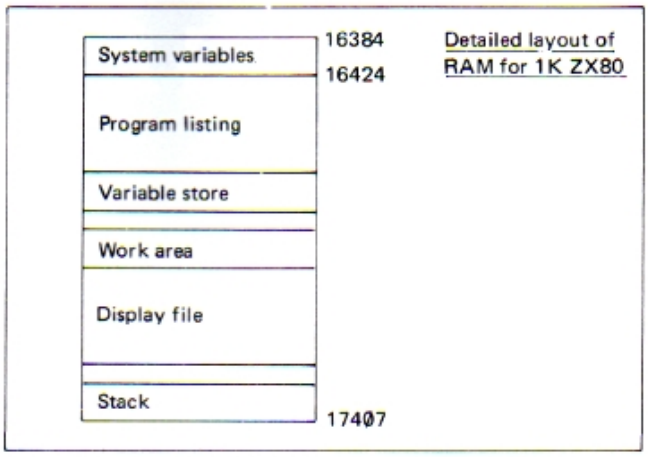
However, this has been picked up by some of our 'eagle-eyed' readers. So if any confusion occured because of the way I said things then I apologise. Storing line numbers is an altogether different kettle of fish. I was merely trying to explain in the simplest way possible why you see the number 50 — and hence the character M — in address 16425.

Last month I explored the most versatile use of the PEEK and POKE commands — the storage and alteration of information in a program listing. In this concluding part of the article I will attempt to show you how to use PEEK and POKE in other ways. Namely the POKEing of characters directly onto the screen and — take note Mr J. F. Horton — the accessing of addresses lower than 16424.

Taking the last point first — as good a way as any to start — it must be said that a good knowledge of internal computer operations is needed to get the best out of PEEKing and POKEing these lower number addresses. Why? Because these addresses are set up and used by the computer itself. The ROM — the 'soul' of the ZX80 — sits beneath the RAM — the 'brain'. When you switch your ZX80 on (known as 'powering-up' in the trade) the first few addresses of the RAM are taken up by the computer to set up the 'system variables'. These 'system variables' include such things as the pointer to the start of the display file (which is discussed at length later), the 'timer', the seed for random numbers and so on. The ZX80 manual contains a full list of these variables in Appendix III.

These 'system variables' can easily be accessed by your programs. I would not advise the newcomer to ZX80 programming to POKE things into addresses lower than 16384 as this is now very definately ROM area. You could probably get away with things in the 'unused' areas (see diagram) but it's not worth risking anything happening to your ZX80 — unless you really *like* waiting for deliveries from SOC. Anyway, I haven't got the space to go into details about POKEing and PEEKing the ROM.





The example of PEEKing and POKEing that Uncle Clive gives in his manual uses the 'timer' — one of the 'system variables'. The short program below does much the same thing as the program in the manual.

```
10    PRINT "SPEED TESTER"
20    PRINT
30    PRINT "PLEASE ENTER YOUR NAME"
40    INPUT A$
50    PRINT
60    PRINT "PRESS NEWLINE WHEN YOU SEE
      YOUR NAME APPEAR ON THE SCREEN"
70    PRINT
80    PRINT "PRESS NEWLINE TO START"
90    INPUT B$
100   CLS
110   GOSUB 230
120   POKE 16414, 0
130   POKE 16415, 0
140   INPUT B$
150   PRINT "YOU TOOK ";PEEK(16414)+256*PEEK
      (16415); "MILLISECONDS TO REACT, ";A$
160   PRINT
170   PRINT " TO TEST YOUR REACTIONS
      AGAIN"
180   PRINT "PRESS NEWLINE. ENTER ANY
      LETTER"
190   PRINT "TO STOP"
200   INPUT C$
210   IF NOT C$=" " THEN STOP
220   GOTO 60
230   FOR A = 1 TO RND (600)
240   NEXT A
250   PRINT , A$
260   RETURN
```

The TV frame-counter 'timer' is held in addresses 16414 and 16415. The numbers in these addresses are incremented fifty times every second — once for each 'scan' of the TV screen. POKEing these two addresses with 0 sets the numbers in them to 0 (lines 120 and 130). PEEKing the addresses straight afterwards gives you the current value stored in them (line 150). By putting an INPUT statement in between the POKEs and the PEEKs you have got a reaction timer. The longer you leave it before you press newline, the higher the numbers in the addresses will be. Don't forget that they increment 50 times a second.

To be exact in your timing you should deduct 4 from the PEEKed value as this compensates for the time it takes the information to get to the processor 80 msecs!

Other useful 'system variables' include the two addresses 16392 and 16393. A manipulation of these will tell you where the VARS area (variable store) starts — or where your program lisiting ends.

```
9999  PRINT PEEK(16392)+PEEK(16393) * 256 - 16461
```

This little routine will tell you how many bytes of memory you have used. It manipulates the numbers it finds in the two addresses to give the start address of the variables, and then subtracts all of the addresses up to the start of the program listing plus an extra 37 to account for the length of line 9999 — which is not part of the program. The result is the number of addresses of the program listing — hence the number of bytes of the program listing as each address can only hold one byte of information.

Other useful 'systems variables' include addresses 16420 and 16421. Address 16420 holds the current position of the last character printed along a line. POKEing this value with 0 tells the computers to start printing on the next line. Try this little program:

```
10      PRINT "*";
20      IF RND (5) = 1 THEN POKE 16420, 0
30      GOTO 10
```

If line 20 wasn't there you would expect the ZX80 to print a screen full of asterisks. But every time the random number is 1 the computer will be fooled into thinking the line is full (contains 32 characters) and start printing on a new line.

Address 16421 holds the current position of the last line to be printed on the screen. POKEing this value with 24 will get rid of the error code at the bottom of the screen;:

```
10      FOR A = 1 TO 80
20      PRINT "INTERFACE";
30      NEXT A
40      POKE 16421,24
```

This should print out a screen full of the word 'Interface' without an error code at the bottom.

Ian Wright has used both these two 'system variables' in his program 'Space Dock' which appeared in 'Interface' 4.

The one other set of 'system variables' that can be put to good use are the two addresses 16396 and 16397. The numbers held in these two addresses act as the pointer to the start of the display file. That means that a manipulation of the values of these addresses gives you the address number of the first square of the screen display. This is how we find out where to POKE things onto the screen. However, the ZX80 can't POKE things into nothing. You have to fill the display file — in other words the screen — with something to POKE into. Spaces will do quite adequately for this purpose. Try this little program:

```
10      FOR A = 1 TO 20
20      PRINT ,,,,
30      NEXT A
40      INPUT B
50      POKE PEEK(16396)+PEEK(16397) * 256 + B , 128
60      GOTO 40
```

The first three lines set up a screenful of spaces — yes! you *can* use commas. The ZX80 will print out 8 spaces for each comma. Once the screen is set up you can start to POKE things into it. Line 50 manipulates the display file pointer value and adds B to it.

If you enter the value 16 you should see an inverse space appear somewhere along the top line. A value of about 300 should print out at somewhere close to the middle of the screen. Notice how quickly it does everything. That is because the screen doesn't have to be printed every time — only the inverse space. Of course, you don't have to print an inverse space everytime. You could change line 50 into: POKE (PEEK (16396) + PEEK(16397) * 256) + RND(640) . RND(10) + 129.

If you RUN the program with this line you have given the computer a free hand in 'creative graphics'. Each time you press newline — and almost instantaneously I might add — a random graphical character will appear at a random spot on the screen.

I'm sure you can see the potential of using a routine such as this to POKE characters directly onto the screen. While it's not exactly moving graphics it's a step closer than printing out the screen every time. Feel free to use any routine/program from this article.. Play around with them until you get used to them. I'm sure that they will prove to be of immense value.

If you are still unsure of anything in this article or have any points that you would like to raise then please don't hesitate to drop me a line (address it to the National ZX80 Users Club) and please include an SAE if you want a reply. I hope that this attempt at laying bare the bones of PEEK and POKE for beginners has been of interest and use to all.

Trevor Sharples

SOME OF THE NICE COMMENTS WE GOT ON THE LAST ISSUE:

. Congratulations on the new layout — indecipherable, Liverpool

. Well done on latest issue of INTERFACE. It has obviously gone from strength to strength — Ian Craig, Kirkcaldy

. You left out my ad. Please return my £2 — J Taylor

. Thank you for a very good magazine — J Horton, Honley

. My back is much better since applying INTERFACE — G Smith

. It's well worth the money to see INTERFACE come of age — the technical stuff is great and I think I can say I learnt more from issue 5 than all the others together — please keep up the POKEing! — I Wright, Diss

. As one of your older readers (I shall be in my 70th year before your next number) I would like to congratulate you on your new format — F Williams, Cleveland

. Congratulations on the new issue of INTERFACE. I have not yet been right through it but find it very good stuff...Can we please in future have a clear indication with each program as to the amount of RAM needed. I intend having a go at programs on page 11 and 13 (of issue 5) but fear that my 1K ZX80 will not take them — Peter Pugh, Ramsgate (NOTE: All progs in the magazine will fit in 1K unless otherwise specified)

. This is the first time I've written since my application to join, and it was in that letter that I posed the problem of the factory foreman who had to build chairs and stools etc. If R Peel of Kennington also sent that problem that's an unbelievable coincidence — G Love, Gravesend (ANOTHER NOTE: Gee, I guess we boobed — again, sorry mate)

. I have just received issue 5 and I was very impressed — keep up the good work — Michael Scott, Tyne and Wear

. Thanks for Issue 5 of INTERFACE — in its new format it looks just like a real magazine — Keith Mead, Cheltenham (who confesses in his letter that he is a member of, dare we mention it, that other club)

. Why won't Alien Attack work? — Gordon Roxby, Manchester

. Without doubt, Alien Attack was the best program in the issue, it was a fine example of minimum flicker graphics — Ian Turtle, Ashby

. I see the "deliberate mistakes" continue. Anyway, congratulations on the new INTERFACE. It shows every promise of being well worth the annual subscription — Alan Christie, Cheltenham

THE ZX80 IN EDUCATION

MINICOMPUTER USERS IN SECONDARY EDUCATION

In INTERFACE, January 1981, the first new super-duper INTERFACE, Tim reported that I have set up an Educational ZX80 User's Group. He has invited me to take up a bit of space here, to report developments in that major applications field.

EZUG — OK, I know it's a horrid acronym — has in fact been set up under the umbrella of MUSE. MUSE is a fairly ancient organisation now — it was founded half a dozen years ago with the name Mini-computer Users in Secondary Education. The "mini" now includes "micro", and the "secondary" includes primary and tertiary — but the name lives on, while members desperately think how to widen the translation of MUSE to cover all relevant fields.

Now that micros have burst into education, the membership of MUSE has grown explosively. The association offers a variety of services for a can't-be-beaten annual sub of £5.00. Their magazine, *Computer in Schools*, is alone worth that paltry sum. But in addition there are all manner of user groups, including EZUG of course; thriving local associations with many well-attended meetings; a major annual conference; technical query services; and a growing software library.

I sincerely recommend all teachers of computing, and all teachers using computers, to consider joining MUSE. Drop a line to Bob Trigger, 58 Chadcote Way, Bromsgrove, Worcestershire, for details.

WHY TEACH WITH THE ZX80

When the Sinclair computer first appeared a year ago (less the renowned delivery time) it was rightly hailed as a breakthrough. The breakthrough was that at last cheap, powerful and simple computing was within reach of "the masses". With ZX80 sales in Britain now running higher than those of all other personal computers, the 1960's version of a computer in every home no longer seems unattainable. The basic ZX80 is so remarkably easy to set up and use, and its BASIC is such a delight, that we all know primary age children who "talk to it like an old friend". Within a decade this country will have many thousands of "computerate" young people — and the benefits of that pool of automatic expertise will be incalculable. By that time, no doubt, the ZX80 will have been submerged by even better, cheaper machines. But the trend will have been set.

All the home computing benefits of the ZX80 apply to education as well. The basic version is so cheap that a primary school can easily afford one. Indeed there are local education authorities considering it as standard for their junior schools. At the secondary level we now have the situation where, even with those drastic cuts, a computing department can have half a dozen ZX80s and thus almost remove the crucial queuing problem. Similarly the science and mathematics departments can have a ZX80 in each room. Even with full RAM and ROM, a second-hand TV set each and a shared cassette recorder, the bill for that equipment is less than the cost of a single RML 38OZ (the most common micro in secondary schools).

As far as educational computing is concerned, the following functions must be fulfilled:

* easy use by novice teachers;
* easy use by novice pupils in computer awareness classes;
* easy yet sophisticated use by computer studies, science and math's students;
* flexible programmability, with good graphics, in those and other subject areas;
* effective use for computer-aided instruction;
* effective use in gaming for the computer club;
* easy extendability to control techniques;
* effective file-handling.

Just about all of these, except perhaps the last, are theoretically offered by the ZX80. "Theoretically" because the recorder interface and the RAM extension must still be debugged, the ROM and printer have still to appear, and noone has yet explored all the machine's potential.

WHAT ABOUT EZUG?

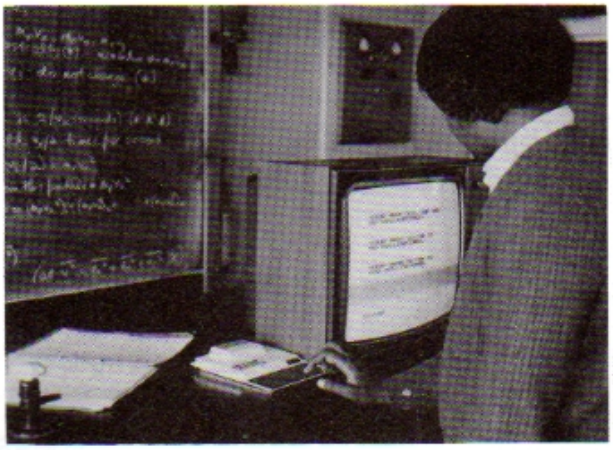
It seems to me that the Educational ZX80 Users' Group, ably assisted by "Interface", has these functions:

* to join with MUSE to assist the smooth, effective and rapid development of computing in education;
* to join with the ZX80 Users' Groups to assist the smooth, effective and rapid development of the SOC computer in its educational context;
* to collate and circulate tips, ideas and news for educational ZX80 use;
* to build up the ZX80 section of the MUSE software library;
* to assist in the development of software and documentation standards for the ZX80.

In Tim Hartnell's editorial in the January INTERFACE, a move in the last direction was started. It would be very helpful if the resulting progress were related to the MUSE software standards as far as possible.

In my next piece I shall develop this theme, and also explain how the MUSE software library could make you rich.... Meanwhile send me an s.a.e. for further details or write to me c/o INTERFACE.

Eric Deeson
Highgate School
Birmingham B12 9DS



MATHS TUTOR

M.D. Stuart's Maths Tutor is a self-explanatory program — and also requires at least 2K of memory. If your maths is a bit rusty then this is the program for you. Cutting out the PRINT statements in lines 13 to 66 and shortening those in lines 360 to 364 should enable the program to RUN on the 1K ZX80. This program shows up how much we have come to depend on pocket calculators!

```
1       LET W$="WHAT IS "
2       LET P$=" + "
3       LET M$=" - "
4       LET T$=" X "
5       LET N$=" NO"
6       LET G$=" GOOD"
7       LET CYC=0
8       LET BAD=0
11      LET S$=" = "
12      LET O$=" / "
13      PRINT "* * * *THIS IS YOUR MATHS
        TUTOR"
14      PRINT
        "* * * *=============-
        ==========="
15      PRINT
16      PRINT "MY NAME IS ZEDEX ATEE"
17      PRINT
20      PRINT "WHAT IS YOUR NAME?"
30      INPUT Z$
40      CLS
50      PRINT "I HOPE YOU HAVE FUN ";Z$
60      PRINT
61      PRINT "PLEASE REMEMBER / IS DIVIDE"
62      PRINT ,,"X IS TIMES"
63      PRINT ,,"+ IS ADD"
64      PRINT ," AND * * * * - IS SUBTRACT"
65      PRINT "--------------------------------"
66      PRINT
70      LET D=RND(5)
80      IF D=3 THEN GOTO 290
90      LET A=RND(20)
100     LET B=RND(20)
101     IF(B>A OR B=A) AND D>3 THEN GOTO
        90
110     LET L=PEEK(16421)
111     IF L<10 THEN CLS
112     PRINT W$;A;
120     IF D=1 THEN PRINT P$;B;
130     IF D=2 THEN PRINT M$;B;
140     IF D=3 THEN PRINT T$;B;
141     IF D>3 THEN PRINT O$;B;
150     INPUT C
160     IF D=1 AND C=A+B THEN GOTO 320
170     IF D=2 AND C=A-B THEN GOTO 320
180     IF D=3 AND C=A*B THEN GOTO 320
181     IF D >3 AND C=A/B THEN GOTO 320
200     LET BAD=BAD+1
201     PRINT S$;C;N$
210     IF BAD <3 THEN GOTO 110
220     LET A=A-1
230     LET BAD=0
240     IF A>0 THEN GOTO 110
250     LET B=B-1
260     IF B=0 THEN LET B=RND(5)
270     LET A=RND(12)
280     GO TO 110
290     LET A=RND(12)
300     LET B=RND(12)
310     GOTO 110
320     PRINT S$;C;G$
330     LET BAD=0
331     IF D=5 THEN GOTO 380
340     LET CYC=CYC+1
350     IF CYC<50 THEN GOTO 70
360     PRINT "THANKYOU "Z$,,"FOR YOUR
        HARD WORK"
361     PRINT "DO YOU WANT SOME MORE
        PROBLEMS?"
362     INPUT V$
363     IF V$="YES" THEN GOTO 60
364     PRINT "PROGRAM TERMINATED"
370     STOP
380     CLS
390     PRINT A;O$;B;" IS ";C,,,,,,," HOW '
        MANY ARE LEFT?"
400     INPUT R
410     IF (B*C)+R=A THEN GOTO 430
411     PRINT R,"THINK AGAIN"
412     GOTO 390
430     PRINT R
431     PRINT "WELL DONE ";Z$
440     GOTO 340
```

MAGNIFICENT SEVEN

Fleas a jolly good fellow! Run your own flea circus, with a little help from ringmaster Stuart Lucas. Seven tiny fleas (heavily disguised as CHR$(2) and CHR$(130)) bounce and bop across your TV screen. Which one will win? And there's more. This is a sophisticated game. If the flea falls in a ditch, it goes back to the start. Wow, and away we go.

```
10      PRINT , " FLEARACE"
20      DIM A(7)
30      LET B=0
40      LET C=0
50      RANDOMISE
60      FOR I = 1 TO 7
70      PRINT I;
80      IF C = 0 THEN LET A(I) = 1
90      IF C = 1 THEN LET A(I) = A(I) +
        RND(5)
100     FOR J = 1 TO 30
110     IF J = 8 THEN GOSUB 320
120     IF A(I) = 8 OR A(I) = 9 THEN LET A(I)
        = 1
130     IF J > A(I) AND J > 9 THEN GOTO 180
140     IF J > A(I) AND J < 9 THEN PRINT
        CHR$(0);
150     IF J < A(I) THEN PRINT CHR$(137);
160     IF J = A(I) THEN PRINT CHR$(20);
170     NEXT J
180     IF A(I) > 30 THEN LET B = 1
190     PRINT
200     PRINT ,CHR$(2); CHR$(130)
210     NEXT I
220     IF B = 1 THEN GOTO 280
230     PRINT "HIT NEWLINE"
240     INPUT A$
250     IF A$ = " " THEN CLS
260     LET C = 1
270     GOTO 60
280     FOR I = 1 TO 7
290     IF A(I) > 30 THEN PRINT
        "FLEA_*";I;"_*_WINS"
300     NEXT I
310     STOP
320     PRINT CHR$(2); CHR$(130);
330     LET J = 9
340     RETURN
```


A GRAFTY LITTLE PROGRAM

Andrew Field, obviously a keen geometrician, has sent us this witty little graph plotting program. And plot away it does. Just enter the equation of your choice (see line 400) and the zippy little machine goes to work, printing shift F's and shift W's with abandon all over your telly.

```
10      GOTO 400
15      LET W=1
20      GOSUB 500
30      FOR X=-9 TO 9
40      PRINT
50      IF X < 0 THEN PRINT X;"_*";
60      IF NOT < X 0 THEN PRINT "_*";X;"_*";
100     LET Y=X+0000000000000000000000000
110     LET Y=Y/W
120     IF ABS(Y) > 29 THEN GOTO 300
130     FOR J=1 TO ABS(Y)
140     IF Y < 0 THEN PRINT " (shift F)";
150     IF Y > 0 THEN PRINT " (shift W)";
160     NEXT J
170     NEXT X
180     PRINT
190     PRINT"_*Y_*_*_*5_*_*_*10_*_*_*15_*_*-
        _*20_*_*_*25X";W
200     PRINT ,,,"_*(SCALE)"
210     GOTO 410
300     LET W=W*2
310     GOTO 100
400     PRINT "COMPLETE EQUATION Y="
410     INPUT A$
420     IF A$=" " THEN LET A$="0"
430     LET B$=A$
440     FOR J=0 TO 20
450     POKE 16499+J,CODE(A$)
460     LET A$=TL$(A$)
470     NEXT J
480     GOTO 15
500     CLS
510     PRINT"_*X_*_*_*_*GRAPH OF Y=";B$;
520     RETURN
```

BAD KING JOHN

You are King John, the ruler of a kingdom which has to be governed successfully for twenty years. You start off with 500 people, 2500 sacks of corn and 100 acres of land. Each subject can plant two sacks of corn, and needs four sacks to eat. If more food is supplied than is needed, a population increase will follow. If more than one quarter of the population starve in any year, an assassination will be attempted. There is a one in three chance of this succeeding. Each acre of land is can support eight sacks of corn. If less than three quarters of the land is planted, then one quarter will be lost the next year. If more than three quarters of the land is used, then one quarter is gained the next year. In a good year, the corn planted will increase six times, in an average year it will increase four times and in a bad year it will increase by two.

This program will fit the standard 1K ZX80, Mr Bambrough says.

```
10    LET Y = 1
20    LET P = 500
30    LET C = 2500
40    LET G = 100
60    PRINT "YEAR" : Y
70    PRINT "PEOPLE"; P
80    PRINT "CORN"; C
90    PRINT "LAND"; G
95    IF P = 0 OR C = 0 OR G = 0 THEN
      STOP
100   PRINT
110   PRINT "CORN TO PLANT?"
120   INPUT S
150   IF S > C OR S > 2 * P OR S > G * 8 THEN
      GOTO 120
160   LET C = C - S
170   PRINT "CORN FOR FOOD? MAX ";C
180   INPUT F
190   IF F > C THEN GOTO 180
200   LET C = C - F
210   LET A = S / 8
215   LET L = (G * 25)/100
220   IF A >((G * 7) / 10)+ ((G * 5) / 100)
      THEN GOTO 250
230   PRINT "LAND DECREASE" ; L;"ACRES"
240   LET G = G - L
245   GOTO 270
250   PRINT "LAND INCREASE"; L; "ACRES"
260   LET G = G + L
270   LET B = F / 4
280   LET D = B - P
290   IF D > 0 OR D = 0 THEN GOTO 380
300   PRINT ABS (D); "PEOPLE STARVED"
310   IF ABS (D) < (P*25) / 100 THEN GOTO
      390
320   RANDOMISE
330   LET X = RND (3)
340   IF NOT X = 2 THEN GOTO 390
350   CLS
360   PRINT " YOU HAVE BEEN
      ASSASSINATED"
370   STOP
380   PRINT D; "PEOPLE GAINED"
390   LET P = P + D
392   PRINT "CROP -";
395   RANDOMISE
400   LET X = RND (6)
410   IF X = 6 THEN GOTO 470
420   IF X > 3 OR X = 3 THEN GOTO 450
430   LET C = C + (S * 2)
435   PRINT S * 2
440   GOTO 480
450   LET C = C + (S*4)
455   PRINT S * 4
460   GOTO 480
470   LET C = C + (S * 6)
475   PRINT S * 6
480   IF Y = 20 THEN GOTO 510
490   LET Y = Y + 1
492   INPUT AS
495   CLS
500   GOTO 60
510   CLS
520   PRINT , "YOU WIN"
```

A program here by Steve Dean that keeps track of your personal accounts. All the variables can be saved, so you can keep a running account over several months (or years!). If you save the variables remember to use GOTO 1 rather than RUN, otherwise you will clear them all ... and that means loading the program again.

PERSONAL ACCOUNTS

```
5     LET MAX=6
11    DIM A(6)
20    GOSUB 900
30    PRINT "ANY CHANGES?"
35    INPUT Z$
40    IF Z$="N" THEN GOTO 100
50    PRINT "NUM"
52    INPUT NO
55    IF NO > MAX OR NO < 1 THEN GOTO
      52
60    PRINT "NEW AMOUNT"
65    INPUT AM
70    LET A(NO)=AM
80    GOTO 20
100   PRINT "ENTER SALARY"
110   INPUT SAL
120   GOSUB 900
130   PRINT "SPENDING CASH £"; SAL-TOT
140   GOTO 30
900   LET TOT=0
901   CLS
910   FOR F=1 TO MAX
916   PRINT F;"_*_";
920   GOSUB F*1000
930   PRINT ,"£";A(F)
935   LET TOT=TOT+A(F)
940   NEXT F
950   PRINT
953   PRINT "TOTAL £";TOT
955   PRINT
970   RETURN
1000  PRINT "DEPOSIT A/C ";
1005  RETURN
2000  PRINT "ACCESS ";
2005  RETURN
3000  PRINT "RENT ";
3005  RETURN
4000  PRINT "MORTGAGE ";
4005  RETURN
5000  PRINT "STANDING ORDERS ";
5005  RETURN
6000  PRINT "BUILDING SOCIETY ";
6005  RETURN
```


ZX80 CLASSIFIEDS

You can advertise in INTERFACE. Personal ads (contacts, selling off unwanted memory boards, ZX80s, Apples, PETs and the like) are £2 for the first 20 words, 15p each additional word. Business ads (including all ads to sell software) are £5 for the first 20 words, 20p each additional word. Payment must accompany booking. Display rates on application.

FOR SALE. 3K RAM memory expansion board, and 2K RAM. £15. Phone Kevin Palmer on 449 1049. Kevin is also interested in getting hold of photocopies of the first two issues of INTERFACE and would like to hear from other club members in the New Barnet area.

ZX80 INVADERS (4K). At last, machine code version of the now-famous pub game, with continuous display and fast moving graphics. On-screen scoring. £5 for listing — J Edmonds, 29 Chestnut Ave., Grays, Essex.

ZX80 memory expansion board and 2K RAM chips. £35 o.n.o. S Brumby, 38 Eastfield Road, Messingham, Scunthorpe, South Humberside, DN17 3PG. Mr Brumby would also like to hear from other club member in his area.

SHARP PC-1211 USERS CLUB. The club operates from 281 Lidgett Lane, Leeds, LS17 6PD, and produces a neat little newsletter called OUTPUT. Send an s.a.e. for a free copy if you own a PC-1211. They are particularly interested in hearing from people who own both ZX80 and a PC-1211.

SECOND LONDON COMPUTER FAIR. Organised by the Association of London Computer Clubs, on April 14, 15 and 16, from 10am to 6pm (7pm on the 15th). Retail exhibitors, hobbyists, workshops, bring and buy. Admission is 75p. At the Polytechnic of North London theatre, opposite Holloway Road tube station. The National ZX80 Users Club will be there.

MAKE SURE your junior school pupil has a sound background in English, Maths., General Knowledge and Reasoning. Coaching available on cassette £4.50. Send cheque or s.a.e. for further details to:- ROSE CASSETTES, 148 Widney Lane, Solihull, West Midlands B91 3LH.

MORSE SIGNALLER (1K RAM) incorporates machine code subroutine to output audible morse signals through cassette LS. Variable signalling speed. Three page Manual plus cassette £3.50.
GRAPHICS PACKAGE (1K RAM) Four programs: Symmetrical Patterns, Large Print, Draw A Picture, Plot A Picture. 12 page illustrated Manual £3. Manual plus cassette £8.
MULTITEXT (4K and 8K versions) prints text in three sizes, nine styles altogether. 10 page illustrated Manual plus cassette £7. Send s.a.e. for details.
BRIDGE SOFTWARE, 36 Fernwood, Marple Bridge, Stockport, Ches SK6 5BE.

GAMES ON CASSETTE (1K) — PESKY PUSSY (1-4 players), REFLEX ACTION, MIND READER, CATCH THE GREMLIN, BLACKJACK – 13 — includes programs of playing instructions and load routine for each game. All for £3. Jay Software, 99 Blundell Road, Widnes, Cheshire.

Looking for educational programs for primary aged children? Six packs of programs available. S.A.E. for details. ZX80 Junior Education Enterprises, 38 Bedford Crescent, St. Ives, Cambs.

ZX80 WANTED. Well maintained and preferably factory-built. Contact Chris Makepeace, 7 Percival Road, Bristol BS8 3LE or ring (0272) 312648 after 6.

Memory Expansion Board. Must sell my 3K RAM MEB to finance other equipment £22 only. Ed Tozer, Phone Basingstoke 75717

Second-hand ZX80 wanted. Kit or ready-built. Send details to S.O McDonald, 12 Hadyn Park Road, London W12. Immediate reply guaranteed.

ZX80-TREK. The classic ST*RTR*K game for the ZX80. 4K/16K RAM versions available now for £5 (on cassette) from M. Thomson, 214 St Leonards Road, London SW14.

CASSETTES. With free leaflet on cure for LOAD/overheating problems plus free renumber prog. Four 1K games, (Mastercode, Simon Says, Dr Who, Alien Invader), £3. Disembler, displays ROM instructions (80 at a time) in ZX80 format (over 1K) plus three 1K games, £3. All seven games plus Hangman, all linked for 16K memory only, £5, or £5.50 with disembler. SAE details/list and simple free game. Bobker, 29 Chadderton Drive, Unsworth, Bury, Lancs.

ZX80 FOR SALE — Built from kit. Perfect working condition. Leads supplied, but no P.S.O. £60 o.n.o. Phone evenings MARLOW 2389.

KALA our best-selling game £2. LUNAR LANDER + SPACE DOCKING + STOPWATCH + CLOCK £3.75. Send order to Hewson Consultants, 7 Grahame Close, Blewbury, Oxon or enclose SAE for full catalogue.

LIFE

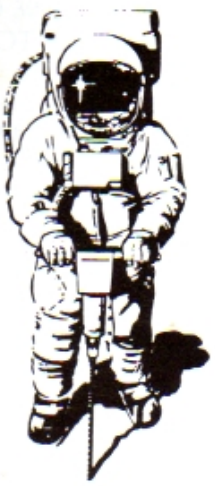
John Hume's 'Life' program must rate as one of the shortest ever written for the ZX80. Type in the program as written and RUN it. You can now enter your starting colonies as values between 0 and 99. When you have entered all the starting colonies then enter the number 100. This stops the program. You can now delete line 1 and 2. To start the program use the instruction GOTO 10 and press newline for successive generations. Pretty impressive, eh? I bet you cant work out what's going to happen from the listing!

```
1     DIM A(99)
2     DIM B(99)
3     INPUT L
4     LET A(L) = 1
5     GOTO 3
10    CLS
20    FOR L=0 TO 99
23    IF L-(L/10)x10=0 THEN PRINT
24    IF A(L)=1 THEN PRINT "0";
25    IF A(L)=0 THEN PRINT "_";
30    LET J=L<11 AND 100
40    LET K=L<10 AND 100
50    LET M=L<9 AND 100
60    LET N=L=0 AND 100
70    LET P=L=99 AND 100
80    LET Q=L>90 AND 100
90    LET R=L>89 AND 100
100   LET S=L>88 AND 100
110   LET C=A(L-11+J)+A(L-10+K)+
      A(L-9+M)+A(L-1+N)+A(L+1-P)+
      A(L+9-Q)+A(L+10-R)+A(L+11-S)
120   LET B(L)=C=3 AND 1 OR (C=2 AND
      A(L)=1) AND 1
130   NEXT L
140   FOR L=0 TO 99
150   LET A(L)=B(L)
160   NEXT L
170   INPUT G$
180   IF G$=" " THEN GOTO 10
```

HOUSTON WE HAVE A PROBLEM

A lunar lander with a difference. You have to take off from Earth and cross the timeless void of space to land on the moon — well not exactly timeless as everything is measured in the new interstellar unit of sinclareseconds. The on-board computer can compensate of Earth's gravity, so all you have to do is enter a thrust against the Moon's gravity. A thrust < 4 will speed up while a thrust > 4 will slow you down — but be careful not to fly out of orbit. The Interspace AA charge a lot for their services! A thrust of four will keep your velocity constant. Your duration of thrust should be a low number unless you like digging craters — an example of "Craterive Computing" (sic.). Happy landings.

```
10      LET V = 0
15      LET D = 0
18      LET K = 0
20      PRINT " THIS IS THE ONBOARD
        COMPUTOR: "
30      PRINT " TYPE IN FORCE AGAINST
        GRAVITY"
40      PRINT " THEN DURATION
        (SINCLARESECS)"
45      LET K = K + 1
50      INPUT F
60      INPUT T
70      LET A = 4 - F
80      LET D = A*T*T/2+V*T+D
81      LET V = V+A*T
82      CLS
85      IF D < 0 THEN GOTO 350
90      IF D = 28 THEN GOTO 250
100     IF D > 28 THEN GOTO 310
110     CLS
120     PRINT " (2 shift A)";
130     IF D = 0 THEN GOTO 170
140     FOR J = 1 TO D
150     PRINT "_*";
160     NEXT J
170     PRINT "(shift D)";
180     FOR J = 1 TO 28 - D
190     PRINT "_*";
200     NEXT J
210     PRINT "(shift A)"
220     PRINT "(2 shift A)"
230     PRINT "DIST=";D*10;" SPEED=";V*10
240     GOTO 30
250     IF V < 1 THEN GOTO 470
255     PRINT "(shift S) SUCCESSFUL LANDING
        (shift S)"
260     PRINT "_*_* (2 shift W)(shift D)"
270     PRINT "_*_*";
        CHR$(128);CHR$(128);"(shift Q)"
280     PRINT "_*_* (3 shift Q)"
```



```
290     PRINT "(7 shift A)"
300     GOTO 400
310     PRINT "_*BOOM"
320     PRINT "_*<)/(>"
330     PRINT "(7 shift A)"
335     PRINT "CRASH LANDING CRASH
        LANDING"
340     GOTO 400
350     CLS
355     PRINT " YOU ARE OUT OF ORBIT"
360     GOTO 230
400     PRINT " YOU TOOK ";K;
        " SINCLARESECS"
420     PRINT " ENTER L TO RESTART"
430     INPUT A$
440     IF NOT A$ = "L" THEN LIST
450     CLS
460     RUN
470     PRINT " TOO FAST..."
480     GOTO 310
```

We don't know who sent us this — please write in so we can say good things about you.

Next month INTERFACE includes the full listing of a superb 4K ADVENTURE, written just for the ZX80 — plus a list of National ZX80 User Club members wanting to get in touch with other enthusiasts.

★ Micro-computer ★

INTERFACE

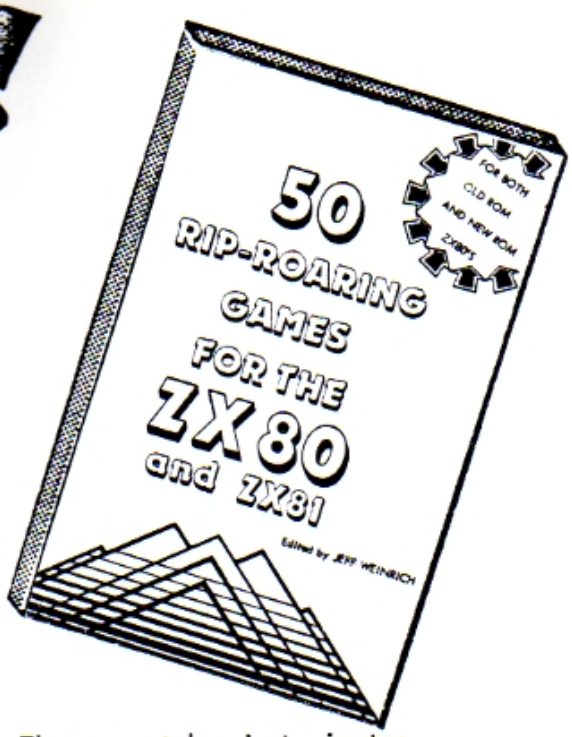
March 1981

Volume 1
Issue 7

CLIVE UNVEILS THE ZX81

RIP-ROARING!

50 RIP-ROARING GAMES



Here it is, a great new book for the ZX80. Fifty great games guaranteed to make you glad you invested in a ZX80.

If you want moving graphics games, zany brain busters, intelligent board games with full graphics, and dramatic programs to demonstrate your ZX80's capabilities to your friends, then this book is for you.

In ASCOT, five tiny 'horses' canter up and down the screen, in an infinite series of moving graphics races. In the new 'machine intelligence' board game BERMUDA TRIANGLE you pit your wits against the ZX80 on a triangular playing board. Full graphics. The game takes just minutes to learn but will keep you occupied for hours. Highly absorbing. BOMB places you on a solid black plane, being POKED this way and that as you search for the hidden explosive. BATTLE is a smashing new program, in which you move under cursor control, trying to avoid being jumped on by the lumbering, moving CHR$(128)'s. If you're not fleet of finger, the game ends with the ultimate ZX80 declaration : "I SQUASHED YOU, HUMAN".

"50 RIP-ROARING GAMES FOR THE ZX80" doesn't pretend to teach you about the ZX80. It just gives you page ... after page ... after page of great new games for your ZX80, plus some exciting adaptations of a few old favourites. And it's only £4.95 - for 50 great games.

There's not room here to list all the contents, but the book includes:

- .TRAJECTORY
- .FLY-SWAT (moving graphics, plus keyboard scan)
- .FOOL'S BREAKOUT
- .KALKI, THE MIND READER
- .LOGICA
- .COMP STORE
- .SPACE STATION
- .CHALLENGE CHECKERS
- .ANTI-HANGMAN
- .JOYBOX
- .MORDECHAI-MIND
- .THE ENCHANTED FOREST
- .SUBTERFUGE 144
- .CHEMIN DE FER
- .NOGOMOKU
- .SIEGE
- .NOUGHTS & CROSSES
- .FALLEN COMRADES
- .CRAPS
- .SHOWDOWN
- .KENO
- .CHESSBOARD NIM
- .PICASSO
- .DARTS
- .BLACKJACK

SYNTAX SOFTWARE, 96 COLLINWOOD GARDENS, ILFORD, ESSEX

Please send me a copy of "50 RIP-ROARING GAMES FOR THE ZX80".
I enclose £4.95

Name . . . . . .

Address . . . . . .

. . . . . .

BONUS: There's a complete section explaining how to convert the programs so they'll run on the new 8K ROM. You can use this part of the book to convert any programs you have.

INPUT

Hello again. Thanks for all the congratulatory mail on INTERFACE and on the growth and development of the club. Thank you also to those who entered our Morse Code competition.
There were many, many very good entries and the task of the judges was very difficult. You'll find their summing up in this issue of INTERFACE. Many people also decided to try and solve the 'tables and stools' problem posed in INTERFACE 5, and we had a lot of fun reading through the submitted programs. Some useful and ingenious coding tricks were used in programs submitted in both areas and we'll be sharing these with you in future copies of the magazine.

In this issue, we look at some hassles which people have had with 16K RAM packs, and — of course — there's our super-duper 4K ADVENTURE program. There are also the usual 1K games.

You've probably seen the photographs from the first meeting of the club, which was held at The Bush Hotel in Shepherd's Bush. It was a great night, and ideas and suggestions put to us at the meeting will be incorporated into INTERFACE and into future meetings.

We'll be at the North London Polytechnic Computer Show in April and we'd love to see you there. We'll have some ZX80's for you to play with, plus a selection of books and cassettes.

If this is your first contact with the National ZX80 User's Club, welcome along. Basically we exist to share ideas about, and our enthusiasm for, the ZX80. We put our INTERFACE each month, and hold meetings. An all-day "ZX80 only" exhibition is being planned for later in the year, and discussions are already underway with David Ahl (Sync, Creative Computing) in the USA about a tie-up between his organisation and the club.

Please let us know what you want to see in INTERFACE. Most people who've written to us say they want "programs, programs, and more programs". So, we'll keep the programs a-coming. each month we'll have at least six complete programs, with bonus goodies — like the 4K ADVENTURE — from time to time. We'll also discuss some of the more esoteric aspects of programming the ZX80.

Please send us your best programs. You retain full copyright (we don't rip them off you like at least one of the computer monthlies does) on the program, and of course, are free to submit it again to other publications if you like, or to sell it.

ADDRESSES

Now, the thorny question of addresses — again. Last month I said the Earls Court Road address was dead. Well, it's not. We discovered that the logistics of getting mail to and from Ashford were so complicated, and lead to so many delays, that it was not worth the trouble. So, as from now, we've reverted to 44-46 Earls Court Road, London W8 6EJ. Please do not use any other address. Sorry to mess you around like this, but we're only in the learning stage of how to run a club of the size the National ZX80 Users Club has rapidly become, and were sure to make a few mistakes. The Ashford address was one of them.

Leap into INTERFACE now and power up your ZX80. If you've got extra money, I urge you to input the ADVENTURE program. The time and trouble involved will be well worth it.
And next month, Trevor Sharples will be explaining how the ADVENTURE program works, how the basic "cave system" is set up, and how you can alter the relationship between the caves in the program.

TREVOR SHARPLES, TIM HARTNELL, MARK CHARLTON, ALAN CARR.

NATIONAL ZX80 AND ZX81 USER'S CLUB

CONTACTS, CONTACTS, CONTACTS

The following members of the National ZX80 User's Club would like to hear from other local members:

Michael Kirkland, 20 Batey Avenue, Hainhill, Prescot, Merseyside, L35

W.J. Peaachment, (he's 13), 30 Meadow Way, Tottington, Lancs.

C. Hobson, Village Stores, Kingham, Oxon, OX7 6YA

C.L. Payne, 6 Magpies, Epping, Essex. CM16 6QG.

M.D. Nott, 8 Eastbury Close, Thornbury, Northavon, Bristol

V. Garland, 12 Hill Park Crescent, North Hill, Plymouth, PL4 8JW

J. Baillie, 33 Idsworth Road, Copnor, Portsmouth, PO3 6NL

J. Davenport, Fairways, Checkendon, Nr. Reading, Berks. NG8

Colin Woodford, 25 Somerset Ave., Comeytrowe Lane, Taunton, Somerset, TA1 5HT

P.J. Pugh, Institution of Mechanical Engineers, 1 Birdcage Walk, Westminster, London SW1

C.L. Roe, 25 Cherry Tree Ave., Walsall WS5 4LH

David Gomm, 26 Griffin CLose, Freetown Estate, Bury, Lancs BL9

P. Clark, 25 Broadclyst Gardens, Thorpe Bay, Essex. SS1 3QP

Stephen Graham, 92 Queensferry Road, Edinburgh, Scotland, EH4

David Goodship, 31 Crawford Close, Reading, Berks R66 2PE

Mr. D. Piper, 42 Christchurch Drive, Blackwater, Camberley, Surrey

Andrew Pike, 920 Bourges Boulevard, Peterborough PE1 2AN

D.L. Russell, 763 Manchester Road, Rochdale, Lancs. OL11 3AH

K. Parker, 13 Peveril Mount, Bradford, West Yorks, BD2 3JY

Derrick Auty, Stable Cottage, Dean House, Kilmeston, Nr. Alresford, Hants

C. Tracey, 44 Elgar Road, Liverpool 14, L14 8U

I. Mansfield, 227 Ryeland Road, Duston, NN5 6XF

Conrad James, 27 Portland Road, London W11

Malcolm Black, 27a Netherton Green, Netherton, Merseyside L30 7PA

Richard J. Price (he's 14), 7 Upper Roman Road, Chelmsford, Essex CM2

R.K. Whiteley, 66 Weetwood Lane, Leeds LS16 5NN

Michael Lloyd (he's 13), 6 The Paddocks, Ulverton Road, Dalkey, Co. Dublin, Eire

R. Storey, 3 Mayfield, Oxspring, N. Sheffield

R.K. Whiteley, 66 Weetwood Lane, Leeds, LS16 5NN

Michael Lloyd (he's 13), 6 The Paddocks, Ulverton Road, Dalkey, Co. Dublin, Eire

R. Storey, 3 Mayfield, Oxspring, N. Sheffield

CLIVE UNVEILS THE ZX81

On Thursday, March 5, Clive Sinclair unleashed the follow-up to the ZX80 -- the ZX81. Slightly shorter than the ZX80, the ZX81 is heavier, more robust, and finished in a matt black plastic. It is essentially a new ROM ZX81, with one very importance difference. As you can see from the keyboard, there are keys marked FAST and SLOW. When running in the FAST mode, the ZX81 operates just like a new ROM ZX80 - extremely fast operation, with the flickering display we have learned to live with.

In the SLOW mode, there is a dramatic change. The picture is rock steady, not a hint of flicker. The ZX81 does not use a memory-mapped screen, but achieves the steady, permanent display by making maintenance of the picture the first priority. All the 'thinking' the computer does occurs between scans of the screen, so the picture remains in place.

The ZX80 contains 22 chips, the ZX81 only four, with one massive chip made in Manchester taking the place of 18 in the ZX80. All software written for the ZX81 will run on a new ROM ZX80, except the new ROM you ordered about 2000 years ago will NOT give you the fast/slow option.

Oh, and the price. Uncle C wants to keep off what he quaintly termed 'oriental' competition, and he's certainly going about it the right way. The ZX81 will sell for just £69.95 built, and £49.95 in kit form. Makes you want to scream, doesn't it? I didn't ask Clive one question at the press conference launch because I didn't want to detract from the Big Day, but I'm wondering what all those people whose orders for ZX80's are in the pipeline are going to do. If you were waiting for a £100 computer, and the same manufacturer came out with a vastly improved computer, at a fraction of the price, you'd be almost certain to want to change your order. We'll see if this is made possible by the genial folk at S.O.C.

It was certainly the fortnight of Uncle C. First the flat screen telly, then the ZX81...and if that wasn't enough you could 'ooh' and 'ahh' at THE PRINTER! About the size of a large cigarette box lying on its side, the printer reproduces everything the ZX81 can put on the screen, graphics and all. The quality of the demo model was superb (and here's a sample) and if the off-the-shelf printer is as good as the one we saw, there is going to be a huge demand for it. The printer works on the radical technology we've come to expect from the bright boys in King's Parade. A little ribbon whizzes around inside the cigarette box, with two needles sticking out from the ribbon. The needles 'scan' the paper the same way the TV screen is scanned. When it comes across a black dot on the TV screen, the needle darts forward and puts a similar dot on the tiny toilet roll of paper sticking out of the top of the cigarette box. It takes 12 seconds to print one screenful, and can either print the display (a screen at a time) or reproduce the entire listing. The printer can be driven by both the ZX80 with new ROM, and the ZX81.

```
10 FOR I=1 TO 22
20 PRINT "/"
30 NEXT I
40 PRINT AT 11,0;"----------
----------"
50 FOR I=0 TO 63
60 PLOT I,22+20*SIN (I/32*PI)
70 PLOT I,22+20*COS (I/32*PI)
80 NEXT I
```

Although S.O.C. say the ZX81 will be available in 'three weeks' (i.e. the end of March) the printer is not available until 'June' (one S.O.C. source) or until 'autumn' (the girl on the phone at S.O.C. Yes, I actually got through!)

The Great Man took the opportunity at the press conference to blast the BBC for deciding to use the Acorn Atom for their series later this year. He claimed he told them he could produce a micro with a proper, external keyboard, memory-mapped display and any BASIC they wanted, for £110 retail, whereas, Mr S. said, the Acorn BBC computer would cost £200.

Which brings me to an interesting point. Trevor Sharples and I have borrowed a couple of Acorn Atoms to give them a field test. Commodore (the PET people) are bringing out, as you probably already know, the VIC soon, and the Tandy Colour Computer is on the way. We'll be trying out any and all computers at our end of the market, just to see how the ZX80 (and now that dratted new thing) measure up.

Please note that INTERFACE will never forget that its prime job is to help and inform old ROM ZX80 owners. We will NOT take any space away from old ROM matters and programs to make way for new ROM and ZX81 material. We will, of course, be running new ROM programs in due course, but these will be in EXTRA pages. Our responsibility in the first place will always be to old ROM people, with an emphasis on 1K machines -- because, after all, that's what all of us have.

Please let me know what thoughts you have on the ZX81 so we can kick the subject around a bit. I'll spend a few days with one before the next INTERFACE, and will bring you a detailed report.

There'll also be a major article to tell you how to convert old ROM programs to run on new ROM machines and ZX81's. See you in the next INTERFACE,

TIM HARTNELL

Startling –

Red alert! Acton Stations! Unconditional Surrender recreates the battlefield of war and places you go in the position of missile attack commander. The General Strategic Plan – see program below – has been conceived by Lieutenant Major Tim Parker, and he has ordered you to carry the attack through to its conclusion. Your only aid will be a ZX80 with more than 1K memory.

Guide your missile (+) into the enemy defenses (*) without passing over the constantly appearing airmines (shift A). Your manoeuvreability decreases with speed, but you stand more chance of evading the enemy. Enter commands 5,6,7 or 8 to move and increase your velocity by a factor of one, or Ø to move with the same direction and velocity as your provious move.

```
 1Ø  GO TO 18Ø
2Ø   FOR A = 1 TO B
3Ø   PRINT "(shift A)";
4Ø   NEXT A
5Ø   RETURN
6Ø   LET D = PEEK(16397)
7Ø   IF D = 127 THEN LET D = D - 256
8Ø   LET E = PEEK(16396) + D*256
9Ø   RETURN
1ØØ  CLS
11Ø  PRINT "CRUNCH"
12Ø  INPUT A$
13Ø  CLS
14Ø  CLEAR
15Ø  GO TO 1Ø
16Ø  PRINT "YOU WIN IN ";C;" GOES"
17Ø  GO TO 12Ø
18Ø  LET C = Ø
19Ø  LET D = Ø
2ØØ  LET E = Ø
21Ø  LET B = 32
22Ø  GOSUB 2Ø
23Ø  FOR A = 1 TO 5
24Ø  IF NOT A = 3 THEN PRINT "(shift A)"...
     "(5 spaces)(shift A)"
25Ø  IF A = 3 THEN PRINT "(shift A)";"+"...
     "(5 spaces)(shift A)"
26Ø  NEXT A
27Ø  LET B = 26
28Ø  GOSUB 2Ø
29Ø  PRINT "(5 spaces)(shift A)"
3ØØ  FOR A = 1 TO 5
31Ø  PRINT "(shift A)"..."(5 spaces)(shift A)"
32Ø  NEXT A
33Ø  PRINT "(shift A)(5 spaces)";
34Ø  GOSUB 2Ø
35Ø  FOR A = 1 TO 5
36Ø  PRINT "(shift A)"..."(5 spaces)*"
37Ø  NEXT A
38Ø  LET B = 32
39Ø  GOSUB 2Ø
4ØØ  LET G = Ø
41Ø  LET H = Ø
42Ø  LET K =3
43Ø  LET L = 3
44Ø  INPUT I
445  IF NOT (J=5 OR J=6 OR J=7 OR J=8 OR
     J=Ø) THEN GO TO 44Ø
45Ø  LET C = C + 1
46Ø  IF J = 5 THEN LET H = H + 1
 47Ø IF J = 6 THEN LET G = G + 1
48Ø  IF J = 7 THEN LET G + G - 1
49Ø  IF J = 8 THEN LET H = H + 1
5ØØ  LET M = ABS(H)
51Ø  IF ABS(G) M THEN LET M = ABS(G)
52Ø  FOR F = 1 TO M
53Ø  IF (NOT F>ABS(G)) AND G<Ø THEN LET
     L = L - 1
54Ø  IF (NOT F>ABS(G)) AND G>Ø THEN LET
     L = L + 1
55Ø  IF (NOT F>ABS(H)) AND H>Ø THEN LET
     K = k+ 1
56Ø  IF (NOT F>ABS(H)) AND H<Ø THEN LET
     K = K - 1
57Ø  LET N = L*33 + K
58Ø  GOSUB 6Ø
59Ø  IF PEEK(E + N) = 9 THEN GO TO 1ØØ
6ØØ  IF PEEK(E + N) = 2Ø THEN GO TO 16Ø
61Ø  POKE E = N, 19
62Ø  NEXT F
63Ø  FOR A = 1 TO 5
64Ø  LET P = RND(17) + 1
65Ø  LET Q = RND(3Ø) + 1
66Ø  GOSUB 6Ø
67Ø  POKE E + (P - 1)*33 = Q, 9
68Ø  NEXT A
69Ø  GO TO 4Ø4Ø (C) TIM PARKER
```

THE ZX80 IN EDUCATION

MINICOMPUTER USERS IN SECONDARY EDUCATION

In my piece on this page last month, seeing as it was my Maiden appearance in INTERFACE, I made some general comments about the ZX80 in the educational sontext, with particular reference to MUSE. This was because MUSE – Mini/micro Users in Secondary Education – has kindly agreed to give backing to the Educational ZX80 Users' Group.

The main function of that group is the provision of ZX80 software in MUSE's important and growing software library.

This is a two-way process. On the one hand we must transfer the library's existing software to ZX80 format; ZX80 users will then be able to draw on those most useful programs. On the other hand we must develop software ourselves to go into that library; others will transfer it for use on other machines. The efficient programming required by Sinclair gives us and edge here!

— THE MUSE SOFTWARE LIBRARY —

The current catalogue was recently circulated to MUSE members. If you haven't got a copy, that's because you're not part of that select band. (I recommend MUSE membership very strongly to teachers – it's good value indeed for £5.00 a year; contact Bob Trigger, 58 Chadcote Way, Bromsgrove, Worcestershire).

The catalogue so far includes 31 programs, in maths, statistics, computing, games, physics, biology and geography. They need from 1K to 72K, most being less than 8K; they run on 380Z (cassette or disc), but work is in hand to transfer them to Pet, Apple, TRS 80 and ZX80; they are classified in five levels from primary to University use.

MUSE is now doing a lot of work to convert programs between the standard machines; the ZX80 will join the circle within six months, all being well. So, no doubt will other machines as new groups are formed.

Contributing to the Library

Here is an outline of the system as far as this activity of the Educational ZX80 User's Group is concerned.

* Author submits a LISTing but retains copyright.

* We agree the distribution costs for the MUSE library; author agrees not to undercut this.

* MUSE distributes th program (including author's name) and pays author commission.

Example 1 ☆

Library catalogue price of program		£5.00
Author commission	£1.50	
Library commission	£3.50	
Copying charge		£1.00
Cassette, packing, postage		£1.00
		£7.00

Example 2.☆☆

Library prices of program (i)		£2.00
(11)		£4.00
(iii)		£14.00
Author commission (50p + £1 + £6)	£7.50	
Library commission	£12.00	
Copying		£3.00
Cassette, etc.		£1.00
		£24.00

MUSE has devised a sliding scale of all author's commissions, ranging from 50p on a £2.00 program to £27.00 on a £50.00 program. These arrangements compare very favourably to commercial practice; as author you can of course market your program in addition – but we ask you not to undercut us.

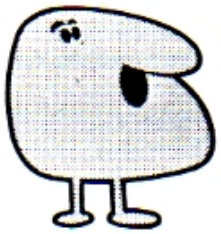
So far I have received potentially useful ZX80 programs for language teaching, primary maths, secondary maths, computing, statistics, and exam. results handling, as well as one to allow the teacher to set up tests in any subject at any level. Good to see that not all of these categories are yet included in the MUSE library lists!

If you have programs that you feel could be of value in this context, please send them on cassette or as listings. Simple documentation is helpful, on the tape if not on paper! let me have a stamped addressed envelope ("foolscap size") if you'd like a copy of the Group's current Newsletter.

ERIC DEESON
HIGHGATE SCHOOL
BIRMINGHAM
B12 9DS

MAZE-MASTER

Trip through the Hampton Court of the 21st century. Royal maze-masters, John and Timothy Edmonds, invite you to find the hidden key and hence your escape from the maze. With great flexibility in mind they designed the maze for a 1K ZX80, but those of you with more memory can change lines 5 and 6 to LET N = 30 and LET P = 20. This increases the size of the maze.



```
 1  RANDOMISE
 5  LET N = 13
 6  LET P = 13
 7  LET J = 0
    LET A = 0
10
25  LET M = N + 3
30  LET L = 0
40  LET G = RND(P) * M + RND(N)
50  LET C = 0
60  LET R = 0
70  LET X = RND(N)
80  LET Y = RND(P/2) + P/2
85  LET H = 12
100 FOR K = 1 TO P + 2
105 FOR L = 1 TO N + 2
110 PRINT "*_";
115 NEXT L
116 PRINT
120 NEXT K
200 LET A = 1 + PEEK(16396)
    + PEEK(16397) * 256
210 FOR K = 0 TO N + 1
220 POKE A + K, 128
230 POKE A + K + M * (P + 1), 128
240 NEXT K
250 FOR K = 1 TO P
260 POKE A + M * K, 128
270 POKE A + M * K + N + 1, 128
280 NEXT K
290 POKE A + N/2 + 1, 0
330 POKE A + X + Y * M, H
340 INPUT J
345 IF J<1 OR J>9 OR J=5 THEN GO TO 340
350 LET L = (J - 1)/3
360 LET R = Y + L - 1
370 LET C = X + J - L * 3 - 2
380 IF R = 0 AND C = N/2 + 1 AND H = 48
    THEN GO TO 600
390 IF R<1 OR R>P OR C<1 OR C>N
    THEN GO TO 340
400 LET L = R * M + C
410 IF NOT L = G THEN GO TO 420
415 LET G = 1000
416 POKE A + L, 176
417 GO TO 340
420 LET J = PEEK (A + L)
430 IF J = 128 THEN GO TO 340
450 IF J = 176 THEN LET H = 48
460 IF J = 176 OR J = 9 OR RND(100)>60
    THEN GO TO 550
510 POKE A + L, 128
520 GO TO 340
550 POKE A + Y * M + X, 9
560 LET X = C
570 LET Y = R
580 GO TO 330
600 CLS
605 PRINT "WELL DONE YOURE OUT"
```

NUMBER BASE CONVERTER

This program for the 1K ZX80 written by Carolyn Hughes – the first female author we've published – will convert a decimal number (base 10) to any other number base between two and nine. The program is self-explanatory, so I won't say anymore about it – except that it is a useful program for those of us who aren't too hot on maths.

```
10  DIM A (30)
20  FOR B = 1 TO 30
30  LET A(B) = 0
40  NEXT B
50  PRINT "ENTER A NUMBER IN BASE 10"
60  INPUT C
70  CLS
80  PRINT "WHICH BASE (2 TO 9) DO YOU
    WISH TO CONVERT TO?"
90  INPUT D
100 IF D<10 AND D>1 THEN GO TO 120
110 GO TO 90
120 CLS
130 'PRINT C;"* _ IN BASE * _";D;"* _IS"
140 FOR E = 1 TO 30
150 LET F = C/D
160 LET A(E) = C - (D * F)
170 LET C = F
180 IF C = 0 THEN GO TO 200
190 NEXT E
200 DIM G(E)
210 FOR H = 1 TO E
220 LET G (E - H + 1) = A(H)
230 NEXT H
240 FOR J = 1 TO E
250 PRINT G(J);
260 NEXT J
```

MARK'S BYTE

Alan Martin of South Woodford sent me something that looks very useful, but I can't work out how to use it. Perhaps you're brighter than I am. Alan writes: "If you run the following you'll immediately appreciate that lines 1Ø and 2Ø can often do away with all that POKEing and PEEKing of 16414/5. RND(17) gives one second intervals, 170 gives one-tenth of a second".

```
1Ø    RANDOMISE
2Ø    LET A = RND(17)
3Ø    PRINT A; " - "
4Ø    INPUT A$
6Ø    IF A$= "S" THEN STOP
      GO TO 1Ø
```

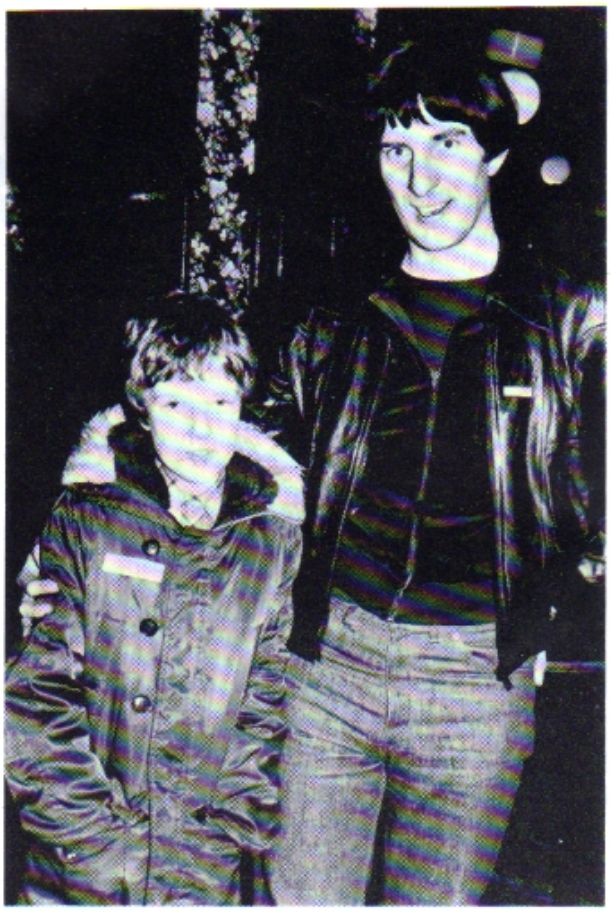
I'll leave it up to you to inform me on this one.

Adam Kennedy, Stretton-on-Dunmore suggests it would be great if someone could design a simple circuit which would sound a tone every time a key was pressed on the ZX80. I agree. If you're a hardware buff, see what you can come up with.

O.P. Stryjak, Harefield, writes: "Right now, my ZX80 is undergoing a hardware update. I threw away the Sinclair packaging to "hardwire" the ZX80 board into a decent keyboard, a LEO 11 as it happens which was purchased for £12 in a second-hand used computer bits shop . . . a piece of cake to wire up . . . All you have to do is solder bits of wire from the bottom of the keys on the keyboard to the two little 'rivet' heads beneath each 'key' on the ZX80 . . . the second upgrade consists of actually bolting an extra 16K on . . . ". Well, that should solve a few problems.

H. Jones, of London SW20, has also been at his ZX80 with a soldering iron. He writes: "I have done the mod to get white characters on a black background. "A" connected to "B" instead of "C" on the underside of the PCB. It seems to work much better on my TV. However, I may install a switch so that I can change back and forth when the novelty wears off. I found this a very easy mod". I've also got an inverse video switch on my ZX80. It certainly looks more like the output of a "real computer" this way, but on my TV, the white on black is not as sharp as the black on white, so I tenf to leave my machine on "standard".

To see what's in a program, and its memory locations, Michael Cross suggests using the following sub-routine. When you run it, he says, you'll see a list of numbers and a list of characters on the screen. The list of numbers contains memory locations, and the characters are the program.



John Edmonds (who wrote ZX80 INVADERS) with his son Timothy

```
1ØØØ  FOR X = 16424 TO 322767
1Ø1Ø  PRINT X, CHR$(PEEK(X))
1Ø2Ø  NEXT X
```

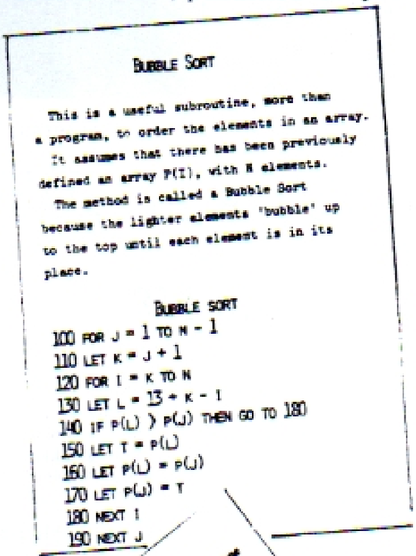
use CONTINUE when the program crashes.

From Belgium, someone who's name I can't read suggests that you could wire an LED into the LOAD lead so you'll know when there is a signal going down the lead.

A. Coppin of Hanworth recommends the book "Introduction to Microcomputer Programming" by Peter C. Sanderson (Newnes, Butterworth).

Talking of books, I see SYNTAX SOFTWARE have a new book out called 50 RIP-ROARING GAMES FOR THE ZX80 AND ZX81. Let's hope this is better than some of the other ZX80 books around (no, Tim, I didn't mean yours, for an amateur it's quite good).

This comes from "30 PROGRAMS FOR THE SINCLAIR ZX80 1K", published last year.

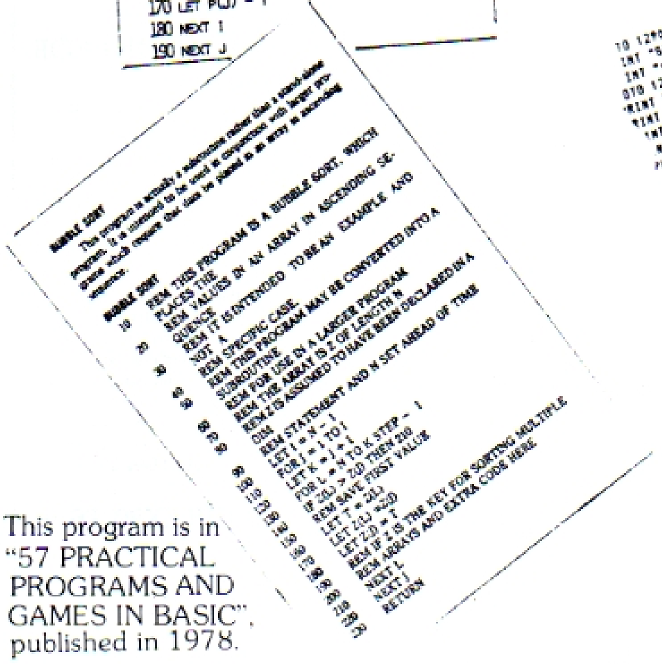


BUBBLE SORT

This is a useful subroutine, more than a program, to order the elements in an array. It assumes that there has been previously defined an array P(I), with N elements.
The method is called a Bubble Sort because the lighter elements 'bubble' up to the top until each element is in its place.

BUBBLE SORT

```
100 FOR J = 1 TO N - 1
110 LET K = J + 1
120 FOR I = K TO N
130 LET L = 13 + K - 1
140 IF P(L) > P(J) THEN GO TO 180
150 LET T = P(L)
160 LET P(L) = P(J)
170 LET P(J) = T
180 NEXT I
190 NEXT J
```



BUBBLE SORT

This program is actually a subroutine rather than a stand-alone program. It is intended to be used in conjunction with larger programs which require that data be placed in an array in ascending sequence.

BUBBLE SORT

```
10  REM THIS PROGRAM IS A BUBBLE SORT, WHICH
    PLACES THE
20  REM VALUES IN AN ARRAY IN ASCENDING SE-
    QUENCE
30  REM IT IS INTENDED TO BE AN EXAMPLE AND
    NOT A SPECIFIC CASE.
40  REM THIS PROGRAM MAY BE CONVERTED INTO A
    SUBROUTINE
50  REM FOR USE IN A LARGER PROGRAM
60  REM THE ARRAY IS Z OF LENGTH N
70  REM Z IS ASSUMED TO HAVE BEEN DECLARED IN A
    DIM STATEMENT AND N SET AHEAD OF TIME
80  LET I = N - 1
90  FOR J = 1 TO I
100 LET K = J + 1
110 FOR L = N TO K STEP - 1
120 IF Z(L) > Z(J) THEN 210
130 REM SAVE FIRST VALUE
140 LET T = Z(L)
150 LET Z(L) = Z(J)
160 LET Z(J) = T
170 REM IF Z IS THE KEY FOR SORTING MULTIPLE
180 REM ARRAYS AND EXTRA CODE HERE
190 NEXT L
200 NEXT J
210 RETURN
```

This program is in "57 PRACTICAL PROGRAMS AND GAMES IN BASIC", published in 1978.

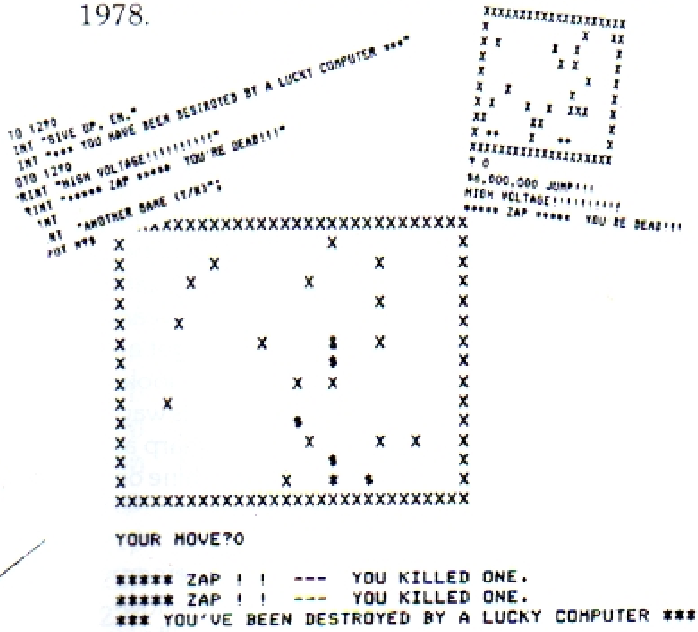
Which brings me to an interesting point. A member of the National ZX80 Users Club, Martin Johnson of Esher, wrote to me enclosing photocopies from two books of programs he'd been given for Christmas.
"Is it not odd," he wrote, "that not only do the programs use identical names for variables, but the comments before the programs are identical?". The two pages – one from Melbourne House's "30 Programs for the ZX80 1K" (the book Mr. Sinclair allegedly described as "excellent") and the other from the US publisher TAB BOOKS "57 Practical Programs & Games in BASIC" – are reproduced on this page.

One of the standard works on games programs is David Ahl's BASIC COMPUTER GAMES (reviewed in INTERFACE 6). Last month, I bought a copy of COMPUTER GAMES FOR BUSINESSES, SCHOOLS AND HOMES, by J Victor Nahigian and William S. Hodges. A few excerpts from both these books are reproduced for your interest. All the publishers involved have been sent a copy of this article and asked to comment. We'll bring you their replies in a future issue of INTERFACE.

Well, that's it for this month. See you next month (unless that Hartnell person kicks me out).

Keep the cards and letters coming in (as Dean Martin used to say).

This is part of a program which appears in David Ahl's BASIC COMPUTER GAMES, published in 1978.



And this is from COMPUTER GAMES FOR BUSINESSES, SCHOOLS AND HOMES, published in 1979.

HEX CALCULATOR

J.B. Wilkins has written a 1K program to turn your ZX80 into a calculator using the hexadecimal numbering system. Hexadecimal notation (Hex for short) seems totally bewildering to the first-time programmer, but it is a subject that should be mastered – especially if you intend to get to grips with machine-code. This program will hopefully clear the air of mystery surrounding HEX – and give you something to impress your friends with.

```
 2Ø  REM HEXADECIMAL CALCULATOR
 25  REM RANGE - 7FFF TO 7FFF
 3Ø  REM FUNCTIONS + - x / xx
 5Ø  LET T = Ø
 6Ø  PRINT "ENTER FIRST NUMBER"
 7Ø  INPUT A$
1ØØ  LET B$ = A$
11Ø  LET C = Ø
12Ø  IF B$ = " "THEN GO TO 15Ø
13Ø  LET B$ = TL$(B$)
14Ø  LET C = C + 1
15Ø  GO TO 11Ø
*155Ø LET K = CODE (A$)
17Ø  IF K<44 THEN GO TO 2ØØ
18Ø  LET A$ = TL$(A$)
2ØØ  LET C = C - 1
21Ø  LET S = Ø
22Ø  LET D = 16**(C - 1)
23Ø  FOR J = 1 TO C
24Ø  LET X = CODE (A$
25Ø  LET Y = (X - 28) x D
26Ø  LET A$ = TL$(A$)
27Ø  LET D = D/16
28Ø  LET S = S + Y
29Ø  NEXT J
3ØØ  IF K<45 THEN LET T = T + S
31Ø  IF K = 22ØTHEN LET T = T - S
32Ø  IF K = 221 THEN LET T = T + S
33Ø  IF K = 222 THEN LET T = T x S
34Ø  IF K = 223 THEN LET T = T/S
36Ø  IF K = 226 THEN LET T = T xx S
37Ø  CLS
4ØØ  PRINT "HEX TOTAL"
41Ø  LET P = T
42Ø  IF P> - 1 THEN GO TO 45Ø
43Ø  PRINT " - ";
45Ø  LET P = - P
46Ø  IF P>15 THEN LET C= 2
47Ø  IF P>255 THEN LET C = 3
48Ø  IF P>4095 THEN LET C = 4
48Ø  LET B - 16 ** (C - 1)
5ØØ  FOR G = 1 TO C
51Ø  LET L = P/B
52Ø  LET M = P - (L x B)
53Ø  LET B = B/16
54Ø  LET P = M
55Ø  PRINT CHR$ (L + 28);
56Ø  NEXT G
57Ø  PRINT
58Ø  PRINT
59Ø  PRINT "ENTER NEXT NUMBER"
     GO TO 6Ø
```

(C) J.B. WILKINS

Marauders

The Marauders from the Magellic Cloud is Stuart Roberts' attempt to bring the ever-popular aracde game Space Invaders down to a size that the 1K ZX80 can handle.

Th commands at your disposal are 5 or 8 to move left or right, 7 to remain in position or 6 to fire. Simultaneous fire will hit both the alien and your laser base, and alignment of spaceship and alien will result in Mutual destruction. Watch out for any aliens that you hit – they can still fight back!

After a row of aliens has been destroyed, press any arrow and newline to come into contact with rest of the invading force. Can you beat Stuart's record of 2970? No prize for trying!

```
 1   LET TK = Ø
 2   DIM B(7)
 3   LET J = 2
 4   LET C = 1
 5   LET E = -1
 6   LET F = 4
 7   LET G = Ø
 8   LET L = 1
 9   LET N = 4
 1Ø  FOR a = 1 TO J
```

```
11    LET B(A) = Ø
12    NEXT A
13    LET H = RND(J - 1)
14    LET D = Ø
15    IF G = 1 THEN GO TO 67
16    IF E = 1 THEN GO TO 77
17    PRINT K
18    LET M = Ø
19    FOR A = 1 TO 4 - F
2Ø    PRINT
21    NEXT A
22    LET X = N
23    GOSUB 73
24    FOR A = 1 TO J
25    IF B(A) = Ø THEN PRINT "*";
26    IF B(A) = 1 THEN PRINT "shift T"
27    NEXT A
28    PRINT
29    LET X = N + H
3Ø    GOSUB 73
31    PRINT "V"
32    IF F = Ø THEN GO TO 85
33    IF G = 1 AND C = N + 1 THEN GO TO 37
34    LET X = C
35    LET X$ = ":"
36    IF G = 1 THEN GOTO 39
37    LET X$ = ":"

39    FOR A = 1 TO F
4Ø    GOSUB 73
41    PRINT X$
42    NEXT A
43    LET G = Ø
44    LET X = C
45    GOSUB 73
46    PRINT "+"
47    PRINT "ShiftF 11shiftT shiftD"
48    IF N + L = C THEN LET C = 1
49    LET L = H
5Ø    INPUT Y
51    CLS
52    FOR A = 1 TO J
53    IF B(A) = Ø THEN GO TO 58
54    NEXT A
55    LET J = J + 1
56    IF J = 8 THEN GO TO 3
57    GO TO 4
58    IF Y = 8 THEN LET D = 1
59    IF Y = 5 THEN LET D = -1
6Ø    IF Y = 7 THEN LET G = 1
61    LET C = C + D
62    IF N = 5 OR N = 1 THEN LET F = F - 1
63    IF N = 5 THEN LET E = -1
64    IF N = 1 THEN LET E = 1
65    LET N = N + E
66    GO TO 13
67    IF C - 1 = M THEN LET K = K + 5Ø*J
68    LET P = C - N + 1
69    IF P>J OR P<J THEN GO TO 16
7Ø    IF B(P) = Ø THEN LET K = K + 5*J
71    LET B(P) = 1
72    GO TO «$
73    FOR Z = 1 TO X
74    PRINT "*_";
75    NEXT Z
76    RETURN
77    LET X = M
78    GOSUB 73
79    IF G = 1 AND C - 1 + X THEN GO TO 83
8Ø    PRINT "<shiftT>"
81    LET M = M - 3
82    GO TO 19
83    PRINT J*5Ø
84    GO TO 81
85    PRINT "LANDED"
```

AND HERE IT IS, OUR LONG-AWAITED 4K ADVENTURE PROGRAM. IT'S A LOT OF FUN TO PLAY, AND WILL DEFINITELY REPAY THE TIME IT TAKES TO GET IT INTO YOUR ZX80. NEXT MONTH, TREVOR SHARPLES WILL EXPLAIN THE THEORY BEHIND THE PROGRAM, AND SUGGEST SOME WAYS YOU CAN CHANGE IT ....

BUT FOR NOW, LET'S GO DOWN THE ...

Catacombs of Morglim

Aeons ago in the far-distant province of Rednuam lived the mighty wizard Morglim. Throughout his long life he robbed both the rich and the poor and kept all the money himself. To guard his treasure he built a series of catacombs. Each piece of treasure was hidden in a different place and guarded by a motley assortment of monsters and vagabonds.

Morglim's time has passed and the catacombs have lain unexplored for several millenia. However, local folk tales tell of a treasure fit for a King's ransom still to be found in the murky depths of the series of caves. Are you brave enough to enter the Catacombs of Morglim?

Use the command GOTO 2Ø and enter the series of numbers to set up the cave system. When the program stops, return to the command made and enter the instruction GOTO 1Ø to play the game. Do not use RUN or CLEAR or you will wipe the variable that you have just put in.

This program was written originally by Ole Norregaard and slightly modified by Trevor Sharples.

```
 1Ø  GO TO 3ØØØ
 2Ø  DIM R(48)
 3Ø  DIM P (3)
 4Ø  FOR J = Ø TO 48
 5Ø  PRINT J
 6Ø  INPUT R(J)
 7Ø  CLS
 8Ø  NEXT J
 9Ø  STOP
1ØØ  LET L= RND(3) + 2
11Ø  LET P(Ø) = Ø
12Ø  FOR J = 1 TO 3
13Ø  LET P(J) = J + 3
14Ø  NEXT J
15Ø  LET Z = Ø
16Ø  LET C = Ø
17Ø  GOSUB 253Ø
18Ø  LET J = Ø
19Ø  RANDOMISE
2ØØ  GOSUB 22ØØ
21Ø  GOSUB 2260
22Ø  GOSUB 116Ø
23Ø  LET J = Ø
24Ø  PRINT "?"
25Ø  INPUT C$
26Ø  CLS
27Ø  LET C = CODE (C$)
28Ø  IF C = 13 THEN STOP
29Ø  IF C = 49 THEN GOSUB 2260
3ØØ  IF C = 57 THEN GOSUB 38Ø
31Ø  IF C = 53 THEN GOSUB 49Ø
32Ø  IF C = 51 THEN GOSUB 64Ø
33Ø  IF C = 56 THEN GOSUB 68Ø
34Ø  IF C = 42 THEN GOSUB 72Ø
35Ø  IF C = 6Ø THEN GOSUB 76Ø
36Ø  IF C = 38 THEN GOSUB 8ØØ
37Ø  GO TO 24Ø
38Ø  IF X<4 THEN GO TO 114Ø
39Ø  FOR K = Ø TO 3
4ØØ  IF P(K) = ØTHEN GO TO 44Ø
41Ø  NEXT K
42Ø  PRINT "YOUR SACK IS FULL"
43Ø  RETURN
44Ø  LET R(J) = R(J) - 1ØØ * X
```

```
450 LET P(K) = X
460 LET X = 0
470 PRINT "OK"
480 RETURN
490 IF X>0 THEN PRINT "THE CAVE IS NOT
    EMPTY"
500 IF X>0 THEN RETURN
510 PRINT "WHICH ARTICLE? (1 - 4)"
520 INPUT M
530 LET M = M - 1
540 IF M<0 OR M >3 THEN GO TO 520
550 CLS
560 IF J = 0 THEN GO TO 610
570 LET X = P(M)
580 LET R(J) = R(J) + 100 * X
590 LET P(M) = 0
600 GO TO 470
610 PRINT "INSIDE THE SAFE NOW"
620 LET Z = Z + P(M) * 100
630 GO TO 590
640 IF N = 0 OR N>2 THEN GO TO 1070
650 IF X>0 OR X<4 THEN GO TO 1090
660 LET J = J - 7
670 GO TO 1110
680 IF N<2 THEN GO TO 1070
690 IF X>0 AND X<4 THEN GO TO 1090
700 LET J = J + 7
710 GO TO 1110
720 IF E<2 THEN GO TO 1070
730 IF X>0 AND X<4 THEN GO TO 1090
740 LET J = J + 1
750 GO TO 1110
760 IF E = 0 OR E>2 THEN GO TO 1070
770 IF X> 0 AND X<4 THEN GO TO 1090
780 LET J = J - 1
790 GO TO 1110
800 IF X= 0 OR X>3 THEN GO TO 1140
810 PRINT "WHAT ARE YOU ATTACKING
    WITH?".....(1 - 4)"
820 INPUT M
830 CLS
840 LET M = M - 1
850 IF M<0 OR M>3 THEN GO TO 820
860 PRINT "THE"
870 GOSUB X * 10 + 2100
880 IF P(M) - 3 = X THEN GO TO 970
890 IF RND(3)>1 THEN GO TO 1000
900 PRINT "WOUNDS YOU, AND"
910 LET L = L - 1
920 IF L<1 THEN GO TO 1040
930 PRINT "DISAPPEARS"
940 LET R(J) = R(J) - X * 100
950 GOSUB 2250
960 RETURN
970 IF RND(2)>1 THEN GO TO 890
980 PRINT "IS KILLED"
990 GO TO 940
1000 PRINT "IS UNHURT"
1010 IF RND(2) = 1 THEN RETURN
1020 PRINT "BUT"
1030 GO TO 930
1040 PRINT "KILLS YOU"
1050 PRINT "YOU SCORE:";Z
1060 STOP
1070 PRINT "NO EXIT"
1080 RETURN
1090 PRINT "WAY OUT BLOCKED BY THE";
1100 GO TO X * 10 + 2100
1110 PRINT "NOW"
1120 GO SUB 2260
1130 RETURN
1140 PRINT "OH, REALLY?"
1150 RETURN
1160 FOR J = 1 TO 3
1170 FOR K = 1 TO 9
1180 LET X = RND(48)
1190 IF R(X)>99 THEN GO TO 1180
1200 LET R(X) = R(X) + K * 100
1210 NEXT K
1220 NEXT J
1230 RETURN
2100 PRINT "-"
2105 RETURN
2110 PRINT "DWARF"
2115 RETURN
2120 PRINT "DRAGON"
2125 RETURN
2130 PRINT "BEAR"
2135 RETURN
2140 PRINT "AN AXE"
2145 RETURN
2150 PRINT "A SWORD"
2155 RETURN
2160 PRINT "SOME FRUIT"
2165 RETURN
2170 PRINT "A PEARL"
2175 RETURN
2180 PRINT "A GOLD NUGGET"
2185 RETURN
2190 PRINT "A GIANT DIAMOND"
2195 RETURN
2200 PRINT "IN YOUR SACK ARE:"
2210 FOR B = 0 TO 3
2220 GOSUB P(B) * 10 + 2100
2230 NEXT B
```

```
2240 PRINT J,,Z; "POINTS"
2250 RETURN
2260 IF C = 49 THEN GOSUB 2200
2270
2280 IF J>1 THEN PRINT "YOU ARE IN A CAVE"
2290 IF J = 8 THEN PRINT "LIGHT COMING IN
     FROM THE NORTH"
2300 IF J = 0 THEN PRINT "YOU ARE INSIDE
     THE HOUSE.", DOOR LEADING OUT EAST"
2310 IF J = 1 THEN PRINT "YOU ARE OUT IN
     OPEN AIR (11 spaces) TO THE WEST IS A
     HOUSE",,"TO THE SOUTH IS",,,"A HOLE IN
     THE ROCKS"
2320 PRINT
2330 PRINT "YOU CAN GO:"
2340 LET X = R(J) - (R(J)/100)* 100
2350 LET N = X/10
2360 LET E = X - N * 10
2370 LET X = R(J)/100
2380 PRINT
2390 IF N = 0 THEN GO TO 2420
2400 IF N < 3 THEN PRINT "NORTH"
2410 IF N > 1 THEN PRINT "SOUTH"
2420 IF E = 0 THEN GO TO 2450
2430 IF E <3 THEN PRINT "WEST"
2440 IF E>1 THEN PRINT "EAST"
2450 PRINT
2460 IF X>0 THEN PRINT "HERE IS"
2470 IF X>0 AND X<4 THEN PRINT "A";
2480 IF J = 0 THEN GO TO 2510
2490 IF X>0 THEN GO TO X * 10 + 2100
2500 RETURN
2510 PRINT "A SAFE IS STANDING ON THE
     FLOOR"
2520 RETURN
2530 FOR J = 1 TO 48
2540 LET R(J) = R(J) - (R(J)/100)* 100
2550 NEXT J
2560 RETURN
3000 PRINT "DO YOU WANT INSTRUCTIONS?"
3010 PRINT, "Y/N"
3020 INPUT U$
3030 CLS
3040 IF U$ = "N" THEN GO TO 100
3050 PRINT "(4 spaces) THE CATACOMBS OF
     MORGLIM"
3060 PRINT
3070 PRINT
3080 PRINT "A GAME OF ADVENTURE IN
     WHICH YOU HAVE TO EXPLORE THE
     CATACOMBS OF MORGLIM TO FIND
     THE PIECES OF * * * TREASURE"
3090 PRINT
```

```
3100 PRINT "BUT YOU DONT ALWAYS GET
     YOUR OWN WAY - THERE ARE PLENTY
     OF 8 spaces) MONSTERS OUT TO STOP
     YOU"
3110 INPUT U$
3120 CLS
3130 PRINT "YOUR OBJECTIVE IS TO PUT AS
     MANY ITEMS OF TREASURE AS
     POSSIBLE * * INTO THE SAFE BEFORE
     SOMETHING (4 spaces) NASTY HAPPENS..."
3140 PRINT
3150 PRINT "YOU CAN ONLY PUT THINGS
     INTO (4 spaces) THE SAFE WHILE YOU
     ARE INSIDE * * * THE HOUSE"
3160 PRINT
3170 PRINT "CAN YOU REMEMBER THE WAY
     BACK TO THE HOUSE FROM THE
     CAVES ... ?"
3180 INPUT U$
3190 CLS
3200 PRINT "YOU HAVE 9 COMMANDS:"
3210 PRINT
3220 PRINT "$ - STOPS THE GAME"
3230 PRINT "L - LOOKS AT WHAT IS IN
     YOUR SACK"
3240 PRINT "N - GO NORTH"
3250 PRINT "E - GO EAST"
3260 PRINT "W - GO WEST"
3270 PRINT "S - GO SOUTH"
3280 PRINT "T - TAKE AN OBJECT LYING IN
     THE (5 spaces) CAVE AND PUT IT IN THE
     SACK"
3290 PRINT "P - PUT AN OBJECT FROM THE
     SACK (5 spaces) INTO AN EMPTY CAVE
     OR THE (7 spaces) SAFE"
3300 PRINT "A - ATTACK THE MONSTER IN
     THE (7 spaces) CAVE"
3310 INPUT U$
3320 CLS
3330 PRINT "HOW MANY POINTS CAN YOU
     SCORE * * * BEFORE YOU MAKE A
     MISTAKE ... ?"
```

```
3340 PRINT
3350 PRINT "A GOOD SCORE IS OVER 1200
     POINTS"
3360 INPUT U$
3370 GO TO 100
```

(C) OLE NORREGAARD.

DISPLAYED NUMBER:	ENTER:
0	3
1	31
2	33
3	2
4	31
5	3
6	31
7	33
8	12
9	12
10	31
11	13
12	2
13	21
14	20
15	33
16	32
17	12
18	31
19	33
20	11
21	23
22	11
23	10
24	33
25	12
26	21
27	30
28	13
29	32
30	2
31	12
32	2
33	12
34	21
35	33
36	11
37	33
38	2
39	32
40	31
41	20
42	13
43	2
44	11
45	03
46	11
47	13
48	11

The Winner

The response that we had to our morse-code competition can only be described as little short of overwhelming. It seems that some of you gave up your Christmas evening to get down to programming, and one entrant told us that the program he finally transmitted was the eighth version.

The entries seemed to be divided into two main schools of programming. There were those of you who used lots of GOSUBS and RETURNS, and there were those who stored stuff in a REM statement. The search was narrowed down to the REM people as that proved the most efficient way of storing data. So many of the programs were similar, but David Edwards of Marlow, Bucks, eventually ran out the winner. His program was just that little bit tidier and more compact. A voucher for two software cassettes of your choice will be with you soon – Post Office permitting.

ENGLISH – TO – MORSE CONVERTER

```
10REM 32333539476362605648053
02614032713107171029040608252001
3150211230922182 8
 20  INPUT A$
 30  IF A$ = "" THEN STOP
 40  LET A  = CODE (A$) * 2 + 16371
 50  IF A = 16371 THEN GO TO 120
 60  LET B=(PEEK(A)-28) * 10=PEEK(A=1)-
 70  IF B = 1 THEN GO TO 120
 80  IF (B/2) * 2<B THEN PRINT ".";
 90  IF (B/*)*2 = B THEN PRINT "-";
100  LET B = B/2
110  GO TO 70
120  PRINT "* "
130  LET A$ = TL$(A$)
140  GO TO 30
```

(C) DAVID EDWARDS.

The first meeting of the club was held at The Bush Hotel, Shepherds Bush. It was a splendid night, with over 70 attending. We'll have details of future meetings in coming issues of INTERFACE. These are some of the new friends we made at the last meeting. They are making fun of Tim's book, silly, misguided fools.....

N.B. Listing shown is set out exactly how it should appear on the VDU (TV screen).

Only numerals Ø to 9 are used after REM statement 1Ø.

A "–" (minus sign) represents a DASH, and a "." (full-stop) represents a DOT.

Special mention must be made of Mr. B. Desborough's program as it showed real programming ingenuity. A 139 byte program converts the English sentence to a code of "Ø" for "." and "1" for "–". We've included it here even though we couldn't award it the winning prize as it did not convert the "Ø" and "1" to dots and dashes.

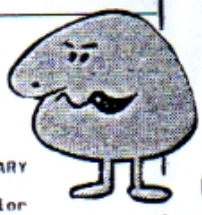
```
 4   REM 9SUG6MIK8RHOBAJQXEC7DLFTVW
 6   INPUT A$
 8   LET A=Ø
1Ø   FOR B = Ø TO 4
2Ø   LET A=A+(PEEK(16389+CODE(A$) ) AND 2**B)
     *5**B
3Ø   NEXT B
4Ø   PRINT TL$(STR$(A) ),
5Ø   LET A$ = TL$(A$)
6Ø   IF NOT A$=""THEN GOT TO 8
```

(C) B. DESBOROUGH

Entries for our second competition are flooding in from all you would-be composers. We're all really amazed at the high standard of material that you are producing. It's really quite pleasurable to sit back and listen to some of the tunes that you have come up with. The 'Master Composer' will be announced in Issue 8.

ZX80 CLASSIFIEDS

You can advertise in INTERFACE. Personal ads (contacts, selling off unwanted memory boards, ZX80s, Apples, PETs and the like) are £2 for the first 20 words, 15p each additional word. Business ads (including all ads to sell software) are £5 for the first 20 words, 20p each additional word. Payment must accompany booking. Display rates on application.



3K RAM memory expansion board for sale. Telephone CHRIS CHARLES on 05384 - 2226

****

LOOKING FOR EDUCATIONAL PROGRAMS FOR PRIMARY AGED CHILDREN? Six packs of programs available. S.A.E. for details. ZX80 Junior Education Enterprises, 38 Bedford Crescent, St Ives, Cambs.

****

3K RAM memory expansion board and 2K RAM for sale. Phone Kevin Palmer on 01 - 449 1049

****

Test your knowledge of French grammar with the ZX80. Ideal for exam revision. 2 4K programs on a single cassette will generate over 600 French verb-forms, and over 3000 different noun-phrases. Cassette and listing £5.75. (8K version, £9.75). Send order plus s.a.e. to P Storm, 45a Daventry Street, London, NW1.

****

Full 3K ZX80 MEB for sale. £25 ONO. S Humphreys, 55 Dykeshall Rd, Sheffield 6.

****

3K memory expansion (2K unused) £25. A Archer, 3 The Green, Shafton, Barnsley, S72 8PA. Phone Barnsley 710467.

****

Four 1K programs on cassette for £3.50. A - Dutch Draughts, Breakout, Saturn Probe, Nine Mens Morris. Or B - Battleships, Air Raid, Pot Shot, Hangman. Good graphics. State A or B. L Kelsall, 4 Avenue Road, St Albans, Herts.

****

ZX80 INVADERS (4K). At last, machine code version of the now famous pub game. ZX80 GALAXY WARS (4K). Star trek in real time. Guide your spaceship through the galaxies and destroy the aliens. Both continuous display, fast-moving graphics, on-screen scoring. £5 each listing. J Edmonds, 29 Chestnut Ave., Grays Essex.

****

BRIDGE SOFTWARE: MORSE SIGNALLER (1K RAM) Incorporates machine code subroutine to output morse signals through cassette loudspeaker. Variable signalling speed. Three-page manual plus cassette £3.50.
GRAPHICS PACKAGE (1K RAM) Four programs: Symmetrical patterns; Large Print; Draw A Picture; Plot a Picture. 12-page illustrated manual £3. Manual plus cassette £8.
MULTITEXT (4K and 8K RAM versions) prints text in three sizes, nine styles altogether. 12-page illustrated manual, plus cassette £7.
Bridge Software (C), 36 Fernwood, Marple Bridge, Ches. SK6 5BE. Mail order only. SAE for details.

****

THE ULTIMATE question-and-answer program. Accepts questions and answers on any subject from the keyboard, presents questions in random sequence, checks student's response, eliminates questions once mastered. Listing for 2K RAM £5; for 1K (no check) £3. WYNCOM, 11 Furze Platt Road, Maidenhead, SL6 7ND

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ZX80 for sale, little used, offers, phone Heltwhistle 20160

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CASSETTES (Each containing five 1K programs) educational, puzzles, games - £3. Send s.a.e. for details: L Kingshott, 178 Charlton Lane, Charlton, London.

****

SHARP PC-1211 USERS CLUB. The club operates from 281 Lidgett Lane, Leeds, Ls17 6PD, and produces the magazine OUTPUT. Send an s.a.e. for a free copy if you own a PC-1211.

****

MEAN CHECKERS MACHINE...

*?!&?

For just £3.95 you can now have one of the most aggressive and intelligent DRAUGHTS programs written for the old ROM 16K ZX80.

Full screen graphics, 'book' openings, kings and multiple jumps are automatic, average response time is a tiny 18 seconds. Full capture tally displayed, & the board is shown after every move. Either you, or the ZX80, can have first move.

DATABASE CONSULTANCY, 105 Fairholme Avenue, Gidea Park, Romford, RM2 5UR.

I enclose £3.95. Please send me a MEAN CHECKERS MACHINE on new C-12 cassette.

Name.....

Address.....

.....

JOIN THE CLUB HERE

Please send me:

( ) The next 12 issues of INTERFACE. I enclose £7.50 (UK), £9.50 (Europe), £13.50 (elsewhere).....£ _____

( ) Issue 5 of INTERFACE, £1.00 .....£ _____

( ) Issue 6 of INTERFACE, £1.00 .....£ _____

( ) A copy of "THE EARLY DAYS", a reprint of INTERFACE 1 through 4, (some of it retyped to make it more legible) with many programs, and highlights of the club's growth. £2.....£ _____

I enclose a total of....£ _____

National ZX80 and ZX81 Users Club, 44 - 46 Earls Court Road, LONDON, W8 6EJ

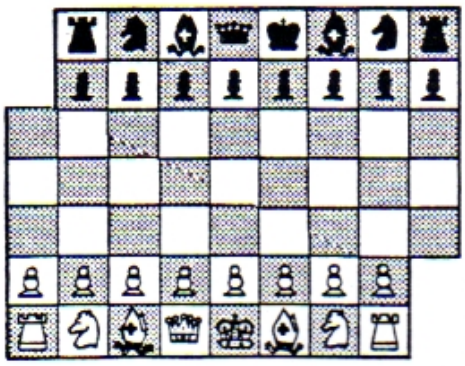
Name .....

Address.....

.....

Send this page or a copy. Please make cheques payable to: "National ZX80 Users Club" ********

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 tolerably good 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 11K, and requires a further 2K for working space. It is supplied dubbed once on each side of a new cassette. Full instructions are included within the game.



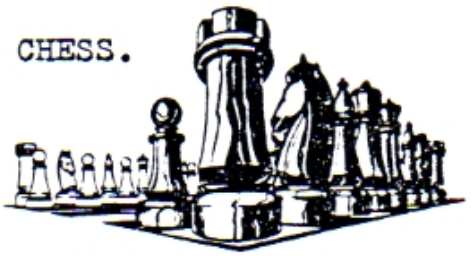
Philip Joy, 130 Rushgreen Road, ROMFORD, ESSEX

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

Name . . . . . .

Address. . . . . .

. . . . . .



GAMBLING BANDIT

If you can't afford to go to Las Vegas, then bring Las Vegas into your home with this program of STEPHEN ATKINSON. Written for the standard 1K ZX80, this game allows you to amass fortunes – but unfortunately you never get paid! Gamble your money away or enter Ø to cut your losses. This version of the game has a random hold feature. To hold a reel simply enter the number of the reel (1,2,or 3) – or if you don't want to hold then enter Ø. Three of a kind hits the jackpot, and the riches pour forth if the first two reels are the same as well. How good are you on the one-ram (or should it be arm?) bandit?

```
  5  RANDOMISE
 1Ø  DIM A(3)
 2Ø  LET K = Ø
 3Ø  LET L = Ø
 4Ø  LET M = Ø
 5Ø  LET S = Ø
 6Ø  LET R = 5ØØ
 7Ø  LET Z = R
 8Ø  PRINT " – GAMBLING BANDIT –"
 9Ø  PRINT
1ØØ  GO SUB 8ØØ
11Ø  PRINT
12Ø  PRINT
13Ø  PRINT "SPEND? (Ø TO STOP)"
135  PRINT
14Ø  INPUT V
145  IF V>R OR V<Ø THEN GO TO 14Ø
15Ø  IF V = Ø THEN GO TO 4ØØ
16Ø  LET R = R – V
165  LET Z = R
17Ø  IF A(1) = Ø THEN GO TO 23Ø
18Ø  FOR L = 1 to 3
19Ø  PRINT A(L);":";
2ØØ  NEXT L
21Ø  LET S = RND(5)
22Ø  IF S = 1 THEN GO SUB 5ØØ
23Ø  PRINT
24Ø  FOR U = 1 TO 3
25Ø  LET T = RND(5)
26Ø  IF S = 1 AND (U=K OR U=L OR U=M)
     THEN GO TO 28Ø
27Ø  LET A(U) = T
28Ø  PRINT "<"; A(U); ">";
29Ø  NEXT U
3ØØ  PRINT
32Ø  IF NOT A(1) = A(2) THEN GO TO 36Ø
33Ø  PRINT "YOU WIN £";
34Ø  IF NOT A(2) = A(3) THEN GO SUB 6ØØ
35Ø  IF A(2) = A(3) THEN GO SUB 7ØØ
36Ø  INPUT X$
37Ø  IF R = Ø THEN GO TO 4ØØ
38Ø  CLS
39Ø  GO TO 7Ø
4ØØ  CLS
41Ø  PRINT B$
415  PRINT
42Ø  IF R = Ø THEN PRINT "YOU'RE BROKE"
425  IF R = Ø THEN PRINT
43Ø  GO SUB 8ØØ
435  PRINT "LEFT"
44Ø  PRINT
45Ø  PRINT "NEXT ?"
46Ø  INPUT Y$
47Ø  IF Y$ = "N" THEN STOP
48Ø  CLS
49Ø  GO TO 6Ø
5ØØ  PRINT, "HOLD 1/2/3"
5Ø5  PRINT
51Ø  INPUT K
515  IF K = Ø THEN RETURN
52Ø  INPUT L
525  INPUT M
53Ø  RETURN
6ØØ  LET Z = V x 2
6Ø5  LET R = R + Z
61Ø  GO SUB 81Ø
62Ø  RETURN
7ØØ  LET Z = V x 1Ø
71Ø  LET R = R + Z
72Ø  GO TO SUB 81Ø
73Ø  RETURN
8ØØ  PRINT "YOUVE £";
81Ø  LET A = Z/1ØØ
82Ø  LET B = Z – A x 1ØØ
83Ø  IF B = 1Ø THEN PRINT A;".Ø";B;
84Ø  IF B = 9 THEN PRINT A;".";B;
85Ø  RETURN
```